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Computer aided instruction in nautical education

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COMPUTER AIDED INSTRUCTION IN NAUTICAL EDUCATION

by

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Cape Verde

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The contents of this paper reflect my personal views and are not necessarily endorsed by the UNIVERSITY.

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FOR THE MET(N)-90

It was my privilege and my joy

to share the course with you.

IF WE LIVED ON A PLANET WHERE NOTHING EVER CHANGED, there would be little to do. There would be nothing to figure out. There would be no impetus for science. And if we lived in an unpredictable world, where things changed in random or very complex ways, we would not be able to figure things out. Again, there would be no such thing as science. But we live in an in-between universe, where things change, but according to pattterns, rules, or as we call them, laws of nature. If I throw a stick up in the air, it always fall down. If the sun sets in the west, it always rises again the next morning in the east. And so it becomes possible to figure things out. We can do science, and with it we can improve our lives.

- Carl Sagan, COSMOS

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INTRODUCTION AND SCOPE

Centro de Formacao Nautica, CFN, is a nautical school situated at the island of S. Vicente, Mindelo. It was inaugurated in January 1984 as result of a cooperative agreement between the governments of Cape Verde and Norway. Actually, the school is run by foreign experts under IMO management until December 1991 when the project expires. As far as the national teaching staff is concerned, they work as lecturers, counterparts of the IMO experts in order to take over the school at the end of the project. Furthermore some teaching staff, former graduates from various countries are abroad. In cooperation with the referred project they acquire additional technical expertise which will allow them to fully perform all the necessary tasks of a maritime lecturer.

The students are selected depending upon the national needs, usually only a group of 20 students are admitted every two years alternatively between deck and engine departments. The radio and electronics students are enrolled every three years in a number not exceeding 15. These radio students and a great number of engineers are absorbed by the local industries.

The students come from local high schools with 11 years of formal schooling in the area of science which includes mathematics and physics.

The CFN structure is composed by three departments, deck, engine and radio having the following installation:

- The Headquarters, where we find the Administration, the Deck Department, the Engine Department, the Radio Department, the classrooms and laboratories, the library, the auditorium etc. The headquarters is

situated at a distance of 6 km from the center of the city of Mindelo and occupies an area of 5.000 m2.

- The Engine Workshop, divided into sections for electrical and oxi-acetylene welding, assembling and disassembling, instrumentation, repair of vehicles etc. These work shops are situated close to the headquarters, and actually are being remodeled. They occupy an area of about 1.000 m2.

- The Seamanship Installations, are situated closed to the sea and are composed of a small craft hangar, seamanship workshop, storerooms, and a life saving station.

- The Fire Fighting Center, which is also situated close to the sea, has been established with a view on future utilization by various entities. For this reason it's expansion is considered.

The laboratories are poorly equipped with very outdated equipment, except the stability laboratory which has fairly good equipment including a tank with two models.

Although the library has a reasonable number of books and publications, one may say that there is not enough for the number of students attending the courses.

Since the school only has few photocopy machines, in-house publication is very limited. Computers facilities are not available at all presently, the acquisition and a good management of computer facilities will help to solve a great deal of the deficiency. It is also the opinion of the author that the unavailability of computer facilities can

be regarded as an advantage, as long as the experience of other schools is considered. Another side-effect of the unavailability of computers is that prices of hardware and software are still decreasing, thus lessening the financial burden at the time of purchase.

This project attempts to state the case for computers in education in general, providing some understanding of their different parts, their importance and a review of the many ways that a nautical institution can benefit of their use. It addresses an audience of those interested in education, teachers, administrators, students and those interested in training within companies. It also could be integrated, as a first step in the broad project of purchasing and establishing of a computer laboratory, and the curriculum development within a nautical school.

The project is composed of four chapters and one appendix. In chapter I, which can be divided into two parts, the main types of computers which are available nowadays are described along with the main functional elements and the output/input devices available. In the second part of this chapter the main areas and issues related to the use of computer in a nautical school are considered.

The second chapter deals with the issue of Computer Assisted Instruction (CAI), its advantages and disadvantages and various modes that can be used in a nautical school environment, that is drill, tutorials, simulations and testing programs.

The third chapter simulates a CAI case study. Students are tested both in traditional ways and with a computer aided test and the results are analyzed.

The fourth chapter contains the conclusions of the project and states some recommendations relating to the use

of computers in education, with special emphasis to CFN.

The appendix is composed of a listing of the computer program that has been made by the author of this project.

CHAPTER I - COMPUTERS IN EDUCATION

1.1 - INTRODUCTION

Nautical Education is witnessing a major change in the way information is processed and in the way people learn, the implications of which are quite revolutionary, and similar to the invention of the printing press. At present computers are increasingly being used in all fields of education for almost all age levels and they may soon be the most dominant delivery system in education.

The main aim of this paper is to demonstrate the case for computers in CAI (Computer Assisted Instruction) and their general application in the form of microcomputers within a Nautical School environment, namely, in administration, library applications, research, curriculum planning, and computer literacy.

Despite its increasing popularity, the word computer still gives rise to different impressions and images in people's minds depending upon their expertise and level of education. While some believe that computers are powerful and intelligent devices that can do almost everything, others are fascinated and mystified by the wonder of the science fiction movies. However, most people ignore the fact that computers do not have any intelligence in the way human beings have. Computers cannot think for themselves and do exactly what they are programed to do with very high speeds.

The basic rationale for writing this paper is to show that pedagogical issues should take precedence over technical ones. However, any computer paper is incomplete without a brief discussion of the main components of a microcomputer. There is no intention of examining the

subject in detail for fear of conveying the impression that it is more important to know the vocabulary at the expense of knowing how to operate the computer.

1.2 - TYPES OF COMPUTERS

Mainframe computers, minicomputers, and microcomputers are the three main categories of computers. It is difficult and it is becoming rather meaningless to define the boundaries between them. However, it still remains important to recognize the different types of application areas of the three categories machines referred to, and to consider one or two other types.

1.2.1 - Mainframe computers

The mainframe computer is the most powerful and usually the fastest of the three types of machine. They have an extensive range of storage facilities, can support a large number of terminals. Software packages operating on mainframes can support very large databases, so that a hundred or more people may use the computer simultaneously. Usually mainframes are acquired by institutions such as universities, local authorities, large companies and research establishments in order to support a large variety of applications. Examples of mainframes computers include the IBM 370 series, the CDC 7600 series, the ICL 2900 series and the Honeywell 6000 series.

1.2.2 - **Minicomputers**

Minicomputers are generally smaller and cheaper than mainframes. Examples of minicomputers include, the PDP11, DEC10, the VAX series, the HP300 from Hewlett Packard, the Data General machines and the Prime series. They are widely used by libraries or other type of information service for their own processing, and by small or sections of larger companies.

1.2.3 - **Microcomputers**

Microcomputers emerged by the end of the 1970s with the advent of microprocessor-based computers. The first were based on processors with a word length of 8 bits. Examples are the Apple II, Commodore PET, Tandy TRS80, Research Machines Ltd 380z and the Sinclair. More recent micros are based on processors with 16 bits, and 32 bits like the Apple LISA and the IBM PC range of computers. These larger machines are able to support various database-management systems and sophisticated text-retrieval and library packages. Alternatively, they may be used as home computers.

1.2.4 - **Word processors**

Word processors deserve to be mentioned as long they are designated for inputing, editing, formatting, storing, searching and sorting of text and for delivering the final output. These features are of paramount utility in producing reports and letters etc.

Standard microcomputers, such as described above, are

widely used as word processors, and a great variety of software packages are available. The difference between a microcomputer and a word processor is that the latter is a dedicated machine which cannot be programed to support other functions. Being a dedicated machine it tends to have many of the necessary features, say a super typewriter such as a high quality printer and a well designed keyboard. It is likely that given time general purpose microcomputer take over the function of such a specialist machines.

1.2.5 - Work stations

Work stations are microcomputer systems which incorporate a powerful microcomputer with good graphics capabilities and productivity aids such as mouse and digitizer input devices etc. They are usually connected to a network, to a mainframe or to a minicomputer and they are often used for special purposes such as computer-aided design or to deliver lessons in computer based training. Powerful workstations are also used by software developers to create commercial applications for microcomputers.

1.3 - THE COMPONENTS OF A MICROCOMPUTER

As it is not necessary either for the trainer or for the trainee to know the detailed workings of a computer, this subchapter attempts to give a brief overview. The objective is to provide a sufficient understanding of working principles and terms to facilitate further study.

The cheapest computer may cost under $100 and the most expensive several million dollars. Despite this range in computer prices, the principles of almost all modern

machines are similar:

1 - The computer takes the information.
2 - The information is processed.
3 - The computer produce some kind of output

Figure 1 - The processing cycle

1.3.1 - The central processing unit

The CPU stands for Central Processing Unit and this is where the processing stage of computer operation is carried out. The CPU is consists of three main components:

1 - The control unit
2 - The ALU, arithmetic and logic unit
3 - The memory

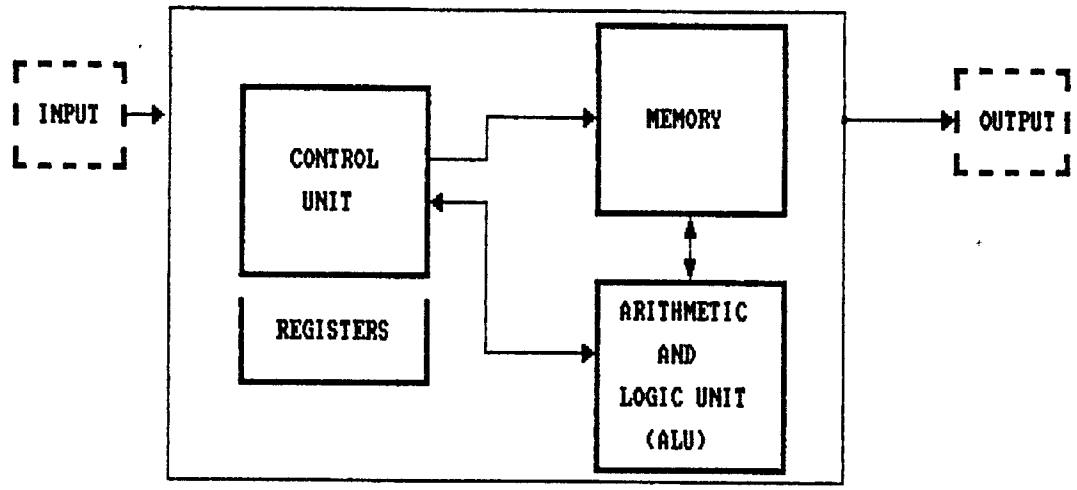


Figure 2 - The central processing unit

1.3.2 - The control unit

The function of the control unit is to coordinate all functions of the central processor by interpreting and executing instructions held in the computer memory. For example, a sequence of instructions may tell the control unit to read data form the keyboard and store them in a particular part of the memory. In case if there is any data keyed, the control would do exactly that. Another example that shows the relation between the control unit and the ALU is, for instance, a sequence of instructions that might tell the control unit to read two numbers from two memory locations, add them and eventually store the result in a third memory location.

1.3.3 - The Arithmetic and Logic Unit (ALU)

The ALU carries out logical and standard arithmetic operations such as addition, subtraction, multiplication and division. The logical operations are carried out by comparing values so that switches can be set which cause the execution of a certain program to follow different sequences, depending upon the results of the referred comparisons.

1.3.4 - The computer memory

The computer memory is composed of a huge number of locations that can hold a piece of information each and have a unique address so that the information can be accessed directly, like for example a character (A, b, c, d, etc), a number (0, 1, etc) or part of a program.

The memory of modern computers is often termed **RAM** and **ROM**. RAM stands for **Random Access Memory** and retains all stored information while the computer is switched on, but when the power is switched off the information is lost and the memory must be loaded again. The RAM has the following characteristics:

- Data may move directly from any RAM address to the CPU (this is called reading from memory).

- Data may move directly from the CPU to any RAM address (this is called writing to memory).

- When the power is turned off all data held in RAM is lost (the information in RAM is thus

called volatile).

ROM stands for **Read Only Memory** and holds for instance, the monitor program. It is a set of instructions that allow the user to execute the keyboard commands to load data and address, to examine contents of memory and registers, and to execute a complete program. The ROM has the following characteristics:

- Data may be read from ROM into the CPU.
- Data may not be written from CPU to ROM.
- Data in ROM is fixed, not volatile (When power of the computer is turned off, the information is not lost).

1.4 - INPUT / OUTPUT DEVICES

This section deals with the communication devices which are currently used in any kind of computer based training. The great majority of people interact with the computer via a keyboard, usually similar to a typewriter one, a display terminal and also a printer.

1.4.1 - Keyboards

The keyboard is by far the most popular means for the user to input data into a computer. It has some disadvantages,

because many students may lack keyboard skills. This factor bears consideration for all those engaged in computer based instruction design.

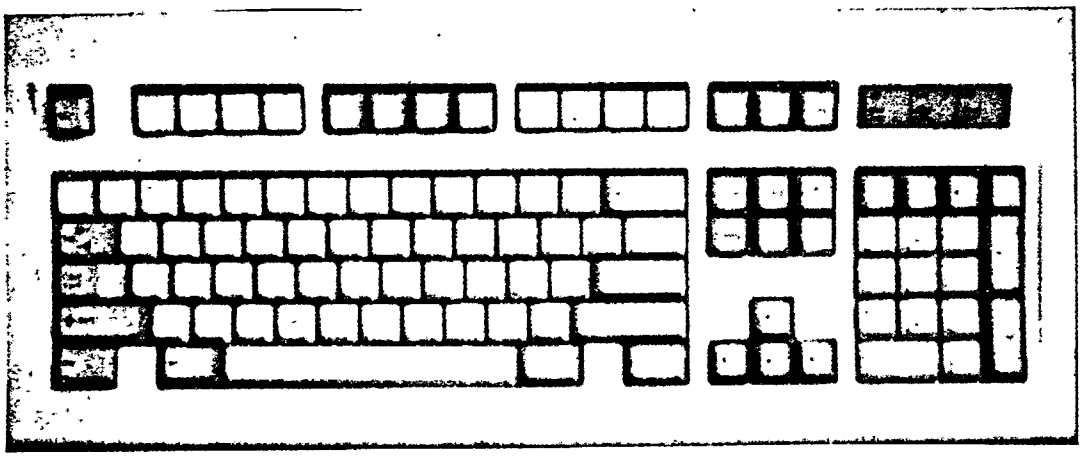


Figure 3 - A standard computer keyboard

Figure 3 shows a common keyboard layout. Although the layouts are somehow different, the main functions are as follows:

The **numeric keypad** in a ten key calculator key format which is located on the right side of the keyboards. This arrangement allows the rapid input of numeric data. The numeric key pad is activated pressing the Num Lock key.

The **cursor control keys** or the **arrow keys** determine where data is displayed on the screen. The cursor is a symbol like an underline character, which indicates where on the screen the next character will be entered. While on some keyboards the cursor control keys are included as part of the numeric keypad, other keyboards have a second set of arrow keys located between the typewriter keys and the numeric keypad.

The **function keys** are keys which may be programed to perform specific tasks, for example, the function key F1 might be used as a help key. Whenever that key is pressed,

messages are displayed giving instructions to help the user.

The other keys on the keyboard - **PgUp**, **PgDn**, **Home**, and **End** - have several uses depending upon the software. Some programs make no use of these keys. The Shift keys have several functions. They allow the input of capital letters and the symbol on the upper portion of any key on the keyboard. The **Escape (Esc) key** also has many different uses. In some kind of microcomputer software it is used to cancel an instruction. As with the escape key, all typewriter keys may be assigned special functions the microcomputer software allowing the computer to be used in many different applications.

1.4.2 - Display terminal

In some respects the screen is similar to an ordinary television set. A cathode ray tube displays a given set of information by horizontally scanning one line a a time. The data stored in a RAM, provides a 1 and 0 pattern to the scanning beam. While a 1 intensifies the beam producing a bright spot, a 0 leaves the spot dark. The number of lines scanned depends on the number of character lines to be displayed and on the number of dots which represents a character. The horizontal sweep moves the beam to the edge of the screen, then quickly retraces as a response to the horizontal synchronization signal. The vertical sweep shifts the beam down one line, and the horizontal sweep traces the next line. When the beam reaches the bottom of the screen, the vertical sweep retraces to the top, responding to the vertical synchronization signal, and the process repeats. The above discussion concerns only monochrome displays. Although there are some similarities,

the bit interpretation in the case of color displays is different because of the number of colors that can be assigned for each pixel. Whereas modern screens are able to display up to 80 characters per line and up to 25 lines or more at one time, televisions are capable of displaying only 40 characters per line because beyond that the definition is likely to suffer. Television sets sold for attachment to microcomputers are just capable of displaying 80 characters per line.

Screens are sold for attachment to terminal and computer networks and directly to microcomputers. They are capable to present 24 or 25 lines of 80 characters per line in upper or lower case in a very readable form and some may display up to 132 characters per line.

Most screens are made using similar technology to that used for televisions. However, it is possible to get liquid crystal and plasma displays for flat screen use. They are compact and have a stable flicker free display, although they are still rather expensive they are most likely to become the standard in the future.

1.4.3 - Printers

One of the best features of computers is the storage and transmission of data. However, most people still want to see information in printed form and for this reason it will continue to be necessary to print out in the information stored in the microcomputer.

Printers can be attached to all microcomputers and there are many types currently available, namely, **Daisy Wheel, Dot Matrix, Ink Jet** and **Laser printers.**

Daisy wheel printers have a series of petals radiating from a hub and each petal is embossed with a character.

The output is similar to that of any good typewriter, and differents wheels may be used for different characters, fonts, etc.

Dot matrix printers have a grid of pins which are pushed against the ribbon in response to the CPU signals. The pins create the shape of the letters which are defined in terms of the number of pins that compose the matrix, usually 7x7 or 9x7. The more pins there are, the better is the image.

Ink jet printers are now sold for microcomputers systems which print with an extremely high quality at great speed up to 150 characters per second. In some instance they work more like a photocopy machine printing one page at a time. Also, they have very few moving parts which make them reliable.

Laser printers work by means of a laser beam controlled by the computer spot which charges a drum that transfers the characters to paper. Laser printers are very fast, printing at a speed of two seconds per page and with a very high quality which make them very suitable to work on a network in a shared basis, or in publishing. As the prices are dropping, some may be even cheaper than matrix printers, laser printers can be even used as a dedicated machine with a personal computer.

Most printers today are capable of printing graphics and more are becoming available with the option of printing in colors. Another common features of modern printers is the capability of screen dump which allow users to obtain a print out of a screen on the printer which may be of great importance during the development and testing of a course.

Printers are the slowest element in a microcomputer system. While the fastest printer may be capable of printing 180 characters per seconds, the CPU is operating in nanoseconds for each operation. This is to say that the

microcomputer may have completed a specific task in a few seconds, but the operator has to wait until all results are printed out. In the case of any computer based training, there are three main situations where the use of printers may be of great importance:

- The student may want a copy of some of the material to take home, like for example the results of a test.

- The instructor may need to print the test results and test statistics.

- The programmers may want a printed copy of the teaching material in order to enhance or simply to modify it.

1.4.4 - Digitizers

Digitizers allows users to turn a series of points on a map or diagram into digital coordinates, which is a good method of reducing the time to create pictures on the screen. The quality of the picture depends, not only, on the original, but also on the resolution that the digitizer supports.

The pictures produced with a digitizer may be edited using a special software package in order to improve it and or to add colors. The use of digitizers is increasing rapidly and it is also possible to attach them to certain printers. Today it is also possible to purchase video digitizers that can, for example photograph a person or an object and digitize it in colors.

1.4.5 - Plotters

A plotter is a device used to draw pictures, diagrams, plot graphs, histograms, etc on paper or acetate under control of the computer. The techniques used for plotting vary with the size of the plot and accuracy required. A plotter usually consists of a flat bed upon which the paper rests and a mechanism to move a pen in the X and Y directions simultaneously. The pen may be changed under software control and several colors may be available. Plotters can be very useful in computer based training. Radar Simulation training is one application where the exercises may be plotted for subsequent discussion and debriefing.

1.4.6 - Digital Pads, Graphics Tablets, Touch Sensitive Screens, Mouse and Light Pens

As has been discussed, keyboards are not a very satisfactory means of data input for the general user, because the layout of the typewriter type keyboard appears rather strange to the neophyte. For this reasons many alternatives are today available in the market.

The digital pad consist of a board on which diagrams, charts, etc can be placed. The pad is build in such a way that the user can press his finger on to the pad and the position of the point pressed is fed back to the computer. This is a rather cheap and crude device. The number of points that can be pointed is quite small. However, for training young and unskilled students it may be of great value.

The graphic tablet adopts the same principle of feeding back a point's position to the computer. But in this case, rather than a finger the user uses a pointer to

indicate the point selected. For instance, if a chart is placed on the graphic tablet and a student is asked to identify a specific point, he would have to move the pointer to the point in the chart which he thought to be the correct one. To transmit the coordinates of the chosen point to the computer he would have to press the pointer on the surface of the tablet. The graphic tablet may be of great interest to computer assisted training. Today large tablets are used in computer aided design, cartography and civil engineering.

Touch sensitive screens are quite similar to digital pads in the way the user selects the points. Two different techniques are used by the computer in order to recognize the point. First, by shining a grid of lights horizontally and vertically across the screen, close to the screen surface. The finger then breaks some of the light beams. Second, by pressing a flexible cover on the screen. In both cases the coordinates of the point indicated are fed back to the computer. This is also a very crude method of data input, but it may be quit good in some kind of training.

The light pen it is also similar to the graphic tablet, except that the signal is directed to the screen. It is a device with a shape similar to a normal pen with a fine beam of light shining from the end and connected to the microcomputer by a cable. When it is pressed on the screen, the coordinates of the point is fed back to the computer.

A mouse is a means of communicating with the computer without a keyboard and consists of a small device attached to a computer and whose movement over a flat surface is reflected by the movement of the cursor on the screen.
The mouse operates by detecting the movements of a ball that rolls across the referred surface.

The mouse is becoming the standard pointer device on

microcomputer due to its simplicity and it is commonly used for developing pictures and diagrams. It can also be used for development purposes and training where it functions are similar to the light pen or a touch sensitive screen.

1.5 - BACKING STORAGE

So far we have discussed the central processing unit of a computer and mentioned some current input and output devices such as keyboards, screens printers etc. This section deals with the problem of magnetic data storage. As has been discussed computer memory is composed of millions of bytes, instructions are carried out quite rapidly. However, computer memory is still very expensive and volatile. For this reason information stored in the main memory must be saved in a permanent way and for less cost.

1.5.1 - The Disk Drives

The magnetic disk may be considered as the secondary memory of a computer and in some instances it is quite similar to an audio record player. The information is stored in circular manner serially along a track and is accessed by rotating the disk. But, while the audio recorder rotates at speeds about 33 1/3 rpm, the digital disk rotates at a speed of about 3600 rpm. Whereas the former stores analogue information in a continuous spiraling track and interfaces with an amplifier, the latter stores digital signals in a concentric track by magnetizing the disk surface and interfaces with a computer.

The operating principle of a digital disk is easy to

understand. A magnetic head is located over a track of the rotating disk and a current in the head coil is switched on in accordance with a given bit pattern. This causes a reversal current to be set in the head. The flux links with the disk coating and leaves corresponding magnetized spots. The read operation uses the same head. While the head passes over the magnetic spots and links with the head coating, current is induced in the coil. The signal is then amplified and decoded into a corresponding bit pattern.

1.5.2 - The Diskettes

Diskette or floppy disk is another type of data storage which is extensively used in microcomputer systems. It is a very cheap device that have a capacity of 360,000 to over one million bytes on a single floppy disk.

The storage principle is similar to that for disk storage described above except that the data are stored on a flexible plastic disk coated with magnetic film. The diskettes are permanently encased in a jacket which holds it fairly stiff for protection against physical damage and dirt. A slot in the case allows head access for reading and writing. The diskette rotates inside the jacket when it is inserted in the diskette drive. When the door is closed the read and write head is pressed against the diskette and moves back and forth across the tracks on the diskette. This system is rather slow at finding data but can still access them in less then one second. The diskettes are today manufactured in two standard sizes, 51/4 inch and 31/2 inch, being the plastic envelope for 31/2 inch diskettes more robust.

1.5.3 - Magnetic tape

Magnetic tapes are reels of polyester film, coated with a magnetic coating. The technique of data storage is again similar to the previous ones, that is, information is stored a byte at a time according to a bit pattern across the tape. However, there is a great difference between magnetic tape and disk storage. With the former, reading and writing can only be done sequentially, which means that accessing data at the end of a magnetic tape is only possible by winding through the tape until the end making the process very slow. Conversely, with disks, the head can move straight to the track that is requested even though it is near to the further address on the disk.

However, magnetic tapes can still be of great value as information can be accessed sequentially. They are very useful for providing backup storage of data from disk, as magnetic tapes are cheap and do not occupy much space.

They are mostly found on mainframe and minicomputers. However, a similar device is becoming today widely used on microcomputers for backing purposes which is the tape cartridge.

1.5.4 - Compact disks and Digital optical disks

The compact disk (CD) was initially designed to provide high fidelity sound in the home, using special digital recording technique. Ever since its introduction, the CD became quite popular.

The use of this special recording technique was used after modification in the hardware in order to store computer data, and hence the use of the compact disk as a mass storage. This version is called a **CD-ROM** which stands

for compact disk read only memory.

Digital optical disks are a new category of disks which have been especially developed for use as mass storage for computers and they comprise three categories:

- OROM, Optical Read Only Memory.
- WOOD, Write Once Optical Disks.
- Erasable disks (re-writable)

Digital optical disk drives are available in the market from a large number of suppliers and are already being used for a number of applications. However, the prices of these drives are still fairly high, although they are falling.

The potential uses of the optical disk are numerous, due to the significant advantages in the method of storage and retrieval of information on microcomputers, namely:

- The ability to mass produce some forms of optical disks.
- The significant increase in storage capacities over magnetic disks.
- The disk is protected against wear.
- Storage of text, video and sound on the same disk can be used for teaching purposes.

To sum up, the optical disk may have a profound impact on propagation of information, by allowing a wide number of optical publications to be produced.

1.6 - COMPUTERS IN NAUTICAL SCHOOLS

This section focuses on the issues of the various uses of computers within a Nautical School, particularly their

location, their use in administration, curriculum planning, library application computer literacy and computer science and programming.

1.6.1 - The location of the computers

The first thing to be considered in respect to computers in any school is where to place them. Their location can be either fixed as in a computer lab, or movable with both possibilities having advantages and disadvantages. A computer may be mounted in a cart which makes it possible to carry it from one place to another. This possibility makes it easy to respond to different needs. For example machines can be moved into a classroom as are needed. Thus, several computers must be kept on carts for circulation to classrooms for demonstrations, simulations or simply for group problem solving. The use of a single computer connected to a large screen or even connected to a special display is an extremely effective computer teaching method.

However, such easy mobility demands good scheduling and involves keeping track of where the machines are.

Fixed machines can occupy a variety of locations. The establishment of a computer lab is the best option. Research suggests that a certain number of machines should kept in only one place. Such a lab must contain a number of about 15 to 30 computer, in order to accommodate a class of students. Putting computers in only one class is better then assigning one or two machines to each classroom. It makes them more accessible to everyone in the school and provide the flexibility to use computers in a variety of ways. However, the establishment of a computer lab must be done carefully considering the following important points:

1.6.1.1 - The location

The location is an important issue. The lab must be in a separate room, and not a part of a normal teaching classroom where it would be limited to those times when the room was not in use. It must be located in an area independent or neutral from the various departments so that teachers and students do not take the computers as the domain of a specific department. A good location is close to the library as long this area is accepted as one which serves every aspects of the school. Furthermore it is the logical location for software collection.

1.6.1.2 - The layout

The layout is most of the time dependent upon the nature of the room, except in the case of a new school. Thus the layout must be a compromise between what is desirable and the ideal, bearing in mind the possible applications. Usually there are two popular configurations, with computers in rows facing the front of a room or arranged around the periphery. The latter arrangement, provides a better traffic flow around the class. Teachers can easily circulate around the room to monitor student progress and provide feedback to the students on their work. This configuration allows all wires to be placed in the wall and tables can be placed in the central areas so that students can move away from the computer. A major disadvantage of this arrangement is that students must turn around to face the teacher during his lecturing.

Placing computers in a more traditional classroom type in rows facing the front room has the obvious advantages

for instruction, since student are facing the teacher, the overhead screen, the board or any display device. However, traffic flow, supervising the student's work does cause serious difficulties.

1.6.1.3 - The wiring

The wiring of the lab must be adequate in order to allow further expansion. A lab must be wired in such a way that the teacher can monitor machines from master switches. Networking is also preferable because such a system has various advantages, like for example, the instructor can have the output of his computer to appear on each screen in the lab or to monitor each computer to observe individual students. Such a system also allows software to be stored in a hard disk drive and loaded from that drive into individual computers.

1.6.2 - The staffing

This is again an important issue to be considered in planning a computer lab. The duty of scheduling, supervising, providing assistance to the entire staff and students must be assigned in preference to a teacher. The teacher also must be responsible for software and hardware maintenance. The teacher must be someone with experience in working with computers and above all must have a strong interest in working with students and working with other teachers.

Full time staffing is strongly recommended for the following reasons:

1. Teachers who have little or no experience with computers will feel more comfortable in coming to the lab with their classes or simply in sending small groups of students to work on home work assignments.

2. Someone is available to assist the teacher in subjects, like word processing or any type of software that requires an intensive guidance as each student encounters different difficulties.

3. The reliability of both hardware and software must be must be ensured. Someone is always available for small troubleshooting and repair.

1.7 - THE USE OF MICROCOMPUTERS IN ADMINISTRATION

As any school or university, nautical schools have the same needs in the areas of accounting and financial services. The use of computers in these areas has a great deal to do in the way administrative issues associated with running a school are changing. The budgeting records, the ordering and receiving of materials, the accounting and inventories, the payrolls etc. are kept on disk files which are easily accessed when needed. Today most of these administrative functions are computerized either by a time share network system, by a local area network or simply by means of stand-alone microcomputers.

The use of some computer software already referred to, like word processors databases or spread sheets can be of paramount importance to the administration.

A carefully designed database may be a powerful tool for the school administration. Several kinds of important

information may be included, namely student's address, health records, marks, daily attendance records, etc. Care must be taken about the security of data, possibly at different levels.

The use of spreadsheets can be of great help as a decision making tool helping the administrator to manipulate data in order to make predictions of future budgets in functions of expected changes in, for instance teachers salaries. Sophisticated spread sheets like LOTUS have the capability of generating graphs based upon data recorded which can be of paramount importance to the administrator helping him to understand a large number of changes or simply in order to give a presentation when required.

Another important application is the use of word processors. Word processing can greatly simplify and enhance most typing tasks, like letters to parents which can be customized and stored and retrieved for modifications. Many memos to the staff may, as well, be stored and brought for easy reproduction. Handouts which may be frequently changed can be stored on disk for easy access and further changes. This last application is becoming increasingly popular in a most sophisticated way which is so called desktop publishing. This kind of software allows the school to create a near professional publication in the school with the use of a laser printer.

To sum up, the use of microcomputers together with integrated software packages like Microsoft Works, LOTUS and DBASE have an important roll to play in any nautical school in order to facilitate the administrations tasks.

1.8 - THE USE OF COMPUTERS IN LIBRARIES

As stated before, computers are particularly good in performing routine and repetitive tasks and record keeping. Such tasks are common in any library and do consume a great amount of librarian's time which can easily be saved by recourse to computers. The time saved can be spent in a more profitable way working with students and teachers. By computerizing the libraries, the speed and efficiency with which students and teachers can access materials is greatly increased.

1.8.1 - The card catalogue

The card catalogue is today an anachronistic technology for classifying books that unfortunately is still in use in most libraries. It has the following disadvantages:

- A great number of hours is spent by library staff in preparing the card catalogue which most people simply do not like to use.
- Some times one is almost placed to guess the most appropriate subject title that is researched. One may even reach a dead lock if cross reference is not available.

The computerization of the card catalogue greatly increases the speed with which information can be reached. Boolean searching techniques are used in card cataloguing. Supposing that a student was searching for information in Orbital Motions, he needed only to type, for instance, the word ORBITAL into a computerized catalog. The result was that he would find all library materials which had the word

ORBITAL as a subject title or heading. Other searching materials also allow one to expand or limit a search in a number of options. A printer connected to the computer would allow the printing of all information. This technique allows librarians to generate very quickly very specific bibliographies for users. This system may also provide all information about the bibliography in question, such as, the status of each item, whether it is already borrowed or not. In the first case it would give the due date.

1.8.2 - **The automated circulation system**

This system of book catalog is quite similar to that used in any ordinary super market. The system consists of labeling each book with a bar code which is unique for each library, usually fixed to a card and stored at the library circulation desk. Books are checked out by means of a light pen connected to the library computer. This system has several advantages:

- The staff do not have to fill cards after they have been checked once. This procedure save a great deal of time.
- Overdue notices may be produced automatically and can be send to each student. Students with overdue books may be prevented of borrowing any one until their situation is normalized. The record of students who are leaving the school can easily checked whether they have any library material.
- Inventory of libraries is a procedure which is often neglected because it is a time consuming task. Inventory of the library may be easily done by means of using a portable device to scan the shelves.

Thus, the computer can generate a list of missing items providing by this way a good accuracy of the inventory.

The use of the computer in the library may be of paramount importance, in several library areas even though the library is not equipped with automated circulation or card catalogue systems:

- The area of cataloging and preparing library items, for example, by means of using special software that can process the information input by the librarian.

- Word processor and data bases again have many applications in this area. Word processor can be used in its normal use, that is to produce memos, letters, lists etc. Data bases can be used to maintain track of the equipment, inventories and in non-computerized libraries it can even save a lot of time with the overdue notices.

Moreover, as computer technology is growing at a great speed, many new applications are foreseen today. With the networking via satellite many libraries in different parts of one country or even in different countries can be linked together which allow the searching of material in several libraries and requested. This new applications, of computer technology may enlarge a great deal the horizon of the developing countries libraries.

1.8.3 - Reference services via computer based technology

In section 1.5.3 the optical disk was introduced. With this new technology it is possible to store up to 2 gigabytes of information in a single disk. This makes the storage, retrieval and manipulation of a great quantity of information in digital form possible.

Since its introduction, a growing number of data bases are being available on optical disks and some software are already available for microcomputer use. This may put large data bases at the disposal of ordinary users that can be manipulated by a personal computer.

The searching process with a CD-ROM is similar to searching with either a small data base system on magnetic disk with a microcomputer or searching to an online data base on a network.

There are many advantages in using a CD-ROM. Paul Burton and Howard Petrie state the following over online access to remotely located data bases (1) and over printed material (2):

(1) - Predictable costs compared with paying online connected time charges;
- No pressure to search due to time;
- Increasing the number of searches reduces the cost per search;
- Inexperienced users of online services are more likely to use them;

(2) - CD-ROM takes less space;
- is faster to use;
- Multiple copies can be distributed to users at a particular location as they are not expensive to make.

Nevertheless, it advantages the use of CD-ROM still has some problems most of them stemming from the commercial side and from some yet unknown factors like its predicted shelf life (about 10 years).

In summing up, the CD-ROM is likely to have a great impact on the dissemination of information that some authors say is revolutionary. The combination of its features, storage of text, sound and images may provide opportunities for a new way of presenting information. Richard De Genaro indicates the following: - serials, encyclopedias, reference works, operations manuals, texts for students and abstracts. It is also his opinion that CD-ROM users will increase, provided optical disks are produced at a right price and both hardware and software are standardized.

1.9 - COMPUTER LITERACY AND AWARENESS

Computer literacy is a term used to mean the minimum knowledge or familiarity about computers in order to enable one to work well. The term computer awareness is similar, however it is used to designate a lower level of knowledge about computer. Almost all students who use computers today will use a computer not only during their studies, but perhaps during their lifetime or at least they will be affected by them.

As computer science is a dynamic issue and computers are increasing rapidly in number, computer literacy should be future oriented, based upon predictions of how computers are going to be used in the ordinary life. Hence, any curriculum must encourage continuous ability of learning, how to take benefits of sources of informations available,

tendencies and trends where computers are likely to be used in future should be stressed.

This section proposes a brief overview of the areas which computers literacy is likely to cover in the context of nautical students.

1.9.1 - Knowledge about computers

Knowledge about computers means the general and basic knowledge about the operation of a system. This is to say that students must be aware of the different components of a computer and how they work. These skills are listed below and can be taught at the beginning of the first year as students are required to use the computer to achieve various instructional aims:

Basic operations:
- to turn the computer on/off
- to load a program
- to take care of the hardware and software
- to use the keyboard
- to use the peripherals devices (printers, etc.)
- to work with application programs.

1.9.2 - Knowledge about software applications

Knowledge of applications consists of how to use applications programs in order to perform specific tasks. The most common applications have already been described- databases, spreadsheets and word processors. As examples of other applications, one may include the use of graphics devices, light pen or mouse which are commonly used in the

ordinary life. The areas where they can be introduced to the student are:

Knowledge of computer applications

- to learn how to use word processors. This can be taught in the languages classes.

- to learn the basic uses of databases and spreadsheets. The areas where they can be taught are Economics, Social Sciences, Calculus (Nauticals, Stability, Naval Architecture).

- Computer Assisted Instruction. (Chapter II)

- Robotics/Circuits Analysis. Can be taught in Physics and Electronics classes.

- CAD (Computer Assisted Design). Can be taught in Drawing, Naval Archictecture or in any other subject were the student is required.

- programming

1.9.3 - **Awareness of social issues consequences of the impact of computers**

The last but not least component of computer literacy is a comprehensive understanding of the ethical use of computers. The main goal of this issue is to promote not only the protection of the author rights but also the ensuring of individual privacy. The obvious areas for discussing this issue is within the Social Science classes. But this is not to say that every teacher and instructor

shouldn't introduce these topic of discussion in their own classes too.

CHAPTER II - COMPUTER AIDED INSTRUCTION

2.1 - INTRODUCTION

As computer science abounds in acronyms, it should first be stated that within this project, CAI, Computer Aided Instruction or Computer Assisted Instruction, will refer to any computer application used as an aid to the training process.

CAI applications are designed for a wide variety of subjects and for all kind of students. This is one of the educational field where the computers capabilities are being rigorously explored. It has rapid programmable capabilities and combinations of graphics, sound and touch sensitive screen. In general it provides a great number of output and input devices which are extremely seductive features for both students and teachers.

CAI is one of the oldest applications of computers in education. The first CAI programs were provided through large mainframes and networks operated and controlled from a central location. One example of such a system is PLATO (Programed Logic for Automatic Teaching Operation). This is a CAI project initiated by the University of Illinois and Standford University for elementary reading and mathematics skills, through a time-shared instructional system. The system is managed of a large computer provides many terminals where students study on an individual basis. The terminals are connected to the main computer on which all lessons are provided and student data is stored. All programs are executed on the main computer and the communications between terminals is carried out by

telephone. More than 600 students are allowed to use the terminals at the same time and the system also allows authors to develop instructional materials at the same time that students are studying.

Until recently, the use of mainframes or at least minicomputers was absolutely necessary to run CAI for even an elementary school. However, the increasing memory and processing power of microcomputers has reduced the overall cost of CAI and induced many software houses to develop CAI packages.

Despite the introduction of microcomputers, CAI programs remain almost the same, that is, information is presented on screens and students are asked to give a response to a question which is evaluated. If the response is correct, the student moves to another frame; if incorrect, similar problems are given until a correct response is made.

The traditional method of a teacher standing in front of a class, presenting information, guiding or helping the student in his first interaction with a certain subject, the subsequent practice in order to gain fluency, speed and improvement of performance, and finally the assessment of the learning process, may be transferred quite successfully to computer based courseware. However, this not to say that any computer course should always carry on all stages of the model described above. Depending upon the type of computer aided course, it may use any combination of those phases, which may take form of Tutorials, Drill-Practice, Simulations and Tests.

Tutorials are programs used in a wide variety of areas and their main feature is that they present information by guiding the student through the new subject but without any engagement in practice or in the assessment of training.

Tutorials are quite suitable for learning rules and principles.

Generally, drill-practice programs ask questions and provide feedback in order to help students to perform quickly and fluently with no errors. A simple example of a drill practice program is one in which the learner is provided with two numbers and is asked to perform an elementary operation like addition. For example, if the answer is incorrect, the computer provides the correct one and asks another question. In this case the computer is used to facilitate the strengthening of an already learned subject. However, drill-practice programs are often criticized. People argue that drill tasks can be done as well without computers.

Simulation is perhaps one of the teaching techniques where the advantages of using computers are better demonstrated. It differs from the previous CAI programs in that students learn the subject by performing the activities to be learned in a simplified environment which is similar to the real world, and in that the learning process is also transferred to the reality. In simulation programs the learner is actually a participant of the all learning situations, which makes the motivation factor be greater than in the previous CAI program types.

Testing is one of the most important aspects of any instruction model. It may take form of a simple quiz done by an instructor at the end of a module or it may be so important that it can even change one's career.

The main goal of a test within a school environment is to determine the level of student performance and the areas in which the performance is the required. Moreover, testing is still the main element in rank ordering, in indicating priorities for student employment, and issuing

diplomas and certificates.

Computer testing may be used for several reasons:

- To automate and standardize the marking of tests.
- To speed up the availability of the results.
- To make possible the establishment of a data base of student progress, individually or within a group.
- To increase motivation during the testing procedure, by making it in the form of a computer game.

One way of using computers in testing is as an aid to construct the tests, that is, the instructor uses the capabilities of the computer to generate the tests, to print and score test results by means of special purpose software packages or even by using a simple word processor and databases.

Another way of using computers in testing is by administering tests directly through the computer terminal. Both ways have advantages and disadvantages which will be dealt within more detail in the next sections.

2.1.1 - Advantages of CAI

Nowadays, computers are quite a fashionable subject in our society and as such have a high positive motivational value which should not be overlooked. Although they are not viewed in a favorable way by many people, they are particularly exciting for most young students. It is commonly accepted that one of the determining factors in learning is the amount of time spent working on a particular subject. So in this context any mechanism that motivates and keeps students on the task is desirable.

Students usually arrive at school with different backgrounds and abilities. The time required for learning differs from student to student. The individualized nature of CAI means that students with a high level of initial knowledge can complete a specific course faster than others with less knowledge or those with a slower pace. However, all students should eventually complete the course satisfactorily as long they are able to do so. This is again highly motivating for the students because those who are capable become productive sooner. Students with less knowledge, who eventually could feel inhibited in class, may retrieve and repeat the lessons as they wish.

Teachers use drawings and graphics of many types in their presentations in the classroom. In view of the fact that computers can provide a wide range of interactive visual information, graphics can be produced any time and in any mathematics or other science lesson.

The course content is presented consistently, while a lecturer, for example, may be absent or may emphasize topics with which he is more familiar or like better.

The expert in a certain subject may not be good a lecturer and so may not be suitable to teach which can be extremely demotivating for students. The development of CAI may bring together the subject experts and trainers as a team.

Although the initial development cost of a CAI module is high, the amount of time spent by the instructor in a course which is developed to replace a classroom based one may be very low because the CAI part of the course eliminates instructor preparation time, which may be higher in case if a new instructor is taking a course. Furthermore, students travel costs may be reduced as well as those of instructors if they are no longer required to

run courses in different parts of the country.

CAI courses can be updated very rapidly in comparison with printed materials, like graphics and texts which may be very time-consuming to modify.

The ability of a computer to monitor and record statistics on the performance of individual or collective students, including the time spent on particular topics, may lead to considerable time saving in the calculation and recording the students results. Moreover, this record of student performance through a course gives the trainers a means of re-evaluating and improving the course itself and also helps in the assessment of the effectiveness of the course.

As prices of microcomputers are dropping, we can assume that in a near future every home will have a computer. Home based training can work with either a micro computer or with a terminal that can be connected to a telephone network. So in either case it may be ideal for students in a refresher level course to do part of the work at home.

2.1.2 - Disadvantages of CAI

The major disadvantage of CAI is the lack of good material available on the market now. The user of a personal computer still has great difficulty in finding good educational material that can be used extensively.

The drop in hardware prices has not been followed by an equivalent drop in software prices, which contributes to the lack of material available on the market.

The number of teachers with adequate knowledge of how to use computers in learning is still very small and the

number with skills to develop a CAI program is even smaller. Hence the computer tends to be misused or not used at all. Then the advantages such as individualization are not realized, and the computer tends to be used more like an automatic page turner.

The cost of CAI may be regarded as one of its main disadvantages. This is, of course, a very subjective matter because it depends on the financial capability of the institution and how much they want to invest.

It is still very difficult to assess the benefits of using CAI in comparison with the traditional methods. There has been very little research in this field and most of the results are contradictory.

2.2 - SEVERAL EXAMPLES OF CAI

Bearing in mind the skills that a nautical officer is supposed to acquire during the time at school in order to satisfy the minimum requirements of the International Maritime Organization stated in the International Convention on Standards of Training, Certification and Watchkeeping (STCW-78) and also taking into account the short courses published by the same organization, it follows that CAI may have a wide range of applications in almost every field of nautical education:

- Astronomical and Electronic Navigation.
- Naval Architecture and Stability
- Shiphandling
- Cargohandling (dangerous goods)
- Management
- English Language and Communication

There are many ways whereby the introduction of CAI, in its various forms, into nautical education may enhance the skills outlined above by functioning as a tool to complement classroom lessons. This can be done either in the form of student homework or as a demonstration in the classroom.

The use of the Simulation mode of CAI brings the issue of using computer simulation such as radar or shiphandling simulators instead of specialist simulators which are valuable equipment but may lie beyond the financial capabilities of most nautical schools.

2.2.1 - Tutorials

As it has been stated earlier, the traditional aim of tutorials is to present information without any engagement in practice and without the assessment of learning. However, as Stephen M. Alessi and Stanley R. Trollip present in the book Computer Based Instruction, a good tutorial should include not only presentation and guidance but also extended practice and assessment. The figure below from the same book shows the flow and the structure of a tutorial.

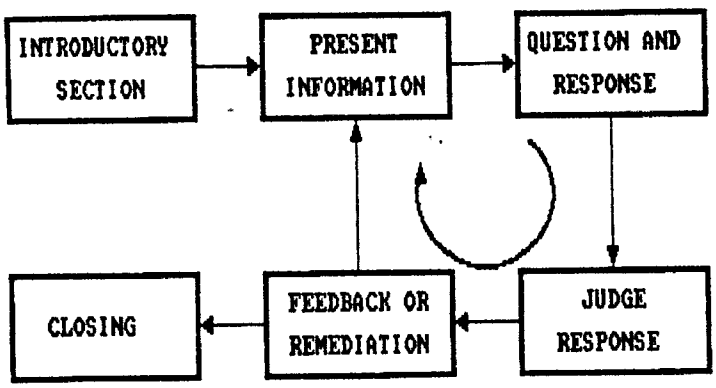


Figure 4 - The general structure of a tutorial

As we can see, in the picture some steps which represent relevant aspects of tutorials are grouped:

1 - Introduction: informs the student about the purpose and nature of the lesson.
2 - Presentation of information: presents and elaborates the information.
3 - Question and responses: asks question that the student must answer.
4 - Judging responses: the program evaluates the response in order to assess student comprehension.
5 - Feedback or remediation about response: the program gives feedback to improve comprehension and future performance.
6 - Sequencing and ending of lessons: the cycle continues until the lesson is terminated by the student or by the program itself.

EXAMPLE OF A TUTORIAL

- The program named **Simluz** which will be described is a computer program developed by the author of this project, using the high level language BASIC, and based upon the "International Regulations for Preventing Collision at Sea 1972 (Amendement 1983).

The program is designed in two parts: the first, named **TUTORIAL**, which will be described in this section, and the second a **Multiple - Choice Test**.

Some screens of the program will be shown, taking into account the relevant factors that a tutorial must have:

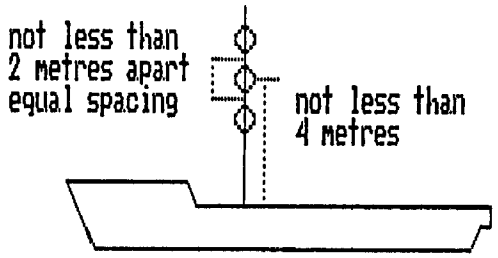
- The use of menus
- The page title
- Presentation of objectives
- Presentation of information
- Directions

The title page

- In order to attract student attention and to give a general idea of the lesson all tutorials begin with a title page. The title is important because the first screen seen by every student has to create a receptive attitude and give the student the idea that the lesson is going to be interesting. However, it is a mistake to have overly elaborate title screens that may clutter the screen and make the objectives look dull.

TUTORIAL: RULE-3, RULE-21, RULE-22, ANNEX I

SPACING OF LIGHTS CARRIED IN A VERTICAL LINE



Where lenght is 20 metres or more

Press '+' to go on '-' to go back 'Esc' to main Menu

Figure 5 - A page with a title

Presentation of objectives

- After the title, usually a phrase that states the objectives of the lessons is displayed on the screen in order to indicate to the student what he will be able to do at the end of the lesson. The following is an example of objectives:

After this tutorial you will be able to identify a vessel:

- by its lights displayed during the night:
- by its sound signals

However, it is argued that objectives has the following disadvantages:

- they may focus student attention on only what is stated in the objectives.
- they are hard for students to read at the beginning of the lesson.
- they may be difficult to write for some subjects.

Stephen M. Alessi & Stanley B. Trollip argue that presenting objectives enhances learning and satisfaction in some instances but it is necessary to omit them in other cases, especially when the students are very young and cannot comprehend them. They also recommend that a tutorial should have a concise statement of objectives with the exception of young students.

Directions

- Directions are information about how to move forward or backward in the lesson. They also should include how to

answer questions, how to resume in case of error, how to end the lesson and how to escape from a certain section. Furthermore, as with objectives, directions should be concise and accurate. Most of the time they include the use of the function keys.

Presentation of information

- This is a critical factor which determines the quality of a lesson. Following are some hints on how test and graphics should be presented:

  - The first and more important rule is to avoid in any instance to cluttering the screen.

  - Text normally should be presented from the top left of the screen and should accumulate downwards.

  - When the amount of text is too large, the best way to handle the problem is to display one paragraph at a time with a prompt between them. However, the program should never display one paragraph with a timed pause and then clear the screen because this tends to create confusion.

  - graphics can be used in two ways: to display pictures and diagrams or to enhance a text display by drawing boxes and borders. Graphics are used in simple diagram presentation (for example, organigrams and other types of simple drawings). The use of more complicated graphs is becoming more common and the quality is very high on the IBM PS/2 family of computers which are

equipped with the VGA (Video Graphic Adaptor).

Basically, there are two ways of producing graphics for display on the screen:

(1) To draw a picture with specialized graphics package, for example Microsoft Paintbrush. It is also possible to use a digitizer to convert a diagram into a picture on the screen.

(2) The picture may be drawn during the coding process by using commands like draw, line, circle, paint,etc.

2.2.2 - Drill practice

As stated earlier in this chapter, tutorials are programs used to perform the first two steps of an instructional methodology, i.e. the presentation and the guidance of the student through the material. Computer based drill is used mainly to do the third part, that is, the practising.

Computer based drill is commonly seen as the least important mode of CAI and receives a lot of criticism. Some instructors claim that drills may be done as well with books or with a teacher and so the power of the computer is not used at all.

Another criticism is that drills do not teach but only practice with the assumption that the student is already familiar to some extent with the subject. For this reason, drills must always be preceded by some other means of instructional methodology in order to present and guide the

student until he is able to carry on with the process of practising and performing quickly and well.

Although many people thing that the areas of application of drills are very limited generally speaking, I belive that for nautical education drills might have broad applications, namely in English Language applications, in communications (Morse Code) and in lights signaling.

EXAMPLE OF A DRILL

- To illustrate the mechanism of a drill we commonly use the algorithm for producing an arithmetic basic operation. A simple flowchart for producing an addition drill is illustrated in the figure--.

Introduction

- The program explains the objectives of the exercise and presents a certain number of worked examples.

Practice

- The computer presents randomly problems, for example "3 + 7 = ?". The student then should answer the question presented. In case of error the computer will present the correct answer and then repeat the cycle with a new problem. If the answer is correct the program will confirm the response. If a certain number of questions are answered correctly then the program will end up the exercise. This cycle will be repeated as often as it is necessary in order to reach the level of performance desired.

End of exercise

- The program should present to the student the number of problems attempted, the number of problems correctly

answered, congratulate and exit.

A more elaborated type of drill can be done in one the nautical areas referred to above, namely a Morse Code drill practice program.

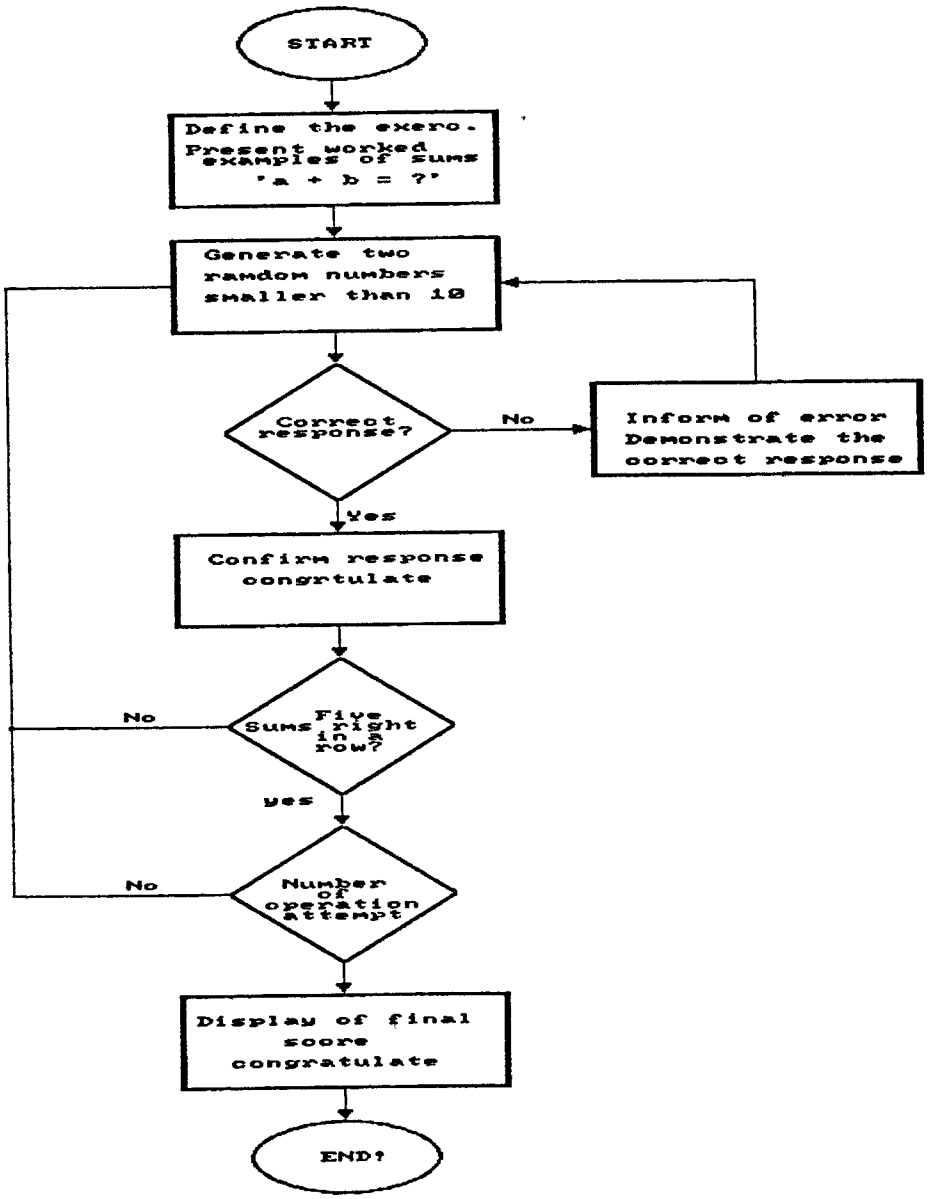


Figure 6- Flowchart illustration of the addition drill.

The program could start with a small pre-test in order to determine the level of speed that the material should be presented. Then the computer could generate random messages which would be displayed on the screen. The student then has to receive those messages, feed them into the computer. The answer would be then evaluated. Depending on the level of student performance, the computer could either increase the speed or send more complex messages.

Another example of a drill that clearly shows the advantages of producing programs in-house by the instructors or by the students is the second part of the program SIMLUZ. By using simple BASIC commands and statements, like for example, CIRCLE, LINE, PAINT, PSET, PRESET AND DRAW, models are displayed on the screen and sound signals can be heard.

2.2.3 - SIMULATION

As far as education is concerned, a simulation is a technique that teaches about some aspect of the universe by imitating or replicating it in a realistic way. In a simulation the student learns by performing the activities to be learned in a context that is similar to the real world, making it quite motivating to the student.

Computer simulation has been classified in many differents ways. Although it is not within the scope of this project, it is convenient to describe the different types of computer simulation in education.

Process simulation, in which the student selects values of various parameters of a situation at the

beginning of the simulation and then watches the process occur without further intervention. This type of simulation, for example, is used by economists for forecasting. A typical characteristic of process simulation is that the process is slowed or accelerated and so the rate at which the process occurs in real life is changed. This enhances the learning process.

Physical simulation, in which a physical object is displayed on the screen so that the student can learn about how to manipulate it in a simplified environment. Typical example in nautical education is a radar simulator which displays information on the screen that gives the student the opportunity to use it or learn about it.

Procedural simulation, in which the student learns the correct sequence that constitutes a procedure or diagnosis. Common examples are programs that teach how to operate a calculator or a telephone. Another popular example of procedural simulation is a medical diagnosis simulation, where the student is presented with a case which may consist of diagnosing a patient's problem and prescribing appropriate treatment. There are other examples of simulations involving the diagnosis of electronic or mechanical faults of various apparatus.

The main characteristic of procedural simulation is that whenever the student acts, the program reacts, providing feedback about the effects that the student's actions would have in a real situation.

Situational simulations, which deal with the attitudes and behavior of organisms in different situations. This kind of simulation allows the student to explore the

effects of different approaches to a situation, or to play different roles in it. An of a example of situational simulation is POLUT, a program which deals with aspects of water pollution and its effects on living organisms.

Simulation is probably, the most popular and fastest growing CAI mode due to the following reasons:

- Simulations are used only as a complement to the normal teaching activities. Using computers on a temporary basis does not disrupt traditional practices and, above all, does not threaten the jobs of any traditional teacher. However, some authors argue that simulation does threaten jobs because of the shortening of the lecturers time (Singh).

- Despite ample applications for this mode in almost any educational context, most computer simulations are in the field of science, where people are more receptive to new technology.

- Simulation is a mode which effectively utilizes the rapid calculating and data processing facilities of the computer.

- Computer simulation is in some instances the only way of developing certain types of learning experiments in a classroom which would not be possible otherwise.

However, for nautical education I will suggest another way of classifying computer simulations according to their contribution to the nautical sciences:

- students strengthening their understanding of formulas and concepts;
- students replicating the steps of an experiment or accident that otherwise could not be done, and comparing with other resources like, for instance specially built simulators or any other traditional teaching method.

Examples of simulation will be given in various nautical fields using the following tools:

1 - Commercially software package.
2 - Simulations performed by means of using a high level language.
3 - Simulation performed by means of using a specialized simulation language.

SIMULATION POSSIBILITY 1:

Commercially software package

Simulations, like the other CAI modes, are usually written using high level languages, mainly BASIC, FORTRAN, Pascal and more recently C and even the so-called Authoring languages. However, nowadays a great deal of software packages is already available on the market. Despite this, a lack of good software in the nautical field still exists.

The use of this type of software may become of paramount importance in various nautical fields like Radar and ARPA courses, especially for schools with limited financial resources. Taking in account the prices of the

specialists simulators, which may cost millions of dollars,

simulation in a simpler mode may be done by means of micro-computers using the programs referred. In this case the establishment of a computer laboratory should seriously be considered. The advantages of a computer lab within a school are obvious: we have then a very flexible tool that can be used in various fields, from data storage and processing, to word processing and the most complicated calculations.

Despite the above-mentioned lack of software in nautical fields there are, however, some packages which deserve credit such as the ones described below:

- **SISRADAR** is a Radar simulator program from Videotel which is approved by several national maritime departments. It is particularly useful for general radar training and is considered excellent for skills and drills training. The system also provides full ARPA facilities as laid down by IMO.

- **POSEIDON NAVIGATION SIMULATOR** is also a computer based simulator with the computer representing a ship that can be steered either manually or by means of autopilot. Time, course, speed and log readings are displayed on the screen at all times.

The program is intended for use in lower courses in navigation, up to and including a second mate's certificate.

SIMULATION POSSIBILITY 2:

Simulation by means of using a general purpose high level computer language.

This section and the following provide a broad view of simulation languages discussion, their advantages and disadvantages and how to chose a language for a particular subject.

One may often have to make a choice between either a general or a special purpose simulation language. High level languages such as **FORTRAN, COBOL, BASIC, PASCAL** and **C** may be used to program almost everything. However, this may not be always practical. The following list gives some reasons for their use:

- The programer can select the format of the output.

- They give a great deal of flexibility to the programmer in terms of mathematics and in terms of the type of experiment that can be performed.

- The programmer is already skilled in the use of one or more general purpose languages.

- In the case of BASIC, which is the most popular computer language for personal computers, it is worth a few more words. BASIC can be learned in a very short time and it has the advantage of an interpreter, which means that it executes the instructions as soon they are recognized. Therefore, it does offers the advantage that one can stop the program in the middle while a

program is being developed. Moreover, new vertions of BASIC are coming in compiled form. Compiled programs which are given to the students are esier to use and more difficult to damage.

The use of high level languages may be of paramount importance within a classroom environment, not only for simulations, but also to facilitate the understanding of formulas and concepts which would otherwise be very difficult.

SIMULATION POSSIBILITY 3:

Special Purpose Simulation Languages

Besides the general purpose languages, there are also problem oriented languages which are similar to some extent to the former languages in that a certain algorithm must be developed in order to describe a model of a system. They have some obvious advantages which are summarized as follows:

- Reduced programming time and effort.

- They are usually flowchart-oriented languages, which means that they use special symbols that simplify the modeling and, of course, the coding.

- The programmer can introduce delays into the

system or alter the clock as he wishes.

- The readability, initialization, debugging facilities and model structure features are very sophisticated.

However, there are some potential disadvantages of special purpose simulation languages which are described here:

- In most cases the language has to be purchased and licensed.

- The language may not be already known by the student or by the instructors and has to be learned, which leads frequently to the use of a general purpose language instead.

- The language may not be suitable for all models.

-The modeling process may be difficult, because the level of abstraction required is very high, which may not be good for junior students.

Some popular simulation languages are:

GPSS, which is an acronym for General Purpose System Simulation, a problem - oriented language. It is considered one of the most popular simulation languages. GPSS is easy to learn and to use. It views the system as consisting of blocks and transactions and so the modeled

system is described in a flow chart. A GPSS program then can be easily coded from the block diagram.

This language has been used mainly in industrial systems (braking systems for vehicles), transportation (city ambulance services), complex computer systems, space missions, airport luggage handling systems, etc.

TUTSIM, is a simulation language, that shows the behavior of linear or non-linear dynamic system by means of graphics. The program solves a certain number of equations, either static or dynamic, the latter being differential equations. For the former equations, it is easy to show, for example, the solutions of all kinds of trigonometric functions. In this case, the advantage of this program over any other high level language, where the programer has to take care of everything, is obvious.

TUTSIM is a powerful simulation tool developed for education and research. The program is composed of a number of function blocks - namely, logical, integration, delay, noise, trigonometric blocks etc. - which allow simulation of a wide variety of scientific fields.

In order to calculate models, TUTSIM needs a set of four different types of data:

1. Model **STRUCTURE**. Defines the model and tells what block functions have been used and their respective interconnections.
2. Model **PARAMETERS**. Defines the actual values in a model and are entered during model entry or during parameter change.
3. **PLOTBLOCS and RANGES**. Defines what results of

which block are displayed on the screen. The first PLOTBLOCK is called the X output, because with graphical output of the results this is the block output displayed along the X axis. In addition four Y outputs may be defined.

4. **TIMING**. Specifies the calculation step size and the final value of the independent variable, usually the simulation time. It is defined during a model entry or timing change. An example of a TUTSIM simulation is the best illustration of the usefulness of such a program.

EXAMPLE OF TUTSIM Simulation (Shiphandling)

- The example that is going to be described here is the turning circle of a Nomoto ship. The following figures are the block diagram and the output of the simulation on the screen:

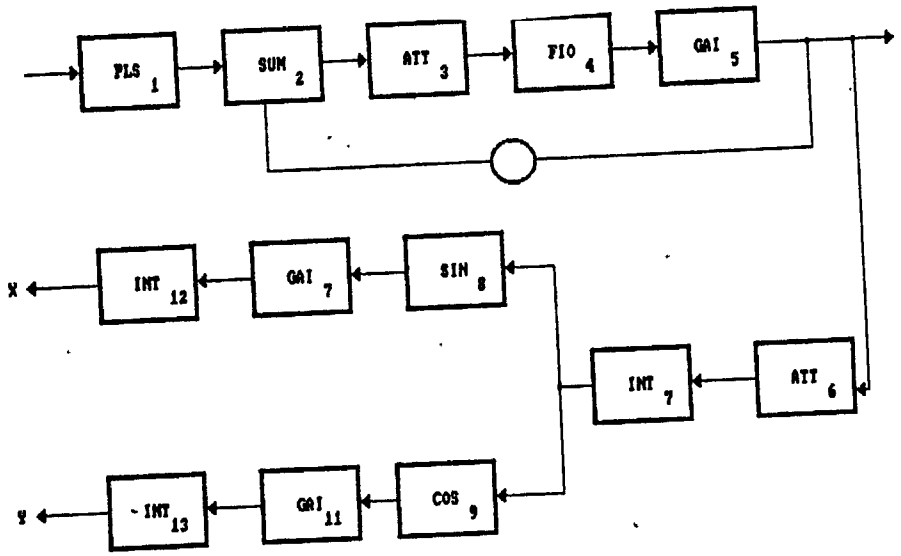


Figure 7 - Tutsim block diagram

```
Model File: tutsim
Date:     10 /     19 /  1990
Time:      2 :     25
Timing:    0.5000000  ,DELTA  ; 350.0000      ,RANGE
PlotBlocks and Scales:
Format:
     BlockNo,  Plot-MINimum,  Plot-MAXimum;  Comment
Horz:     12 ,-100.0000     , 600.0000     ;
  Y1:     13 ,-300.0000     , 600.0000     ;
  Y2:      3 ,    0.0000    ,   1.0000     ;
  Y3:        ,              ,              ;
  Y4:        ,              ,              ;
```

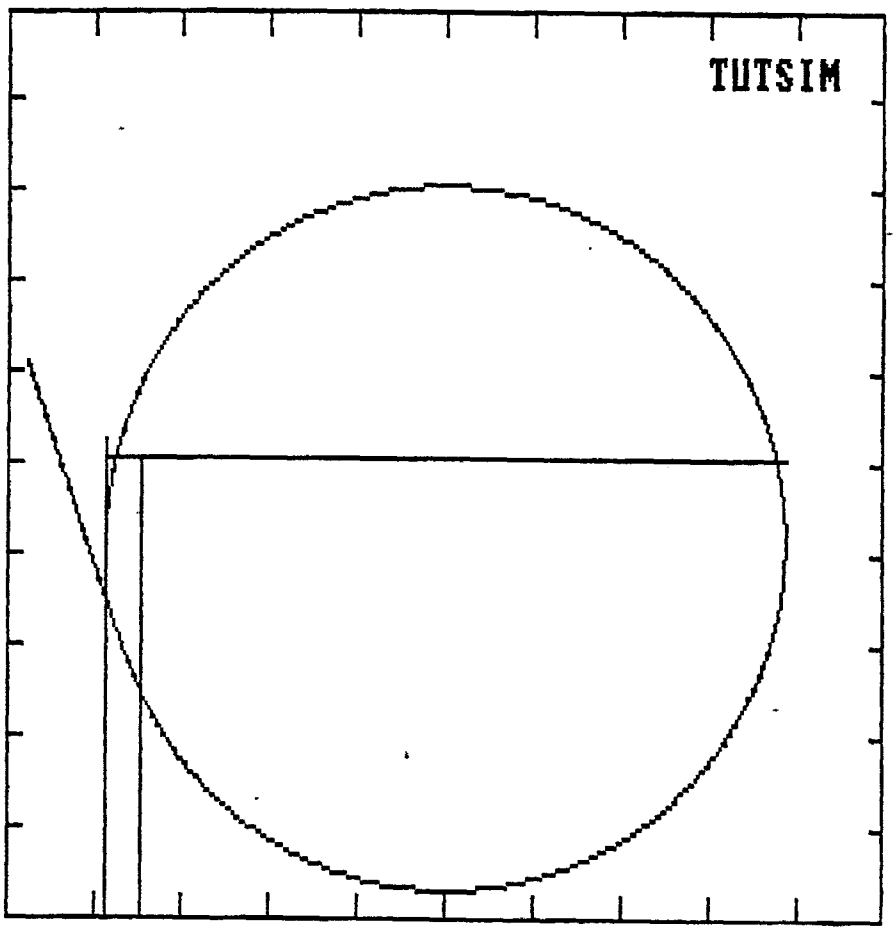


Figure 8 -TUTSIM simulation of a turning circle of a ship.

There are other languages such as SIMULA, SIMSCRIPT, SLAM, LISP, PROLOG, etc. The last two languages are used for artificial intelligence applications and often to create expert systems that involve the simulation of human decision making.

2.2.4 - Testing

With the advent of computers and following their introduction to the educational process, computers are increasingly being used to construct tests and to administer them to students directly by using a terminal or a microcomputer.

Actually, computer assisted testing has the advantages of automated application and marking: the tests are corrected by reference to a standard set of responses avoiding the boredom of marking and thus speeding significantly the availability of the results. Furthermore, this kind of testing brings a great deal of interest and motivation into the process if it is constructed like a computer based game.

Administration of tests by computer.

The students enter directly the responses to questions that are displayed on the screen, which means that the entire process is automated. In this case, the computer assumes a great deal of the instructor's role. However, the human factor will always be present in deciding the amount of material, the content and the conducting of the test.

Test administration by computer has the following advantages:

- The testing can be individualized, which allows the student to take the test when he is ready for it rather than at a fixed time.

- Each student's response, whether correct or not, can be stored in a data base which can be used in

order to improve the questions in a certain subject. This can be of paramount importance not only for the instructor but also to the institution.

- An other area where computer testing can benefit the assessment process, is in creating tests that could not exist without the computer, as for example in simulations. Alessi gives an example of student pilot who could be tested in a simulation of the cockpit before flying a real airplane. For the same reason, students could be trained on a radar computer simulation in order to learn the procedures of radar operation and plotting. He also recommends considering ways of using simulations in the testing process in order to develop ways of establishing their reliability and validity in comparison to traditional tests.

The current disadvantages may be summarized as follows:

- One disadvantage arises from the fact that the types of questions that can be asked are restricted to the multiple choice and short answer format. This is due to the fact that questions which require an extended response are difficult to assess by computer.

- The administration of a test to a large number of students may raise problems, such as not having enough computers or terminals.

Construction of tests by computer

There are many ways of using computers to help in test construction. One way that has been used for many years is that once the questions are written, they are stored in data bases which can be retrieved whenever tests are needed. Usually, the instructor selects the questions to be used in a particular test and then they are printed, duplicated and distributed to the students. Another way of selecting the questions is by chosing the questions randomly for each student before printing. In this way each student answers the same questions, but printed out in a different sequence. Another way of constructing tests is to select questions from a large pool in order to give a different test to each student.

A second role of computer assistance in test construction is to generate questions exactly as they will appear on the screen together with the help features and a procedure for providing the details of the questions.

Alessi gives the following summary of main features of a computer based test:

BEFORE THE TEST:

Give clear directions.
Give the purpose of the test.
Give the constraints.
Give an opportunity to practice.
Let the student decide when to start the test.
Have safety barriers and nets in place.

DURING THE TEST:

Keep each question in one display.
Keep question format consistent.
Provide easy access to the questions.
Provide capability to mark questions for review.
Provide capability to browse through the questions. Do not penalize format errors.
Provide restart capability.
Let the student know how much time remains. Have safety barriers and nets in place.

AFTER THE TEST:

Give the results immediately.
Give detailed feedback.
Provide an option for printed results.
State how to leave the testing system.
Provide a way for the student to make comments.
Store all necessary data.
Prevent unauthorized access to results and data.
Have safety barriers and nets in place.

EXAMPLES OF A TEST

- The program that is going to be described, is the **EXAMINER Testing System**, which is a powerful computer based system that can be used either to create or to administer tests. Its main objective is to provide institutions with means of implementing tests to be taken on paper or directly through the computer without having to make use of programming expertise.

The EXAMINER has 3 parts which are shown in the following figure:

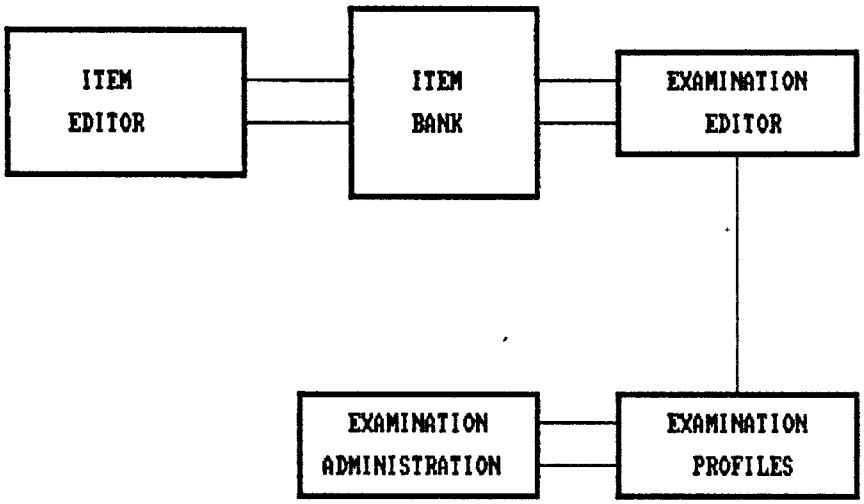


Figure 9 - The Examiner

- The Item Editor contain up to 99,000 items that can be classified in up to 6 levels of hierarchical structure. The system can handle parallel items which can be assigned a predefined difficulty level and a weight for scoring purpose. Furthermore, a variety of item statistics are calculated from data generated by examinations.

- The examiner supports various types of tests: multiple-choice, multiple-correct, open-ended numeric, open-ended alphanumeric, and a unique type called dual.

- The Examination Editor allows the user to define and produce examinations following these steps:

First, a description of an examination is stored in a profile which includes the number of items to be presented in an examination, the pass mark, time limit (if any), the order of presentation of items, whether multiple-choice questions are to be ramdomized, the difficulty of the

examination, and whether students are to be given their results immediately.

Second, the profiles also contain directions for selecting the items to appear in an examination. Each examination can contain specific items for all students, items drawn randomly from a specific subset of database, or both simultaneously. Moreover, profiles of examinations are stored within the system for repeated or later use. At any time an authorized instructor can select a profile and an examination from it.

- The administration system is the feature that allows students to take examinations directly via the computer. All features of traditional examinations are present, including browsing, skipping items, changing answers to items, and answering items in any order. At the end of the examination, scoring takes place and item statistics are automatically updated.

The EXAMINER has a wide range of application from simple classroom quizzes to national level certification examinations. The London Stock Exchange uses the Examiner throughout Great Britain to certify its brokers, while in the Netherlands, universities and a great number of banks use it. This entails sending examinations on floppy disks to many locations in the country.

The Examiner or any program of this kind could be of paramount importance in seafarers' certification in accordance with the STCW in various matters, from the safety of life at sea to radar and ARPA certification.

A simpler mode of computer testing which offers some advantages of in-house programing and the development of some kinds of software by the instructors, is the second part of the program SIMLUZ.

CHAPTER III - TUTORIALS AND TEST RESULTS

3.1 - INTRODUCTION

This section discusses methods of evaluation or assessment of CAI tests compared with traditional types tests. The objective of this tutorial is to provide the author with some kind of statistical information regarding the two methods afore mentioned. The necessity of collecting data from the results achieved by the students and the ways of treating such data are discussed. The difficulties of comparing two different methods of training are most of the time very extensive. For this purpose a case study was simulated. The simulation consisted in the following:

1. A short tutorial (15 minutes) followed by a test (5 minutes). Both tutorial and test are made in the traditional way, that is, by using blackboard, paper and overhead projector.

2. A computer assisted tutorial (15 minutes) followed by a computer test (5 minutes).

The subject taught in the simulation was ship lights and for further discussion the traditional test and the computer assisted test will be referred to as **METHOD I** and **METHOD II**, respectively.

3.2 - SIMULATION TEST DESCRIPTION

3.2.1 - Objectives and organization

The purpose of this simulation was to approach the issue of interpreting test scores achieved by two groups of students on two different types of test. For this purpose two groups of students were formed, **Group - A** and **Group - B**, and two methods were established **Method - I** and **Method - II**. Furthermore, the subject taught was divided into two parts in such a way that they were switched between the groups and the methods. In other words, the subject delivered to Group-A and tested with Method -I (traditional test), was the same subject delivered to Group -B and tested with Method-II (computer test) and vice versa. For a better understanding the procedure is summarized in the following table:

	Method-I	Method-II
Group-A	Subject 1	Subject 2
Group-B	Subject 2	Subject 1

3.2.2 - Composition of groups and objective of tutorial

The students that participated in the test simulation, both Group - I and Group - II, were WMU students without a nautical background, namely in economy, law, administration and engineering. In order to illustrate the composition of the groups following table is shown:

Number of students - 18
Age - 35 years in average
Duration - 20 minutes
Initial stage of the students - they had no advance knowledge in the subject taught in the simulation.
Subject - ship's lights.
Objective of the tutorial - to identify the type of ship and the side which is presented.

3.2.1 - **Method - I**

This method consisted of a tutorial of 15 minutes followed by a test of 15 minutes. The tutorial was delivered by means of transparencies obtained from hard copies of the computer program. The test had twelve questions and consisted of multiple choice items with three options. Again, the pictures for the test was obtained from the computer test. The idea was to make both tutorials as similar to each other as possible. One page of the test is presented in the appendix.

3.2.2 - **Method - II**

This method consisted of a computer assisted tutorial of 15 minutes followed by a computer test. Both the test and the tutorial were developed by the author of this project using the high level language BASIC. The tutorial consisted of four models of ship lights which were presented by 12 screens representing the three main views (Ahead, Portside, Strarboard) called from a menu. The test consisted of 12 multiple choice questions, each question having 3 options. A screen representing the models of ship lights and the

questions is presented in the appendix.

3.3 - ANALYSIS OF THE TEST RESULTS

One popular approach to test interpretation is norm referencing. With this method the score of an individual is compared to the performance of others, usually by means of comparing the individual's performance with that of some well-defined group, which is called **the norm group**. Due to the conditions under which this test was carried out, the small number of participants, and to the unavailibility of statistics generated from any other norm group, the analysis of the score will be limited to the results obtained.

3.3.1 - Frequency distribution

A simple way for describing a set of test scores is by the use of a **frequency distribution**, which is only a listing of the possible score values and the number of persons who achieved each score. Such a common sense technique presents the scores in a simpler and more understandable manner than by merely listing all the individual scores. Let us consider the two specific sets of scores obtained by the two groups with both methods:

Group - A (SCORES)

Student	Method - I	Method - II
S1	100	75
S2	92	83
S3	100	58
S4	83	67
S5	83	42
S6	92	33
S7	100	83
S8	42	50
S9	92	67

Group - B (SCORES)

Student	Method - I	Method - II
S1	58	42
S2	58	92
S3	75	92
S4	100	67
S5	83	75
S6	100	100
S7	100	83
S8	50	75
S9	100	100

It is easier to analyze the scores if they are arranged in a simple grouped frequency distribution. The frequency distribution is given in the next table for the two set of tests(Method - I and Method -II).

GROUPED FREQUENCY DISTRIBUTION (GROUP - A)

Score Interval	Frequency(Method-I)	Frequency(Method-II)
100-90	6	0
89-70	2	3
69-50	0	4
49-30	1	2

GROUPED FREQUENCY DISTRIBUTION (GROUP - B)

Score Interval	Frequency(Method-I)	Frequency(Method-II)
100-90	4	4
89-70	1	2
69-50	3	1
49-30	0	1

Conclusion

The conclusion that one may draw from frequency distribution is not so important regarding the comparison of methods. However, this strategy simplifies the subsequent description of data by giving a quick idea of how the scores are distributed for each test. In other words, frequency distribution is helpful for indicating the shape of a distribution of scores.

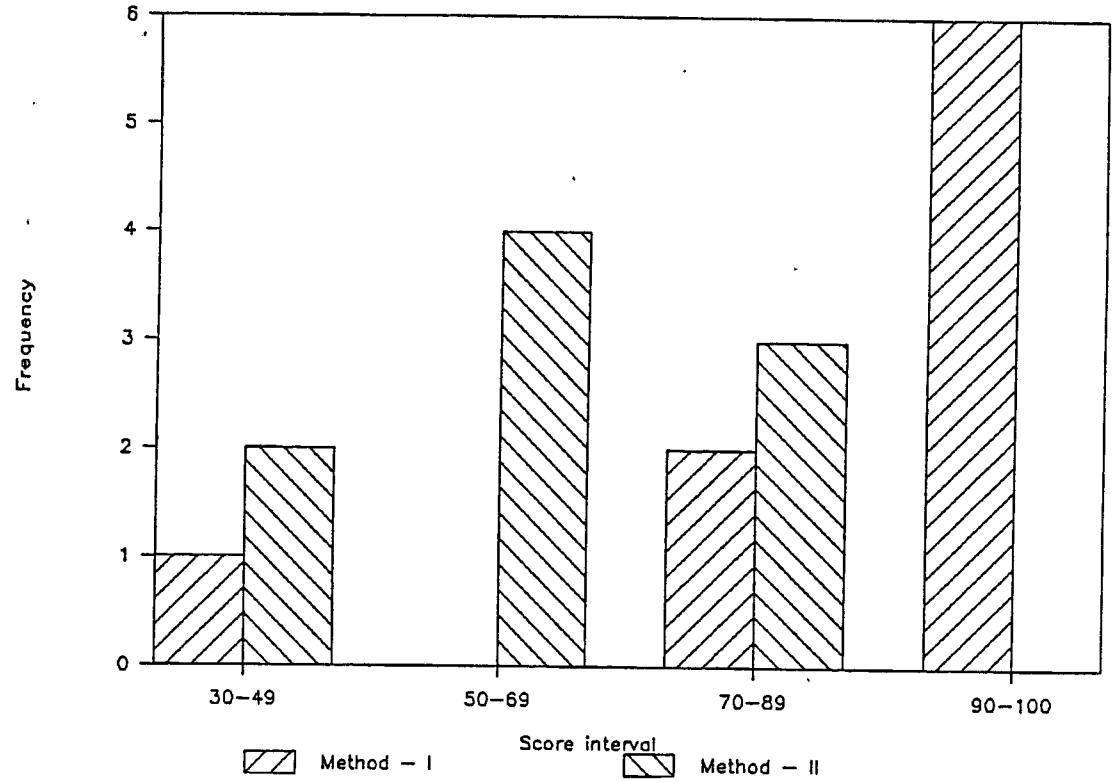


Figure 10 - The grouped frequency (group - A)

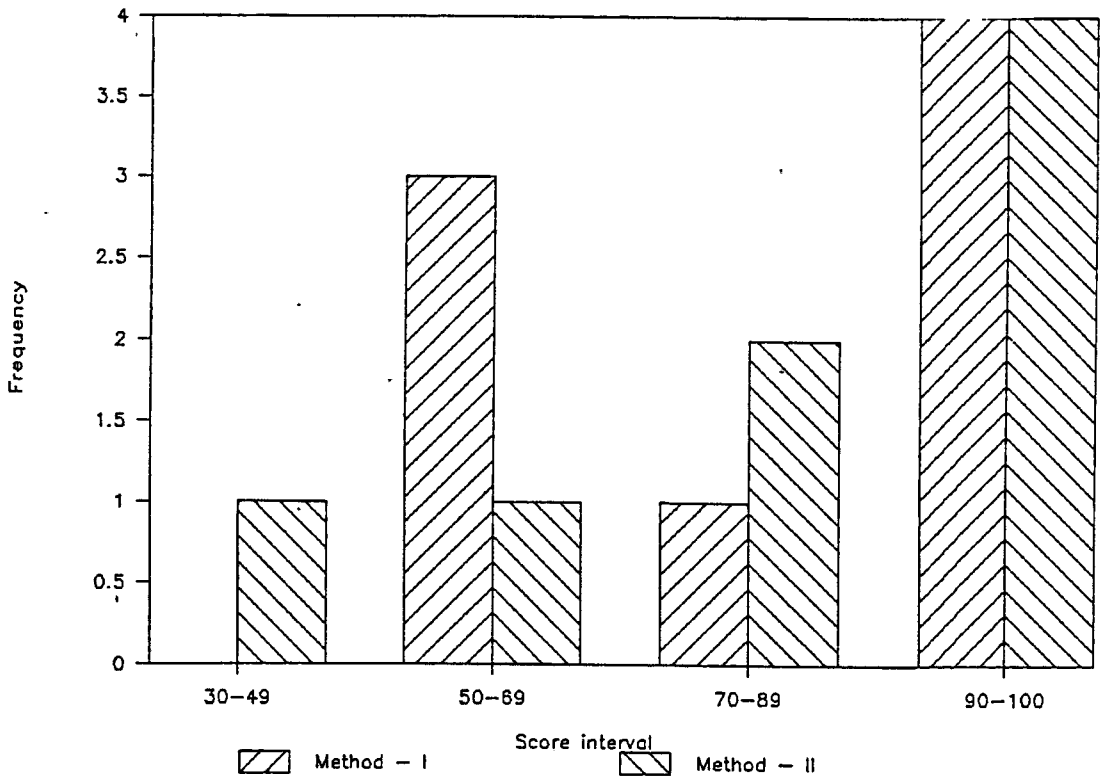


Figure 11 - The grouped frequency (Group - B)

3.3.2 - The central tendency

As we saw, the frequency distribution does not provide enough information apart from the shape of the distribution. Thus, we need to establish not only a scale of measurement but also how the scores are dispersed in the distribution. So first we calculate the **central tendency** and second, the **dispersion.**

3.3.2.1 - The mean

The mean is the most commonly used measure of central tendency because it is easy to calculate and understand. Furthermore it is based on all of the scores in the set and for this reason it gives a summary of much of the information. The mean of a set of scores is nothing else than the arithmetic mean. It is found by adding the scores and dividing the result by the number of scores. The following table gives a summary of all means calculated for the group of tests:

	METHOD-I	METHOD-II	AVERAGE
GROUP-A	87.1	62.0	74.6
GROUP-B	80.4	80.7	80.6
AVERAGE	83.8	71.3	

Conclusion

By analyzing the averages present in the table, one may come to the following conclusions:

1 - The average of GROUP-B is higher then the average of GROUP-A.
2 - The average with METHOD-I is higher then the average with METHOD-II.

3.3.3 - The dispersion

As we saw, measures of central tendency are quite useful for summarizing average performance, but they do not provide any information regarding the distribution of the scores around the average. Two sets of scores may have the same average (Method-I for Group-A and Method-II for Group-B) but they might differ in other ways.

3.3.3.1 - The range

The range is the difference between the highest and the lowest score in a certain set of test scores. The limitation of the information provided by the range comes from the fact that only the two most extreme scores are used in the computation.

3.3.3.2 - The Variance and Standard Deviation

Measures of dispersion that takes in account every score in the distribution are the **variance** and the **standard deviation.**

3.3.3.3 - The variance

The variance measures the dispersion of a set of test score in the distribution about the mean. That is, the variance is the average squared difference between the scores and the mean.

3.3.3.4 - The Standard Deviation

The standard deviation also indicates how the score is spread about the mean, however in this case it is expressed in the same units as the original score. The standard deviation is nothing else than the square root of the variance. The next table shows the variance and the standard deviation's for the sets of test scores.

GROUP-A Computation of Variance and Standard Deviation

Student	Method-I	Deviation from mean	Method-II	Deviation from mean
S1	100	12.9	75	13.0
S2	92	4.9	83	21.0
S3	100	12.9	58	-4.0
S4	83	-4.1	67	5.0
S5	83	-4.1	42	-20.0
S6	92	4.9	33	-29.0
S7	100	12.9	83	21.0
S8	42	-45.1	50	-12.0
S9	92	4.9	67	5.0
S.D.	17.1		16.7	
Variance	292.4		278.9	

GROUP-B Computation of Variance and Standard Deviation

Student	Method-I	Deviation from mean	Method-II	Deviation from mean
S1	58	-22.4	42	-38.7
S2	58	-22.4	92	11.3
S3	75	-5.4	92	11.3
S4	100	19.6	67	-13.7
S5	83	2.6	75	-5.7
S6	100	19.6	100	19.3
S7	100	19.6	83	2.3
S8	50	-30.4	75	-5.7
S9	100	19.6	100	19.3
S.D.	19.7		17.5	
Variance	388.1		309.3	

As we can see, the standard deviation does not have the same drawbacks as the range. Its value does not depend solely on two score values, but depends greatly on the contribution of each score. Furthermore, we can see that the standard deviation of all tests is generally high. This is due to the fact that there are too many scores against, the average (i.e. at considerable variance with the average). To sum up, one can also see that the standard deviations values of all tests are quite similar, having only a range of 3.0 units, which means that the transfer of learning was similar for both methods.

3.3.4 - Measures of relationship

The calculation of averages and standard deviation furnish us a valuable way of comparing tests scores. However we need more details in how to compare the two methods. Thus, when we want to compare one set of scores to another we need to find some kind of correlation between them. For this we have at our disposal the so-called correlation coefficient. Although there are many ways of computing correlations, one simple way which may yield some index of comparison is to indicate by a scatter diagram, the values that are to be compared. Figure 12, is a scatter diagram that plots the correlation between the two methods.

On this graph we confirm the fact that there are too many marks against the average. However, it is possible that the students who scored with one method scored also with the other method, thus confirming the conclusion that the transfer of learning was quite similar for both groups. Furthermore one may see in this graph that the majority of the marks fall close to a line that can be drawn from the

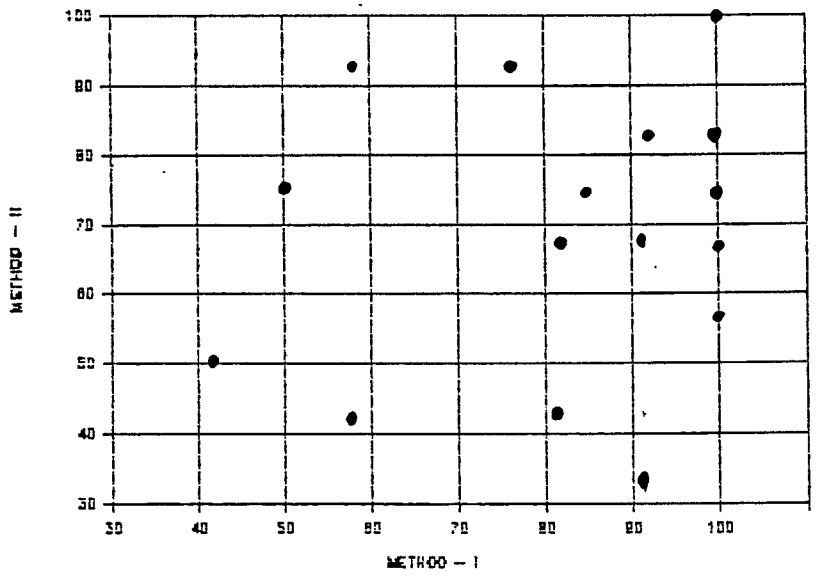


Figure 12 - Correlation between the two methods

lower left to the upper right corner. If all scores were on such a line, the relationship would be perfect which would mean that each student was exactly as much above or bellow the group average in both methods. Although there is a tendency that the majority of the scores to fall on the referred line, there is a trend for some scores to fall in a similar line with the lower left side displaced to the right. Thus, the scatter diagram gives a fairly good picture of the relationship between the two tests, but it is necessary to investigate further.

3.3.5 - The product moment correlation

The product-moment correlation coefficient 'r' is a precise mathematical concept that might allow us to establish of a better relationship between the two set of

scores. The formula is the following:

$$r = \frac{(dx)(dy)}{N(SDx)(SDy)}$$

Where d stands for the deviation from the mean, N stands for the number of cases, SDx stands for the deviation of the first set of score, and SDy stands for the second set of scores. The value of r is calculated in the next table. The next table shows how to compute the product -moment correlation. First, we find the mean and the standard deviation for each set of scores. We then multiply each person's deviation from the group mean for Method I by the deviation from the group mean in Method II. The algebraic products form the numerator of the fraction in the equation. We then proceed to obtain the denominator in the fraction by multiplying the number of cases by the product of the two standard deviations.

COMPUTATION OF THE PRODUCT MOMENT CORRELATION COEFFICIENT FOR BOTH SET OF SCORES

STUDENT	METHOD - I	DEVIATION FROM MEAN	METHOD - II	DEVIATION FROM MEAN	PRODUCT OF DEVIATIONS
S1	100	16.2	75	3.7	59.5
S2	92	8.2	83	11.7	95.9
S3	100	16.2	58	-13.3	-216.3
S4	83	-0.8	67	-4.3	3.4
S5	83	-0.8	42	-29.3	22.8
S6	92	8.2	33	-38.3	-315.2
S7	100	16.2	83	11.7	189.3
S8	42	-41.8	50	-21.3	891.3
S9	92	8.2	67	-4.3	-35.6
S10	58	-25.8	42	-29.3	756.1
S11	58	-25.8	92	20.7	-532.7
S12	75	-8.8	92	20.7	-181.4
S13	100	16.2	67	-4.3	-70.3
S14	83	-0.8	75	3.7	-2.9
S15	100	16.2	100	28.7	465.0
S16	100	16.2	83	11.7	189.3
S17	50	-33.8	75	3.7	-123.9
S18	100	16.2	100	28.7	465.0
					1659.333

Method - I mean = 83.8
Method - II mean = 71.3
Method - I Standard deviation = 18.8
Method - II Standard deviation = 19.5
Product moment correlation r = 0.50

If the relationship between the two variables, in our case the scores in both methods, was perfect, r would be 1.00. For all other lesser degrees of relationship, it would turn out to be a decimal number less than 1.00. In our example, r = 0.50. We can understand the reasons for this moderate correlation due to the fact that the individuals tend to score about as high with one method as they do with the other and also due to the small size of the sample. However, there are numerous exceptions to this general trend.

3.3.6 - Statistical significance and chance

Up till now we have been analyzing some statistical methods for drawing conclusions based on a small group. However, statistics also provides us with some technical means for making inferences about larger groups and events which have not been previously studied. These methods are generally difficult to comprehend, but anyone who intends to work with any kind of psychological measurements should understand the basic reasoning which is behind them.

The fundamental idea to bear in mind is the notion of '**sample**'. Any group of people we choose to test constitutes a sample of a larger population. Thus, the 18 students whose scores have been examined are only a small part of a large group of students of similar backgrounds at WMU.

The issue of how samples are related to large populations can be studied through either empirical procedures or mathematical procedures. In the empirical kind of study, one may test 10,000 students, work out the means and draw the respective conclusions. However, this method is very extensive and time-consuming, if possible at all. Mathematical procedures may allow us to reach the same conclusions with less effort. What one may found in both types of investigations is that the shape of repeated samples from a certain population produces a certain statistical 'distribution'. The mean, the standard deviation or any other parameter of this '**sampling distribution**' can be estimated from the information we have about a few samples or even one sample alone.

The standard deviation that indicates how much variability, for the standard deviation of the sampling distribution, there is in a statistic rather than in events is referred as '**standard error**'.

This concept of sampling distribution allows us to estimate the probability that any result we have obtained could have occurred only by '**chance**'. Chance here simply denotes a label for unknown factors that cause samples to differ.

Now we can go a little further into the analysis of the differences of results achieved in both methods. The scores are again shown in the next table and it is clear that the average score on the first test is higher than on the second one, that there are only four students that scored higher on the second test, and that only two had the maximum mark on both tests. One may wonder whether those differences occurred only by chance or because one method was better than the other. To answer this question we may introduce the t statistic which is the ratio between the mean and the standard error of the difference. So, before any further consideration of the meaning of t, we can calculate t by using the next table.

In the first place, we determine the difference between the two sets of scores for each individual group. As it has been done above, we calculate the mean and the standard deviation of the distribution of differences. But in this inferential method, the total squared deviation is divided by one less than the total number of individuals in the group, in our case by 17 rather than 18. To get the standard deviation of the sampling distribution for such differences, we divide the standard deviation of the differences by the square root of the total number of cases. The t ratio consists then, of the mean of the differences divided by the standard error of the differences. In our case the value of t is 4.2.

The value of t, which is available in standard statistics texts, is statistically significant at the 0.01

level. This means that no more than once in a hundred times would a group of students like ours gives us the results we obtained on the two sets of tests if chance factors alone were operating. We can conclude then that both test measurements are effective and that the results achieved by the students represents something else other than chance only.

From all of the above discussion, one may come to the conclusion that although there has been some transfer of learning with both methods, Method I is more effective than Method II.

COMPUTATION OF THE t STATISTIC

STUDENT	METHOD - I	METHOD - II	DIFFERENCE	DEVIATION FROM MEAN(OF DIFF.)	SQUARED DEVIATION
S1	100	75	25	12.6	157.6
S2	92	83	9	-3.4	11.9
S3	100	58	42	29.6	873.5
S4	83	67	16	3.6	12.6
S5	83	42	41	28.6	815.4
S6	92	33	59	46.6	2167.4
S7	100	83	17	4.6	20.8
S8	42	50	-8	-20.4	418.0
S9	92	67	25	12.6	157.6
S10	58	42	16	3.6	12.6
S11	58	92	-34	-46.4	2157.1
S12	75	92	-17	-29.4	867.0
S13	100	67	33	20.6	422.5
S14	83	75	8	-4.4	19.8
S15	100	100	0	-12.4	154.9
S16	100	83	17	4.6	20.8
S17	50	75	-25	-37.4	1402.1
S18	100	100	0	-12.4	154.9
	Method - I mean = 83.8		12.4		9846.4
	Method - II mean = 71.3				
	Mean of differences 12.4				
	Standard deviation of differences =	24.1			
	Standard error of differences =	2.9			
	t =	4.2			

CHAPTER IV - CONCLUSIONS AND RECOMMENDATIONS

As we have seen in the other chapters, computers are powerful and versatile devices which can be used by teachers in their classes with students. No matter how teachers choose to use computers, their choice will be a function of their teaching method and the availability of resources within the school. Taking for granted that most schools have limited computer resources, school administrations, are forced to establish priorities for computer use. As educators teachers may have to establish their priorities on a knowledge of the various capabilities of the computers for the various applications considering their real educational value.

This chapter gathers some important points that have been made a number of times in this project, in order to further emphasize them by putting them in a single location, and to highlight some recommendations regarding the issue of using computers in nautical education.

1. Computers should always be regarded as a means to meet the end of assisting students to learn efficiently and effectively. For this reason learning rather then technology should be emphasized as far education is concerned.

2. Computers are not a panacea and they are not necessarily desirable in every learning context. They can lead to improved education but they can lead also to poorer education if they are not used properly. For this reason any type of abuse should be avoided.

3. Computers can be used in many different ways in order to help students in the learning process. However, the author would rather like to emphasize that teachers should encourage students to use word processing, data bases and especially spreadsheets.

4. As far CAI is concerned, the software which are today in the marked, despite some of them have already good quality, this mode of computer usage should be used only as a complement of the normal classes or as a first approach like for instance the simulation mode using programs such as SISRADAR.

5. The major learning advantage of the computer is that it is an interactive medium, which allows constant interaction between the student and the device. For this reason, the learning process may be individualized to the needs of each student.

6. Major curriculum development is needed in order to make computers more effective in education. The development of new curriculum, demands an urgent training of teachers in order to use new material and integrate it in their classes.

7. We must not take for granted that because a computer is used the educational process is automatically improved. Some problems with teaching programming already exist. With inadequate use of some existing computer based learning material could be disastrous.

8. Some of computer assisted instruction which is already available in the market is fairly good and can be very useful for the teaching process. However, their use should be carefully considered. It is the author's opinion that they should only be used only in addition to the normal classes.

9. We still have much to learn about the learning process in general and especially when new teaching methods and aids are concerned, especially with this new device which is the computer. For this reason a great deal of humility is needed. We also should realize that even the most advanced techniques and methods may not be the most desirable for our reality. We must be prepared and with the mind open for new modes, new strategy and of course with new ways of thinking. However, we should above all consider the financial and the human resources that we have available.

A P P E N D I X

The program listed in this appendix is a BASIC program written with a GWBASIC version. It runs in any IBM or compatible machine with an EGA graphic card.

The first part which is named TUTORIAL, is divided into two parts:

(1)-Gives the main definitions and the lights specifications in accordance with the COLREG. This part is named as DEFINITIONS.

(2)-Is composed of 72 screen which display three views of ships (Portside, Starboard and Ahead). This part is named as LIGHTS.

The second part of the program consists of a multiple choice test and is named as TEST. It has been done only by changing some lines of the previous part.

```
100 '* ===========DEFINITIONS==============================
110 '* =============M E  N U==============================
120 CLS:KEY OFF
130 SCREEN 7:COLOR 15,1
140 LOCATE 1,15:PRINT "S I M L U Z"
145 LOCATE 3,9:PRINT "World Maritime University"
150 LINE (20,30)-(300,54),,B
160 LOCATE 6,18:PRINT "M E N U"
170 LOCATE 10,15:PRINT "1. Tutorial"
200 LOCATE 13,15:PRINT "4. Multiple Choice"
210 LOCATE 14,18:PRINT "Questions"
220 LOCATE 17,15:PRINT "9. Exit"
225 LOCATE 23,5:PRINT "Please make your choice..."
230 A$=INKEY$
235 IF A$="9" THEN 10000
240 IF A$=CHR$(49)  THEN 10500
242 IF A$="4" THEN CLEAR:LOAD"test",R
250 GOTO 230
1000 '*********************************************************
1010 '****************** T U T O R I A L *********************
1020 '*************** GENERAL DEFINITIONS ********************
1025 CLS:SCREEN 8:COLOR 15,1
1030 PRINT TAB(10)"TUTORIAL:";
1035 PRINT TAB(25)"RULE-3, RULE-21, RULE-22, ANNEX I"
1040 LINE (0,10)-(640,10),14:LINE (0,12)-(640,12),14
1055 LOCATE 4,30:PRINT "GENERAL DEFINITIONS"
1060 LOCATE 7,4
1070 PRINT "RULE-3":PRINT
1080 PRINT TAB(4)"For the purpose of these rules, except
where the context";
1085 PRINT " otherwise requires:":PRINT
1090 PRINT TAB(5)"a)  The word 'VESSEL' includes every
description of water craft including",
```

```
1095 PRINT TAB(9)"non-displacement craft and seaplanes, used
or capable of being used"
1100 PRINT TAB(9)"as a means of transportation on the
water.":PRINT
1105 PRINT TAB(5)"b)  The term 'POWER-DRIVEN VESSEL' means
any vessel propeled by machinery.":PRINT
1110 PRINT TAB(5)"c)  The term 'SAILING VESSEL' means any
vessel undersail provided that"
1115 PRINT TAB(9)"propelling machinery, if fitted, is not
being used."
1120 LOCATE 23,15:PRINT "Press  '+' to go on   '-' to go back
'Esc' to main Menu":LINE (110,184)-(560,184),14:LINE
(110,186)-(560,1 86),14
1125  STP$=INKEY$
1128 IF STP$=CHR$(27) THEN 100
1130 IF STP$="+" THEN 1150
1135 IF STP$="-" THEN 100
1140 GOTO 1125
1150 '* ------------------------------------------------------
1155 VIEW (0,16)-(639,170):CLS
1160 LOCATE 7,5:PRINT "d)  The term 'VESSEL ENGAGED IN
FISHING' means any vessel fishing with"
1165 PRINT TAB(9)"nets, lines, trawls or other fishing
apparatus which restric mano-"
1170 PRINT TAB(9)"euvrability, but does not include a vessel
fishing with trilling"
1175 PRINT TAB(9)"lines or other fishing apparatus which do
not restrict manoeuvrability.":PRINT
1180 PRINT TAB(5)"e)  The word 'SEAPLANE' includes an
aircraft designed to manoeuvre on"
1185 PRINT TAB(9)"the water.":PRINT
1190 PRINT TAB(5)"f)  The term 'VESSEL NOT UNDER COMMAND'
means a vessel which through"
1195 PRINT TAB(9)"some exceptional circumstance is unable to
manoeuvre as required"
1200 PRINT TAB(9)"by these Rules and is therfore unable to
keep out of the way of"
1205 PRINT TAB(9)"another vessel.
1210  STP$=INKEY$
1212 IF STP$=CHR$(27) THEN 100
1215 IF STP$="+" THEN 1230
1220 IF STP$="-" THEN :CLS:GOTO 1055
1225 GOTO 1210
1230 '* ------------------------------------------------------
1235 CLS
1240 LOCATE 7,5:PRINT"g)  The term 'VESSEL RESTRICTED IN HER
ABILITY TO MANOEUVRE' means a vessel"
1245 PRINT TAB(9)"which from the nature of her work is
restrited in her ability to mano-"
1250 PRINT TAB(9)"oeuvre as required by these RULES and is
therefore unable to keep out"
1255 PRINT TAB(9)"of the way of another vessel.":PRINT
1300 PRINT TAB(9)"The following vessels shall be regarded as
vessels resticted in their"
1305 PRINT TAB(9)"ability to manoeuvre:":PRINT
1310 PRINT TAB(9)"(i)  a vessel engaged in laying, servicing
```

```
or picking up a navigation"
1315 PRINT TAB(14)"mark, submarine cable or pipeline;":PRINT
1320 PRINT TAB(9)"(ii) a vessel engaged in dregging,
surveying or underwater operations;"
1325 STP$=INKEY$
1328 IF STP$=CHR$(27) THEN 100
1330 IF STP$="+" THEN 1350
1335 IF STP$="-" THEN 1150
1340 GOTO 1325
1350 '*-------------------------------------------------
1355 CLS
1360 LOCATE 8,9:PRINT "(iii) a vessel engaged in
replinishement or transferring  persons,"
1365 PRINT TAB(14)" provisions or cargo while underway;":
PRINT
1370 PRINT TAB(9)"(iv)  a vessel engaged in the launching or
recovery of aircraft;":PRINT
1375 PRINT TAB(9)"(v)   a vessel engaged in minesweeping
operations;":PRINT
1380 PRINT TAB(9)"(vi)  a vessel engaged in a towing
operation such as severely"
1385 PRINT TAB(14)" restricts the towing vessel and her in
their ability "
1390 PRINT TAB(14)" to deviate from their course."
1395 STP$=INKEY$
1398 IF STP$=CHR$(27) THEN 100
1400 IF STP$="+" THEN 1415
1405 IF STP$="-" THEN 1230
1410 GOTO 1395
1412 '* ------------------------------------------------
1415 CLS
1420 LOCATE 7,5:PRINT "(h) The term 'VESSEL CONSTRAINED BY
HER DRAGHT' means a power-driven"
1425 PRINT TAB(9)"vessel which because of her draught in
relation to the available depth"
1430 PRINT TAB(9)"of water is severely restricted in her
ability to deviate from the"
1435 PRINT TAB(9)"course she is following.":PRINT
1440 PRINT TAB(5)"(i) the word 'UNDERWAY' means that a
vaessel is not at anchor, or made fast"
1445 PRINT TAB(9)"to the shore or aground.":PRINT
1450 PRINT TAB(5)"(j) the words 'LENGTH' and 'BREADTH' of a
vessel means her length overall"
1455 PRINT TAB(9)"and greatest breadth."
1460 STP$=INKEY$
1463 IF STP$=CHR$(27) THEN 100
1465 IF STP$="+" THEN 1480
1470 IF STP$="-" THEN 1350
1475 GOTO 1460
1480 '*-------------------------------------------------
1485 CLS
1490 LOCATE 7,5:PRINT "(k) Vessels shall be deemed to be in
sight of one another only when "
1495 PRINT TAB(9)"one can be observed visually from the
other.":PRINT
1500 PRINT TAB(5)"(l) The term 'RESTRICTED VISIBILITY' means
```

```
any condition in which "
1505 PRINT TAB(9)"visibility is restricted by fog, mist,
falling snow, heavy rain "
1510 PRINT TAB(9)"storms, sandstorms or any other similar
causes."
1520 STP$=INKEY$
1523 IF STP$=CHR$(27) THEN 100
1525 IF STP$="+" THEN 1550
1530 IF STP$="-" THEN 1415
1535 GOTO 1520
1550 '* ------------------------------------------------------
1555 CLS
1560 LOCATE 4,23:PRINT"DEFINITIONS WITH RESPECT TO LIGHTS"
1565 LOCATE 6,4:PRINT "RULE-21":PRINT
1570 PRINT TAB(5)"(a) 'MASTHEAD LIGHT' means a white light
placed over the fore and aft"
1575 PRINT TAB(9)"centerline of the vessel showing an
unbroken light over an arc of"
1580 PRINT TAB(9)"the horizon of 225 degrees and so fixed as
to show the light from"
1585 PRINT TAB(9)"right ahead to 22.5 degrees abaft the beam
on either side of the"
1590 PRINT TAB(9)"vessel.":PRINT
1595 PRINT TAB(5)"(b) 'SIDELIGHTS' means a green light on the
starboard side and a red"
1600 PRINT TAB(9)"light on the port side each showing an
unbroken light over an arc"
1605 PRINT TAB(9)"of the horizon of 112.5 degreesand  so
fixed as to show the light"
1610 PRINT TAB(9)"from right ahead to 22.5 degrees abaft the
beam on its respective"
1615 PRINT TAB(9)"side. In a vessel of les than 20 metres in
length the sidelights"
1620 PRINT TAB(9)"may be combined in one lantern caried on
the fore and aft centre-"
1625 PRINT TAB(9)"line of the vessel."
1630 STP$=INKEY$
1635 IF STP$="+" THEN 1650
1640 IF STP$="-" THEN 1460
1645 GOTO 1630
1650 '*------------------------------------------------------
1655 CLS
1660 LOCATE 7,5:PRINT "(c) 'STERNLIGHT' means a white light
placed as nearly as practicable at the"
1665 PRINT TAB(9)"stern showing an unbroken light over an arc
of the horizon of 135"
1670 PRINT TAB(9)"degrees and so fixed as to show the light
67.5 degrees from right"
1675 PRINT TAB(9)"aft on each side of the vessel.":PRINT
1680 PRINT TAB(5)"(d) 'TOWING LIGHT' means a yellow light
having the same characteristics as"
1685 PRINT TAB(9)"the 'STERNLIGHT' defined in paragraph (c)
of this Rule.":PRINT
1690 PRINT TAB(5)"(e) 'ALL-ROUND LIGHT' means a light showing
an unbroken light  over an"
1695 PRINT TAB(9)"arc of the horizon of 360 degrees.":PRINT
```

```
1700 PRINT TAB(5)"(f) 'FLASHING LIGHT' means a light flashing
at regular intervals at a"
1705 PRINT TAB(9)"frequency of 120 flashes or more per
minute."
1710 STP$=INKEY$
1720 IF STP$="+" THEN 1750
1725 IF STP$="-" THEN 1550
1730 GOTO 1710
1750 '* ------------------------------------------------------
1755 CLS
1760 CIRCLE (320,88),120,7
1765 CIRCLE (320,88),100,7
1770 LINE (320,88)-(208,116),7
1775 LINE (320,88)-(436,116),7
1780 PAINT (320,40),15,7
1785 LOCATE 3,16:PRINT "Arcs of lights as prescribed in the
regulations"
1790 PRINT:PRINT TAB(26)"Masthead light - 225 degrees"
1795 STP$=INKEY$
1800 IF STP$=CHR$(27) THEN 1000
1805 IF STP$="+" THEN 1820
1810 IF STP$="-" THEN 1650
1815 GOTO 1795
1820 '* ------------------------------------------------------
1830 CLS
1835 CIRCLE (320,88),120,7
1840 CIRCLE (320,88),100,7
1845 LINE (320,88)-(208,116),7
1850 LINE (320,88)-(436,116),7
1855 LINE (320,88)-(320,35),7
1860 PAINT (315,40),4,7:'**PORT LIGHT**
1865 PAINT (325,40),2,7:'**STARBOARDLIGHT**
1870 LOCATE 3,16:PRINT "Arcs of lights as prescribed in the
regulations"
1875 LOCATE 4,35:PRINT "Sidelights"
1880 LOCATE 10,5:PRINT "Port sidelight":LOCATE 10,61:PRINT
"Starboard sidelight"
1885 PRINT TAB(5)"112.5 degrees":LOCATE 11,61:PRINT "112.5
degrees"
1890 STP$=INKEY$
1895 IF STP$=CHR$(27) THEN 100
1900 IF STP$="+" THEN 1915
1905 IF STP$="-" THEN 1750
1910 GOTO 1890
1915 '* ------------------------------------------------------


1925 CLS
1930 CIRCLE (320,88),120,7
1935 CIRCLE (320,88),100,7
1940 LINE (320,88)-(208,116),7
1945 LINE (320,88)-(436,116),7
1950 LOCATE 3,16:PRINT "Arcs of lights as prescribed in the
regulations"
1955 PRINT:PRINT TAB(28)"Sternlight -135 degrees"
1960 PAINT (320,135),15,7:'** white **
```

```
1965 STP$=INKEY$
1970 IF STP$=CHR$(27) THEN 100
1975 IF STP$="+" THEN 1990
1980 IF STP$="-" THEN 1820
1985 GOTO 1965
1990 '*-------------------------------------------------------
2000 CLS
2005 CIRCLE (320,88),120,7
2010 CIRCLE (320,88),100,7
2015 LINE (320,88)-(208,116),7
2020 LINE (320,88)-(436,116),7
2025 LOCATE 3,16:PRINT "Arcs of lights as prescribed in the
regulations"
2030 PRINT:PRINT TAB(27)"Towing light - 135 degrees"
2035 PAINT (320,135),14,7:'** yellow **
2040 STP$=INKEY$
2045 IF STP$=CHR$(27) THEN 100
2050 IF STP$="+" THEN 2070
2055 IF STP$="-" THEN 1915
2060 GOTO 2040
2065 '*-------------------------------------------------------
2075 CLS
2080 CIRCLE (320,88),120,7:CIRCLE (320,88),110,7:PAINT
(320,137),4,7:'** Red **
2085 CIRCLE (320,88),100,7:CIRCLE (320,88),90,7:PAINT
(320,128),2,7:'** green **
2090 LOCATE 3,16:PRINT "Arcs of lights as prescribed in the
regulations"
2095 PRINT:PRINT TAB(25)"All-round lights - 360 degrees"
2100 STP$=INKEY$
2105 IF STP$=CHR$(27) THEN 100
2110 IF STP$="+" THEN 2130
2115 IF STP$="-" THEN 1990
2120 GOTO 2100
2125 '* -------------------------------------------------------
2135 CLS
2137 LOCATE 4,30:PRINT "VISIBILITY OF LIGHTS"
2140 LOCATE 7,5:PRINT "RULE-22":PRINT
2145 PRINT TAB(5)"The lights prescribed in these Rules shall
have an intensity as specified"
2150 PRINT TAB(5)"in Section 8 of Annex I tothese Regulation
so as to be visible at the fol-"
2155 PRINT TAB(5)"lowing minimum ranges:":PRINT
2160 PRINT TAB(5)"(a) In vessels of 50 meters or more in
length:":PRINT
2165 PRINT TAB(10)"->a masthead light, 6 miles;":PRINT
2170 PRINT TAB(10)"->a sidelight, sternlight, towing light, 3
miles;":PRINT
2175 PRINT TAB(10)"->a white, red, green or yellow all-round
light, 3 miles."
2180 STP$=INKEY$
2185 IF STP$=CHR$(27) THEN 100
2190 IF STP$="+" THEN 2210
2195 IF STP$="-" THEN 2065
2200 GOTO 2180
2205 '* -------------------------------------------------------
```

```
2210 CLS
2215 LOCATE 7,5:PRINT "(b) In vessels of 12 metres or more in
length but less than 50 metres:"
2217 PRINT TAB(9)"in length:":PRINT
2220 PRINT TAB(10)"-> a masthead light, 5 miles; except that
where the length of the"
2225 PRINT TAB(13)"vessel is less than 20 metres, 3 miles;":
PRINT
2230 PRINT TAB(10)"-> a sidelight, sternlight, towing light,
2 miles;":PRINT
2235 PRINT TAB(10)"-> a white, red, green or yellow all-round
light, 2 miles."
2240 STP$=INKEY$
2245 IF STP$=CHR$(27) THEN 100
2250 IF STP$="+" THEN 2265
2255 IF STP$="-" THEN 2125
2260 GOTO 2240
2265 '* ------------------------------------------------------
2275 CLS
2280 LOCATE 7,5:PRINT "(c) In vessels of less than 12 metres
in length:":PRINT
2285 PRINT TAB(10)"-> a masthead light, 2 miles;":PRINT
2290 PRINT TAB(10)"-> a sidelight, 1  mile;":PRINT
2295 PRINT TAB(10)"-> a sternlight, towing light, 2 miles;":
PRINT
2300 PRINT TAB(10)"-> a white,red, green or yellow all-round
light, 2 miles."
2305 STP$=INKEY$
2310 IF STP$=CHR$(27) THEN 100
2315 IF STP$="+" THEN 2330
2320 IF STP$="-" THEN 2205
2325 GOTO 2305
2330 '* ------------------------------------------------------
2335 '** TECHNICAL DETAILS OF LIGTS AND SHAPES **
2340 CLS
2345 LOCATE 4,24:PRINT "POSITIONING AND TECHNICAL DETAILS"
2350 PRINT TAB(31)"OF LIGHTS AND SHAPES"
2355 LOCATE 7,5:PRINT "ANNEX I"
2360 PRINT TAB(6)"I. Definition"
2365 PRINT TAB(10)"The term 'HEIGHT ABOVE THE HULL' means
height above the uppermost"
2370 PRINT TAB(10)"continuos deck."
2375 PRINT:PRINT TAB(6)"2. Vertical positioning and spacing
of ligths"
2380 PRINT TAB(10)"(a) On a power-driven vessel of 20 metres
or more in length the"
2385 PRINT TAB(14)"the masthead lights shall be placed as
follows:"
2390 PRINT TAB(14)"(i) the forward masthead light, or if only
one masthead light"
2395 PRINT TAB(14)"is carried, then that light, at a height
above the hull of not"
2400 PRINT TAB(14)"less than 6 metres, and, if the breaddth
of the vessel exceeds"
2405 PRINT TAB(14)"6 metres then at a height above the hull
not less than such bre-"
```

```
2410 PRINT TAB(14)"adth, so however that the light need not
be placed at a greater"
2415 PRINT TAB(14)"height above the hull than 12 metres;"
2420 STP$=INKEY$
2425 IF STP$=CHR$(27) THEN 100
2430 IF STP$="+" THEN 2450
2435 IF STP$="-" THEN 2265
2440 GOTO 2420
2450 '* ------------------------------------------------
2455 CLS
2460 LOCATE 4,14:PRINT "(ii) when two masthead lights are
carried the the after one shall"
2465 PRINT TAB(19)"be at least 4.5 metres vertically higher
than the forward one."
2470 PSET (224,108)
2475 DRAW "F15; R230; E6; R6; U5; L180; H6; L74; F15"
2480 PSET (320,112)
2485 DRAW "U30":CIRCLE (320,80),8
2490 PSET (325,80)
2495 DRAW "R145"
2500 PSET (430,112)
2505 DRAW "U38":CIRCLE (430,72),8
2510 PSET (436,72)
2515 DRAW "r30"
2517 PSET (380,110):DRAW "u28"
2520 LOCATE 15,48:PRINT "h"
2525 LOCATE 12,60:PRINT ")not less than"
2530 LOCATE 13,61:PRINT "4.5 metres"
2535 LOCATE 8,5:PRINT "'h' not less than 6 metres,"
2540 LOCATE 9,5:PRINT "if beam exceeds 6 metres 'h'=beam"
2545 LOCATE 10,5:PRINT "but 'h' need not exceed 12 metres"
2550 LOCATE 19,37:PRINT "L=20 metres or more"
2555 LOCATE 20,27:PRINT "Vertical positioning of masthead
lights"
2560 STP$=INKEY$
2565 IF STP$=CHR$(27) THEN 100
2570 IF STP$="+" THEN 2590
2575 IF STP$="-" THEN 2330
2580 GOTO 2560
2590 '* ------------------------------------------------
2595 CLS
2600 LOCATE 5,10:PRINT "(b) the vertical separation of
masthead lights of power-driven"
2605 PRINT TAB(14)"vessels shall be such that in all normal
conditions of trim the"
2610 PRINT TAB(14)"after light will be seen over and separate
from the forward light"
2615 PRINT TAB(14)"at a distance of 1,000 metres from the
stem when viewed from "
2620 PRINT TAB(14)"sea level."
2630 PSET (324,108)
2635 DRAW "F15; R230; E6; R6; U5; L180; H6; L74; F15"
2640 PSET (420,112)
2645 DRAW "U25":CIRCLE (420,93),8
2660 PSET (530,112)
2665 DRAW "U38":CIRCLE (530,72),8
```

```
2670 LINE (30,123)-(330,123)
2675 LINE (30,123)-(420,93),,,&HAAAA
2680 LINE (30,123)-(530,72),,,&HAAAA
2685 LOCATE 19,10:PRINT "1000 metres at sea
level";TAB(45)"normal conditions of trim"
2690 STP$=INKEY$
2695 IF STP$=CHR$(27) THEN 100
2700 IF STP$="+" THEN 2720
2705 IF STP$="-" THEN 2450
2710 GOTO 2690
2720 '* ------------------------------------------------
2725 CLS
2730 LOCATE 4,9:PRINT "(c) The masthead light of a
power-driven vessel of 12 metres"
2735 PRINT TAB(14)"but less than 20 metres in length shall be
placedat above "
2740 PRINT TAB(14)"the gunwale of not less than 2.5 metres."
2745 PSET (224,108)
2750 DRAW "F15; R230; E6; R6; U5; L180; H6; L74; F15"
2755 PSET (320,112)
2760 DRAW "U30":CIRCLE (320,80),8
2765 PSET (325,80)
2770 DRAW "R20"
2775 PSET (340,110):DRAW "U28"
2780 LOCATE 10,3:PRINT "'h' not less than 2.5 metres"
2785 LOCATE 14,50:PRINT "top of"
2790 LOCATE 15,50:PRINT "gunwale"
2795 LOCATE 20,20:PRINT "Lenght 12 metres or more but less
than 20 metres"
2800 LOCATE 15,43:PRINT "h"
2805 STP$=INKEY$
2810 IF STP$=CHR$(27) THEN 100
2815 IF STP$="+" THEN 2830
2820 IF STP$="-" THEN 2590
2825 GOTO 2805
2830 '* ------------------------------------------------
2835 CLS
2840 LOCATE 4,10:PRINT "(d) A power-driven vessel of less
than 12 metres in length may"
2845 PRINT TAB(14)"carry the uppermost light at a height of
less than 2.5 metres"
2850 PRINT TAB(14)"above the gunwale. When however a masthead
light is carried in"
2855 PRINT TAB(14)"addition to sidelights and a sternlight,
then such masthead "
2860 PRINT TAB(14)"light shall be carried at least I metre
higher than the sidelights.
2865 PRINT:PRINT TAB(30)"'h' may be less than 2.5 metres"
2870 PSET (224,108)
2875 DRAW "F15; R230; E6; R6; U5; L180; H6; L74; F15"
2880 PSET (320,112)
2885 DRAW "U38":CIRCLE (320,80),8
2890 PSET (300,80)
2895 DRAW "R40"
2900 PSET (305,82)
2905 DRAW "D30"
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```
2910 PSET (335,80)
2915 DRAW "D20"
2920 CIRCLE (335,102),6,7:PAINT (335,102),4,7
2925 LOCATE 20,26:PRINT "Where length is less than 12 metres"
2930 LOCATE 14,39:PRINT "h"
2935 LOCATE 14,44:PRINT "at least 1 metre"
2940 STP$=INKEY$
2945 IF STP$=CHR$(27) THEN 100
2950 IF STP$="+" THEN 2970
2955 IF STP$="-" THEN 2720
2960 GOTO 2940
2970 '* ------------------------------------------------

2975 CLS
2980 LOCATE 4,9:PRINT " (e) One of the two or three masthead
lights prescribed for a"
2985 PRINT TAB(14)"power-driven vessel when engaged in towing
or pushing another"
2990 PRINT TAB(14)"vessel shall be placed in the same
position as the forwad mast"
2995 PSET (224,108)
3000 DRAW "F5; R230; E6; R6; U5; L180; H6; L74; F15"
3005 PSET (320,102)
3010 DRAW "U50"
3015 CIRCLE (320,80),6:CIRCLE (320,70),6:CIRCLE (320,60),6
3020 LOCATE 10,43:PRINT "one to be carried in same"
3025 LOCATE 11,43:PRINT "position as masthead light"
3030 LOCATE 12,43:PRINT "for power-driven vessels"
3035 LOCATE 19,20:PRINT "Location of mast lights for
power-driven vessel"
3037 LOCATE 20,30:PRINT "engaged in towing or pushing"
3040 STP$=INKEY$
3045 IF STP$=CHR$(27) THEN 100
3050 IF STP$="+" THEN 3070
3055 IF STP$="-" THEN 2830
3060 GOTO 3040
3070 '* ------------------------------------------------
3075 CLS
3080 LOCATE 4,10:PRINT "(f) In all circunstances the masthead
light or lights shall be"
3085 PRINT TAB(14)"so placed as to be above and clear of all
other lights and"
3090 PRINT TAB(14)"obstructions.":PRINT
3095 PRINT TAB(10)"(g) The side lights of a power-driven
vessel shall be so placed at a"
3100 PRINT TAB(14)"height above the hull not greater than
three quarters of that of"
3105 PRINT TAB(14)"the forward masthead light. They shall not
be so low as to be"
3110 PRINT TAB(14)"interfered with by decklines."
3115 PSET (270,120)
3120 DRAW "D20;R100;U20;L100"
3125 PSET (320,100)
3130 DRAW "U30"
3135 PSET (300,120)
3140 DRAW "U15;R5;U5;R30;D5;R5;D15"
```

```
3145 CIRCLE (320,80),8
3150 CIRCLE (270,110),8,7:PAINT (270,110),2,7:'****GREEN
3155 CIRCLE (370,110),8,7:PAINT (370,110),4,7:'****RED
3160 LINE (265,110)-(375,110),,,&HAAAA
3165 LOCATE 17,48:PRINT ") not greater than 3/4 h"
3170 LOCATE 13,43:PRINT "forward mast"
3175 LOCATE 14,43:PRINT "head light"
3180 LINE (320,80)-(300,80),,,&HAAAA
3185 LINE (308,75)-(308,120),,,&HAAA
3190 LOCATE 15,38:PRINT "h"
3195 STP$=INKEY$
3200 IF STP$=CHR$(27) THEN 100
3205 IF STP$="+" THEN 3220
3210 IF STP$="-"THEN 2970
3215 GOTO 3195
3220 '* ------------------------------------------------------
3225 CLS
3230 LOCATE 4,10:PRINT "(h) The side lights, if in a combined
lanern and carried on  a"
3235 PRINT TAB(14)"power-driven vessel of less than 20 metres
in legth, shall be"
3240 PRINT TAB(14)"placed not less than I metres below the
masthead light."
3245 PSET (270,120)
3250 DRAW "D20;R100;U20;L100"
3255 PSET (320,120)
3260 DRAW "U35"
3265 CIRCLE (320,80),8
3270 CIRCLE (313,110),8,7:PAINT (313,110),2,7:'*** GREEN ****
3275 CIRCLE (327,110),8,7:PAINT (327,110),4,7:'*** RED ****
3280 LINE (325,80)-(340,80),,,&HAAAA
3285 LINE (330,110)-(340,110),,,&HAAAA
3290 LINE (338,80)-(338,108),,,&HAAAA
3295 LOCATE 11,25:PRINT "forward mast"
3300 LOCATE 12,25:PRINT "head light"
3305 LOCATE 14,45:PRINT "not less than"
3310 LOCATE 15,45:PRINT "1 metre"
3315 LOCATE 15,5:PRINT "Where combined lantern is carried"
3320 LOCATE 16,5:PRINT "and length is less than 20 metres
3325 LOCATE 21,25:PRINT "Vertical location of sidelights"
3330 STP$=INKEY$
3335 IF STP$=CHR$(27) THEN 100
3340 IF STP$="+" THEN 3360
3345 IF STP$="-" THEN 3070
3350 GOTO 3330
3360 '* ------------------------------------------------------
3365 CLS
3370 LOCATE 4,10:PRINT "(i)  When the Rules prescribe two or
three lights to be carried "
3375 PRINT TAB(14)" in avertical line, they shall be spaced
as follows:":PRINT
3380 PRINT TAB(14)" (i) On a vessel of 20 metres in length or
more such lights shall"
3385 PRINT TAB(14)"  be spaced not less than 2 metres apart,
and the lowest of these"
3390 PRINT TAB(14)"  lights shall, except where atowing light
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is required, not less"
3395 PRINT TAB(14)"  than 4 metres above the hull;":PRINT
3400 PRINT TAB(14)"  (ii) on a vessel of less than 20 metres
in length such lights "
3405 PRINT TAB(14)"  shall be spaced not less than I metre
apart and the lowest of"
3410 PRINT TAB(14)"  these lights shall, except where a
towing light is required,"
3415 PRINT TAB(14)"  not less than 2 metres above the
gunwale;":PRINT
3420 PRINT TAB(14)"  (iii) where three lights are carried
they shall be equally"
3422 PRINT TAB(14)"  spaced"
3425 STP$=INKEY$
3430 IF STP$=CHR$(27) THEN 100
3435 IF STP$="+" THEN 3450
3440 IF STP$="-" THEN 3220
3445 GOTO 3425
3450 '* ------------------------------------------------------
3452 CLS
3455 PSET (224,108)
3460 DRAW "F5;R230;E6;R6;U5;L180;H6;L74;F15"
3462 LINE (320,75)-(300,75),,,&HAAAA:LINE
(320,65)-(300,65),,,&HAAAA
3464 LINE (300,75)-(300,65),,,&HAAAA
3465 PSET (320,102):DRAW "U50"
3470 CIRCLE (320,80),6:CIRCLE (320,70),6:CIRCLE (320,60),6
3472 LINE (325,70)-(340,70),,,&HAAAA
3474 LINE (332,70)-(332,102),,,&HAAAA
3475 LOCATE 10,23:PRINT "not less than"
3480 LOCATE 11,23:PRINT "2 metres apart"
3485 LOCATE 12,23:PRINT "equal spacing"
3490 LOCATE 20,25:PRINT "Where lenght is 20 metres or more"
3495 LOCATE 12,45:PRINT "not less than"
3500 LOCATE 13,45:PRINT "4 metres"
3502 LOCATE 4,22:PRINT "SPACING OF LIGHTS CARRIED IN A
VERTICAL LINE"
3505 STP$=INKEY$
3510 IF STP$=CHR$(27) THEN 100
3515 IF STP$="+" THEN 3530
3520 IF STP$="-" THEN 3360
3525 GOTO 3505
3530 '* ------------------------------------------------------
3535 CLS
3540 PSET (224,108)
3545 DRAW "F5;R230;E6;R6;U5;L180;H6;L74;F5"
3550 LINE (320,75)-(300,75),,,&HAAAA
3555 LINE (320,65)-(300,65),,,&HAAAA
3560 LINE (300,75)-(300,65),,,&HAAAA
3565 PSET (320,102):DRAW "U50"
3570 CIRCLE (320,80),6
3575 CIRCLE (320,70),6
3580 CIRCLE (320,60),6
3585 LINE (325,80)-(340,80),,,&HAAAA
3590 LINE (332,80)-(332,102),,,&HAAAA
3595 LOCATE 10,23:PRINT "not less than"
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3600 LOCATE 11,23:PRINT "1 metre apart"
3605 LOCATE 12,23:PRINT "equal spacing"
3610 LOCATE 13,45:PRINT "not less than"
3615 LOCATE 14,45:PRINT "2 metres"
3620 LOCATE 4,22:PRINT "SPACING OF LIGHTS CARRIED IN A
VERTICAL LINE"
3622 LOCATE 20,25:PRINT "Where leght is less than 20 metres"
3625 STP$=INKEY$
3630 IF STP$=CHR$(27) THEN 100
3635 IF STP$="+" THEN 3650
3640 IF STP$="-" THEN 3450
3645 GOTO 3625
3650 '* ------------------------------------------------
3655 CLS
3660 LOCATE 5,10:PRINT "(j) The lower of the two all-round
lights prescribed for a fishing"
3665 PRINT TAB(14)"vessel when engaged in fishing shall be at
a height above the"
3670 PRINT TAB(14)"sidelights not less than twice the
distance between the two"
3672 PRINT TAB(15)"vertical lights."
3675 PSET (224,108)
3680 DRAW "F15;R230;E6;R6;U5;L180;H6;L74;F15"
3685 PSET (320,112)
3690 DRAW "U50"
3695 CIRCLE (320,60),6,7:PAINT (320,60),4,7:'** red **
3700 CIRCLE (320,80),6,7:PAINT (320,80),15,7:'** white **
3702 CIRCLE (350,105),6,7:PAINT (350,105),4,7:'** red **
3705 LINE (330,60)-(355,60),,,&HAAAA
3710 LINE (330,80)-(355,80),,,&HAAAA
3715 LINE (350,100)-(350,58),,,&HAAAA
3720 LOCATE 11,45:PRINT "h"
3725 LOCATE 14,45:PRINT "not less than 2h"
3730 LOCATE 20,15:PRINT "Height of all-round lights for
vessels engaged in fishing"
3735 STP$=INKEY$
3740 IF STP$="+" THEN 3760
3745 IF STP$="-" THEN 3530
3750 GOTO 3735
3755 '* ------------------------------------------------
3760 CLS
3765 LOCATE 4,10:PRINT "(k) The forward anchor light, when
two are carried,shall be"
3770 PRINT TAB(14)"not less than 4.5 metres above the after
one. On a vessel of 50"
3775 PRINT TAB(14)"metres or more in length this forward
anchor light shall be"
3780 PRINT TAB(14)"not less than 6 metres above the hull.":
PRINT
3785 PRINT TAB(30)"ANCHOR LIGHT SPCING"
3790 PSET (224,135)
3795 DRAW "F15;R230;E6;R6;U5;L180;H6;L74;F15"
3800 CIRCLE (230,122),8
3805 CIRCLE (450,133),6
3810 LINE (235,122)-(350,122),,,&HAAAA
3815 LINE (330,133)-(450,133),,,&HAAAA
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3820 LINE (340,124)-(340,128),,,&HAAAA
3825 LOCATE 18,45:PRINT "not less than 4.5 metres"
3830 PSET (224,80)
3835 DRAW "F15;R230;E6;R6;U5;L180;H6;L74;F15"
3840 CIRCLE (230,65),8
3845 CIRCLE (450,75),8
3850 LINE (235,65)-(340,65),,,&HAAAA
3855 LINE (330,67)-(330,78),,,&HAAAA
3860 LOCATE 16,30:PRINT "Where length is 50 metres or more"
3865 LOCATE 11,45:PRINT "not less than"
3870 LOCATE 12,45:PRINT "6 metres"
3900 STP$=INKEY$
3905 IF STP$="+" THEN 3930
3910 IF STP$="-" THEN 3650
3915 GOTO 3900
3930 '* ------------------------------------------------
3935 CLS
3940 LOCATE 4,5:PRINT "3. Horizontal positioning and spacing
of lights"
3945 PRINT TAB(9)"(a) When two mashead lights are prescribed
for a power-driven"
3950 PRINT TAB(13)"vessel, the horizontal distance between
them shall not be less"
3955 PRINT TAB(13)"than one half of the length of the vessel
but need not be more"
3960 PRINT TAB(13)"than 100 metres. The forward light shall
be placed not more than"
3965 PRINT TAB(13)"one quarter of the length of the vessel
from the stem."
3970 PSET (224,118)
3975 DRAW "F15;R230;E6;R6;U5;L180;H6;L74;F15"
3980 PSET (320,122)
3985 DRAW "U35"
3990 CIRCLE (320,90),8
3995 PSET (430,122):DRAW "U43"
4000 CIRCLE (430,85),8
4005 LINE (425,85)-(325,85),,,&HAAAA
4010 LINE (315,90)-(224,90),,,&HAAAA
4012 LOCATE 11,35:PRINT "not less than 1/2 L but need"
4014 LOCATE 12,35:PRINT "not be more than 100 metres"
4016 LOCATE 13,18:PRINT "not more "
4018 LOCATE 14,18:PRINT "than 1/4 L)"
4020 LOCATE 20,26:PRINT "Horizontal spacing of masthead
lights"
4030 STP$=INKEY$
4035 IF STP$="+" THEN 4050
4040 IF STP$="-" THEN 3755
4045 GOTO 4030
4050 '* ------------------------------------------------
4052 CLS
4055 LOCATE 4,9:PRINT "(b) On a vessel of 20 metres or more
in lenght the sidelights"
4060 PRINT TAB(13)"shall not be placed in front of the
forward masthead lights."
4065 PRINT TAB(13)"They shall be placed at or near the side
of the vessel.
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4070 PSET (100,108)
4075 DRAW "F15;R230;E6;R6;U5;L180;H6;L74;F15"
4080 PSET (196,108)
4085 DRAW "U38"
4090 CIRCLE (196,75),8
4095 CIRCLE (210,102),8,7:PAINT (210,102),4,7:'** RED **
4100 PSET (400,108)
4105 DRAW "D20;R100;U20;L100"
4110 LINE (450,108)-(450,128),,,&HAAAA
4115 CIRCLE (415,100),8,7:PAINT (415,100),2,7:'** GREEN **
4120 CIRCLE (485,100),8,7:PAINT (485,100),4,7:'** RED **
4122 LOCATE 14,50:PRINT "at or near sides"
4124 LOCATE 14,30:PRINT "not forward of"
4126 LOCATE 15,30:PRINT "masthead light"
4128 LOCATE 20,18:PRINT "Where length of vessel is 20 metres
or more"
4130 STP$=INKEY$
4135 IF STP$="+" THEN 4150
4140 IF STP$="-" THEN 3930
4145 GOTO 4130
4150 '* ------------------------------------------------------
9990 RETURN
10000 '* ======================================================
10005 '************** E   X   I   T ************************
10060 SYSTEM
10500 '*************************************************************
10510 '************ T U T O R I A L   M E N U ***************
10515 VIEW:CLS
10520 SCREEN 8:COLOR 14,1
10530 LINE (192,56)-(408,124),7,B:LINE
(208,64)-(392,116),7,B:PAINT (195,60),7,7
10540 LOCATE 10,29:PRINT "1. DEFINITIONS"
10550 LOCATE 12,29:PRINT "2. DISPLAY OF LIGHTS"
10560 LOCATE 14,29:PRINT "0. MAIN MENU"
10570 A$=INKEY$
10580 IF A$=CHR$(49) THEN GOSUB 1000:GOTO 10500
10590 IF A$=CHR$(50) THEN CLEAR:LOAD"tutor2",R
10600 IF A$=CHR$(48) THEN 100
10610 GOTO 10570
10620 '*************************************************************
```

LIGHTS

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11000 '*****************************************************
11010 CLS:KEY OFF:SCREEN 8:COLOR 14,1
11040 LOCATE 2,8
11045 PRINT "01. P D Vessel 1 White    P";TAB(45)"19. N_U_C
Making Way    P"
11050 PRINT TAB(8)"02. P D Vessel 1 White  A-H";TAB(45)"20.
N_U_C Making Way  A-H"
11055 PRINT TAB(8)"03. P D Vessel 1 White    S";TAB(45)"21.
N_U_C Making Way    S"
11060 PRINT TAB(8)"04. P D Vessel 2 White    P";TAB(45)"22.
Cable Making Way    P"
11065 PRINT TAB(8)"05. P D Vessel 2 White  A-H";TAB(45)"23.
Cable Making Way  A-H"
11070 PRINT TAB(8)"06. P D Vessel 2 White    S";TAB(45)"24.
Cable Making Way    S"
11075 PRINT TAB(8)"07. Tug         2 White    P";TAB(45)"25.
Sailing Vessel      P"
11080 PRINT TAB(8)"08. Tug         2 White  A-H";TAB(45)"26.
Sailing Vessel    A-H"
11085 PRINT TAB(8)"09. Tug         2 White    S";TAB(45)"27.
Sailing Vessel      S"
11090 PRINT TAB(8)"10. Tug         3 White    P";TAB(45)"28.
Sailing Vessel Op   P"
11095 PRINT TAB(8)"11. Tug         3 White  A-H";TAB(45)"29.
Sailing Vessel Op A-H"
11100 PRINT TAB(8)"12. Tug         3 White    S";TAB(45)"30.
Sailing Vessel Op   S"
11105 PRINT TAB(8)"13. Tug & Dracone          P";TAB(45)"31.
Fishing Vessel      P"
11110 PRINT TAB(8)"14. Tug & Dracone        A-H";TAB(45)"32.
Fishing Vessel    A-H"
11115 PRINT TAB(8)"15. Tug & Dracone          S";TAB(45)"33.
Fishing Vessel      S"
11120 PRINT TAB(8)"16. Tug & Tow              P";TAB(45)"34.
Minesweeper         P"
11125 PRINT TAB(8)"17. Tug & Tow            A-H";TAB(45)"35.
Minesweeper       A-H"
11130 PRINT TAB(8)"18. Tug & Tow              S";TAB(45)"36.
Minesweeper         S"
11135 PRINT:PRINT TAB(15)"Press '++' to next page       '00'
to main menu"
11140 LOCATE 23,30:PRINT "MAKE YOUR CHOICE PLEASE...";
11150 LINE (0,0)-(639,199),7,B:LINE (4,2)-(635,197),7,B:PAINT
(3,1),14,7
11155  STP$=INPUT$(2)
11160 IF STP$="00" THEN LOAD"TUTOR1",R
11165 IF STP$="++" THEN 11380:'*** NEXT MENU PAGE ***
11170 IF STP$="01" THEN GOSUB 12000:GOTO 11000
11175 IF STP$="02" THEN GOSUB 12200:GOTO 11000
11180 IF STP$="03" THEN GOSUB 12100:GOTO 11000
11182 IF STP$="04" THEN GOSUB 12300:GOTO 11000
11184 IF STP$="05" THEN GOSUB 12400:GOTO 11000
11186 IF STP$="06" THEN GOSUB 12500:GOTO 11000
11188 IF STP$="07" THEN GOSUB 12600:GOTO 11000
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11190 IF STP$="08" THEN GOSUB 12700:GOTO 11000
11192 IF STP$="09" THEN GOSUB 12800:GOTO 11000
11194 IF STP$="10" THEN GOSUB 12900:GOTO 11000
11196 IF STP$="11" THEN GOSUB 13000:GOTO 11000
11198 IF STP$="12" THEN GOSUB 13100:GOTO 11000
11200 IF STP$="13" THEN GOSUB 13200:GOTO 11000
11202 IF STP$="14" THEN GOSUB 13300:GOTO 11000
11204 IF STP$="15" THEN GOSUB 13400:GOTO 11000
11206 IF STP$="16" THEN GOSUB 13500:GOTO 11000
11208 IF STP$="17" THEN GOSUB 13600:GOTO 11000
11210 IF STP$="18" THEN GOSUB 13700:GOTO 11000
11212 IF STP$="19" THEN GOSUB 13800:GOTO 11000
11214 IF STP$="20" THEN GOSUB 13900:GOTO 11000
11216 IF STP$="21" THEN GOSUB 14000:GOTO 11000
11218 IF STP$="22" THEN GOSUB 14100:GOTO 11000
11220 IF STP$="23" THEN GOSUB 14200:GOTO 11000
11222 IF STP$="24" THEN GOSUB 14300:GOTO 11000
11224 IF STP$="25" THEN GOSUB 14400:GOTO 11000
11226 IF STP$="26" THEN GOSUB 14500:GOTO 11000
11228 IF STP$="27" THEN GOSUB 14600:GOTO 11000
11230 IF STP$="28" THEN GOSUB 14700:GOTO 11000
11232 IF STP$="29" THEN GOSUB 14800:GOTO 11000
11234 IF STP$="30" THEN GOSUB 14900:GOTO 11000
11236 IF STP$="31" THEN GOSUB 15000:GOTO 11000
11238 IF STP$="32" THEN GOSUB 15100:GOTO 11000
11240 IF STP$="33" THEN GOSUB 15200:GOTO 11000
11242 IF STP$="34" THEN GOSUB 15300:GOTO 11000
11244 IF STP$="35" THEN GOSUB 15400:GOTO 11000
11246 IF STP$="36" THEN GOSUB 15500:GOTO 11000
11350 IF STP$<>"1" OR STP$<>"2" OR STP$<>"3" OR STP$<>"4" OR
STP$<>"5" OR STP$<>"6" OR STP$<>"7" OR STP$<>"8" OR STP$<>"9"
OR STP$<> "10" THEN LOCATE 23,55
11352 IF STP$<>"11" OR STP$<>"12" OR STP$<>"13" OR STP$<>"14"
OR STP$<>"15" OR STP$<>"16" OR STP$<>"17" OR STP$<>"18" OR
STP$<>"19" OR STP$<>"20" THEN LOCATE 23,55
11354 IF STP$<>"21" OR STP$<>"22" OR STP$<>"23" OR STP$<>"24"
OR STP$<>"25" OR STP$<>"26" OR STP$<>"27" OR STP$<>"28" OR
STP$<>"29" OR STP$<>"30" THEN LOCATE 23,55
11356 IF STP$<>"31" OR STP$<>"32" OR STP$<>"33" OR STP$<>
ANS 30
 CORRECT : 0  INCORRECT : 120564!"   STP$  "+" - + 23,55
11360 PRINT "      ":BEEP:GOTO 11140
11380 '* ------------------------------------------------
11385 CLS:CLEAR:F=60:DIM ROR(F):COLOR 14,1
11390 LOCATE 2,8:PRINT "37. Trawler <50
P";TAB(45)"55. Trawler Fast All    P"
11395 PRINT TAB(8)"38. Trawler <50          A-H";TAB(45)"56.
Trawler Fast All  A-H"
11400 PRINT TAB(8)"39. Trawler <50            S";TAB(45)"57.
Trawler Fast All    S"
11405 PRINT TAB(8)"40. Trawler                P";TAB(45)"58.
Purse Seine All     P"
11410 PRINT TAB(8)"41. Trawler              A-H";TAB(45)"59.
Purse Seine All   A-H"
11415 PRINT TAB(8)"42. Trawler                S";TAB(45)"60.
Purse Seine All     P"
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11420 PRINT TAB(8)"43. Deep Draft Vessel      P";TAB(45)"61.
Hovercraft          P"
11425 PRINT TAB(8)"44. Deep Draft Vessel    A-H";TAB(45)"62.
Hovercraft        A-H"
11430 PRINT TAB(8)"45. Deep Draft Vessel      S";TAB(45)"63.
Hovercraft          S"
11435 PRINT TAB(8)"46. Pilot Vessel           P";TAB(45)"64.
Dreger  <50       A-H"
11440 PRINT TAB(8)"47. Pilot Vessel         A-H";TAB(45)"65.
Dreger  >50         P"
11445 PRINT TAB(8)"48. Pilot Vessel           S";TAB(45)"66.
Dreger  >50         S"
11450 PRINT TAB(8)"49. Trawler Shooting All   P";TAB(45)"67.
Pilot Vessel      A-S"
11455 PRINT TAB(8)"50. Trawler Shooting All A-H";TAB(45)"68.
Pilot Vessel At Anchor"
11460 PRINT TAB(8)"51. Trawler Shooting All   S";TAB(45)"69.
Veesel at Anchor"
11465 PRINT TAB(8)"52. Trawler Hawling All    P";TAB(45)"70.
Vessel Towing     A-S"
11470 PRINT TAB(8)"53. Trawler Hawling All  A-H";TAB(45)"71.
N_U_C             A-S"
11475 PRINT TAB(8)"54. Trawler Hauling All    S";TAB(45)"72.
N_U_C (Not M. Way)A-S"
11480 PRINT:PRINT TAB(15)"Press '--'to move back        '00'
to main Menu"
11482 LOCATE 23,30:PRINT "MAKE YOUR CHOICE PLEASE...";
11485 LINE (0,0)-(639,199),7,B:LINE (4,2)-(635,197),7,B:PAINT
(3,1),14,7
11490  STP$=INPUT$(2)
11495 IF STP$="00" THEN LOAD"TUTOR",R
11500 IF STP$="--" THEN 11000
11510 IF STP$="37" THEN GOSUB 15600:GOTO 11380
11512 IF STP$="38" THEN GOSUB 15700:GOTO 11380
11514 IF STP$="39" THEN GOSUB 15800:GOTO 11380
11516 IF STP$="40" THEN GOSUB 15900:GOTO 11380
11518 IF STP$="41" THEN GOSUB 16000:GOTO 11380
11520 IF STP$="42" THEN GOSUB 16100:GOTO 11380
11522 IF STP$="43" THEN GOSUB 16200:GOTO 11380
11524 IF STP$="44" THEN GOSUB 16300:GOTO 11380
11526 IF STP$="45" THEN GOSUB 16400:GOTO 11380
11528 IF STP$="46" THEN GOSUB 16500:GOTO 11380
11530 IF STP$="47" THEN GOSUB 16600:GOTO 11380
11532 IF STP$="48" THEN GOSUB 16700:GOTO 11380
11534 IF STP$="49" THEN GOSUB 16800:GOTO 11380
11536 IF STP$="50" THEN GOSUB 16900:GOTO 11380
11538 IF STP$="51" THEN GOSUB 17000:GOTO 11380
11540 IF STP$="52" THEN GOSUB 17100:GOTO 11380
11542 IF STP$="53" THEN GOSUB 17200:GOTO 11380
11544 IF STP$="54" THEN GOSUB 17300:GOTO 11380
11546 IF STP$="55" THEN GOSUB 17400:GOTO 11380
11548 IF STP$="56" THEN GOSUB 17500:GOTO 11380
11550 IF STP$="57" THEN GOSUB 17600:GOTO 11380
11552 IF STP$="58" THEN GOSUB 17700:GOTO 11380
11554 IF STP$="59" THEN GOSUB 17800:GOTO 11380
11556 IF STP$="60" THEN GOSUB 17900:GOTO 11380
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11558 IF STP$="61" THEN GOSUB 18000:GOTO 11380
11560 IF STP$="62" THEN GOSUB 18100:GOTO 11380
11562 IF STP$="63" THEN GOSUB 18200:GOTO 11380
11564 IF STP$="64" THEN GOSUB 18300:GOTO 11380
11566 IF STP$="65" THEN GOSUB 18400:GOTO 11380
11568 IF STP$="66" THEN GOSUB 18500:GOTO 11380
11570 IF STP$="67" THEN GOSUB 18600:GOTO 11380
11572 IF STP$="68" THEN GOSUB 18700:GOTO 11380
11574 IF STP$="69" THEN GOSUB 18800:GOTO 11380
11576 IF STP$="70" THEN GOSUB 18900:GOTO 11380
11578 IF STP$="71" THEN GOSUB 19000:GOTO 11380
11580 IF STP$="72" THEN GOSUB 19100:GOTO 11380
11582 IF STP$<>"0" OR STP$<>"-" OR STP$<>"37" OR STP$<>"38"
OR STP$<>"39" OR STP$<>"40" OR STP$<>"41" OR STP$<>"42" OR
STP$<>"43" OR
 STP$<>"45" OR STP$<>"46" OR STP$<>"47" OR STP$<>"48" OR
STP$<>"49" OR STP$<>"50" THEN LOCATE 23,55
11584 '* ------------------------------------------------
11592 IF STP$<>"51" OR STP$<>"52" OR STP$<>"53" OR STP$<>"54"
OR STP$<>"55" OR STP$<>"56" OR STP$<>"57" OR STP$<>"59" OR
STP$<>"60" THEN LOCATE 23,55
11602 IF STP$<>"61" OR STP$<>"62" OR STP$<>"63" OR STP$<>"64"
OR STP$<>"65" OR STP$<>"66" OR STP$<>"67" OR STP$<>"68" OR
STP$<>"68" OR STP$<>"69" OR STP$<>"70" OR STP$<>"71" OR
STP$<>"72" THEN LOCATE 23,55
11612 PRINT "      ":BEEP:GOTO 11482
11700 '* ------------------------------------------------
11705 '******** SCREEN *******
11710 CLS:KEY OFF:SCREEN 8:COLOR 14,0
11712 W=15:B=0:Y=14:R=4:G=2:A=1:Z=7:'*** COLOR DEFINITION ***
11715 LINE (20,10)-(619,127),G,B
11720 LINE (0,133)-(639,179),G,B
11725 LOCATE 22,13:PRINT " Press ";CHR$(34);"S";CHR$(34);"
for sound";"                Press ";CHR$(34);"C";CHR$(34);" to
continue" 11726 LOCATE 18,2:PRINT "Type off vessel:"
11727 LOCATE 20,4:PRINT "Sound signal:"
11728 LOCATE 20,47:PRINT "  Length:"
11730 RETURN
11800 '*************************************************
11805 '***** JUSTIFY *****
11810 LOCATE 1,1
11815 FOR I=1 TO (40-LEN (D$)/2):D$=" "+D$:NEXT I
11820 RETURN
11830 '* ------------------------------------------------
11896 IF STP$="c" OR STP$="C" THEN 17899
11900 '*************************************************
11910 '******************** S o u n d   S i g n a l s *******
11915 '* P D VESSEL UNDERWAY *
11920 WHILE INKEY$<>CHR$(27): SOUND 32767,20:SOUND 100,30:
WEND:RETURN
11925 '* ------------------------------------------------
11930 '* fishing vessel *
11931 WHILE INKEY$<>CHR$(27)
11935       SOUND 32767,20:SOUND 100,30:SOUND 32767,10:SOUND
120,10
11940       SOUND 32767,10:SOUND 120,10
```

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11942 WEND
11945 RETURN
11950 '* ---------------------------------------------------
11952 WHILE INKEY$<>CHR$(27):SOUND 32767,20:SOUND 120,10:
SOUND 32767,5
11954       SOUND 32767,5:SOUND 100,30:SOUND 32767,5:SOUND
120,10
11956 WEND:RETURN
11960 '* ---------------------------------------------------
11962 WHILE INKEY$<>CHR$(27):SOUND 32767,15:SOUND 130,10:
SOUND 32767,5:SOUND 130,10
11964       SOUND 32767,5:SOUND 130,10:SOUND 32767,5:SOUND
130,10:SOUND 32767,15
11966 WEND:RETURN
11990 '*----------------------------------------------------
12000 '****************************************************
12005 '***** LIGHTS DISPLAY *****
12010 CLS
12050 GOSUB 11700 :'** SCREEN **
12055 D$="P D VESSEL PORTSIDE"
12060 GOSUB 11800:PRINT D$:LOCATE 1,1:PRINT H$
12062 LOCATE 22,20:PRINT I$
12065 CIRCLE (320,24),8,Z:PAINT (320,24),W,Z
12070 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
12072 LOCATE 18,20:PRINT "Power driven vessel underway view
from portside"
12074 LOCATE 20,19:PRINT "One long blast at intervals"
12075 LOCATE 21,19:PRINT "not more than 2 minutes"
12076 LOCATE 20,57:PRINT "Less than 50 metres"
12095 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11915:
GOTO 12095
12097 IF STP$="c" OR STP$="C" THEN 12099
12098 GOTO 12095
12099 RETURN
12100 '* ---------------------------------------------------
12105 CLS
12110 GOSUB 11700
12115 D$="P D VESSEL STARBOARD"
12117 GOSUB 11800:PRINT D$
12120 CIRCLE (320,24),8,Z:PAINT (320,24),W,Z
12125 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
12130 LOCATE 18,20:PRINT "Power driven vessel underway view
from starboard"
12135 LOCATE 20,19:PRINT "One long blast at intervals"
12140 LOCATE 21,19:PRINT "not more than 2 minutes"
12145 LOCATE 20,57:PRINT "Less than 50 metres"
12195 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11915:
GOTO 12195
12196 IF STP$="c" OR STP$="C" THEN 12199
12197 IF STP$="c" OR STP$="C" THEN 12199
12198 GOTO 12195
12199 RETURN
12200 '* ---------------------------------------------------
12205 CLS
12210 GOSUB 11700
12215 D$="P D VESSEL AHEAD"
```

```
12220 GOSUB 11800:PRINT D$
12225 CIRCLE (320,24),8,Z:PAINT (320,24),W,Z
12230 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
12235 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
12240 LOCATE 18,20:PRINT "Power driven vessel underway view
from ahead"
12245 LOCATE 20,19:PRINT "One long blast at intervals"
12250 LOCATE 21,19:PRINT "not more than 2 minutes"
12255 LOCATE 20,57:PRINT "Less than 50 metres"
12295 STP$=INKEY$:IF STP$="s"  OR STP$="S" THEN GOSUB 11915:
GOTO 12295
12297 IF STP$="c" OR STP$="C" THEN 12299
12298 GOTO 12295
12299 RETURN
12300 '* ------------------------------------------------
12305 CLS
12310 GOSUB 11700
12315 D$="P D VESSEL (2 White) PORTSIDE"
12320 GOSUB 11800:PRINT D$
12325 CIRCLE (480,20),8,Z:PAINT (480,20),W,Z
12330 CIRCLE (160,30),8,Z:PAINT (160,30),W,Z
12335 CIRCLE (340,90),8,Z:PAINT (340,90),R,Z
12340 LOCATE 18,20:PRINT "Power driven vessel underway view
from porside"
12345 LOCATE 20,19:PRINT "One long blast at intervals"
12350 LOCATE 21,19:PRINT "not more than 2 minutes"
12355 LOCATE 20,57:PRINT "50 metres or more"
12395 STP$=INKEY$:IF STP$="s" OR STP$= "S" THEN GOSUB 11915:
GOTO 12395
12397 IF STP$="c" OR STP$="C" THEN 12399
12398 GOTO 12395
12399 RETURN
12400 '* ------------------------------------------------
12405 CLS
12410 GOSUB 11700
12415 D$="P D VESSEL (2 White) AHEAD"
12420 GOSUB 11800:PRINT D$
12425 CIRCLE (320,20),8,Z:PAINT (320,20),W,Z
12430 CIRCLE (320,30),8,Z:PAINT (320,30),W,Z
12435 CIRCLE (480,100),8,Z:PAINT (480,100),R,Z
12440 CIRCLE (160,100),8,Z:PAINT (160,100),G,Z
12445 LOCATE 18,20:PRINT "Power driven vessel underway view
from ahead"
12450 LOCATE 20,19:PRINT "One long blast at intervals"
12455 LOCATE 21,19:PRINT "not more than 2 minutes"
12460 LOCATE 20,56:PRINT "50 metres or more"
12495 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11915:
GOTO 12495
12497 IF STP$="c" OR STP$="C" THEN 12499
12498 GOTO 12495
12499 RETURN
12500 '* ------------------------------------------------
12505 CLS
12510 GOSUB 11700
12515 D$="P D VESSEL (2 White) STARBOARD"
12520 GOSUB 11800:PRINT D$:LOCATE 22,30:PRINT I$
```

```
12525 CIRCLE (320,96),8,Z:PAINT (320,96),G,Z
12530 CIRCLE (480,30),8,Z:PAINT (480,30),W,Z
12535 CIRCLE (160,20),8,Z:PAINT (160,20),W,Z
12540 LOCATE 18,20:PRINT "Power driven vessel underway view
from starboard"
12542 LOCATE 20,19:PRINT "One long blast at intervals"
12544 LOCATE 21,19:PRINT "not more than 2 minutes"
12546 LOCATE 20,57:PRINT "50 metres or more"
12595 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11915:
GOTO 12595
12596 IF STP$="c" OR STP$="C" THEN 12599
12598 GOTO 12595
12599 RETURN
12600 '* ------------------------------------------------
12605 CLS
12610 GOSUB 11700
12615 D$="TUG (2 White) PORTSIDE"
12620 GOSUB 11800:PRINT D$
12625 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
12630 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
12635 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
12640 LOCATE 18,20:PRINT "Power driven vessel engaged in
towing ahead or alongside"
12642 LOCATE 20,20:PRINT "One long blast followed"
12644 LOCATE 21,20:PRINT "by two shorts"
12646 LOCATE 20,57:PRINT "Less than 50 metres"
12695 STP$=INKEY$:IF STP$="s" OR STP$="S"THEN GOSUB 11930:
GOTO 12695
12696 IF STP$="c" OR STP$="C" THEN 12699
12698 GOTO 12695
12699 RETURN
12700 '* ------------------------------------------------
12705 CLS
12710 GOSUB 11700
12715 D$="TUG (2 White) AHEAD"
12720 GOSUB 11800:PRINT D$
12725 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
12730 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
12735 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
12737 LOCATE 18,20:PRINT "Power driven vessel engaded in
towing ahead or alogside"
12739 LOCATE 20,20:PRINT "One long blast followed"
12740 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
12741 LOCATE 21,20:PRINT "by tow shorts"
12743 LOCATE 20,57:PRINT "Less than 50 metres"
12795 STP$=INKEY$:IF STP$="s" OR STP$="S"THEN GOSUB 11915:
GOTO 12795
12796 IF STP$="c" OR STP$="C" THEN 12799
12797 GOTO 12795
12799 RETURN
12800 '* ------------------------------------------------
12805 CLS
12810 GOSUB 11700
12815 D$="TUG (2 White) STARBOARD"
12820 GOSUB 11800:PRINT D$
12825 CIRCLE (160,96),6,Z:PAINT (160,96),R,Z
```

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12830 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
12835 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
12840 LOCATE 18,20:PRINT "Power driven vessel engaded in
towing ahead or alongside"
12842 LOCATE 20,20:PRINT "One long blast followed"
12844 LOCATE 21,20:PRINT "by two shorts"
12846 LOCATE 20,57:PRINT "Less than 50 metres"
12895 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11915:
GOTO 12895
12896 IF STP$="c" OR STP$="C" THEN 12899
12897 GOTO 13895
12899 RETURN
12900 '* ------------------------------------------------
12905 CLS
12910 GOSUB 11700
12915 D$="TUG (3 White) PORTSIDE"
12920 GOSUB 11800:PRINT D$
12925 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
12930 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
12935 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
12940 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
12942 LOCATE 18,20:PRINT "Power driven vessel engaded in
towing ahead or alongside"
12944 LOCATE 20,20:PRINT "One long blast follwed"
12946 LOCATE 21,20:PRINT "by two shorts"
12948 LOCATE 20,57:PRINT "50 metres or more"
12995 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 12995
12996 IF STP$="c" OR STP$="C" THEN 12999
12997 GOTO 12995
12999 RETURN
13000 '* ------------------------------------------------
13005 CLS
13010 GOSUB 11700
13015 D$="TUG (3 White) AHEAD"
13020 GOSUB 11800:PRINT D$
13025 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
13030 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
13035 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
13040 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
13045 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
13050 LOCATE 18,20:PRINT "Power driven vessel engaded in
towing ahead or alongside" 13052 LOCATE 20,20:PRINT "One long
blast followed"
13054 LOCATE 21,20:PRINT "by two shorts"
13056 LOCATE 20,57:PRINT "Over 50 metres"
13095 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 13095
13096 IF STP$="c" OR STP$="C" THEN 13099
13097 GOTO 13095
13099 RETURN
```

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13100 '* ---------------------------------------------------
13105 CLS
13110 GOSUB 11700
13115 D$="TUG (3 White) STARBOARD"
13120 GOSUB 11800:PRINT D$
13125 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
13130 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
13135 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
13140 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
13142 LOCATE 18,20:PRINT "Power driven vessel engaded in
towing ahead or alongside" 13144 LOCATE 20,20:PRINT "One long
blast followed"
13146 LOCATE 21,20:PRINT "by two shorts"
13148 LOCATE 20,57:PRINT "Over 50 metres"
13195 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 13195
13196 IF STP$="c" OR STP$="C" THEN 13199
13197 GOTO 13195
13199 RETURN
13200 '* ---------------------------------------------------
13205 CLS
13210 GOSUB 11700
13215 D$="TUG & DRACONE PORTSIDE"
13220 GOSUB 11800:PRINT D$
13225 CIRCLE (160,20),6,Z:PAINT (160,20),W,Z
13230 CIRCLE (160,32),6,Z:PAINT (160,32),W,Z
13235 CIRCLE (160,44),6,Z:PAINT (160,44),W,Z
13240 CIRCLE (180,26),5,Z:PAINT (180,26),A,Z
13245 CIRCLE (220,96),6,Z:PAINT (220,96),R,Z
13250 CIRCLE (510,90),6,Z:PAINT (510,90),W,Z
13252 LOCATE 18,20:PRINT "Power driven vessel engaged in
towing a Dracone"
13254 LOCATE 19,20:PRINT "Length of tow is over 200 metres"
13256 LOCATE 20,20:PRINT "One long blast followed"
13258 LOCATE 21,20:PRINT "by tow short blasts(<2min)"
13260 LOCATE 20,57:PRINT "Less than 50 metres"
13295 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 13295
13296 IF STP$="c" OR STP$="C" THEN 13299
13297 GOTO 13295
13299 RETURN
13300 '* ---------------------------------------------------


13305 CLS
13310 GOSUB 11700
13315 D$="TUG & DRACONE AHEAD"
13320 GOSUB 11800:PRINT D$
13325 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
13330 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
13335 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
13340 CIRCLE (340,26),5,Z:PAINT (340,26),A,Z
13345 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
13350 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
13352 LOCATE 18,20:PRINT "Power driven vessel engaged in
towing a Dracone"
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13354 LOCATE 19,20:PRINT "Length of tow is over 200"
13356 LOCATE 20,20:PRINT "One long blast followed"
13358 LOCATE 21,20:PRINT "by 2 short blasts(<2 min)
13360 LOCATE 20,57:PRINT "Less than 50 metres"
13395 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 13395
13396 IF STP$="c" OR STP$="C" THEN 13399
13397 GOTO 13395
13399 RETURN
13400 '* ------------------------------------------------
13405 CLS
13410 GOSUB 11700
13415 D$="TUG & DRACONE STARBOARD"
13420 GOSUB 11800:PRINT D$
13425 CIRCLE (480,20),6,Z:PAINT (480,20),W,Z
13430 CIRCLE (480,32),6,Z:PAINT (480,32),W,Z
13435 CIRCLE (480,44),6,Z:PAINT (480,44),W,Z
13440 CIRCLE (460,26),5,Z:PAINT (460,26),A,Z
13445 CIRCLE (420,96),6,Z:PAINT (420,96),G,Z
13450 CIRCLE (130,90),6,Z:PAINT (130,90),W,Z
13452 LOCATE 18,20:PRINT "Power driven vessel engaded in
towing a Dracone"
13454 LOCATE 19,20:PRINT "Length of tow over 200 metres"
13456 LOCATE 20,20:PRINT "One long blast followed"
13458 LOCATE 21,20:PRINT "by 2 short blasts(<2 min)"
13460 LOCATE 20,57:PRINT "Less than 50 metres"
13495 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 13495
13496 IF STP$="c" OR STP$="C" THEN 13499
13497 GOTO 13495
13499 RETURN
13500 '* ------------------------------------------------
13505 CLS
13510 GOSUB 11700
13515 D$="TUG & TOW PORTSIDE"
13520 GOSUB 11800:PRINT D$
13525 CIRCLE (160,20),6,Z:PAINT (160,20),W,Z
13530 CIRCLE (160,32),6,Z:PAINT (160,32),W,Z
13535 CIRCLE (160,44),6,Z:PAINT (160,44),W,Z
13540 CIRCLE (180,32),5,Z:PAINT (180,32),R,Z
13545 CIRCLE (180,38),5,Z:PAINT (180,38),W,Z
13550 CIRCLE (180,44),5,Z:PAINT (180,44),R,Z
13555 CIRCLE (240,96),6,Z:PAINT (240,96),R,Z
13560 CIRCLE (550,90),6,Z:PAINT (550,90),R,Z
13565 LOCATE 18,18:PRINT "Power driven vessel engaged in
towing unable to change course" 13567 LOCATE 19,18:PRINT
"Length of tow over 200 metres"
13569 LOCATE 20,18:PRINT "One long blast followed"
13571 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)
13573 LOCATE 20,57:PRINT "Less than 50 metres"
13595 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 13595
13596 IF STP$="c" OR STP$="C" THEN 13599
13597 GOTO 13595
13599 RETURN
13600 '* ------------------------------------------------
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```
13605 CLS
13610 GOSUB 11700
13615 D$="TUG & TOW AHEAD"
13620 GOSUB 11800:PRINT D$
13625 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
13630 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
13635 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
13640 CIRCLE (340,32),5,Z:PAINT (340,32),R,Z
13645 CIRCLE (340,38),5,Z:PAINT (340,38),W,Z
13650 CIRCLE (340,44),5,Z:PAINT (340,44),R,Z
13655 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
13660 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
13665 CIRCLE (450,86),6,Z:PAINT (450,86),G,Z
13670 CIRCLE (190,86),6,Z:PAINT (190,86),R,Z
13672 LOCATE 18,18:PRINT "Power driven vessel engaded in
towing unable to change course" 13674 LOCATE 19,18:PRINT
"Lengt of tow over 200 metres"
13676 LOCATE 20,18:PRINT "One long blast followed"
13678 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)
13680 LOCATE 20,57:PRINT "Less then 50 metres"
13695 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11915:
GOTO 13695
13696 IF STP$="c" OR STP$="C" THEN 13699
13697 GOTO 13695
13699 RETURN
13700 '* ------------------------------------------------
13705 CLS
13710 GOSUB 11700
13715 D$="TUG & TOW STARBOARD"
13720 GOSUB 11800:PRINT D$
13725 CIRCLE (480,20),6,Z:PAINT (480,20),W,Z
13730 CIRCLE (480,32),6,Z:PAINT (480,32),W,Z
13735 CIRCLE (480,44),6,Z:PAINT (480,44),W,Z
13740 CIRCLE (460,32),5,Z:PAINT (460,32),R,Z
13745 CIRCLE (460,38),5,Z:PAINT (460,38),W,Z
13750 CIRCLE (460,44),5,Z:PAINT (460,44),R,Z
13755 CIRCLE (400,96),6,Z:PAINT (400,96),G,Z
13760 CIRCLE (90,90),6,Z:PAINT (90,90),G,Z
13762 LOCATE 18,18:PRINT "Power driven vessel engaged in
towing unable to change course" 13764 LOCATE 19,18:PRINT
"Length of tow over than 200 metres"
13766 LOCATE 20,18:PRINT "One long blast followed"
13768 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)
13770 LOCATE 20,57:PRINT "Less than 50 metres"
13795 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 13795
13796 IF STP$="c" OR STP$="C" THEN 13799
13797 GOTO 13795
13799 RETURN
13800 '* ------------------------------------------------
13805 CLS
13810 GOSUB 11700
13815 D$="N_U_C (Making way) PORTSIDE"
13820 GOSUB 11800:PRINT D$
13825 CIRCLE (320,20),6,Z:PAINT (320,20),R,Z
13830 CIRCLE (320,32),6,Z:PAINT (320,32),R,Z
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13835 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
13837 LOCATE 18,19:PRINT "Vessel not under command making way
though the water"
13839 LOCATE 20,19:PRINT "One long blast followed "
13841 LOCATE 21,19:PRINT "by 2 short blasts(<2 min)
13843 LOCATE 20,57:PRINT "No indication"
13895 STP$=INKEY$:IF STP$="S" OR STP$="s" THEN GOSUB 11930:
GOTO 13895
13896 IF STP$="c" OR STP$="C" THEN 13899
13897 GOTO 13895
13899 RETURN
13900 '* ------------------------------------------------
13905 CLS
13910 GOSUB 11700
13915 D$="N_U_C (Making Way) AHEAD"
13920 GOSUB 11800:PRINT D$
13925 CIRCLE (320,20),6,Z:PAINT (320,20),R,Z
13930 CIRCLE (320,32),6,Z:PAINT (320,32),R,Z
13935 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
13940 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
13942 LOCATE 18,19:PRINT "Vessel not under command making way
through the water"
13944 LOCATE 20,19:PRINT "One long blast followed"
13946 LOCATE 21,19:PRINT "by 2 short blasts(<2 min)"
13948 LOCATE 20,57:PRINT "No indication"
13995 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 13995
13996 IF STP$="c" OR STP$="C" THEN 13999
13997 GOTO 13995
13999 RETURN
14000 '* ------------------------------------------------
14005 CLS
14010 GOSUB 11700
14015 D$="N_U_C (Making Way) STARBOARD"
14020 CIRCLE (320,20),6,Z:PAINT (320,20),R,Z
14025 CIRCLE (320,32),6,Z:PAINT (320,32),R,Z
14030 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
14035 LOCATE 18,19:PRINT "Vessel not under command making way
through the water"
14037 LOCATE 20,19:PRINT "One long blast followed "
14039 LOCATE 21,19:PRINT "by 2 short blasts(<2 min)
14041 LOCATE 20,57:PRINT "No indication"
14095 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 14095
14096 IF STP$="c" OR STP$="C" THEN 14099
14097 GOTO 14095
14099 RETURN
14100 '* ------------------------------------------------
14105 CLS
14110 GOSUB 11700
14115 D$="CABLE (Making way) PORTSIDE
14120 GOSUB 11800:PRINT D$
14125 CIRCLE (320,28),6,Z:PAINT (320,28),R,Z
14130 CIRCLE (320,40),6,Z:PAINT (320,40),W,Z
14135 CIRCLE (320,52),6,Z:PAINT (320,52),R,Z
14140 CIRCLE (480,20),6,Z:PAINT (480,20),W,Z
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14145 CIRCLE (120,32),6,Z:PAINT (120,32),W,Z
14150 CIRCLE (400,96),6,Z:PAINT (400,96),R,Z
14152 LOCATE 18,19:PRINT "Vessel restricted in her ability to
manooevre and making" 14154 LOCATE 19,19:PRINT "way through
the water"
14156 LOCATE 20,19:PRINT "One long blast followed"
14158 LOCATE 21,19:PRINT "by to short blasts(<2 min)
14160 LOCATE 20,57:PRINT "Over 50 metres"
14195 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 14195
14196 IF STP$="c" OR STP$="C" THEN 14199
14197 GOTO 14195
14199 RETURN
14200 '* ------------------------------------------------
14205 CLS
14210 GOSUB 11700
14215 D$="CABLE (Making Way) AHEAD"
14220 GOSUB 11800:PRINT D$
14225 CIRCLE (320,28),6,Z:PAINT (320,28),W,Z
14230 CIRCLE (320,40),6,Z:PAINT (320,40),R,Z
14235 CIRCLE (320,50),6,Z:PAINT (320,50),W,Z
14240 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
14245 CIRCLE (320,60),6,Z:PAINT (320,60),W,Z
14250 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
14255 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
14257 LOCATE 18,19:PRINT "Vessel restricted in her ability to
manoeuvre and making" 14259 LOCATE 19,19:PRINT "way through
the water"
14261 LOCATE 20,19:PRINT "One long blast followed"
14263 LOCATE 21,19:PRINT "by 2 short blasts(<2 min)"
14265 LOCATE 20,57:PRINT "Over 50 metres"
14295 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 14295
14296 IF STP$="c" OR STP$="C" THEN 14299
14297 GOTO 14295
14299 RETURN
14300 '* ------------------------------------------------
14305 CLS
14310 GOSUB 11700
14315 D$="CABLE (Making Way) STARBOARD"
14317 GOSUB 11800:PRINT D$
14320 CIRCLE (320,28),6,Z:PAINT (320,28),R,Z
14325 CIRCLE (320,40),6,Z:PAINT (320,40),W,Z
14330 CIRCLE (320,52),6,Z:PAINT (320,52),R,Z
14335 CIRCLE (160,20),6,Z:PAINT (160,20),W,Z
14340 CIRCLE (480,32),6,Z:PAINT (480,32),W,Z
14345 CIRCLE (260,96),6,Z:PAINT (260,96),W,Z
14347 LOCATE 18,19:PRINT "Vessel restricted in her ability to
manoeuvre and making" 14349 LOCATE 19,19:PRINT "way through
the water"
14351 LOCATE 20,19:PRINT "One long blast followed"
14353 LOCATE 21,19:PRINT "by 2 short blasts(<2 min)
14355 LOCATE 20,57:PRINT "Over 50 metres"
14395 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 14395
14396 IF STP$="c" OR STP$="C" THEN 14399
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14397 GOTO 14395
14399 RETURN
14400 '* ------------------------------------------------
14405 CLS
14410 GOSUB 11700
14415 D$="SAILING VESSEL PORTSIDE"
14420 GOSUB 11800:PRINT D$
14425 CIRCLE (320,90),8,Z:PAINT (320,90),R,Z
14427 LOCATE 18,19:PRINT "Sailing vessel underway and seen
from portside
14429 LOCATE 20,19:PRINT "One long blast followed"
14431 LOCATE 21,19:PRINT "by 2 short blasts(<2 min)
14433 LOCATE 20,57:PRINT "Less than 12 metres"
14495 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 14495
14496 IF STP$="c" OR STP$="C" THEN 14499
14497 GOTO 14495
14499 RETURN
14500 '* ------------------------------------------------
14505 CLS
14510 GOSUB 11700
14515 D$="SAILING VESSEL AHEAD
14520 GOSUB 11800:PRINT D$
14525 CIRCLE (160,90),8,Z:PAINT (160,90),G,Z
14530 CIRCLE (480,90),8,Z:PAINT (480,90),R,Z
14532 LOCATE 18,19:PRINT "Sailing vessel underway and seen
from ahead
14534 LOCATE 20,19:PRINT "One long blast followed"
14536 LOCATE 21,19:PRINT "by 2 short blasts(<2 min)
14538 LOCATE 20,57:PRINT "Less than 12 metres"
14595 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 14595
14596 IF STP$="c" OR STP$="C" THEN 14599
14597 GOTO 14595
14599 RETURN
14600 '* ------------------------------------------------
14605 CLS
14610 GOSUB 11700
14615 D$="SAILING VESSEL STARBOARD"
14620 GOSUB 11800:PRINT D$
14625 CIRCLE (320,90),8,Z:PAINT (320,90),G,Z
14630 LOCATE 18,19:PRINT "Sailing vessel underway and ssen
from strarboard"
14632 LOCATE 20,19:PRINT "One long blast followed"
14634 LOCATE 21,19:PRINT "by 2 short blasts(<2 min)"
14636 LOCATE 20,57:PRINT "Less than 12 metres"
14695 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 14695
14696 IF STP$="c" OR STP$="C" THEN 14699
14697 GOTO 14695
14699 RETURN
14700 '* ------------------------------------------------
14705 CLS
14710 GOSUB 11700
14715 D$="SAILING VESSEL (Optional) PORTSIDE"
14720 GOSUB 11800:PRINT D$
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14725 CIRCLE (320,20),8,Z:PAINT (320,20),R,Z
14730 CIRCLE (320,32),8,Z:PAINT (320,32),G,Z
14735 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
14737 LOCATE 18,19:PRINT "Sailing vessel exhibiting the
optional masthead lights"
14739 LOCATE 20,19:PRINT "One long blast followed "
14741 LOCATE 21,19:PRINT "by 2 short blasts(<2 min)
14743 LOCATE 20,57:PRINT "No indication"
14795 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 14795
14796 IF STP$ ="c" OR STP$="C" THEN 14799
14797 GOTO 14795
14799 RETURN
14800 '* ------------------------------------------------
14805 CLS
14810 GOSUB 11700
14815 D$="SAILING VESSEL (Optional) AHEAD"
14820 GOSUB 11800:PRINT D$
14825 CIRCLE (320,20),8,Z:PAINT (320,20),R,Z
14830 CIRCLE (320,32),8,Z:PAINT (320,32),G,Z
14835 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
14840 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
14842 LOCATE 18,19:PRINT "Sailing vessel exhibiting the
optional masthead lights"
14844 LOCATE 20,19:PRINT "One long blast followed"
14846 LOCATE 21,19:PRINT "by 2 short blasts(2< min)
14848 LOCATE 20,57:PRINT "No indication"
14895 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 14895
14896 IF STP$="c" OR STP$="C" THEN 14899
14897 GOTO 14895
14899 RETURN
14900 '* ------------------------------------------------
14905 CLS
14910 GOSUB 11700
14915 D$="SAILING VESSEL (Optional) STARBOARD"
14920 CIRCLE (320,20),8,Z:PAINT (320,20),R,Z
14925 CIRCLE (320,32),8,Z:PAINT (320,32),G,Z
14930 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
14932 LOCATE 18,19:PRINT "Sailing vessel exhibiting the
optional masthead lights"
14934 LOCATE 20,19:PRINT "One long blast followed "
14936 LOCATE 21,19:PRINT "by 2 short blasts(2< min)
14938 LOCATE 20,57:PRINT "No indication"
14995 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 14995
14996 IF STP$="c" OR STP$="C" THEN 14999
14997 GOTO 14995
14999 RETURN
15000 '* ------------------------------------------------
15005 CLS
15010 GOSUB 11700
15015 D$="FISHING VESSEL PORTSIDE"
15020 GOSUB 11800:PRINT D$
15025 CIRCLE (320,20),8,Z:PAINT (320,20),R,Z
15030 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
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15035 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
15040 LOCATE 18,18:PRINT "Vishing vessel other than trawler
making way through the water" 15042 LOCATE 19,18:PRINT "with
nets extending 150 metres or less"
15044 LOCATE 20,18:PRINT "One long blast followed"
15046 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)
15048 LOCATE 20,57:PRINT "No indication"
15095 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 15095
15096 IF STP$="c" OR STP$="C" THEN 15099
15097 GOTO 15095
15099 RETURN
15100 '* ------------------------------------------------
15105 CLS
15110 GOSUB 11700
15115 D$="FISHING VESSEL AHEAD"
15120 GOSUB 11800:PRINT D$
15125 CIRCLE (320,20),8,Z:PAINT (320,20),R,Z
15130 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
15135 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
15140 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
15142 LOCATE 18,18:PRINT "Power driven vessel other than
trawler making way through" 15144 LOCATE 19,18:PRINT "with
nets extendig 150 metres or less"
15146 LOCATE 20,18:PRINT "One long blast followed"
15148 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
15150 LOCATE 20,57:PRINT "No indication"
15195 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 15195
15196 IF STP$="c" OR STP$="C" THEN 15199
15198 GOTO 15195
15199 RETURN
15200 '* ------------------------------------------------
15205 CLS
15210 GOSUB 11700
15215 D$="SAILING VESSEL STARBOARD"
15220 GOSUB 11800:PRINT D$
15225 CIRCLE (320,20),8,Z:PAINT (320,20),R,Z
15230 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
15235 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
15240 LOCATE 18,18:PRINT "Fishing vessel other than trawler
making way through the water" 15242 LOCATE 19,18:PRINT "with
nets extending 150 metres or less"
15244 LOCATE 20,18:PRINT "One long blast followed"
15246 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
15248 LOCATE 20,57:PRINT "No indication"
15295 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11925:
GOTO 15295
15296 IF STP$="c" OR STP$="C" THEN 15299
15297 GOTO 15295
15299 RETURN
15300 '* ------------------------------------------------
15305 CLS
15310 GOSUB 11700
15312 D$="MINESWEEPER PORTSIDE"
15313 GOSUB 11800:PRINT D$
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15315 CIRCLE (320,20),6,Z:PAINT (320,20),G,Z
15320 CIRCLE (280,32),6,Z:PAINT (280,32),G,Z
15325 CIRCLE (360,32),6,Z:PAINT (360,32),G,Z
15330 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
15335 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
15340 LOCATE 18,18:PRINT "A vessel engaged in minesweeping
and seen from portside"
15342 LOCATE 20,18:PRINT "One long blast fllowed"
15344 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)
15346 LOCATE 20,57:PRINT "No indication"
15395 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 15395
15396 IF STP$="c" OR STP$="C" THEN 15399
15397 GOTO 15395
15399 RETURN
15400 '* ------------------------------------------------
15405 CLS
15410 GOSUB 11700
15415 D$="MINESWEEPER AHEAD"
15420 GOSUB 11800:PRINT D$
15425 CIRCLE (320,20),6,Z:PAINT (320,20),G,Z
15430 CIRCLE (280,32),6,Z:PAINT (280,32),G,Z
15435 CIRCLE (360,32),6,Z:PAINT (360,32),G,Z
15440 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
15445 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
15450 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
15452 LOCATE 18,18:PRINT "A vessel engaged in minesweeping
and seen froom ahead"
15454 LOCATE 20,18:PRINT "One long blast followed"
15456 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
15458 LOCATE 20,57:PRINT "No indication"
15495 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 15495
15496 IF STP$="c" OR STP$="C" THEN 15499
15497 GOTO 15495
15499 RETURN
15500 '* ------------------------------------------------
15505 CLS
15510 GOSUB 11700
15515 D$="MINESWEEPER STARBOARD"
15520 GOSUB 11800:PRINT D$
15525 CIRCLE (320,20),6,Z:PAINT (320,20),G,Z
15530 CIRCLE (280,32),6,Z:PAINT (280,32),G,Z
15535 CIRCLE (360,32),6,Z:PAINT (360,32),G,Z
15540 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
15545 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
15550 LOCATE 18,18:PRINT "A vessel engaged in minesweeping
and seen from starboard" 15552 LOCATE 20,18:PRINT "One long
blast followed"
15554 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
15556 LOCATE 20,57:PRINT "No indication"
15595 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 15595
15596 IF STP$="c" OR STP$="C" THEN 15599
15597 GOTO 15595
15599 RETURN
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15600 '*-----------------------------------------------------
15605 CLS
15610 GOSUB 11700
15615 D$="TRAWLER (<50 Metres) PORTSIDE
15620 GOSUB 11800:PRINT D$
15625 CIRCLE (320,20),8,Z:PAINT (320,20),G,Z
15630 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
15635 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
15640 LOCATE 18,18:PRINT "Vessel engaged in trawling under
way and seen from portside" 15642 LOCATE 20,18:PRINT "One
long blast followed"
15644 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
15646 LOCATE 20,57:PRINT "Less than 50 metres"
15695 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 15695
15696 IF STP$="c" OR STP$="C" THEN 15699
15697 GOTO 15695
15699 RETURN
15700 '* -----------------------------------------------------
15705 CLS
15710 GOSUB 11700
15715 D$="TRAWLER (<50 Metres) AHEAD"
15720 GOSUB 11800:PRINT D$
15725 CIRCLE (320,20),8,Z:PAINT (320,20),G,Z
15730 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
15735 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
15740 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
15742 LOCATE 18,20:PRINT "Vessel engaged in trawling under
way and seen from ahead" 15744 LOCATE 20,18:PRINT "One long
blast followed"
15746 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
15748 LOCATE 20,57:PRINT "Less than 50 metres"
15795 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 15795
15796 IF STP$="c" OR STP$="C" THEN 15799
15797 GOTO 15795
15799 RETURN
15800 '* -----------------------------------------------------
15805 CLS
15810 GOSUB 11700
15815 D$="TRAWLER (<50 Metres) STARBOARD"
15820 GOSUB 11800:PRINT D$
15825 CIRCLE (320,20),8,Z:PAINT (320,20),G,Z
15830 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
15835 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
15840 LOCATE 18,18:PRINT "Vessel engded in trawling under way
and seen from starboard" 15842 LOCATE 20,18:PRINT "One long
blast followed"
15844 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
15846 LOCATE 20,57:PRINT "Less than 50 metres"
15895 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 15895
15896 IF STP$="c" OR STP$="C" THEN 15899
15897 GOTO 15895
15899 RETURN
15900 '* -----------------------------------------------------
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15905 CLS
15910 GOSUB 11700
15915 D$="TRAWLER PORTSIDE"
15920 GOSUB 11800:PRINT D$
15925 CIRCLE (480,20),8,Z:PAINT (480,20),W,Z
15930 CIRCLE (280,32),8,Z:PAINT (280,32),G,Z
15935 CIRCLE (280,44),8,Z:PAINT (280,44),W,Z
15940 CIRCLE (320,96),8,Z:PAINT (320,96),R,Z
15942 LOCATE 18,18:PRINT "Vessel engaged in trawling and
making way through the water" 15944 LOCATE 20,18:PRINT "One
long blast followed"
15946 LOCATE 21,18:PRINT "by 2 short blasts"
15948 LOCATE 20,57:PRINT "Over 50 metres"
15995 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 15995
15996 IF STP$="c" OR STP$="C" THEN 15999
15997 GOTO 15995
15999 RETURN
16000 '* ------------------------------------------------
16005 CLS
16010 GOSUB 11700
16015 D$="TRAWLER"
16020 GOSUB 11800:PRINT D$
16025 CIRCLE (320,20),8,Z:PAINT (320,20),W,Z
16030 CIRCLE (320,32),8,Z:PAINT (320,32),G,Z
16035 CIRCLE (320,44),8,Z:PAINT (320,44),W,Z
16040 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
16045 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
16050 LOCATE 18,18:PRINT "Vessel engaged in trawling and
making way through the  water" 16052 LOCATE 20,18:PRINT "One
long blast followed"
16054 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
16056 LOCATE 20,57:PRINT "Over 50 metres"
16095 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 16095
16096 IF STP$="c" OR STP$="C" THEN 16099
16097 GOTO 16095
16099 RETURN
16100 '* ------------------------------------------------
16105 CLS
16110 GOSUB 11700
16115 D$="TRAWLER STARBOARD"
16120 GOSUB 11800:PRINT D$
16125 CIRCLE (160,20),8,Z:PAINT (160,20),W,Z
16130 CIRCLE (360,32),8,Z:PAINT (360,32),G,Z
16135 CIRCLE (360,44),8,Z:PAINT (360,44),W,Z
16140 CIRCLE (320,96),8,Z:PAINT (320,96),G,Z
16142 LOCATE 18,18:PRINT "Vessel engaded in trawling and
making way through the water" 16144 LOCATE 20,18:PRINT "One
long blast followed"
16146 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
16148 LOCATE 20,57:PRINT "Over 50 metres"
16195 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 16195
16196 IF STP$="c" OR STP$="C" THEN 16199
16197 GOTO 16195
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16199 RETURN
16200 '* ---------------------------------------------------
16205 CLS
16210 GOSUB 11700
16215 D$="DEEP DRAFT VESSEL PORTSIDE"
16220 GOSUB 11800:PRINT D$
16225 CIRCLE (140,25),6,Z:PAINT (140,25),W,Z
16230 CIRCLE (320,30),6,Z:PAINT (320,30),R,Z
16235 CIRCLE (320,40),6,Z:PAINT (320,40),R,Z
16240 CIRCLE (320,50),6,Z:PAINT (320,50),R,Z
16245 CIRCLE (480,20),6,Z:PAINT (480,20),W,Z
16250 CIRCLE (360,96),6,Z:PAINT (360,96),R,Z
16252 LOCATE 18,18:PRINT "Power driven vessel underway and
constrained by her draft" 16254 LOCATE 20,18:PRINT "One long
blast followed "
16256 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
16258 LOCATE 20,57:PRINT "50 metres or more:
16295 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 16295
16296 IF STP$="c" OR STP$="C" THEN 16299
16297 GOTO 16295
16299 RETURN.
16300 '* ---------------------------------------------------
16305 CLS
16310 GOSUB 11700
16315 D$="DEEP DRAFT VESSEL AHEAD"
16320 GOSUB 11800:PRINT D$
16325 CIRCLE (320,16),6,Z:PAINT (320,16),W,Z
16330 CIRCLE (320,26),6,Z:PAINT (320,26),W,Z
16335 CIRCLE (320,35),6,Z:PAINT (320,35),R,Z
16340 CIRCLE (320,45),6,Z:PAINT (320,45),R,Z
16345 CIRCLE (320,55),6,Z:PAINT (320,55),R,Z
16350 CIRCLE (160,100),6,Z:PAINT (160,100),G,Z
16355 CIRCLE (480,100),6,Z:PAINT (480,100),R,Z
16360 LOCATE 18,18:PRINT "Power driven vessel underway and
constrained by her draft" 16362 LOCATE 20,18:PRINT "One long
blast followed"
16364 LOCATE 21,18:PRINT "2 short blasts(<2 min)"
16366 LOCATE 20,57:PRINT "50 metres or more"
16395 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 16395
16396 IF STP$="c" OR STP$="C" THEN 16399
16397 GOTO 16395
16399 RETURN
16400 '* ---------------------------------------------------
16405 CLS
16410 GOSUB 11700
16415 D$="DEEP DRAFT VESSEL STARBOARD"
16420 GOSUB 11800:PRINT D$
16425 CIRCLE (140,20),6,Z:PAINT (140,20),W,Z
16430 CIRCLE (320,30),6,Z:PAINT (320,30),R,Z
16435 CIRCLE (320,40),6,Z:PAINT (320,40),R,Z
16440 CIRCLE (320,50),6,Z:PAINT (320,50),R,Z
16445 CIRCLE (480,25),6,Z:PAINT (480,25),W,Z
16450 CIRCLE (280,96),6,Z:PAINT (280,96),G,Z
16452 LOCATE 18,18:PRINT "Power driven vessel underway and
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consdtrained by herdraft" 16454 LOCATE 20,18:PRINT "One long
blast followed"
16456 LOCATE 21,18:PRINT "by 2 short blast(<2 min)"
16458 LOCATE 20,57:PRINT "50 metres or more"
16495 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 16495
16496 IF STP$="c" OR STP$="C" THEN 16499
16497 GOTO 16495
16499 RETURN
16500 '* ------------------------------------------------
16505 CLS
16510 GOSUB 11700
16515 D$="PILOT VESSEL PORTSIDE"
16520 GOSUB 11800:PRINT D$
16525 CIRCLE (300,20),8,Z:PAINT (300,20),W,Z
16530 CIRCLE (300,32),8,Z:PAINT (300,32),R,Z
16535 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
16540 LOCATE 18,18:PRINT "Vessel engaded in pilotage duty
underway seen from portside" 16542 LOCATE 20,18:PRINT "One
long blast followed
16544 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
16546 LOCATE 20,57:PRINT "No indication"
16595 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 16595
16596 IF STP$="c" OR STP$="C" THEN 16599
16597 GOTO 16595
16599 RETURN
16600 '* ------------------------------------------------
16605 CLS
16610 GOSUB 11700
16615 D$="PILOT VESSEL AHEAD"
16620 GOSUB 11800:PRINT D$
16625 CIRCLE (320,20),8,Z:PAINT (320,20),W,Z
16630 CIRCLE (320,32),8,Z:PAINT (320,32),R,Z
16635 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
16640 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
16642 LOCATE 18,18:PRINT "Vessel engaded in ilotage duty
underway seen from ahead"
16644 LOCATE 20,18:PRINT "One long blast followed"
16646 LOCATE 21,18:PRINT "by 2 short blasts"
16648 LOCATE 20,57:PRINT "No indication"
16695 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 16695
16696 IF STP$="c" OR STP$="C" THEN 16699
16697 GOTO 16695
16699 RETURN
16700 '* ------------------------------------------------
16705 CLS
16710 GOSUB 11700
16715 D$="PILOT VESSEL STARBOARD"
16720 GOSUB 11800:PRINT D$
16725 CIRCLE (340,20),8,Z:PAINT (340,20),W,Z
16730 CIRCLE (340,32),8,Z:PAINT (340,32),R,Z
16735 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
16740 LOCATE 18,18:PRINT "Vessel engaded in pilotage underway
and seen from starboard" 16742 LOCATE 20,18:PRINT "One long
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blast followed"
16744 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
16746 LOCATE 20,57:PRINT "No indication"
16795 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 16795
16796 IF STP$="c" OR STP$="C" THEN 16799
16797 GOTO 16795
16799 RETURN
16800 '* ------------------------------------------------
16805 CLS
16810 GOSUB 11700
16815 D$="TRAWLER SHOOTING ALL PORTSIDE"
16820 GOSUB 11800:PRINT D$
16825 CIRCLE (480,20),6,Z:PAINT (480,20),W,Z
16830 CIRCLE (300,30),6,Z:PAINT (300,30),G,Z
16835 CIRCLE (300,40),6,Z:PAINT (300,40),W,Z
16840 CIRCLE (300,60),6,Z:PAINT (300,60),W,Z
16845 CIRCLE (300,70),6,Z:PAINT (300,70),W,Z
16850 CIRCLE (340,96),6,Z:PAINT (340,96),R,Z
16852 LOCATE 18,18:PRINT "Vessel engaged in trawling underway
and shooting nets"
16854 LOCATE 20,18:PRINT "One long blast followed"
16856 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
16858 LOCATE 20,57:PRINT "Less than 50 metres"
16895 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 16895
16896 IF STP$="c" OR STP$="C" THEN 16899
16897 GOTO 16895
16899 RETURN
16900 '* ------------------------------------------------
16905 CLS
16910 GOSUB 11700
16915 D$="TRAWLER SHOOTING ALL AHEAD"
16920 GOSUB 11800:PRINT D$
16925 CIRCLE (320,20),6,Z:PAINT (320,20),G,Z
16930 CIRCLE (320,30),6,Z:PAINT (320,30),W,Z
16935 CIRCLE (340,50),6,Z:PAINT (340,50),W,Z
16940 CIRCLE (340,60),6,Z:PAINT (340,60),W,Z
16945 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
16950 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
16952 LOCATE 18,18:PRINT "Vessel engaged in trawling underway
and shooting her nets" 16954 LOCATE 20,18:PRINT "One long
blast followed"
16956 LOCATE 21,18:PRINT "2 short blasts(<2 min)"
16958 LOCATE 20,57:PRINT "Less than 50 metres"
16995 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 16995
16996 IF STP$="c" OR STP$="C" THEN 16999
16997 GOTO 16995
16999 RETURN
17000 '* ------------------------------------------------
17005 CLS
17010 GOSUB 11700
17015 D$="TRAWLER SHOOTING ALL STARBOARD"
17020 GOSUB 11800:PRINT D$
17025 CIRCLE (160,20),6,Z:PAINT (160,20),W,Z
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17030 CIRCLE (340,30),6,Z:PAINT (340,30),G,Z
17035 CIRCLE (340,40),6,Z:PAINT (340,40),W,Z
17040 CIRCLE (340,60),6,Z:PAINT (340,60),W,Z
17045 CIRCLE (340,70),6,Z:PAINT (340,70),W,Z
17050 CIRCLE (300,96),6,Z:PAINT (300,96),G,Z
17052 LOCATE 18,18:PRINT "Vessel engaged in trawling underway
and shooting nets"
17054 LOCATE 20,18:PRINT "One long blast followed"
17056 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)
17058 LOCATE 20,57:PRINT "Less than 50 metres"
17095 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 17095
17096 IF STP$="c" OR STP$="C" THEN 17099
17097 GOTO 17095
17099 RETURN
17100 '* ------------------------------------------------
17105 CLS
17110 GOSUB 11700
17115 D$="TRAWLER HAULING ALL PORTSIDE"
17120 GOSUB 11800:PRINT D$
17125 CIRCLE (480,20),6,Z:PAINT (480,20),W,Z
17130 CIRCLE (280,30),6,Z:PAINT (280,30),G,Z
17135 CIRCLE (280,40),6,Z:PAINT (280,40),W,Z
17140 CIRCLE (300,60),6,Z:PAINT (300,60),W,Z
17145 CIRCLE (300,70),6,Z:PAINT (300,70),R,Z
17150 CIRCLE (340,96),6,Z:PAINT (340,96),R,Z
17152 LOCATE 18,18:PRINT "Vessel engaged in trawling underway
and hauling the nets" 17154 LOCATE 20,18:PRINT "One long
blast followed"
17156 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
17158 LOCATE 20,57:PRINT "Less than 50 metres"
17195 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 17195
17196 IF STP$="c" OR STP$="C" THEN 17199
17197 GOTO 17195
17199 RETURN
17200 '* ------------------------------------------------
17205 CLS
17210 GOSUB 11700
17215 D$="TRAWLER HAULING ALL AHEAD"
17220 GOSUB 11800:PRINT D$
17225 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
17230 CIRCLE (320,30),6,Z:PAINT (320,30),G,Z
17235 CIRCLE (320,40),6,Z:PAINT (320,40),W,Z
17240 CIRCLE (340,60),6,Z:PAINT (340,60),W,Z
17245 CIRCLE (340,70),6,Z:PAINT (340,70),R,Z
17250 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
17255 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
17260 LOCATE 18,18:PRINT "Vessel engaded in trawling underway
and hauling the nets" 17262 LOCATE 20,18:PRINT "One long
blast followed"
17264 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
17266 LOCATE 20,57:PRINT "Less than 50 metres"
17295 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 17295
17296 IF STP$="c" OR STP$="C" THEN 17299
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17297 GOTO 17295
17299 RETURN
17300 '* ------------------------------------------------
17305 CLS
17310 GOSUB 11700
17315 D$="TRAWLER HAULING ALL STARBOARD"
17320 GOSUB 11800:PRINT D$
17325 CIRCLE (160,20),6,Z:PAINT (160,20),W,Z
17330 CIRCLE (360,30),6,Z:PAINT (360,30),G,Z
17335 CIRCLE (360,40),6,Z:PAINT (360,40),W,Z
17340 CIRCLE (340,60),6,Z:PAINT (340,60),W,Z
17345 CIRCLE (340,70),6,Z:PAINT (340,70),R,Z
17350 CIRCLE (300,96),6,Z:PAINT (300,96),G,Z
17360 LOCATE 18,18:PRINT "Vessel engaded in trawling underway
and hauling the nets" 17362 LOCATE 20,18:PRINT "One long
blast followed"
17364 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
17366 LOCATE 20,57:PRINT "Less than 50 metres"
17395 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 17395
17396 IF STP$="c" OR STP$="C" THEN 17399
17397 GOTO 17395
17399 RETURN
17400 '* ------------------------------------------------
17405 CLS
17410 GOSUB 11700
17415 D$="TRAWLER FAST ALL PORTSIDE"
17420 GOSUB 11800:PRINT D$
17425 CIRCLE (480,20),6,Z:PAINT (480,20),W,Z
17430 CIRCLE (280,30),6,Z:PAINT (280,30),G,Z
17435 CIRCLE (280,40),6,Z:PAINT (280,40),W,Z
17440 CIRCLE (300,60),6,Z:PAINT (300,60),R,Z
17445 CIRCLE (300,70),6,Z:PAINT (300,70),R,Z
17450 LOCATE 18,18:PRINT "Vessel engaded in trawling not
making way with her nets " 17452 LOCATE 19,18:PRINT "fast to
an obstruction"
17454 LOCATE 20,18:PRINT "One long blast followed"
17456 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
17458 LOCATE 20,57:PRINT "50 metres or more"
17495 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 17495
17496 IF STP$="c" OR STP$="C" THEN 17499
17497 GOTO 17495
17499 RETURN
17500 '* ------------------------------------------------
17505 CLS
17510 GOSUB 11700
17515 D$="TRAWLER FAST ALL AHEAD"
17520 GOSUB 11800:PRINT D$
17525 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
17530 CIRCLE (320,30),6,Z:PAINT (320,30),G,Z
17535 CIRCLE (320,40),6,Z:PAINT (320,40),W,Z
17540 CIRCLE (340,60),6,Z:PAINT (340,60),R,Z
17545 CIRCLE (340,70),6,Z:PAINT (340,70),R,Z
17550 LOCATE 18,18:PRINT "Vessel engaded in trawling not
making way with her nets"
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17552 LOCATE 19,18:PRINT "fast to an obstruction"
17554 LOCATE 20,18:PRINT "One long blast followed"
17556 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
17558 LOCATE 20,57:PRINT "50 metres or more"
17595 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 17595
17596 IF STP$="c" OR STP$="C" THEN 17599
17597 GOTO 17595
17599 RETURN
17600 '* ------------------------------------------------
17605 CLS
17610 GOSUB 11700
17615 D$="TRAWLER FAST ALL STARBOARD"
17620 GOSUB 11800:PRINT D$
17625 CIRCLE (160,20),6,Z:PAINT (160,20),W,Z
17630 CIRCLE (360,30),6,Z:PAINT (360,30),G,Z
17635 CIRCLE (360,40),6,Z:PAINT (360,40),W,Z
17640 CIRCLE (340,60),6,Z:PAINT (340,60),R,Z
17645 CIRCLE (340,70),6,Z:PAINT (340,70),R,Z
17650 LOCATE 18,18:PRINT "Vessel engaged in trawling not
making way and with nets"
17652 LOCATE 19,18:PRINT "fast to an obstruction"
17654 LOCATE 20,18:PRINT "One long blast followed"
17656 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
17658 LOCATE 20,57:PRINT "50 metres or more"
17695 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 17695
17696 IF STP$="c" OR STP$="C" THEN 17699
17697 GOTO 17695
17699 RETURN
17700 '* ------------------------------------------------
17705 CLS
17710 GOSUB 11700
17715 D$="PURSE SEINE ALL PORTSIDE"
17720 GOSUB 11800:PRINT D$
17725 CIRCLE (300,20),8,Z:PAINT (300,20),R,Z
17730 CIRCLE (300,30),8,Z:PAINT (300,30),W,Z
17735 CIRCLE (320,50),8,Z:PAINT (320,50),Y,Z:'*** FLASHING **
17740 GET (322,40)-(333,60),ROR
17745 CIRCLE (340,96),8,Z:PAINT (340,96),R,Z
17748 LOCATE 18,18:PRINT "Vessel engaged in fishing with
purse seine nets and underway" 17750 LOCATE 20,18:PRINT "One
long blast followed"
17752 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
17753 'GET (310,40)-(330,60),ROR
17754 LOCATE 20,57:PRINT "No indication"
17795 STP$=INKEY$:IF STP$="s" OR STP$="S"THEN GOSUB 11930:
GOTO 17795
17796 IF STP$="c" OR STP$="C" THEN 17799
17797 FOR N=0 TO 50:NEXT N:PUT (315,40),ROR,XOR
17798 FOR N=0 TO 100:NEXT N:GOTO 17795
17799 RETURN
17800 '* ------------------------------------------------
17805 CLS
17810 GOSUB 11700
17815 D$="PURSE SEINE ALL AHEAD"
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17820 GOSUB 11800:PRINT D$
17825 CIRCLE (320,20),8,Z:PAINT (320,20),R,Z
17830 CIRCLE (320,30),8,Z:PAINT (320,30),W,Z
17837 GET (330,40)-(350,60),ROR
17840 CIRCLE (340,60),8,Z:PAINT (340,60),Y,Z:'*** FLASHING **
17843 GET (330,50)-(350,70),ROR
17845 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
17850 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
17852 LOCATE 18,20:PRINT "Vessel engaged in fishing with
purse seine nets and underway" 17854 LOCATE 20,19:PRINT "One
long blast followed"
17856 LOCATE 21,19:PRINT "by 2 short blasts(<2 min)"
17858 LOCATE 20,57:PRINT "No indication"
17895 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 17895
17896 IF STP$="c" OR STP$="C" THEN 17899
17897 PUT (330,50),ROR,XOR:FOR N=0 TO 50:NEXT N:PUT
(330,40),ROR,XOR
17898 FOR N=0 TO 100:NEXT N:GOTO 17895
17899 RETURN
17900 '* ------------------------------------------------------
17905 CLS
17910 GOSUB 11700
17915 D$="PURSE SEINE ALL STARBOARD"
17920 GOSUB 11800:PRINT D$
17925 CIRCLE (300,20),8,Z:PAINT (300,20),R,Z
17930 CIRCLE (300,30),8,Z:PAINT (300,30),W,Z
17935 CIRCLE (280,50),8,Z:PAINT (280,50),Y,Z:'*** FLASHING **
17940 GET (270,40)-(290,60),ROR
17945 CIRCLE (320,96),8,Z:PAINT (320,96),R,Z
17950 LOCATE 18,18:PRINT "Vessel engaged in fishing with
purse seine nets and underway" 17952 LOCATE 20,18:PRINT "One
long blast followed"
17954 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
17956 LOCATE 20,57:PRINT "No indication"
17995 STP$=INKEY$:IF STP$="s"  OR STP$="S" THEN GOSUB 11930:
GOTO 17995
17996 IF STP$="c" OR STP$="C" THEN 17999
17997 PUT (270,40),ROR,XOR:FOR N=0 TO 50:NEXT N:PUT
(270,50),ROR,XOR
17998 FOR N=0 TO 100:NEXT N:GOTO 17995
17999 RETURN
18000 '* ------------------------------------------------------
18005 CLS
18010 GOSUB 11700
18015 D$="HOVERCRAFT PORTSIDE"
18020 GOSUB 11800:PRINT D$
18025 CIRCLE (320,20),7,Z:PAINT (320,20),Y,Z:'*** FLASHING **
18027 GET (310,11)-(330,30),ROR
18030 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
18040 CIRCLE (400,96),8,Z:PAINT (400,96),R,Z
18042 LOCATE 18,18:PRINT "An air-cushion vehicle operating in
the non-displacement mode" 18044 LOCATE 20,18:PRINT "One long
blast at intervals"
18046 LOCATE 21,18:PRINT "not more than 2 minutes"
18048 LOCATE 20,57:PRINT "Less than 50 metres"
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18095 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11915:
GOTO 18095
18097 IF STP$="c" OR STP$="C" THEN 18099
18098 PUT (310,11),ROR,XOR:FOR N=1 TO 110:NEXT N:GOTO 18095
18099 RETURN
18100 '* ------------------------------------------------
18105 CLS
18110 GOSUB 11700
18115 D$="HOVERCRAFT AHEAD"
18120 GOSUB 11800:PRINT D$
18125 CIRCLE (320,20),8,Z:PAINT (320,20),Y,Z:'*** FLASHING **
18127 GET (310,11)-(330,30),ROR
18130 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
18135 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
18140 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
18142 LOCATE 18,18:PRINT "An air-cushion vehicle operating in
the non-displacement mode" 18144 LOCATE 20,18:PRINT "One long
blast at intervals"
18146 LOCATE 21,18:PRINT "not more than 2 minutes"
18148 LOCATE 20,57:PRINT "Less than 50 metres"
18195 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11915:
GOTO 18195
18197 IF STP$="c" OR STP$="C" THEN 18199
18198 PUT (310,11),ROR,XOR:FOR N=1 TO 100:NEXT N:GOTO 18195
18199 RETURN
18200 '* ------------------------------------------------
18205 CLS
18210 GOSUB 11700
18215 D$="HOVERCRAFT STARBOARD"
18220 GOSUB 11800:PRINT D$
18225 CIRCLE (300,20),7,Z:PAINT (300,20),Y,Z:'*** FLASHING **
18227 GET (290,11)-(310,30),ROR
18230 CIRCLE (300,32),8,Z:PAINT (300,32),W,Z
18235 CIRCLE (200,96),8,Z:PAINT (200,96),G,Z
18240 LOCATE 18,18:PRINT "An air-cushion vehicle operating in
the non-displacement mode" 18242 LOCATE 20,18:PRINT "One long
blast at intervals"
18244 LOCATE 21,18:PRINT "not more than 2 minutes"
18246 LOCATE 20,57:PRINT "Less than 50 metres"
18295 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11915:
GOTO 18295
18297 IF STP$="c" OR STP$="C" THEN 18299
18298 PUT (290,11),ROR,XOR:FOR N=1 TO 100:NEXT N:GOTO 18295
18299 RETURN
18300 '* ------------------------------------------------
18305 CLS
18310 GOSUB 11700
18312 D$="DREDGER (<50 Metres) AHEAD"
18315 GOSUB 11800:PRINT D$
18320 CIRCLE (320,18),6,Z:PAINT (320,18),W,Z
18325 CIRCLE (320,30),6,Z:PAINT (320,30),R,Z
18330 CIRCLE (320,38),6,Z:PAINT (320,38),W,Z
18335 CIRCLE (320,46),6,Z:PAINT (320,46),R,Z
18340 CIRCLE (280,52),6,Z:PAINT (280,52),R,Z
18345 CIRCLE (280,60),6,Z:PAINT (280,60),R,Z
18350 CIRCLE (360,52),6,Z:PAINT (360,52),G,Z
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18355 CIRCLE (360,60),6,Z:PAINT (360,60),G,Z
18360 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
18365 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
18368 LOCATE 18,18:PRINT "Vessel engaged in dredging making
way through the water"
18370 LOCATE 20,18:PRINT "One long blast followed"
18372 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
18374 LOCATE 20,57:PRINT "Less than 50 metres"
18395 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 18395
18396 IF STP$="c" OR STP$="C" THEN 18399
18397 GOTO 18395
18399 RETURN
18400 '* ------------------------------------------------
18405 CLS
18410 GOSUB 11700
18415 D$="DREDGER (>50 Metres) STARBOARD"
18420 GOSUB 11800:PRINT D$
18425 CIRCLE (160,18),6,Z:PAINT (160,18),W,Z
18430 CIRCLE (320,30),6,Z:PAINT (320,30),R,Z
18435 CIRCLE (320,38),6,Z:PAINT (320,38),W,Z
18440 CIRCLE (320,46),6,Z:PAINT (320,46),R,Z
18445 CIRCLE (280,52),6,Z:PAINT (280,52),R,Z
18450 CIRCLE (280,60),6,Z:PAINT (280,60),R,Z
18455 CIRCLE (360,52),6,Z:PAINT (360,52),G,Z
18460 CIRCLE (360,60),6,Z:PAINT (360,60),G,Z
18465 CIRCLE (220,96),6,Z:PAINT (220,96),G,Z
18470 CIRCLE (480,42),6,Z:PAINT (480,42),W,Z
18472 LOCATE 18,18:PRINT "Vessel enaged in dredging making
way through the water"
18474 LOCATE 20,18:PRINT "One long blast followed"
18476 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
18478 LOCATE 20,57:PRINT "50 metres or more"
18495 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 18495
18496 IF STP$="c" OR STP$="C" THEN 18499
18497 GOTO 18495
18499 RETURN
18500 '* ------------------------------------------------
18505 CLS
18510 GOSUB 11700
18515 D$="DREDGER (>50 Metres) PORTSIDE"
18520 GOSUB 11800:PRINT D$
18525 CIRCLE (480,18),6,Z:PAINT (480,18),W,Z
18530 CIRCLE (320,30),6,Z:PAINT (320,30),R,Z
18535 CIRCLE (320,38),6,Z:PAINT (320,38),W,Z
18540 CIRCLE (320,46),6,Z:PAINT (320,46),R,Z
18545 CIRCLE (280,52),6,Z:PAINT (280,52),R,Z
18550 CIRCLE (280,60),6,Z:PAINT (280,60),R,Z
18555 CIRCLE (360,52),6,Z:PAINT (360,52),G,Z
18560 CIRCLE (360,60),6,Z:PAINT (360,60),G,Z
18565 CIRCLE (420,96),6,Z:PAINT (420,96),R,Z
18570 CIRCLE (160,42),6,Z:PAINT (160,42),W,Z
18572 LOCATE 18,18:PRINT "Vessel engaded in dredging making
way through the water"
18574 LOCATE 20,18:PRINT "One long blast followed"
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18576 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
18578 LOCATE 20,57:PRINT "50 metres or more"
18595 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 18595
18596 IF STP$="c" OR STP$="C" THEN 18599
18597 GOTO 18595
18599 RETURN
18600 '* ------------------------------------------------
18605 CLS
18610 GOSUB 11700
18615 D$="PILOT VESSEL ASTERN"
18620 GOSUB 11800:PRINT D$
18625 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
18630 CIRCLE (320,44),8,Z:PAINT (320,44),R,Z
18635 CIRCLE (320,60),8,Z:PAINT (320,60),W,Z
18640 LOCATE 18,18:PRINT "Pilot vessel engaged in pilotage
duty making way through" 18642 LOCATE 19,18:PRINT "the water
and seen from astern"
18644 LOCATE 20,18:PRINT "One long blast at intervals"
18646 LOCATE 21,18:PRINT "not more than 2 minutes"
18648 LOCATE 20,57:PRINT "No indication"
18695 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11915:
18695
18696 IF STP$="c" OR STP$="C" THEN 18699
18697 GOTO 18695
18699 RETURN
18700 '* ------------------------------------------------
18705 CLS
18710 GOSUB 11700
18715 D$="PILOT VESSEL AT ANCHOR"
18720 GOSUB 11800:PRINT D$
18725 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
18730 CIRCLE (320,44),8,Z:PAINT (320,44),R,Z
18735 CIRCLE (220,70),8,Z:PAINT (220,70),W,Z
18740 CIRCLE (480,50),8,Z:PAINT (480,50),W,Z
18742 LOCATE 18,18:PRINT "Power driven pilot vessel on
sation"
18744 LOCATE 20,18:PRINT "4 short blasts at intervals"
18746 LOCATE 21,18:PRINT "not more than 2 minutes"
18748 LOCATE 20,57:PRINT "50 metres or more"
18795 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11960:
GOTO 18795
18796 IF STP$="c" OR STP$="C" THEN 18799
18797 GOTO 18795
18799 RETURN
18800 '* ------------------------------------------------
18805 CLS
18810 GOSUB 11700
18815 D$="VESSEL AT ANCHOR"
18820 GOSUB 11800:PRINT D$
18825 CIRCLE (200,44),8,Z:PAINT (200,44),W,Z
18830 CIRCLE (400,70),8,Z:PAINT (400,70),W,Z
18840 LOCATE 18,18:PRINT "Power driven vessel at anchor"
18842 LOCATE 20,18:PRINT "One short blast followed by"
18844 LOCATE 21,18:PRINT "one long and another short blast"
18846 LOCATE 20,57:PRINT "50 metres or more"
```

```
18895 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11950:
GOTO 18895
18896 IF STP$="c" OR STP$="C" THEN 18899
18897 GOTO 18895
18899 RETURN
18900 '* ------------------------------------------------
18905 CLS
18910 GOSUB 11700
18915 D$="VESSEL TOWING ASTERN"
18920 GOSUB 11800:PRINT D$
18925 CIRCLE (320,44),8,Z:PAINT (320,44),Y,Z
18930 CIRCLE (320,55),8,Z:PAINT (320,55),W,Z
18935 CIRCLE (320,70),8,Z:PAINT (320,70),W,Z
18940 LOCATE 18,18:PRINT "Power driven vessel engaged in
towing and seen from astern" 18942 LOCATE 20,18:PRINT "One
long blast followed"
18944 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)
18946 LOCATE 20,57:PRINT "No indication"
18995 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 18995
18996 IF STP$="c" OR STP$="C" THEN 18999
18997 GOTO 18995
18999 RETURN
19000 '* ------------------------------------------------
19005 CLS
19010 GOSUB 11700
19015 D$="N_U_C ASTERN"
19020 GOSUB 11800:PRINT D$
19025 CIRCLE (320,32),8,Z:PAINT (320,32),R,Z
19030 CIRCLE (320,44),8,Z:PAINT (320,44),R,Z
19035 CIRCLE (320,70),8,Z:PAINT (320,70),W,Z
19040 LOCATE 18,18:PRINT "Vessel not under command making way
through the water"
19042 LOCATE 19,18:PRINT "and seen from astern or vessel
aground"
19044 LOCATE 20,18:PRINT "One long blast followed"
19046 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
19048 LOCATE 20,57:PRINT "No indication"
19095 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
GOTO 19095
19096 IF STP$="c" OR STP$="C" THEN 19099
19097 GOTO 19095
19099 RETURN
19100 '* ------------------------------------------------
19105 CLS
19110 GOSUB 11700
19115 D$="N_U_C (Not Making Way) ASTERN"
19120 GOSUB 11800:PRINT D$
19125 CIRCLE (320,32),8,Z:PAINT (320,32),R,Z
19130 CIRCLE (320,44),8,Z:PAINT (320,44),R,Z
19140 LOCATE 18,18:PRINT "Vessel not under command and not
making way through the water" 19142 LOCATE 20,18:PRINT "One
long blast followed"GTH:
19144 LOCATE 21,18:PRINT "by 2 short blasts(<2 min)"
19146 LOCATE 20,57:PRINT "No indication"
19195 STP$=INKEY$:IF STP$="s" OR STP$="S" THEN GOSUB 11930:
```

```
GOTO 19195
19196 IF STP$="c" OR STP$="C" THEN 19199
19197 GOTO 19195
19199 RETURN
19200 '*****************************************************
```

MULTIPLE CHOICE TEST

```
5  KEY 15,CHR$(4)+CHR$(70):'TRAP BREAK
6  ON KEY (15) GOSUB 30000
7  KEY (15) ON
10 '* ------------------------------------------------
12 CLS:KEY OFF
20 '*************** MULTIPLE CHOICE TEST **********************
40 LOCATE 10,10:PRINT "The test consists in 12 questions. The
same screens will"
50 PRINT TAB(10)"displayed and you are requested to enter an
answer which"
60 PRINT TAB(10)"is only the number corresponding to the
correct response."
62 LOCATE 20,20:PRINT "Press any key to continue..."
65 A$=INKEY$:IF A$="" THEN 65
70 CLS:LOCATE 10,10
80 '
90  OPEN "O",#1,"TEST.DTA"
95  INPUT "Enter your name";N$
100 PRINT :PRINT:LOCATE 13,10
105 INPUT "Enter your course";CR$
110 PRINT#1,N$;"----------";"Course ";CR$:PRINT#1,:PRINT#1,
115 LOCATE 20,20:PRINT "Press any key to start the test"
120 A$=INKEY$:IF A$="" THEN 120
210 '* ------------------------------------------------------
220 '*************** RANDOM NUMBER GENERATOR *****************
230 FOR T=1 TO 24
235 REM RANDOMIZE TIMER
250 ON T GOSUB
15000,12000,16400,14700,18100,14900,16300,12600,15100,16600,
18000,12400,12800,12100,12700,14800,12500,16400,12300,167
00,12200,15200,18200,16200,
260 NEXT
270 '*********************************************************
300 CLS
305 LOCATE 10,10:PRINT "YOU HAVE FINISHED THE TEST.":PRINT :
PRINT :PRINT
310 PRINT TAB(10)"You had :";COUNT; " correct answers and"
320 PRINT TAB(10) COUNT1;"incorrect answers."
330 PRINT#1," Correct :";COUNT,
340 PRINT#1,"Incorrect :";COUNT1
350 LOCATE 20,20:PRINT "Press  ENTER TO EXIT"
360 A$=INKEY$:IF A$="" THEN 360
370 CLS:SYSTEM
10000 '*******************************************************
10010 '* * * * C O U N T E R * * * *
10020 COUNT=COUNT
10022 COUNT1=COUNT1
10025 STP$=INPUT$(1)
10030 IF STP$=LEFT$(D$,1) THEN COUNT=COUNT+1:PRINT#1,"ANS
";STP$:PRINT#1,:RETURN
10035 IF STP$=LEFT$(B$,1) OR STP$=LEFT$(C$,1) THEN
COUNT1=COUNT1+1:PRINT#1,"ANS ";STP$:PRINT#1,:RETURN
10040 IF STP$=CHR$(13) THEN COUNT=COUNT :RETURN
10200 '* ------------------------------------------------
```

```
11612 PRINT "      ":BEEP:GOTO 10025
11699 RETURN
11700 '* ------------------------------------------------------
11705 '******** SCREEN *******
11710 CLS:SCREEN 8
11712 W=15:B=0:Y=14:R=4:G=2:A=1:Z=7:'*** COLOR DEFINITION ***
11715 LINE (20,10)-(619,127),G,B
11720 LINE (0,133)-(639,179),G,B
11725 LOCATE 22,30:PRINT "Make your choice..."
11727 L1=18:L2=19:L3=20:RETURN
11729 '* ------------------------------------------------------
11730 LOCATE 18,8:PRINT "Question No.";T
11735 RANDOMIZE TIMER
11737 L=INT(RND*3)+1
11739  IF L=1 THEN SWAP L1,L3
11741  IF L=2 THEN SWAP L1,L2
11743  IF L=3 THEN SWAP L3,L2
11750 LOCATE 18,25:LOCATE L1,26:PRINT D$
11755 LOCATE 19,25:LOCATE L2,26:PRINT C$
11760 LOCATE 20,25:LOCATE L3,26:PRINT B$
11762     PRINT#1,"Question No. ";T :PRINT#1,
11764     PRINT#1,D$;" #"
11766     PRINT#1,B$
11768     PRINT#1,C$ :PRINT#1,
11780 RETURN
11800 '* ------------------------------------------------------
11805   REM LOCATE 1,1:PRINT "score=";COUNT
11807 LOCATE 22,30:PRINT "                              "
11808 LOCATE 22,10:PRINT "Press ";CHR$(34);"C";" to continue
Esc to menu"
11810 STP$=INKEY$:IF STP$="c" OR STP$="C" THEN RETURN
11812 IF STP$=CHR$(27) THEN STOP
11814 GOTO 11810
11815 '* ------------------------------------------------------
12000 '*****************************************************
12005 '***** LIGHTS DISPLAY *****
12010 CLS
12050 GOSUB 11700 :'** SCREEN **
12051 B$="1. SAILING VESSEL PORTSIDE"
12054 C$="2. FISHING VESSEL PORTSIDE"
12055 D$="3. POWER DRIVEN VESSEL PORTSIDE"
12065 CIRCLE (320,24),8,Z:PAINT (320,24),W,Z
12070 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
12072 GOSUB 11730
12095 GOSUB 10000:GOSUB 11800
12099 RETURN
12100 '* ------------------------------------------------------
12105 CLS
12110 GOSUB 11700
12112 B$="3. SAILING VESSEL STARBOARD"
12114 C$="1. PILOT VESSEL STARBOARD"
12115 D$="2. POWER DRIVEN VESSEL STARBOARD"
12120 CIRCLE (320,24),8,Z:PAINT (320,24),W,Z
12125 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
12195 GOSUB 11730:GOSUB 10000:GOSUB 11800
12199 RETURN
```

```
12200 '* ---------------------------------------------------
12205 CLS
12210 GOSUB 11700
12215 D$="2. POWER DRIVEN VESSEL AHEAD"
12217 B$="1. FISHING VESSEL ASTERN"
12219 C$="3. PILOT VESSEL AHEAD"
12225 CIRCLE (320,24),8,Z:PAINT (320,24),W,Z
12230 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
12235 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
12295 GOSUB 11730:GOSUB 10000:GOSUB 11800
12299 RETURN
12300 '* ---------------------------------------------------
12305 CLS
12310 GOSUB 11700
12315 D$="2. POWER DRIVEN VESSEL PORTSIDE"
12317 B$="1. VESSEL NOT UNDER COMMAND PORTSIDE"
12319 C$="3. POWER DRIVEN VESSEL LESS THAN 50 METRES"
12325 CIRCLE (480,20),8,Z:PAINT (480,20),W,Z
12330 CIRCLE (160,30),8,Z:PAINT (160,30),W,Z
12335 CIRCLE (340,90),8,Z:PAINT (340,90),R,Z
12395 GOSUB 11730:GOSUB 10000:GOSUB 11800
12399 RETURN
12400 '* ---------------------------------------------------
12405 CLS
12410 GOSUB 11700
12415 D$="3. POWER DRIVEN VESSEL AHEAD"
12417 B$="1. HOVERCRAFT AHEAD"
12419 C$="2. VESSEL AT ANCHOR"
12425 CIRCLE (320,20),8,Z:PAINT (320,20),W,Z
12430 CIRCLE (320,30),8,Z:PAINT (320,30),W,Z
12435 CIRCLE (480,100),8,Z:PAINT (480,100),R,Z
12440 CIRCLE (160,100),8,Z:PAINT (160,100),G,Z
12495 GOSUB 11730:GOSUB 10000:GOSUB 11800
12499 RETURN
12500 '* ---------------------------------------------------
12505 CLS
12510 GOSUB 11700
12515 D$="1. POWER DRIVEN VESSEL STARBOARD"
12517 B$="3. POWER DRIVEN VESSEL LESS THAN 50 METRES"
12519 C$="2. POWER DRIVEN VESSEL PORTSIDE"
12525 CIRCLE (320,96),8,Z:PAINT (320,96),G,Z
12530 CIRCLE (480,30),8,Z:PAINT (480,30),W,Z
12535 CIRCLE (160,20),8,Z:PAINT (160,20),W,Z
12595 GOSUB 11730:GOSUB 10000:GOSUB 11800
12599 RETURN
12600 '* ---------------------------------------------------
12605 CLS
12610 GOSUB 11700
12615 D$="2. TUG BOAT PORTSIDE"
12617 B$="3. MINESWEEPER PORTSIDE"
12619 C$="1. SAILING VESSEL AHEAD"
12625 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
12630 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
12633 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
12635 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
12695 GOSUB 11730:GOSUB 10000:GOSUB 11800
```

```
12699 RETURN
12700 '* ---------------------------------------------------
12705 CLS
12710 GOSUB 11700
12712 B$="1. SAILING VESSEL AHEAD"
12714 C$="3. HOVERCRAFT AHEAD"
12715 D$="2. TUG BOAT AHEAD"
12725 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
12730 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
12733 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
12735 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
12736 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
12738 GOSUB 11730:GOSUB 10000:GOSUB 11800
12799 RETURN
12800 '* ---------------------------------------------------
12805 CLS
12810 GOSUB 11700
12812 B$="1. VESSEL NOT UNDER COMMAND"
12814 C$="3. SAILING VESSEL PORTSIDE"
12815 D$="2. TUG BOAT PORTSIDE"
12825 CIRCLE (160,96),6,Z:PAINT (160,96),R,Z
12830 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
12833 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
12835 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
12838 GOSUB 11730:GOSUB 10000:GOSUB 11800
12899 RETURN
12900 '* ---------------------------------------------------

12905 CLS
12910 GOSUB 11700
12915 D$="TUG (3 White) PORTSIDE"
12925 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
12930 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
12935 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
12940 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
12999 RETURN
13000 '* ---------------------------------------------------
13005 CLS
13010 GOSUB 11700
13015 D$="TUG (3 White) AHEAD"
13025 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
13030 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
13035 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
13040 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
13045 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
13099 RETURN
13100 '* ---------------------------------------------------
13105 CLS
13110 GOSUB 11700
13115 D$="TUG (3 White) STARBOARD"
13125 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
13130 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
13135 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
13140 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
13199 RETURN
13200 '* ---------------------------------------------------
```

```
13205 CLS
13210 GOSUB 11700
13225 CIRCLE (160,20),6,Z:PAINT (160,20),W,Z
13230 CIRCLE (160,32),6,Z:PAINT (160,32),W,Z
13235 CIRCLE (160,44),6,Z:PAINT (160,44),W,Z
13240 CIRCLE (180,26),5,Z:PAINT (180,26),A,Z
13245 CIRCLE (220,96),6,Z:PAINT (220,96),R,Z
13250 CIRCLE (510,90),6,Z:PAINT (510,90),W,Z
13299 RETURN
13300 '* ------------------------------------------------
13305 CLS
13310 GOSUB 11700
13325 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
13330 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
13335 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
13340 CIRCLE (340,26),5,Z:PAINT (340,26),A,Z
13345 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
13350 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
13399 RETURN
13400 '* ------------------------------------------------
13405 CLS
13410 GOSUB 11700
13415 D$="TUG & DRACONE STARBOARD"
13425 CIRCLE (480,20),6,Z:PAINT (480,20),W,Z
13430 CIRCLE (480,32),6,Z:PAINT (480,32),W,Z
13435 CIRCLE (480,44),6,Z:PAINT (480,44),W,Z
13440 CIRCLE (460,26),5,Z:PAINT (460,26),A,Z
13445 CIRCLE (420,96),6,Z:PAINT (420,96),G,Z
13450 CIRCLE (130,90),6,Z:PAINT (130,90),W,Z
13499 RETURN
13500 '* ------------------------------------------------
13505 CLS
13510 GOSUB 11700
13515 D$="TUG & TOW PORTSIDE"
13525 CIRCLE (160,20),6,Z:PAINT (160,20),W,Z
13530 CIRCLE (160,32),6,Z:PAINT (160,32),W,Z
13535 CIRCLE (160,44),6,Z:PAINT (160,44),W,Z
13540 CIRCLE (180,32),5,Z:PAINT (180,32),R,Z
13545 CIRCLE (180,38),5,Z:PAINT (180,38),W,Z
13550 CIRCLE (180,44),5,Z:PAINT (180,44),R,Z
13555 CIRCLE (360,96),6,Z:PAINT (360,96),R,Z
13560 CIRCLE (500,90),6,Z:PAINT (500,90),R,Z
13599 RETURN
13600 '* ------------------------------------------------
13605 CLS
13610 GOSUB 11700
13615 D$="TUG & TOW AHEAD"
13625 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
13630 CIRCLE (320,32),6,Z:PAINT (320,32),W,Z
13635 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
13640 CIRCLE (340,32),5,Z:PAINT (340,32),R,Z
13645 CIRCLE (340,38),5,Z:PAINT (340,38),W,Z
13650 CIRCLE (340,44),5,Z:PAINT (340,44),R,Z
13655 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
13660 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
13665 CIRCLE (450,86),6,Z:PAINT (450,86),G,Z
```

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13670 CIRCLE (190,86),6,Z:PAINT (190,86),R,Z
13699 RETURN
13700 '* ------------------------------------------------
13705 CLS
13710 GOSUB 11700
13715 D$="TUG & TOW STARBOARD"
13725 CIRCLE (480,20),6,Z:PAINT (480,20),W,Z
13730 CIRCLE (480,32),6,Z:PAINT (480,32),W,Z
13735 CIRCLE (480,44),6,Z:PAINT (480,44),W,Z
13740 CIRCLE (460,32),5,Z:PAINT (460,32),R,Z
13745 CIRCLE (460,38),5,Z:PAINT (460,38),W,Z
13750 CIRCLE (460,44),5,Z:PAINT (460,44),R,Z
13755 CIRCLE (280,96),6,Z:PAINT (280,96),G,Z
13760 CIRCLE (140,90),6,Z:PAINT (140,90),G,Z
13799 RETURN
13800 '* ------------------------------------------------
13805 CLS
13810 GOSUB 11700
13815 D$="N_U_C (Making way)"
13825 CIRCLE (320,20),6,Z:PAINT (320,20),R,Z
13830 CIRCLE (320,32),6,Z:PAINT (320,32),R,Z
13835 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
13899 RETURN
13900 '* ------------------------------------------------
13905 CLS
13910 GOSUB 11700
13915 D$="N_U_C (Making Way) AHEAD"
13925 CIRCLE (320,20),6,Z:PAINT (320,20),R,Z
13930 CIRCLE (320,32),6,Z:PAINT (320,32),R,Z
13935 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
13940 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
13999 RETURN
14000 '* ------------------------------------------------
14005 CLS
14010 GOSUB 11700
14015 D$="N_U_C (Making Way) STARBOARD"
14020 CIRCLE (320,20),6,Z:PAINT (320,20),R,Z
14025 CIRCLE (320,32),6,Z:PAINT (320,32),R,Z
14030 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
14099 RETURN
14100 '* ------------------------------------------------
14105 CLS
14110 GOSUB 11700
14115 D$="CABLE (Making way) PORTSIDE
14125 CIRCLE (320,28),6,Z:PAINT (320,28),R,Z
14130 CIRCLE (320,40),6,Z:PAINT (320,40),W,Z
14135 CIRCLE (320,52),6,Z:PAINT (320,52),R,Z
14140 CIRCLE (480,20),6,Z:PAINT (480,20),W,Z
14145 CIRCLE (120,70),6,Z:PAINT (120,70),W,Z
14150 CIRCLE (400,96),6,Z:PAINT (400,96),R,Z
14199 RETURN
14200 '* ------------------------------------------------
14205 CLS
14210 GOSUB 11700
14215 D$="CABLE (Making Way) AHEAD"
14225 CIRCLE (320,28),6,Z:PAINT (320,28),R,Z
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14230 CIRCLE (320,40),6,Z:PAINT (320,40),W,Z
14235 CIRCLE (320,52),6,Z:PAINT (320,52),R,Z
14240 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
14245 CIRCLE (320,70),6,Z:PAINT (320,70),W,Z
14250 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
14255 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
14299 RETURN
14300 '* ------------------------------------------------
14305 CLS
14310 GOSUB 11700
14315 D$="CABLE (Making Way) STARBOARD"
14320 CIRCLE (320,28),6,Z:PAINT (320,28),R,Z
14325 CIRCLE (320,40),6,Z:PAINT (320,40),W,Z
14330 CIRCLE (320,52),6,Z:PAINT (320,52),R,Z
14335 CIRCLE (160,20),6,Z:PAINT (160,20),W,Z
14340 CIRCLE (480,70),6,Z:PAINT (480,70),W,Z
14345 CIRCLE (260,96),6,Z:PAINT (260,96),W,Z
14399 RETURN
14400 '* ------------------------------------------------
14405 CLS
14410 GOSUB 11700
14415 D$="SAILING VESSEL PORTSIDE"
14425 CIRCLE (320,90),8,Z:PAINT (320,90),R,Z
14499 RETURN
14500 '* ------------------------------------------------
14505 CLS
14510 GOSUB 11700
14515 D$="SAILING VESSEL AHEAD
14525 CIRCLE (160,90),8,Z:PAINT (160,90),G,Z
14530 CIRCLE (480,90),8,Z:PAINT (480,90),R,Z
14599 RETURN
14600 '* ------------------------------------------------
14605 CLS
14610 GOSUB 11700
14615 D$="SAILING VESSEL STARBOARD"
14625 CIRCLE (320,90),8,Z:PAINT (320,90),G,Z
14628 GOSUB 11730:GOSUB 10000:GOSUB 11800
14699 RETURN
14700 '* ------------------------------------------------
14705 CLS
14710 GOSUB 11700
14712 B$="2. FISHING VESSEL PORTSIDE"
14714 C$="1. PILOT VESSEL PORTSIDE"
14715 D$="3. SAILING VESSEL PORTSIDE"
14725 CIRCLE (320,20),8,Z:PAINT (320,20),R,Z
14730 CIRCLE (320,32),8,Z:PAINT (320,32),G,Z
14735 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
14738 GOSUB 11730:GOSUB 10000:GOSUB 11800
14799 RETURN
14800 '* ------------------------------------------------

14805 CLS
14810 GOSUB 11700
14812 B$="2. POWER DRIVEN VESSEL AHEAD"
14814 C$="3. PILOT VESSEL AHEAD"
14815 D$="1. SAILING VESSEL AHEAD"
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14825 CIRCLE (320,20),8,Z:PAINT (320,20),R,Z
14830 CIRCLE (320,32),8,Z:PAINT (320,32),G,Z
14835 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
14840 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
14845 GOSUB 11730:GOSUB 10000:GOSUB 11800
14899 RETURN
14900 '* ------------------------------------------------
14905 CLS
14910 GOSUB 11700
14912 B$="3. FISHING VESSEL PORTSIDE"
14914 C$="1. PILOT VESSEL STARBOARD"
14915 D$="2. SAILING VESSEL STARBOARD"
14920 CIRCLE (320,20),8,Z:PAINT (320,20),R,Z
14925 CIRCLE (320,32),8,Z:PAINT (320,32),G,Z
14930 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
14932 GOSUB 11730:GOSUB 10000:GOSUB 11800
14999 RETURN
15000 '* ------------------------------------------------
15005 CLS
15010 GOSUB 11700
15012 B$="2. SAILING VESSEL PORTSIDE"
15014 C$="3. PILOT VESSEL PORTSIDE"
15015 D$="1. FISHING VESSEL PORTSIDE"
15025 CIRCLE (320,20),8,Z:PAINT (320,20),R,Z
15030 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
15035 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
15038 GOSUB 11730:GOSUB 10000:GOSUB 11800
15099 RETURN
15100 '* ------------------------------------------------
15105 CLS
15110 GOSUB 11700
15112 B$="1. HOVERCRAFT STARBOARD"
15114 C$="2. PILOT VESSEL STARBOARD"
15115 D$="3. FISHING VESSEL AHEAD"
15125 CIRCLE (320,20),8,Z:PAINT (320,20),R,Z
15130 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
15135 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
15140 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
15145 GOSUB 11730:GOSUB 10000:GOSUB 11800
15199 RETURN
15200 '* ------------------------------------------------
15205 CLS
15210 GOSUB 11700
15212 B$="3. POWER DRIVEN VESSEL STARBOARD"
15214 C$="2. HOVERCRAFT PORTSIDE"
15215 D$="1. SAILING VESSEL STARBOARD"
15225 CIRCLE (320,20),8,Z:PAINT (320,20),R,Z
15230 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
15235 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
15240 GOSUB 11730:GOSUB 10000:GOSUB 11800
15299 RETURN
15300 '* ------------------------------------------------
15305 CLS
15310 GOSUB 11700
15312 D$="MINESWEEPER PORTSIDE"
15315 CIRCLE (320,20),6,Z:PAINT (320,20),G,Z
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15320 CIRCLE (280,32),6,Z:PAINT (280,32),G,Z
15325 CIRCLE (360,32),6,Z:PAINT (360,32),G,Z
15330 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
15335 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
15399 RETURN
15400 '* ------------------------------------------------
15405 CLS
15410 GOSUB 11700
15415 D$="MINESWEEPER AHEAD"
15425 CIRCLE (320,20),6,Z:PAINT (320,20),G,Z
15430 CIRCLE (280,32),6,Z:PAINT (280,32),G,Z
15435 CIRCLE (360,32),6,Z:PAINT (360,32),G,Z
15440 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
15445 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
15450 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
15499 RETURN
15500 '* ------------------------------------------------
15505 CLS
15510 GOSUB 11700
15515 D$="MINESWEEPER STARBOARD"
15525 CIRCLE (320,20),6,Z:PAINT (320,20),G,Z
15530 CIRCLE (280,32),6,Z:PAINT (280,32),G,Z
15535 CIRCLE (360,32),6,Z:PAINT (360,32),G,Z
15540 CIRCLE (320,44),6,Z:PAINT (320,44),W,Z
15545 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
15599 RETURN
15600 '*-------------------------------------------------
15605 CLS
15610 GOSUB 11700
15615 D$="TRAWLER (<50 Metres) PORTSIDE
15625 CIRCLE (320,20),8,Z:PAINT (320,20),G,Z
15630 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
15635 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
15699 RETURN
15700 '* ------------------------------------------------
15705 CLS
15710 GOSUB 11700
15715 D$="TRAWLER (<50 Metres) AHEAD"
15725 CIRCLE (320,20),8,Z:PAINT (320,20),G,Z
15730 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
15735 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
15740 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
15799 RETURN
15800 '* ------------------------------------------------
15805 CLS
15810 GOSUB 11700
15815 D$="TRAWLER (<50 Metres) STARBOARD"
15825 CIRCLE (320,20),8,Z:PAINT (320,20),G,Z
15830 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
15835 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
15899 RETURN
15900 '* ------------------------------------------------
15905 CLS
15910 GOSUB 11700
15920 GOSUB 11800:PRINT D$
15925 CIRCLE (480,20),8,Z:PAINT (480,20),W,Z
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15930 CIRCLE (280,32),8,Z:PAINT (280,32),G,Z
15935 CIRCLE (280,44),8,Z:PAINT (280,44),R,Z
15940 CIRCLE (320,96),8,Z:PAINT (320,96),R,Z
15999 RETURN
16000 '* ------------------------------------------------
16005 CLS
16010 GOSUB 11700
16015 D$="TRAWLER"
16025 CIRCLE (320,20),8,Z:PAINT (320,20),W,Z
16030 CIRCLE (320,32),8,Z:PAINT (320,32),G,Z
16035 CIRCLE (320,44),8,Z:PAINT (320,44),W,Z
16040 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
16045 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
16099 RETURN
16100 '* ------------------------------------------------
16105 CLS
16110 GOSUB 11700
16115 D$="TRAWLER STARBOARD"
16125 CIRCLE (160,20),8,Z:PAINT (160,20),W,Z
16130 CIRCLE (360,32),8,Z:PAINT (360,32),G,Z
16135 CIRCLE (360,44),8,Z:PAINT (360,44),W,Z
16140 CIRCLE (320,96),8,Z:PAINT (320,96),G,Z
16199 RETURN
16200 '* ------------------------------------------------
16205 CLS
16210 GOSUB 11700
16212 B$="1. VESSEL NOT UNDER COMMAND AHEAD"
16214 C$="3. PILOT VESSEL PORTSIDE"
16215 D$="2. DEEP DRAFT VESSEL PORTSIDE"
16225 CIRCLE (140,70),6,Z:PAINT (140,70),W,Z
16230 CIRCLE (320,30),6,Z:PAINT (320,30),R,Z
16235 CIRCLE (320,40),6,Z:PAINT (320,40),R,Z
16240 CIRCLE (320,50),6,Z:PAINT (320,50),R,Z
16245 CIRCLE (480,20),6,Z:PAINT (480,20),W,Z
16250 CIRCLE (360,96),6,Z:PAINT (360,96),R,Z
16255 GOSUB 11730:GOSUB 10000:GOSUB 11800
16299 RETURN
16300 '* ------------------------------------------------
16305 CLS
16310 GOSUB 11700
16312 B$="2. HOVERCRAFT AHEAD"
16314 C$="1. DEEP DRAFT VESSEL STARBOARD"
16315 D$="3. DEEP DRAFT VESSEL AHEAD"
16325 CIRCLE (320,18),6,Z:PAINT (320,18),W,Z
16330 CIRCLE (320,31),6,Z:PAINT (320,31),R,Z
16335 CIRCLE (320,41),6,Z:PAINT (320,41),R,Z
16340 CIRCLE (320,51),6,Z:PAINT (320,51),R,Z
16345 CIRCLE (320,68),6,Z:PAINT (320,68),W,Z
16350 CIRCLE (160,100),6,Z:PAINT (160,100),G,Z
16355 CIRCLE (480,100),6,Z:PAINT (480,100),R,Z
16360 GOSUB 11730:GOSUB 10000:GOSUB 11800
16399 RETURN
16400 '* ------------------------------------------------
16405 CLS
16410 GOSUB 11700
16412 B$="1. FISHING VESSEL PORTSIDE"
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16414 C$="3. PILOT VESSEL STARBOARD"
16415 D$="2. DEEP DRAFT VESSEL STARBOARD"
16425 CIRCLE (140,20),6,Z:PAINT (140,20),W,Z
16430 CIRCLE (320,30),6,Z:PAINT (320,30),R,Z
16435 CIRCLE (320,40),6,Z:PAINT (320,40),R,Z
16440 CIRCLE (320,50),6,Z:PAINT (320,50),R,Z
16445 CIRCLE (480,70),6,Z:PAINT (480,70),W,Z
16450 CIRCLE (280,96),6,Z:PAINT (280,96),G,Z
16460 GOSUB 11730:GOSUB 10000:GOSUB 11800
16499 RETURN
16500 '* ------------------------------------------------
16505 CLS
16510 GOSUB 11700
16512 B$="3. SAILING VESSEL PORTSIDE"
16514 C$="2. HOVERCRAFT AHEAD"
16515 D$="1. PILOT VESSEL PORTSIDE"
16525 CIRCLE (300,20),8,Z:PAINT (300,20),W,Z
16530 CIRCLE (300,32),8,Z:PAINT (300,32),R,Z
16535 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
16540 GOSUB 11730:GOSUB 10000:GOSUB 11800
16599 RETURN
16600 '* ------------------------------------------------
16605 CLS
16610 GOSUB 11700
16612 B$="1. FISHING VESSEL AHEAD"
16614 C$="2. HOVERCRAFT AHEAD"
16615 D$="3. PILOT VESSEL AHEAD"
16625 CIRCLE (320,20),8,Z:PAINT (320,20),W,Z
16630 CIRCLE (320,32),8,Z:PAINT (320,32),R,Z
16635 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
16640 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
16650 GOSUB 11730:GOSUB 10000:GOSUB 11800
16699 RETURN
16700 '* ------------------------------------------------
16705 CLS
16710 GOSUB 11700
16712 B$="1. HOVERCRAFT PORTSIDE"
16714 C$="2. DEEP DRAFT VESSEL AHEAD"
16715 D$="3. PILOT VESSEL STARBOARD"
16725 CIRCLE (340,20),8,Z:PAINT (340,20),W,Z
16730 CIRCLE (340,32),8,Z:PAINT (340,32),R,Z
16735 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
16740 GOSUB 11730:GOSUB 10000:GOSUB 11800
16799 RETURN
16800 '* ------------------------------------------------
16805 CLS
16810 GOSUB 11700
16815 D$="TRAWLER SHOOTING ALL PORTSIDE"
16825 CIRCLE (480,20),6,Z:PAINT (480,20),W,Z
16830 CIRCLE (300,30),6,Z:PAINT (300,30),G,Z
16835 CIRCLE (300,40),6,Z:PAINT (300,40),W,Z
16840 CIRCLE (300,60),6,Z:PAINT (300,60),W,Z
16845 CIRCLE (300,70),6,Z:PAINT (300,70),W,Z
16850 CIRCLE (340,96),6,Z:PAINT (340,96),R,Z
16899 RETURN
16900 '* ------------------------------------------------
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16905 CLS
16910 GOSUB 11700
16915 D$="TRAWLER SHOOTING ALL AHEAD"
16925 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
16930 CIRCLE (320,30),6,Z:PAINT (320,30),G,Z
16935 CIRCLE (340,50),6,Z:PAINT (340,50),W,Z
16940 CIRCLE (340,60),6,Z:PAINT (340,60),W,Z
16945 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
16950 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
16999 RETURN
17000 '* ------------------------------------------------
17005 CLS
17010 GOSUB 11700
17015 D$="TRAWLER SHOOTING ALL STARBOARD"
17025 CIRCLE (160,20),6,Z:PAINT (160,20),W,Z
17030 CIRCLE (340,30),6,Z:PAINT (340,30),G,Z
17035 CIRCLE (340,40),6,Z:PAINT (340,40),W,Z
17040 CIRCLE (340,60),6,Z:PAINT (340,60),W,Z
17045 CIRCLE (340,70),6,Z:PAINT (340,70),W,Z
17050 CIRCLE (300,96),6,Z:PAINT (300,96),G,Z
17099 RETURN
17100 '* ------------------------------------------------
17105 CLS
17110 GOSUB 11700
17115 D$="TRAWLER HAULING ALL PORTSIDE"
17125 CIRCLE (480,20),6,Z:PAINT (480,20),W,Z
17130 CIRCLE (280,30),6,Z:PAINT (280,30),G,Z
17135 CIRCLE (280,40),6,Z:PAINT (280,40),W,Z
17140 CIRCLE (300,60),6,Z:PAINT (300,60),W,Z
17145 CIRCLE (300,70),6,Z:PAINT (300,70),R,Z
17150 CIRCLE (340,96),6,Z:PAINT (340,96),R,Z
17199 RETURN
17200 '* ------------------------------------------------
17205 CLS
17210 GOSUB 11700
17215 D$="TRAWLER HAULING ALL AHEAD"
17225 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
17230 CIRCLE (320,30),6,Z:PAINT (320,30),G,Z
17235 CIRCLE (320,40),6,Z:PAINT (320,40),W,Z
17240 CIRCLE (340,60),6,Z:PAINT (340,60),W,Z
17245 CIRCLE (340,70),6,Z:PAINT (340,70),R,Z
17250 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
17255 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
17299 RETURN
17300 '* ------------------------------------------------
17305 CLS
17310 GOSUB 11700
17315 D$="TRAWLER HAULING ALL STARBOARD"
17325 CIRCLE (160,20),6,Z:PAINT (160,20),W,Z
17330 CIRCLE (360,30),6,Z:PAINT (360,30),G,Z
17335 CIRCLE (360,40),6,Z:PAINT (360,40),W,Z
17340 CIRCLE (340,60),6,Z:PAINT (340,60),W,Z
17345 CIRCLE (340,70),6,Z:PAINT (340,70),R,Z
17350 CIRCLE (300,96),6,Z:PAINT (300,96),G,Z
17399 RETURN
17400 '* ------------------------------------------------
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17405 CLS
17410 GOSUB 11700
17415 D$="TRAWLER FAST ALL PORTSIDE"
17425 CIRCLE (480,20),6,Z:PAINT (480,20),W,Z
17430 CIRCLE (280,30),6,Z:PAINT (280,30),G,Z
17435 CIRCLE (280,40),6,Z:PAINT (280,40),W,Z
17440 CIRCLE (300,60),6,Z:PAINT (300,60),R,Z
17445 CIRCLE (300,70),6,Z:PAINT (300,70),R,Z
17499 RETURN
17500 '* ------------------------------------------------
17505 CLS
17510 GOSUB 11700
17515 D$="TRAWLER FAST ALL AHEAD"
17525 CIRCLE (320,20),6,Z:PAINT (320,20),W,Z
17530 CIRCLE (320,30),6,Z:PAINT (320,30),G,Z
17535 CIRCLE (320,40),6,Z:PAINT (320,40),W,Z
17540 CIRCLE (340,60),6,Z:PAINT (340,60),R,Z
17545 CIRCLE (340,70),6,Z:PAINT (340,70),R,Z
17599 RETURN
17600 '* ------------------------------------------------
17605 CLS
17610 GOSUB 11700
17615 D$="TRAWLER FAST ALL STARBOARD"
17625 CIRCLE (160,20),6,Z:PAINT (160,20),W,Z
17630 CIRCLE (360,30),6,Z:PAINT (360,30),G,Z
17635 CIRCLE (360,40),6,Z:PAINT (360,40),W,Z
17640 CIRCLE (340,60),6,Z:PAINT (340,60),R,Z
17645 CIRCLE (340,70),6,Z:PAINT (340,70),R,Z
17699 RETURN
17700 '* ------------------------------------------------
17705 CLS
17710 GOSUB 11700
17715 D$="PURSE SEINE ALL PORTSIDE"
17725 CIRCLE (300,20),8,Z:PAINT (300,20),R,Z
17730 CIRCLE (300,30),8,Z:PAINT (300,30),W,Z
17735 CIRCLE (320,50),8,Z:PAINT (320,50),Y,Z
17740 CIRCLE (320,60),8,Z:PAINT (320,60),Y,Z
17745 CIRCLE (340,96),8,Z:PAINT (340,96),R,Z
17799 RETURN
17800 '* ------------------------------------------------
17805 CLS
17810 GOSUB 11700
17815 D$="PURSE SEINE ALL AHEAD"
17825 CIRCLE (320,20),8,Z:PAINT (320,20),R,Z
17830 CIRCLE (320,30),8,Z:PAINT (320,30),W,Z
17835 CIRCLE (340,50),8,Z:PAINT (340,50),Y,Z
17840 CIRCLE (340,60),8,Z:PAINT (340,60),Y,Z
17845 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
17850 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
17899 RETURN
17900 '* ------------------------------------------------
17905 CLS
17910 GOSUB 11700
17915 D$="PURSE SEINE ALL STARBOARD"
17925 CIRCLE (300,20),8,Z:PAINT (300,20),R,Z
17930 CIRCLE (300,30),8,Z:PAINT (300,30),W,Z
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17935 CIRCLE (280,50),8,Z:PAINT (280,50),Y,Z
17940 CIRCLE (280,60),8,Z:PAINT (280,60),Y,Z
17945 CIRCLE (320,96),8,Z:PAINT (320,96),R,Z
17999 RETURN
18000 '* ------------------------------------------------
18005 CLS
18010 GOSUB 11700
18015 D$="HOVERCRAFT PORTSIDE"
18017 B$="1. DEEP DRAFT VESSEL PORTSIDE"
18019 C$="2. DEEP DRAFT VESSEL STARBOARD"
18025 CIRCLE (320,20),8,Z:PAINT (320,20),W,Z
18030 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
18035 CIRCLE (160,90),8,Z:PAINT (160,90),W,Z
18040 CIRCLE (400,96),8,Z:PAINT (400,96),R,Z
18050 GOSUB 11730:GOSUB 10000:GOSUB 11800
18099 RETURN
18100 '* ------------------------------------------------
18105 CLS
18110 GOSUB 11700
18112 B$="3. FISHING VESSEL AHEAD"
18114 D$="2. HOVERCRAFT PORTSIDE"
18115 D$="1 .HOVERCRAFT AHEAD"
18125 CIRCLE (320,20),8,Z:PAINT (320,20),W,Z
18130 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
18135 CIRCLE (160,96),8,Z:PAINT (160,96),G,Z
18140 CIRCLE (480,96),8,Z:PAINT (480,96),R,Z
18150 GOSUB 11730:GOSUB 10000:GOSUB 11800
18199 RETURN
18200 '* ------------------------------------------------
18205 CLS
18210 GOSUB 11700
18212 B$="3. FISHING VESSEL STARBOARD"
18214 C$="2. PILOT VESSEL STARBOARD"
18215 D$="1. HOVERCRAFT STARBOARD"
18225 CIRCLE (300,20),8,Z:PAINT (300,20),W,Z
18230 CIRCLE (300,32),8,Z:PAINT (300,32),W,Z
18235 CIRCLE (200,96),8,Z:PAINT (200,96),G,Z
18240 CIRCLE (480,90),8,Z:PAINT (480,90),W,Z
18250 GOSUB 11730:GOSUB 10000:GOSUB 11800
18299 RETURN
18300 '* ------------------------------------------------


18305 CLS
18310 GOSUB 11700
18312 D$="DREDGER (<50 Metres) AHEAD"
18325 CIRCLE (320,30),6,Z:PAINT (320,30),R,Z
18330 CIRCLE (320,38),6,Z:PAINT (320,38),W,Z
18335 CIRCLE (320,46),6,Z:PAINT (320,46),R,Z
18340 CIRCLE (280,52),6,Z:PAINT (280,52),R,Z
18345 CIRCLE (280,60),6,Z:PAINT (280,60),R,Z
18350 CIRCLE (360,52),6,Z:PAINT (360,52),G,Z
18355 CIRCLE (360,60),6,Z:PAINT (360,60),G,Z
18360 CIRCLE (160,96),6,Z:PAINT (160,96),G,Z
18365 CIRCLE (480,96),6,Z:PAINT (480,96),R,Z
18399 RETURN
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18400 '* ------------------------------------------------
18405 CLS
18410 GOSUB 11700
18415 D$="DREDGER (>50 Metres) STARBOARD"
18425 CIRCLE (160,18),6,Z:PAINT (160,18),W,Z
18430 CIRCLE (320,30),6,Z:PAINT (320,30),R,Z
18435 CIRCLE (320,38),6,Z:PAINT (320,38),W,Z
18440 CIRCLE (320,46),6,Z:PAINT (320,46),R,Z
18445 CIRCLE (280,52),6,Z:PAINT (280,52),R,Z
18450 CIRCLE (280,60),6,Z:PAINT (280,60),R,Z
18455 CIRCLE (360,52),6,Z:PAINT (360,52),G,Z
18460 CIRCLE (360,60),6,Z:PAINT (360,60),G,Z
18465 CIRCLE (220,96),6,Z:PAINT (220,96),G,Z
18470 CIRCLE (480,42),6,Z:PAINT (480,42),W,Z
18499 RETURN
18500 '* ------------------------------------------------
18505 CLS
18510 GOSUB 11700
18515 D$="DREDGER (>50 Metres) PORTSIDE"
18525 CIRCLE (480,18),6,Z:PAINT (480,18),W,Z
18530 CIRCLE (320,30),6,Z:PAINT (320,30),R,Z
18535 CIRCLE (320,38),6,Z:PAINT (320,38),W,Z
18540 CIRCLE (320,46),6,Z:PAINT (320,46),R,Z
18545 CIRCLE (280,52),6,Z:PAINT (280,52),R,Z
18550 CIRCLE (280,60),6,Z:PAINT (280,60),R,Z
18555 CIRCLE (360,52),6,Z:PAINT (360,52),G,Z
18560 CIRCLE (360,60),6,Z:PAINT (360,60),G,Z
18565 CIRCLE (420,96),6,Z:PAINT (420,96),R,Z
18570 CIRCLE (160,42),6,Z:PAINT (160,42),W,Z
18599 RETURN
18600 '* ------------------------------------------------
18605 CLS
18610 GOSUB 11700
18615 D$="PILOT VESSEL ASTERN"
18625 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
18630 CIRCLE (320,44),8,Z:PAINT (320,44),R,Z
18635 CIRCLE (320,60),8,Z:PAINT (320,60),W,Z
18699 RETURN
18700 '* ------------------------------------------------
18705 CLS
18710 GOSUB 11700
18715 D$="PILOT VESSEL AT ANCHOR"
18725 CIRCLE (320,32),8,Z:PAINT (320,32),W,Z
18730 CIRCLE (320,44),8,Z:PAINT (320,44),R,Z
18735 CIRCLE (220,70),8,Z:PAINT (220,70),W,Z
18740 CIRCLE (480,50),8,Z:PAINT (480,50),W,Z
18799 RETURN
18800 '* ------------------------------------------------
18805 CLS
18810 GOSUB 11700
18815 D$="VESSEL AT ANCHOR"
18825 CIRCLE (200,44),8,Z:PAINT (200,44),W,Z
18830 CIRCLE (400,70),8,Z:PAINT (400,70),W,Z
18899 RETURN
18900 '* ------------------------------------------------
18905 CLS
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18910 GOSUB 11700
18915 D$="VESSEL TOWING ASTERN"
18925 CIRCLE (320,44),8,Z:PAINT (320,44),Y,Z
18930 CIRCLE (320,55),8,Z:PAINT (320,55),W,Z
18935 CIRCLE (320,70),8,Z:PAINT (320,70),W,Z
18999 RETURN
19000 '* ------------------------------------------------
19005 CLS
19010 GOSUB 11700
19015 D$="N_U_C ASTERN"
19025 CIRCLE (320,32),8,Z:PAINT (320,32),R,Z
19030 CIRCLE (320,44),8,Z:PAINT (320,44),R,Z
19035 CIRCLE (320,70),8,Z:PAINT (320,70),W,Z
19099 RETURN
19100 '* ------------------------------------------------
19105 CLS
19110 GOSUB 11700
19115 D$="N_U_C (Not Making Way) ASTERN"
19125 CIRCLE (320,32),8,Z:PAINT (320,32),R,Z
19130 CIRCLE (320,44),8,Z:PAINT (320,44),R,Z
19199 RETURN
30000 *'------------------------------------------------
30010 RETURN
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