


5-1992

UA66/3/2 Computer Science Alumni Newsletter, Vol. 7

WKU Computer Science

Follow this and additional works at: http://digitalcommons.wku.edu/dlsc_ua_records

 Part of the [Computer Sciences Commons](#), [Mass Communication Commons](#), and the [Public Relations and Advertising Commons](#)

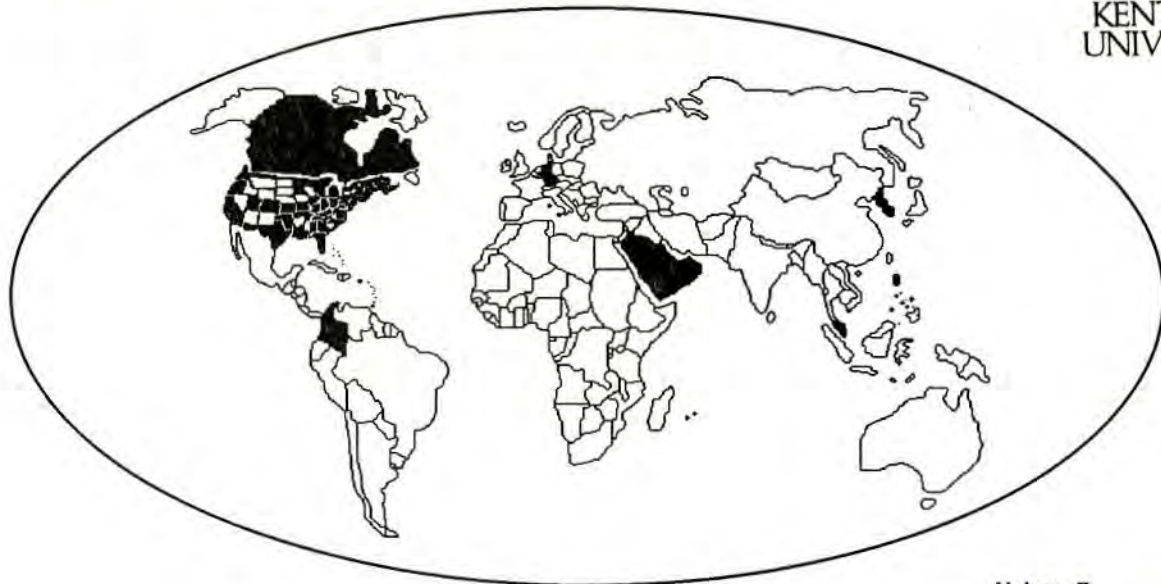
Recommended Citation

WKU Computer Science, "UA66/3/2 Computer Science Alumni Newsletter, Vol. 7" (1992). *WKU Archives Records*. Paper 5242.
http://digitalcommons.wku.edu/dlsc_ua_records/5242

This Newsletter is brought to you for free and open access by TopSCHOLAR®. It has been accepted for inclusion in WKU Archives Records by an authorized administrator of TopSCHOLAR®. For more information, please contact topscholar@wku.edu.

Computer Science

WESTERN KENTUCKY UNIVERSITY
ARCHIVES



Volume 7

May 1992

*WKU Computer Science Alumni

Alumni News Letter

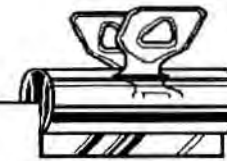
WKU Computer Science Alumni Newsletter 1991-1992

Introduction

Welcome to the seventh edition of the Computer Science Alumni Newsletter! This is an especially significant one, as it includes a request for help from you (no, not \$\$!). Dr. Robert Crawford, as editor, has selected a wide range of interesting articles, but we are not receiving many updates or news items about YOU! Consequently, this issue is noticeably bereft of alumni news. We have had a few notes during the past year about weddings, babies, new jobs, etc. but do not want to slight all the other news which surely transpired. This will truly be an "alumni" newsletter only when it contains lots of news about alumni! So, please send us your goodies (family, career, etc.) as soon as you can.

TABLE OF CONTENTS

WKU Graduate Receives Assistantship for Doctorate	1
New Faculty Hired	1
Computing Resources Update	2
Accreditation by the CSAB, Plans and Progress	3
Survey For Alumni	4
CS Student Advisory Board	5
CS Professional Advisory Board	5
MICAL Project	6
CS1 & CS2 Laboratory	8
CS240 Class Programming Contest	8
An Early Overview of Computer Science	9
A Simple Simulator for Micro-Programs	9
Automated Reasoning and Fuzzy Logic	10
Advanced Graphics	11
Computer Information Systems I	11
Computer Information Systems II	12
Phonathon	13
First-ever Visiting Research Scholar	14
Activities Last Year	14
ACM 1991-1992	15
Computer Science Enrollments Up!	17
Sample Employers of Alumni	18



WKU GRADUATE RECEIVES ASSISTANTSHIP AT PENN STATE FOR DOCTORATE

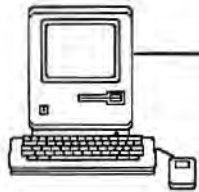
Mr. Chandra Danam, a 1992 graduate with the Master's in CS will be attending graduate school this Fall in the Department of Computer Science at Penn State University in College Station, PA. He has been awarded a graduate teaching assistantship with a stipend and full tuition waiver to pursue the doctorate in Computer Science. His present interests are operating systems and programming languages.

While at Western, Chandra maintained a 4.0 grade point average and was a member of the student ACM and the honorary Computer Science society, Upsilon Pi Epsilon (UPE). He was awarded the honor of Most Outstanding Computer Science Graduate Student by the faculty. Best of luck, Chandra!

NEW FACULTY HIRED Art Shindhelm

After a long search involving over 200 applications, the CS Department has selected Mr. Ali Kooshesh for the Assistant Professor of Computer Science opening. Ali expects to be able to add the "Dr." to his name by this summer. Ali will be receiving his Ph.D from the University of New Mexico in Albuquerque and his dissertation title is: "Shortest Paths in Isothetic Line Segments."

Ali has expressed a strong interest in operating systems in general and Unix in particular. He is currently teaching Unix as a component of a course at the University of New Mexico. We are all looking forward to this strong addition to the department.



Computing Resources Update Ken Modesitt



Student Computing Laboratories

Two new student computing laboratories and four electronic classrooms came on-line on a full-time basis during 1991-92. The ribbon-cutting ceremony for the labs, held on April 26, 1991, was attended by faculty, students, WKU administrators, and members of the CS Professional Advisory Board. A copy of the lab setups with the equipment is attached. Total retail value for all equipment and software now exceeds \$320,000, based on a University investment of \$75,000, over a 400% increase!

Software Loans

A large inventory of state-of-the-art tools has been obtained in the areas of computer-aided software engineering (CASE), expert system shells, data base systems, computer-based education, graphics packages, project planning, CAD, programming languages, and fourth generation languages. Over \$104,000 worth of software from 30 corporations has been donated to date, excluding the \$110,000 amount for PLATO software.

Computer Science initiated a major campus-wide pilot test for PLATO (R) -- a world-wide system for computer-based education. WKU is using a library of nearly 1000 hours and 1800 lessons of such proven material, including:

Mathematics	(B:Basic, I:Intermediate, A:Advanced)
Literacy	(B,I)
Science	(Physics and Chemistry:A) (Biology, Physics, Chemistry, Earth Science:I)
Programming	(Pascal and Fortran)
Life Skills	(parenting, life coping, job search)
2 Substance Abuse	(alcohol, tobacco, drugs, STDs, AIDS).

PLATO is integrated, interactive, graphical and proven material, which would complement what instructors present in class and laboratories. Well over 300 students have participated in this pilot test for about 30 classes throughout the University. Instructors can see, on a demand basis, e.g., daily or weekly, how each of their students are doing. In addition to the existing software base, we also are experimenting with a state-of-the-art authoring system, whereby faculty can design their own computer-assisted learning materials. A decision will be made this summer about the permanent presence of PLATO on the WKU campus.

Accreditation by the Computing Sciences Accreditation Board (CSAB) Plans and Progress Ken Modesitt



The Department will apply for national accreditation of our program in June, 1992, to the appropriate agency, the Computing Sciences Accreditation Board (CSAB). This board is composed of representatives from both ACM and IEEE. Most recently, accreditation was granted to 16 additional four-year computer science programs, bringing the total to 111 programs on a wide variety of public and private campuses. Of special note is that Eastern Kentucky University now has its Computer Science program accredited. To qualify for evaluation, a computer science B.S. program must be designed to prepare its graduates for professional employment and progressive careers as computer scientists. An accredited program meets or exceeds requirements in five areas: faculty, students, curriculum, laboratory and computing resources, and institutional support.

What does this have to do you, the alumni of the Department? At a meeting of the CSAB, it was stated that "If the graduates of a program are readily acceptable as computing professionals, then the program should be creditable. The Department must show this to be the case." So, how can you help show that you are "readily acceptable as computing

professionals?" THIS IS WHERE WE REQUIRE YOUR HELP!! Please complete and send us the enclosed survey as soon as possible. This will be absolutely essential information for CSAB, as well as the regional accrediting agency for the entire University. Thanks a bundle!!



Survey for Alumni Ken Modesitt

We currently have some information on over 400 of our alumni (notice the map on the cover which shows where you live!) and some employment data on about 100, thanks to the enormous success of the phonathon last fall (over \$2000). Completing the enclosed survey will provide lots more useful material, especially for receiving national accreditation as a high-quality Department of Computer Science.

This information is requested to demonstrate the very high calibre of our graduates (YOU) and to provide input on possible changes for the department, e.g., curricula, laboratories, etc. Three different accrediting agencies insist that the Department of Computer Science show that our graduates are "good." We have chosen to have you help us do this, via completing a survey, rather than administering some type of examination to graduating seniors. Thus, the results of the survey will be compiled for you, our current students (to see what real CS grads do!) and for professional accreditation by the following agencies:

Computing Sciences Accreditation Board
Southern Association for Colleges and Schools
(regional accrediting agency)
and
Kentucky Council on Higher Education.

A variant of this survey will also be administered to employers and graduate schools. Your suggestions on this survey, as well as the one for employers would be very welcome! If you have some ideas on how to collect employer data, please let us know. Please return it by July 1!



Computer Science Student Advisory Board (CSSAB) Ken Modesitt

The third year of this Board began in 1991. It is composed of 10 students representing virtually all the types seen in the Department: freshmen, sophomore, juniors, seniors, graduate students, co-op, assistants, non-traditional, transfers, minors, etc.

During the last year, the members came up with many good ideas for improving the operation of the department. As one result, we will offer an increased emphasis on UNIX, with the bi-term course being offered every semester. Another venture to be completed this summer is the creation of a disk which runs on both a PC and a Macintosh, and which tells the story of Computer Science at Western: curriculum, enrollment, students, faculty, equipment, alumni, etc. We plan to use the disk for high school recruiting, alumni distribution, employers, public relations, and other target areas. The program will be extremely user-friendly with lots of graphics, animation, sound, pictures of people, mouse interface. What suggestions might you have?

Computer Science Professional Advisory Board (CSPAB) Ken Modesitt

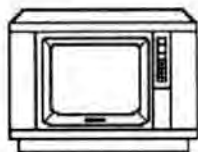
The Computer Science Professional Advisory Board finished its second year during 1991-92. Members include:

Ashland Petroleum	Ashland, KY
Bell South	Louisville, KY
Desa International	Bowling Green, KY
Humana Corporation	Louisville, KY
Logan Aluminum	Russellville, KY
R. R. Donnelley & Sons	Glasgow, KY
TransFinancial BanCorp	Bowling Green, KY.



These corporations have agreed to help the Department with "Quality Assurance" of our program. They are telling us what expectations they have of our graduates -- that's YOU! Hence, it is doubly important that we hear from YOU re: whether or not these expectations match reality.

These industry representatives also meet with faculty and the Student Advisory Board. A number of mutually beneficial arrangements have already occurred and more are in the offing. These include: employment of our graduates, co-op and internship programs, scholarships, site visits, joint research efforts, adjunct professors, etc. In 1990-91, CSPAB members made a substantial financial investment, by providing over \$17,000 to the Department, to help equip the student computing laboratories, and for faculty research. I am extremely enthusiastic about the potential for these interactions. Would be interested to know if any of you would like to have your company join, with perhaps you serving as the representative? Current plans only call for meeting twice a year, usually around interviewing times in the fall and spring. Your contributions could go a very long way in ensuring that CS at WKU is responsive to the "real world" of the computing industry.



The MICAL Project **Darleen Pigford / Greg Baur**

The MICAL Project (Multimedia
Interactive Computer Aided Learning),



under the direction of Dr. Darleen Pigford and Dr. Greg Baur was begun in the spring of 1991. Its purpose is to investigate and develop a multimedia based instructional delivery system that can be used in CS 145, Introduction to Computing (for non-CS majors) or in selected major computer science courses.

Assisting Drs. Pigford and Baur are three Ogden Research Scholars: Jenny Chiles, Lon Maynard, and Rachel Scott. Sam Ware is also assisting. All four students are undergraduate computer science majors or minors. The group is working with both Macintosh IIsi and Zenith 386

platforms. It is using the Authorware Professional authoring system and peripherals including laser videodisk, graphics overlay and CD-ROM. Bar code generation software is also being used.

The MICAL Project has four phases. The first phase is to develop small units of instruction for CS 145 that use bar code symbols as input to control the laser videodisk player so that the user can randomly access a desired frame or sequence of frames on the videodisk. This application could be used by an instructor in front of class or by an individual student. Work on the phase nears completion in May.

The second phase involves the use of an authoring system to prepare instructional materials that use the laser videodisk with graphics overlay. Graphics overlay allows both the videodisk image and computer generated graphics to be displayed on the same screen simultaneously. Materials will be developed in a HyperCard-like environment. The third phase involves the use of an expert system shell to control user access to a given set of instructional materials. This will allow for greater individualization of instruction. The fourth phase will create a networked environment where multiple work stations can share the same set of instructional materials. This involves the use and movement of video, audio and data across the network. The target date for project completion of a prototype system is scheduled for May 1994. Successful completion of a prototype will greatly increase chances of outside funding to set up a multiple workstation environment for the use of students.

The project team has made several presentations on its work to professional groups in the past year. Project assistants made presentations to the Small College Computing Conference in Nashville in November and to WKU faculty in a Center for Teaching and Learning workshop in October on campus. In addition, Drs. Pigford and Baur have presented papers at the Association for the Development of Computer Based Instructional Systems last November. Further dissemination of the group's work is planned for 1992 and 1993.

Alumni who are interested in more information on MICAL or who would like to share ideas are strongly encouraged to contact either Dr. Pigford or Dr. Baur.



CS1 & CS2 Laboratory Courses

Carol Wilson

Carol Wilson has developed hands-on laboratory courses to accompany CS240, Computer Science I, and CS241, Computer Science II. The Pascal laboratory courses provide a supervised environment in which the beginning computer science student has an opportunity for hands-on reinforcement and exploration of the topics being covered in lecture. Because appropriate published material was not available when the course was first implemented, Mrs. Wilson wrote a set of assignments that could be used with any Pascal textbook. These assignments were expanded into lab manuals, Pascal Laboratory Manual and Turbo Pascal Laboratory Manual, which were published by West Educational Publishing in March 1992.

CS240 Class Programming Contest Darleen Pigford



Dr. Darleen Pigford's CS240 class, Computer Science I, had their own VAX/PASCAL programming contest. The rules of the contest were similar to those of the regional and national ACM programming competitions. The programs are scored on accuracy of output and speed of completion.

Initially the students were divided into teams of two or three, each trying to solve five practice problems. Each team could use only one terminal. The actual contest was Wednesday, April 8, 1992, from 3:45 to 5:00 (with a fresh set of problems).

The winning team members were, Mr. Billy Gonyo, a pre-med major from Cross Plains, TN and Ms. Melinda Brown, a computer science major from Bowling Green. They worked four out of five programming problems. Second place went to Ms. Carolyn Wood, a computer science major from Franklin, KY and Mr. Jackie Anderson, an EE technology

major and computer science minor. They completed three out of five problems.

Award certificates were given to the winners, and a "frustratingly fun" time was had by all.

An Early Overview of Computer Science Uta Ziegler

"Pascal I, Pascal II, Assembler, is this what computer science is all about?" some of our CS majors wonder after their third semester. Programming seems to be the major theme. Well, okay, so now Pascal I is called CS I and programming is not the only thing students are supposed to learn, but the emphasis certainly seems to be on programming.

Some faculty members thought that it might be a better idea to tell students early what CS is about. So we developed a bi-term class to be taken along with CS 240 to do just that. The course will be offered for the first time this coming fall. It's supposed to be fun and informative, giving students an idea and appreciation of the various fields of CS (such as OS, computer organization, applications, data structures, software engineering, foundations, computability, artificial intelligence,) as well as introducing them to the CS faculty here at WKU.

A Simple Simulator for Micro-Programs Uta Ziegler

How does a CPU work? Well, it indefinitely repeats a fetch-and-execute cycle. That is, it fetches the next computer instruction and executes it through a series of micro-instructions. The micro-instructions manipulate registers, initiate Read and Write operations with main memory, determine the addressing mode of operands based on bits in the computer instruction, control the actions of the ALU, and make sure the PC is correctly updated for the next fetch.



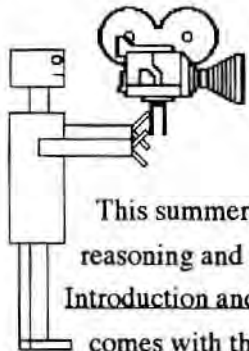
Get the picture? No? That's what my students said, too. So I thought if they can **see** what's happening and can **write** micro-programs maybe they'd understand. So I sat down and started to learn about TURBO PASCAL's graphic capabilities and gradually built a small simulator for micro-programs based on the example computer discussed in our text book.

The simulator displays parts of the main memory which are accessed, such as stack, data, or instructions. It also shows parts of the control memory (which contains the micro-program) such that the student knows which micro-instruction will be executed next. And of course there is the ALU-box, some registers, and status bits.

Since there are quite a number of boxes on the screen, the simulator high-lights the ones it manipulates to draw the student's attention to the action. The registers or memory locations which are accessed in the current micro-instruction are highlighted, as well as the operation and the register/memory-location where the result is to be stored.

A student can watch the execution of a computer instruction through a sequence of micro-instructions (which is a lot neater than watching me on the board reportedly executing the same micro-program). Moreover, after a student sees that there is no miracle involved what so ever, she/he can write a micro-program and test it using the simulator.

Students seemed to like the simulator because they could see what happens and - I guess - because it's something different.



Automated Reasoning and Fuzzy Logic Art Shindhelm

This summer, the CS 475/G course offering will be in automated reasoning and fuzzy logic. Larry Wos' text Automated Reasoning: Introduction and Applications, 2nd edition will be the class text. It comes with the latest version of OTTER. OTTER is a public

domain theorem prover created at Argonne National Laboratory. Students will use OTTER extensively in the course to solve problems in different areas.

The basic concepts of fuzzy logic will also be presented. The relationship between fuzzy logic and automated reasoning will be explored as well as the reasons for the widespread use of fuzzy logic in a variety of areas ranging from expert systems, camcorders and the brake systems of automobiles. For more information the instructor can be contacted by email at SHINDHELM@WKUVX1.BITNET.



Advanced Graphics Offered Robert Crawford



For the first time at WKU, an advanced graphics course was offered this spring. The core of the course was the construction of an object-oriented ray tracer which (at last count) was running something over 12,000 lines in length and growing. Topics



covered in the course included: the fundamentals of ray casting and ray tracing; illumination models; shading; texturing; bump mapping; Bezier patches; transparency; fractals.

This year the students received credit through CS476, but it is hoped that a regular advanced graphics course will shortly become part of the standard offerings.

Computer Information Systems I Darleen Pigford

Computer Information Systems I is a Senior level course required for the Business Option. Students enhanced the traditional database curriculum with team



projects. Even though the homework assignments were done using Structured Query Language and a PASCAL precompiler for VAX/RDB database files, the team projects spanned across various platforms. Project work consisted of project definitions, cost estimates, progress reports, ten deliverables, database software presentation, and documentation. Each team consisted of four members, one of whom served as the team leader.

The following is a summary of the project titles and the implementation platforms:

Undergrad Degree Form Manger Gradbase	DBASE IV, Novell Multiuser Environment VAX/RDB 4.0/PASCAL
Car Rental Database	Paradox 3.5/PC/AT
Computer Science Scheduler	NetwareSQL
ACRS Supply Inventory	VAX/RDB SQL C

The team implementing the ACRS inventory brushed up on their knowledge of C while the teams using Netware discovered the complexities of a networked environment. Details of the project strategy and deliverables can be found in Dr. Pigford's paper "The Documentation and Evaluation of Team-Oriented Database Projects" published in the Special Interest Group Computer Science Education Bulletin (SIGCSE) Volume 24, Number 1, March 1992.

Computer Information Systems II

Students enrolled in Dr. Pigford's CS543 Computer Information Systems II supplemented volume II of Date's *An Introduction to Database*, with individual project reports. These technical projects were designed to extend the standard curriculum with current database topics. Individual projects consisted of a project definition, midterm progress report, oral and written reports. Each project presenter prepared a list of ten questions / answers for the class members. Project questions were included on the

final examination. Project source material came from technical manuals, library references, and the new CD-ROM Computer Selects in the Science Library at Western.

A summary of the projects is given below:

PERSON	PROJECT
Diane Carver	FOCUS: the database management system for the programmer and nonprogrammer
Murali Krishna Golla	Communication Strategies in Distributed Databases
Paul Janssen	SQL servers (Backends) which run on Novell Netware, A discussion of current product offerings
Francis Siaw	Database--Insight into Multimedia Databases
Fei Wang	The Strategy of Database Security and Integrity
Wei Yang	Recovery in VAX/RDB
Yuan Zhang	Database Integrity and Its Implementation in Paradox

The class award for the **BEST DATABASE PROJECT** was earned by Mr. Golla and the class award for **THE MOST PROMISING DATABASE STUDENT** was awarded to Diane Carver.



Phonathon Ken Modesitt

This year marked the second time that Computer Science has participated in the annual University phonathon. This probably comes as no surprise to you, as you undoubtedly had a call from one of our student volunteers. What may be a surprise is that over \$2,000 was pledged by you, including matching grants from your employers. THANK YOU!! Three of you, in fact, joined forces and contributed \$700 to help upgrade our UNIX resources (with 50% coming from a generous employer



matching grant)! It was disappointing, however, to discover that we had current correct addresses and phone numbers for only about 50% of you. Would sure appreciate your help in locating correct information for other alumni. Thanks!



**First-ever
Visiting Research Scholar
Ken Modesitt**



Dr. Tong Long En, Associate Professor of Computer Science and Engineering from the University of Science and Technology at Beijing (USTB), People's Republic of China, was a visiting research scholar with us from September, 1991 until March, 1992. His research involved working in expert systems, particularly inductive ones. This was a memorable experience for all of us -- he learned LOTS of English and we learned a little Mandarin! Such intercultural exchanges provide marvelous opportunities for all concerned, as Dr. Tong saw first-hand how a United States university differs from one in China. His department head, Professor Tu Xu Yan, is the president of the Chinese Association of Artificial Intelligence, and may be coming in the fall. Dr. Tu's textbook, *Artificial Intelligence and Its Applications*, is the one used in most Chinese universities.

**Activities Last Year
Ken Modesitt**

1991-92 was a very good year professionally. A major highlight was to be an invited lecturer at the Computer Science and Engineering Department of the University of Science and Technology in Beijing (USTB). I gave a two-week series of lectures on "Computer Science in the Real World: Expert Systems, Software Engineering, and



Computer-based Learning." A joint communique was signed, in which a long-term relationship will be set up involving exchanges of scholars and the possibility of some of their best graduate students attending WKU.

The faculty and students at USTB were marvelous hosts, lecture participants, and guides. The English language proficiency was excellent on the part of the students, as well as for several of the faculty. However, it was often easier to converse with the latter in German or Russian. Students attend school six days a week in China, and work extremely hard. The computer equipment, while not up to the par of the United States, is adequate for both personal computers (IBM-compatible only) and larger ones. The main interest is related to the ability of the United States to be a world-wide leader in computer software development.

One of the most visible outcomes of the trip to China was the presence of Associate Professor Tong Long En from USTB as a visiting research scholar in Computer Science. See related article.

I presented a paper, "The Golden Arches of Academic Computing," at the 34th International Conference of the Association for the Development of Computer-based Instructional Systems (ADCIS), at St. Louis, MO. I am the joint author of a paper to be presented in Chicago this summer on "PLATO (R) and The Community College, Leading Technology in a Leading Commonwealth," at the Leadership 2000 Conference of the League for Innovation. Also, a chapter, "Basic Principles and Techniques in Knowledge Acquisition," was published by the Association for Civil Engineers in *Expert Systems in Civil Engineering: Knowledge Acquisition*.

**ACM 1991-1992
Christy West**

Western's chapter of the Association of Computing Machinery has been very busy this year! During the fall semester, we had three meetings. The September meeting



focused on the computer systems at WKU through speakers such as Mr. Hunter Goatly on the VAX, Dr. Ken Modesitt on the CS department labs, and Mr. Eric Hall on UNIX. In October, Ms. Carol White from the Career Services Center spoke about co-op and permanent job opportunities. At our last fall meeting in November, Mr. Kevin Raymer from South Central Bell spoke on telecommunications.

Also during the fall semester, we sent two teams to the ACM Programming Contest in Indianapolis, Indiana. The team members were Mark Bitterling, Philip Brown, Reggie Burnette, Chandra Danam, Eric Hall, Mark Mayes, Geoff Parsons, and Danny Vandermeer. Although the teams did not bring home a gold medal, they both made very respectable finishes.

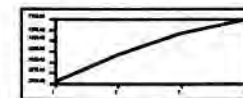
We had four meetings during the spring semester. In January, Dr. Ken Modesitt spoke on computing in the far east. At the February meeting, an ACM national speaker, Dr. Ernst Leiss from the University of Houston spoke about viruses and worms. In March, Dr. John Crenshaw demonstrated how music and computers can work together. At our April meeting, Dr. Tom Cheatham, CS department head at Middle Tennessee State University and former CS professor at WKU, spoke about Software Testing. Also at the April meeting the officers for the 1992-1993 year were elected -- Laurie Goad as Chairman, Baron Chandler as Vice-Chairman, and Andrew Vanover as Secretary/Treasurer.

During the month of April we also sponsored several other events. In conjunction with Upsilon Pi Epsilon, we sponsored a trip to Huntsville, Alabama to visit the Marshall Space Flight Center and the Space and Rocket Center. We also sponsored the spring picnic with Pi Mu Epsilon at Covington Woods Park. Finally, ACM and UPE sponsored the First Annual Awards Banquet which was held in the Executive Dining Room of DUC. At this banquet many outstanding CS majors were recognized, including the ACM Outstanding Sophomore, Junior, and Senior, who were Lon Maynard, Grady Bullington, and Darrell Burkhead respectively.

The ACM Executive Committee for 1991-1992 -- Mark Bitterling, Philip Brown, Jay Snider, Christy West, and Clark West -- would like to thank you for a remarkable year!

COMPUTER SCIENCE ENROLLMENTS UP!

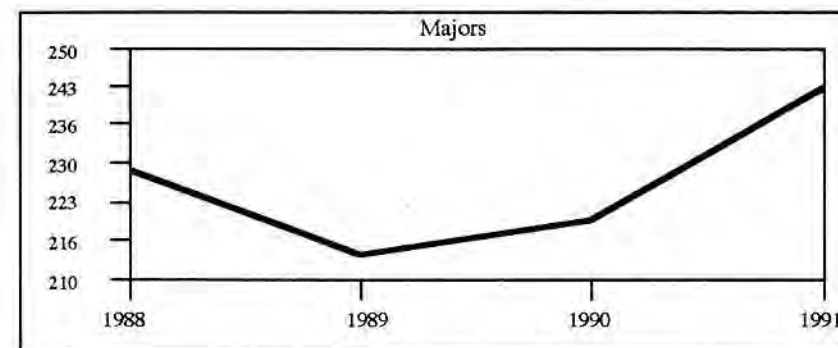
Ken Modesitt



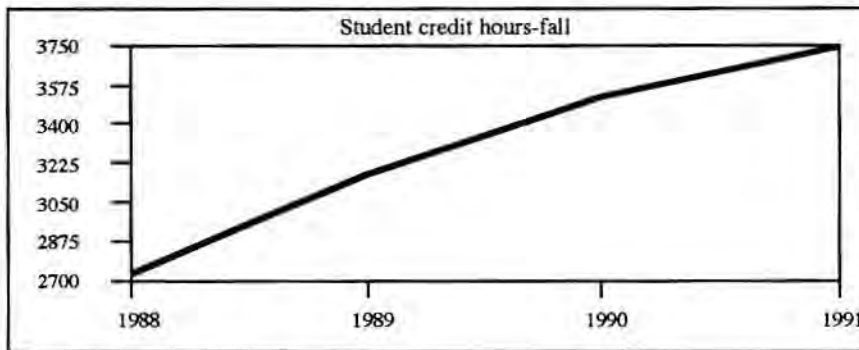
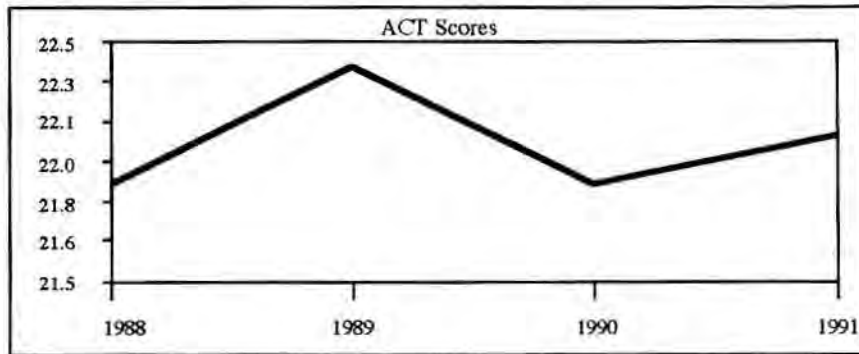
Computer Science at Western Kentucky University is an excellent example of the growing nationwide interest in the development of computer scientists and software engineering professionals. See the following data.

	1988	1989	1990	1991	change (1988-1991)
Majors	229	214	220	243	6.1%
ACT scores	21.9*	22.4	21.9	22.1	1 %
Student credit hrs-fall	2724	3173	3510	3744	+36.4%

* estimate



The average ACT scores of Computer Science students has been above that for Ogden College and Western Kentucky University for the last seven years! The same scores for entering freshmen have also exceeded the other averages for six of the same seven years -- bright students!!



A major concern, however, is the reduction in the number of women and minorities choosing computer science. For example, the percentage of entering CS students who are women has diminished from 35% to 25% since 1989. The story for minorities is even more gloomy. How can computer science meet the demand for qualified graduates (900,000 estimate for 1995; Bureau of Labor Statistics) without drawing from these qualified sources? When women (51.3% of the population) and minorities (20% of the population) are not well-represented, we have a problem! What do your companies do to encourage these potential computer scientists and software engineers? We could sure use your suggestions!
(Self Employed)

SAMPLE EMPLOYERS OF ALUMNI

- | | |
|---------------------------------------|---------------------------------------|
| Anderson Computing Systems | Image Science, Inc. |
| AT&T Bell Laboratories | Intergraph Corporation |
| Bioscience Information Service | J.C. Holland & Company, CPAs |
| BMG Direct Marketing, Inc. | Lexmark |
| Boeing Computer Support Services | Lockheed Missiles & Space |
| Business Computer Solutions | Locus, Inc. |
| Brown & Williamson Tobacco Corp. | Management Science America |
| Cabinet for Human Resources (KY) | Martin Marietta Energy Systems |
| Chemical Abstracts Service | Measurex/MDDC Division |
| Citibank (Citicorp) | Microdynamics, Inc. |
| City of St. Louis | Monsanto Research Corporation |
| Compaq | National Healthcorp |
| Computing Solutions, Inc. | Natl. Center for Supercomputing Appl. |
| Convex Computer, Frankfurt, Germany | NCR |
| DataRose | Perot Systems Corp. |
| Dept. of Defense | Politeknile ITB |
| E & S, Inc. | Pressure Systems Inc. |
| E-Systems | ProCom |
| Electronic Data Systems (EDS) | R. R. Donnelley & Sons Company |
| Eglin AFB | Square D |
| Environ. Research Inst. of Michigan | State of Tennessee |
| Farmers Bank and Capital Trust, Co. | State of Tennessee General Assembly |
| First Texas Computer Corp. | Stetson University |
| General Electric Co. | Teledyne Brown Engineering |
| General Motors Research | Texas Instruments |
| Georgia Institute of Technology | Thoroughbred Mazda |
| Harris Corp. | Trendar Corporation |
| Harris Corp. (Government Sys. Sector) | Union Underwear Company |
| Hewlett-Packard | U.S. Army |
| Hughes Aircraft Co. | Wake Research Group |
| Humana | Western Kentucky University |

"Imagination Is More Important Than Knowledge."
Albert Einstein

Computer Science Faculty



Greg Baur



Robert Crawford



John Crenshaw



Larry Mayhew



Kenneth L. Modesitt



Darleen Pigford



Sylvia Pulliam



Arthur Shindhelm



Carol Wilson



Uta Ziegler

Please Send All Correspondence To:

Department of Computer Science

TCCW 137A

Western Kentucky University

Bowling Green, KY 42101

(502) 745-4642

e-mail on BITNET: Modesitt@wkuvx1.

Department of Computer Science
Western Kentucky University
137A TCCW
Bowling Green, KY 42101

NON-PROFIT
ORGANIZATION U.S.
POSTAGE BULK
RATE PERMIT 398
BOWLING GREEN,
KY 42101

DEGREE REQUIREMENTS

The major in Computer Science (reference number 629) requires a minimum of 40 semester hours of Computer Science courses, ENG 307, and an approved second major or minor depending on which of the three options is selected. All three options require CS 240, 241, 242, 250, 338, 340, 360, and 425. Computer Science electives may include from 0-6 hours of 200-level courses. Additional requirements are as follows:

SYSTEMS PROGRAMMING

CS 342, 445, 450; a math minor including MATH 126, 227, and 307; Physics 250, 251, 260, 261, or Physics 201, 202, 207, and 208. (CS 443, 476, and MATH 329 are recommended)

SCIENTIFIC APPLICATIONS

CS 405, 446, 456; a math minor including MATH 126, 227, 307, and 327; Physics 250, 251, 260, 261 or Physics 201, 202, 207, and 208. (CS 406 and MATH 329 are recommended)

BUSINESS APPLICATIONS

CS 245 COBOL or CS 246, and CS342, 343, 443; MATH 126; ECON 202, 203; a minor in Business Administration or a major in Economics; a descriptive statistics course such as MATH 203 or ECON 206. (CS 476 is recommended).

COMPUTER SCIENCE COURSES		<u>Credit hours</u>	<u>Prerequisites</u>
145 *	Introduction to Computing	3	Two years HS Math
230 *	Introduction to Programming	3	Two years Alg or M100
240	Computer Science I	3	M118 or CS145, Coreq M118
241 **	Computer Science II	3	CS 240
242	Assembly Language Programming	3	CS 241
243	Introduction to Microcomputer Systems	3	CS230 or CS 240
244	Computer Science I Lab	1	Coreq CS 240
245	Introduction to Programming Languages	1.5	CS 240
246 ***	COBOL Application Programming I	3	CIS 241
250	Social Implications of Computing	1.5	CS 241
295	Introduction to Research Methodology	1	Ogden Scholar
299	Introduction to Research in CS	1-3	"B" grade in CS 240 and 241
338	Discrete Computational Math	3	CS 241
340	Computer Organization	3	CS 242, 338
342	Use of an Operating System	3	CS 242
343	File Management	3	CS 246 or 245 COBOL
346	COBOL Application Programming II	3	CS 246
349	Consulting Practicum in CS	1-2	CS 340
360	Software Engineering I	3	CS 242
369	Cooperative Education in CS	1-3	Dept. Approval
389	Practicum in CS	1-4	CS 242
405	Numerical Analysis I	3	CS 245 FORTRAN, M327
406	Numerical Analysis II	3	CS 405, M331
425	Operating Systems I	3	CS 340
442	Data Structures	3	CS 338
443	Database Management Systems	3	CS 338, CS 360
444	Programming Languages	3	CS 242
445	Operating Systems II	3	CS 425
446	Interactive Computer Graphics	3	CS 360, M307
447	System Simulation	3	CS 241, M203
450	Telecommunications	3	CS 425
456	Artificial Intelligence	3	CS 338, CS 360
458	Expert Systems	3	CS 456
460	Software Engineering II	3	CS 360
470	Introduction to Operations Research	3	M 327
475	Selected Topics in Computer Science	1-3	
476	Research Methods and Projects	3	CS 360

*Does not count toward a CS major or minor

** Math 126 or 119 or 120 a corequisite for this course

*** Only 1.5 hours count toward a CS major

Example course schedule for a Computer Science major with Scientific or Systems option

Freshman Year				Junior Year			
First Semester		Second Semester		First Semester		Second Semester	
LME 101	1			Eng 300	3	CS 425	3
Eng 100	3	Hist 119 or 120	3	CS 340, 360	6	CS Electives	6
Math 118	5	Math 126	4.5	Math 307	4	Math 327	4
CS 230 or 240 (244)	3-4	CS 240 (244) or 241	3-4	General Ed	3	Eng 307	3
General Ed	3-4	General Ed	6				
<u>Sem. Hours</u>	<u>16-18</u>	<u>Sem. Hours</u>	<u>16.5-17.5</u>	<u>Sem. Hours</u>	<u>16</u>	<u>Sem. Hours</u>	<u>16</u>

Sophomore Year				Senior Year			
First Semester		Second Semester		First Semester		Second Semester	
Eng 200	3			CS Electives	6-9		
CS 241 or 242	3			Math 329	3	CS Electives	6-9
Math 227	4.5	CS 242, 250, 338	7.5	General Ed	5-6	Electives	8-9
Phys 201, 207, or 250, 251	4	Phys 202, 208, or 260, 261	4	<u>Sem. Hours</u>	<u>14-18</u>	<u>Sem. Hours</u>	<u>14-18</u>
General Ed	3	General Ed	6				
<u>Sem. Hours</u>	<u>17.5</u>	<u>Sem. Hours</u>	<u>17.5</u>				

For the Business Applications Option, replace the math and physics courses in the sophomore year with Math 203, Acct 200-210 and Econ 202-203. Also, the courses required for the Business Administration minor or Economics major must be included in the junior and senior year.

OTHER BASIC COURSES FOR THE COMPUTER SCIENCE MAJOR

Econ 202-203	Principles of Economics	Math 327	Multivariable Calculus (M 307)
Eng 307	Technical Writing	Math 329	Probability & Statistics I (M 327)
Math 118	College Algebra & Trigonometry	Math 331	Differential Equations (M227)
Math 203	Statistics (M 118)	Phys 201-202	College Physics I, II
Econ 206	Equiv to Math 203	Phys 207-208	Labs for College Physics
Math 126-227	Calculus & Analytical Geom I, II	Phys 250-260	University Physics I, II
Math 307	Linear Algebra	Phys 251-261	Labs for University Physics

COMPUTER SCIENCE MINOR

A minor in Computer Science requires at least 18 semester hours which must include CS 240, 241, 242, and three upper level courses, one of which must be at the 400 level. An introduction to the calculus (M 119, 120, or 126) is required for the minor but is not part of it. EET 491 Microprocessor Systems Design may be included as a 300 level course.

NOTE: Forty-two hours of upper level (300-400) courses are required for all CS majors.

COMPUTER SCIENCE FACULTY

Dr. Greg Baur	Dr. Darleen Pigford
Dr. Robert Crawford	Ms. Sylvia Pulliam
Dr. John Crenshaw	Dr. Arthur Shindhelm
Dr. Larry Mayhew (with Philosophy)	Ms. Carol Wilson
Dr. Kenneth Modesitt	Dr. Uta Ziegler

FOR FURTHER INFORMATION CONTACT:

Dr. Kenneth Modesitt, Head
Thompson Complex Central Wing 137 A
Department of Computer Science
Western Kentucky University
Bowling Green, KY 42101

Phone: (502) 745-4642
BITNET e-mail: modesitt@wkuvx1
FAX: (502) 745-6471

DEGREE REQUIREMENTS

The graduate program requires a minimum of 30 semester hours of graduate level course work, at least 15 of which must be in courses numbered 500 or higher. The student may elect either Plan A which includes 6 hours for a thesis or Plan B which is the non-thesis option. The Graduate college requirement for a research tool component may be met by electing CS476G, Research Methods and Projects in Computer Science. The research tool requirement is in addition to the 30 semester hours required for the graduate degree.

The six core courses must be included in each student's program. During the last semester of coursework, the graduate committee will conduct the required comprehensive examination of the candidate.

A maximum of six semester hours in cognate courses may be included in the program. Cognates and other elective computer science courses are selected with the approval of the graduate advisor. If the student has completed some of the core courses as an undergraduate, additional electives will be included in the program. Mathematics, statistics, operations research, management science and physics are appropriate cognate fields.

COURSES FOR GRADUATES AND UNDERGRADUATES

Course Number & Description	Credits	Req.	Course Number & Description	Credits	Req.
405 Numerical Analysis I	3	CS245, Fortran, M327	447 System Simulation	3	CS241, M203
406 Numerical Analysis II	3	CS405, M31	456 Artificial Intelligence	3	CS338, 360
442 Data Structures	3	CS338	458 Expert Systems	3	CS456
443 Data Base Management Systems	3	CS338, 360	460 Software Engineering II	3	CS360
444 Programming Languages	3	CS242	475 Selected Topics in CS	1-3	
445 Operating Systems II	3	CS425	476 Research Methods & Projects in Computer Science	3	CS360
446 Computer Graphics	3	CS360, M307			

GRADUATE COURSES

Course Number & Description	Credits	Course Number & Description	Credits
541 Mathematical Foundations of Computer Science	3	549 Analysis of Algorithms	3
543 Computer Information Systems Design	3	567 Micro-Computer Operating Systems	3
544 Compiler Theory and Design	3	595 Advanced Topics in Computer Science	3
545 Advanced Operating Systems Principles	3	599 Thesis Research and Writing	6

GRADUATE COMPUTER SCIENCE FACULTY

Dr. Greg Baur	Dr. Kenneth Modesitt
Dr. Robert Crawford	Dr. Darleen Pigford
Dr. John Crenshaw	Dr. Arthur Shindhelm
Dr. Larry Mayhew (with Philosophy)	Dr. Uta Ziegler

FOR FURTHER INFORMATION CONTACT:

Dr. Kenneth Modesitt, Head
Thompson Complex Central Wing, 137-A
Department Computer Science
Western Kentucky University
Bowling Green, KY 42101

Phone: (502) 745-4642
BITNET e-mail: modesitt@wkuvx1
FAX: (502) 745-6471

DEGREE DESCRIPTION

The program is designed to provide an emphasis in programming systems and information systems. In addition, a course in mathematical foundations of computer science is required. The following courses identify the core of the curriculum and indicate the minimum content in each graduate students program.

Course	Description	Hours	Prerequisites
CS442G	Data Structures	3	CS338
CS443G	Data Base Management Systems	3	CS338, 360
CS445G	Operating Systems II	3	CS425
CS541	Mathematical Foundations of Computer Science	3	
CS543	Computer Information Systems Design	3	CS443
CS544	Compiler Theory and Design	3	CS444
CS____	Four elective courses selected from computer science and approved cognate courses	12 30	
CS476G	Research Methods and Project (Satisfies graduate research tool requirement)	3 33	CS360

NOTE: *A minimum of four 500 level computer science courses is required.*

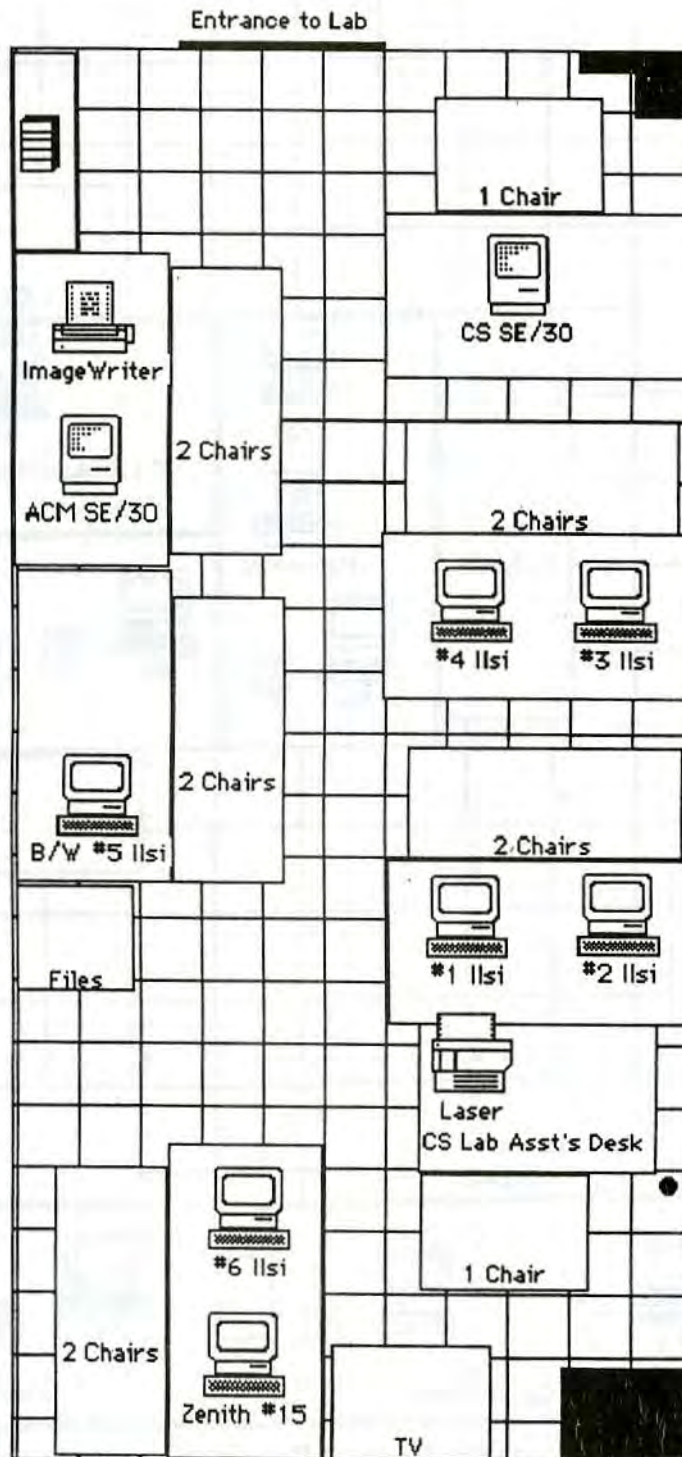
ADMISSION REQUIREMENTS

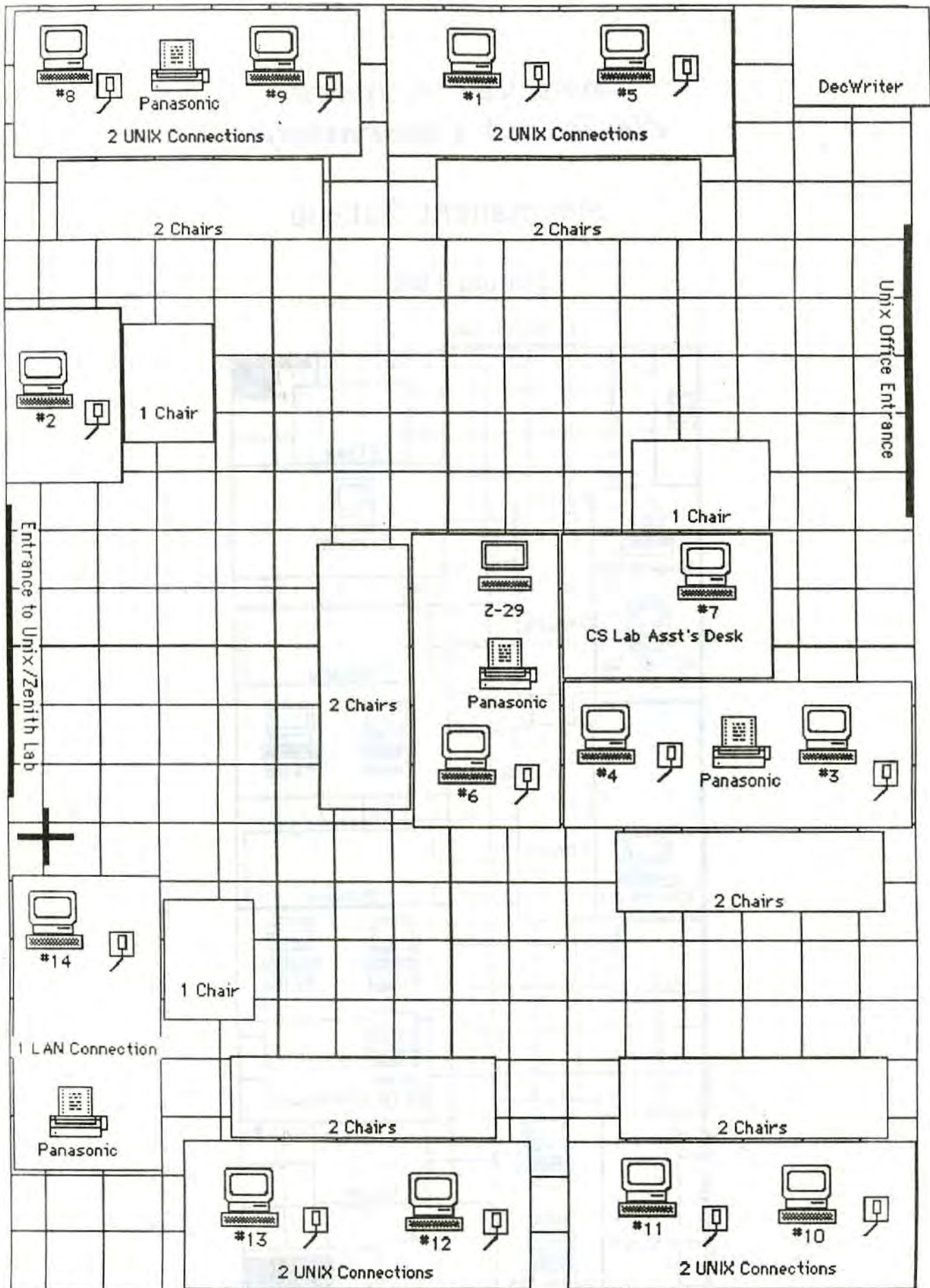
In addition to satisfying general Graduate College admission requirements, a student entering the program will have completed an undergraduate degree in computer science, mathematics, physics, engineering, or a similar field. Minimum requirements include a knowledge of programming in both assembly language and a higher level language, a discrete mathematics or logic course, a computer organization course, a course in data structures and at least eight semester hours of calculus. Minimum requirements may be satisfied by courses actually taken as an undergraduate, substantial practical experience in the computer field, or remedial course work taken while a graduate student.

Computer Science Macintosh Laboratory

...Permanent Set-up

Spring 1991





Unix/Zenith Lab ...Permanent Set-up

PLEASE RETURN BY JULY 1, 1992, ENCLOSING SOME FAMILY INFORMATION AND PICTURES FOR THE NEXT ISSUE OF THE NEWSLETTER!

**WESTERN KENTUCKY UNIVERSITY
COMPUTER SCIENCE DEPARTMENT
ALUMNI SURVEY
MAY 1992**

Estimated Time To Complete: 20 - 30 minutes.

Today's Date: _____

OPTIONAL:

Name _____

Address _____

E-mail _____

Phone _____

1. Computer Science degree(s) obtained at WKU:

BS _____ (date) MS _____ (date)

Option: ___ Systems ___ Scientific ___ Business

No degree received but took courses during _____ (give approximate dates)

2. University degrees obtained elsewhere or in a different field:

BS _____ (field) _____ (date) _____ (school)

MS _____ (field) _____ (date) _____ (school)

Ph.D _____ (field) _____ (date) _____ (school)

3. Are you currently employed full-time? _____ part-time? _____

4. Total years of full-time work experience in computer-related fields? _____

5. Total years of part-time work experience in computer-related fields? _____

Intern/CO-OP _____ Research/Teaching assistant _____

Lab Assistant _____ Contract Programmer _____

Other _____

6. If you are currently employed in the computer field, check off the items that most closely describe the primary focus of the company/entity you work for:

- Accounting
- Aerospace
- Banking and Insurance
- Computer Hardware Manufacturing
- Computer Service (installation and maintenance of hardware and/or software)
- Computer Sales and Marketing
- Contract Programming
- Education
- Engineering (other than Aerospace)
- Entertainment
- Government
- Manufacturing
- Military
- Publishing
- Retail (other than computer related products)
- Software Engineering
- Software Publishing
- Telecommunications
- Other: _____

7. JOB TITLE INFORMATION:

- What is your current job title? _____
- How many people do you currently supervise? _____
- What is the job title of your immediate manager? _____
- What was your job title when you were first employed? _____
Year _____

8. If you are working in a computer-related field, check off the items that most closely describe the primary activities of your current job:

- Administration/Line Management
- Computer Hardware Testing
- Customer Support
- Computer Programming
- Network Systems Management
- Sales and Marketing
- Software Design
- Software Maintenance
- Software Testing
- Operating Systems Management
- Teaching
- Other: _____

9. In which of the following computer application areas have you had significant work experience?

- Administrative Data Processing
- Artificial Intelligence
- Compilers
- Computer Aided Engineering
- Computer Graphics
- Computer System Implementation
- Design of Digital Computers
- Image Processing
- Networks and/or Distributed Teleprocessing
- Numerical Computation
- Operating Systems
- Real-time Programming
- Simulation and Modeling
- Software Engineering
- Other: _____

10. If you are not employed in a computer-related field, describe your current job.

11. **GRADUATE SCHOOL INFORMATION:**

Current Program

Field _____ School _____

Completed Program (after WKU)

Field _____ School _____

Degree: Ph.D. _____ M.S. _____ Other _____ Year _____

Courses Taken (after WKU)

Field _____ School _____ Year _____

Items 12-18 are designed to be answered by students who have completed a degree in computer science at WKU. For items 12-18 circle the response which most closely indicates how well you agree with the item statement:

12. The Computer Science program at WKU prepared me sufficiently for my first job.

Strongly Disagree

Disagree

Agree

Strongly Agree

Comments:

13. The required courses in the Computer Science program at WKU provide a comprehensive foundation in the computer field.

Strongly Disagree Disagree Agree Strongly Agree
Comments:

14. My job requires that I continue to learn new computing techniques, beyond those I studied in my WKU Computer Science program.

Strongly Disagree Disagree Agree Strongly Agree
Comments:

15. The computing facilities at WKU were adequate to meet the needs of the Computer Science program.

Strongly Disagree Disagree Agree Strongly Agree
Comments:

16. The Computer Science program at WKU prepared me for the amount of teamwork required in my job.

Strongly Disagree Disagree Agree Strongly Agree
Comments:

17. The general education courses at WKU have been useful to me.

Strongly Disagree Disagree Agree Strongly Agree

Most useful ones? _____

18. The advising process at WKU has been useful to me.

Strongly Disagree Disagree No Opinion Agree Strongly Agree
Comments:

19. Check those programming languages and application packages you regularly use in your current job.

Languages

- Ada
- Assembly
- Basic
- C
- C++
- Cobol
- Fortran
- Pascal
- 4GL's
- SQL
- UNIX Shell
- IBM JCL
- Other _____

Packages

- CAD
- CASE/SE tools
- Database (mainframe)
- Database (micros)
- Desktop Publishing
- Drawing/Graphics
- Network Software
- Num/Data Analysis
- Productivity: WP, Spreadsheets, Utilities
- Windows
- X-Windows
- Other _____

20. What computer hardware do you regularly use in your current job?

- IBM/Compatible PC's
- Macintosh
- Other microcomputers
- IBM mainframe/mini
- VAX
- HP
- CRAY
- Other mini or mainframe computers _____
- Workstations _____

21. Are these networked?

- Yes
- No
- System Name(s) and Types _____

22. What operating systems do you regularly use in your current job?

- CMS
- DOS
- Macintosh
- MVS
- Other _____
- OS/2
- UNIX
- VMS
- Windows

23. The classical software lifecycle is composed of development (of new systems or major upgrades to an existing product) and maintenance. Management of the process is also critical, as in the generation of new ideas, e.g. algorithms (R&D). What percentage of your workload is devoted to:

- Research & Development (R&D)
- Management
- Development
- Maintenance
- Other _____

24. Please give a finer breakdown, if possible.

Development

- Feasibility: Is this software necessary/possible?
- Requirements analysis: What does the customer want?
- Design: How should we build it?
- Code: Build it
- V&V: Did we build the correct product? Correctly?
- Documentation: User and system
- Other _____

Maintenance

- Corrective: Fix the defects
- Adaptive: Port to a new environment (OS, HW, Language, etc.)
- Perfective: Add new or enhance existing features
- Other _____

25. How many hours per week, on the average, do you spend in your professional career?

- less than 35
- 35-39
- 40-44
- 45-49
- 50-54
- 55-59
- 60+

26. Check any new computing techniques or application areas that you have needed to learn for your job since leaving WKU.

GENERAL

- New Languages
- New Machines
- New Operating Systems

ENGINEERING/COMPUTER
HARDWARE RELATED AREAS

- CAD/CAM/CAE
- Digital Signal Processing
- Hardware
- Image Processing
- Other Engineering Topics
- Real-time Programming
- Repair/Upgrade
- Simulation/Modeling
- Other _____

COMPUTER SCIENCE AREAS

- Advanced Database Tools/Techniques
- AI Techniques
- CASE Tools
- Debugging/Testing Techniques
- Graphics
- Networks/Telecommunications
- OOP/OOD
- Operating Systems Management
- Parallel Programming
- Software Engineering Techniques
- User Interface Design
- Windows Programming
- Other _____

OTHER TECHNIQUES OR APPLICATIONS:

- Business Applications
- Interpersonal Skills
- Management Skills
- Other _____

27. What distribution of effort best describes the amount of individual and teamwork required in your job?

Individual	_____	%
With your department	_____	%
With other departments	_____	%
With other companies	_____	%

28. Check those areas of your WKU education which have been most relevant to your job performance in the computer field.

HAD	COURSE	RELEVANT	HAD	COURSE	RELEVANT
_____	_____	Business Courses	_____	_____	Group Projects
_____	_____	Classes with Writing	_____	_____	Large System Design
_____	_____	Computer Architecture	_____	_____	Logic/Problem Solving
_____	_____	Computer Science Theory	_____	_____	Mathematics
_____	_____	Data Structures	_____	_____	Networks
_____	_____	Database/Files	_____	_____	Operating Systems
_____	_____	Engineering/Physics	_____	_____	Programming Languages
_____	_____	Ethics/Societal Issues	_____	_____	Programming Skills
_____	_____	General CS Background	_____	_____	Software Engineering
_____	Other: _____				

29. Check those areas of your WKU education which could have been strengthened by additional coursework. Include, if you wish, areas outside the computing discipline.

IN CS	COURSES	OTHER
_____	_____	Management Skills
_____	_____	Oral Communication Skills
_____	_____	Written Communication Skills
_____	_____	C
_____	_____	Circuit Design
_____	_____	Database Techniques
_____	_____	Hardware/Software Interface Techniques
_____	_____	IBM mainframe environment
_____	_____	Networks
_____	_____	Software Design and Development
_____	_____	Software Quality Techniques
_____	_____	UNIX/Operating Systems
_____	_____	Other _____
_____	_____	Engineering/Physics
_____	_____	Mathematics/Logic
_____	_____	Other _____

30. What do you see as the emerging computer technologies that ought to be taught in the WKU computer science program either as an elective or as a requirement? See attachment for current courses.

- CAD/CAM/CAE
- CASE/Other Software Engineering Tools/Techniques
- Distributed/Parallel Computing
- Embedded Systems/Real-time Programming
- Expert Systems
- Fourth Generation Languages
- Fuzzy Systems
- Graphics/Animation
- Imaging Technologies
- Multi-media
- Networks/Telecommunications
- Neural Nets
- New Hardware Trends
- OOP/OOD
- Popular Microcomputer Application Packages
- User Interfaces
- Various AI Topics
- Windows Programming
- Other _____

31. Who or what sparked your interest in your current career?

- | | |
|---|--|
| <input type="checkbox"/> Family | <input type="checkbox"/> Organization |
| <input type="checkbox"/> Friend | <input type="checkbox"/> ACM |
| <input type="checkbox"/> Teacher: <input type="checkbox"/> Jr. High | <input type="checkbox"/> Money |
| <input type="checkbox"/> <input type="checkbox"/> High School | <input type="checkbox"/> Specific Course |
| <input type="checkbox"/> <input type="checkbox"/> Univ. | <input type="checkbox"/> General Science |
| <input type="checkbox"/> <input type="checkbox"/> Other _____ | |

32. If you had a younger sister or brother who wanted to major in Computer Science, would you recommend WKU?

- Yes No

33. What is your gender? Female Male

34. What is your ethnic background?

- American Indian
- Asian
- Black
- Filipino
- Mexican American
- Other Hispanic
- Pacific Islander
- White
- Other
- Decline to State

35. Did you work in the computer field either before or while you were a student in the Computer Science Program at WKU?

Yes _____

No _____

36. Include any other information you think we should be aware of. Is there any question you think should be added to or deleted from this survey?

OPTIONAL:

37. Employer _____

Address _____

38. What is your current annual salary if you have a full-time job?

39. What is your current salary in dollars per hour if you have a part-time job?



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 272 BOWLING GREEN, KY.

POSTAGE WILL BE PAID BY ADDRESSEE

**Department of Computer Science
Western Kentucky University
Bowling Green, KY 42101-9977**

