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Design and Implementation of Software Based Project Management System

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Abstract: Last century recorded fundamental changes in the way organizations work and this was driven by the desire to optimize performance and profitability. New information technology enables the ability to facilitate this revolution because it provides solution to one of the key business barriers, such as detailed information planning, organizing and controlling of allocated resources to accomplish project cost and time. Project management (PM) is the systematic planning, organizing, controlling, co-ordinating and directing allocated resources to accomplish project cost and time. The project management process starts with the project approval. It consists of sub-processes of project start, co-ordination, controlling, discontinuity, management and close down. Projecting from this work, discoveries are targeted at the following understandings concerning; what is project management(PM), traditional methods of PM, types of PM, problems associated with PM, the benefits of using modern PM, techniques and the Design of a computerized project management software. These project management software programs help managers monitor the daily development of a project in a systematic fashion and see to it that they are running on schedule. C SHARP(C#) was used to design a computerized project management system and simulated using the Visual Studio IDE as the test bed.

Keywords: Project Management, Test Bed, Simulation, Software, Visual Studio.

I. INTRODUCTION

Project management system is the discipline of planning, organizing and directing resources to bring about the successful completion of specific project goals and objectives. Long before there was an institute for project management, or updated knowledge books and guides on how to manage projects, or even before the existence of Gantt charts, history offers several examples of colossal projects successfully completed. The Pyramids of Giza, Great Wall of China, and Coliseum are all good examples of such projects. Project Management, at its core, is concerned with creating an environment where people can work together to achieve a mutual objective, in order to deliver successful projects on time and on budget. Throughout the history of humanity, humans have been working on improving and refining the practices of project management. Project management has been practiced for as long as humanity inhabited earth. There are many examples in history of challenging projects that were successfully completed, despite all the complexities and uncertainties that could've rendered the project a failure. Many of these projects necessitated an enormous workforce, large scope, many years of work, advanced planning and precise execution. Regrettably, despite all of these monumental achievements, very little documentation of their methods and techniques exists. It's not until the 1950s that organizations have started to apply systematic tools and techniques to complex projects. The U.S. Navy greatly contributed to the formulation and documentation of principles of modern project management methodologies and techniques. There were also other noteworthy projects, such as the Manhattan project, that significantly contributed to advancement of standard practices in modern project management. During the 1960s ambitious projects such as landing a man in the moon further helped in the formation and utilization of tools to manage large scope projects. In the 1970s technological advancement made the creation of project management software possible, via software companies such as Oracle. In the 1980s PCs became affordable, subsequently smaller companies started to use computers for project management. In the 1990s notable project management tools such as PRINCE2 and CCPM commenced. In the third millennium, academia started offering degrees for project management. Moreover, project management theories, tools, and techniques are now mainstream in many organizations and industries. It's not clear

exactly what the future holds for project management, but with challenges such as globalization, diminishing resources, and increasing population there is no more fitting vehicle for managing such issues than project management.

Understanding the past, gives us a chance to better understand the future. Studying the history of project management, one will understand that project management has evolved throughout history. Its continuous evolvement facilitated the advancement of project management, and hence paved the way for the next big project. In spite of the numerous substantial projects in history, there is little documentation of the methodologies or techniques before the 1950s. Advancements in science and technology expedited the progression of project management as a profession. It is now widely accepted that a project manager requires a special set of skills. As organizations evolve, so will the challenges facing future project managers. However, while the future may require future project managers to adapt by learning new specialized skills, the fundamental elements that make a project manager a great one will not change; leadership, pragmatism, decisiveness, communication and foresight to name a few.

II. LITERATURE REVIEW

1950s marked the beginning of the modern Project Management era where core engineering fields come together working as one. Project management became recognized as a distinct discipline arising from the management discipline with engineering model In the United States, prior to the 1950s, projects were managed on an *ad hoc* basis using mostly Gantt Charts, and informal techniques and tools. At that time, two mathematical project-scheduling models were developed. The "Critical Path Method" (CPM) was developed as a joint venture between DuPont Corporation and Remington Rand Corporation for managing plant maintenance projects. And the "Program Evaluation and Review Technique" or PERT, was developed by Booz Allen Hamilton as part of the United States Navy's (in conjunction with the Lockheed Corporation) Polaris missile submarine program; These mathematical techniques quickly spread into many private enterprises.(Kerzner ,2003)

At the same time, as project-scheduling models were being developed, technology for project cost estimating, cost management, and engineering economics was evolving, with pioneering work by Hans Lang and others. In 1956, the American Association of Cost Engineers (now AACE International; the Association for the Advancement of Cost Engineering) was formed by early practitioners of project management and the associated specialties of planning and scheduling, cost estimating, and cost/schedule control (project control). AACE continued its pioneering work and in 2006 released the first integrated process for portfolio, program and project management (Total Cost Management Framework) (Comnious 2006)

In 1969, the project management institute (PMI) was formed to serve the interest of the project management industry. The premise of PMI is that the tools and techniques of project management are common even among the widespread application of the projects from the software industry to the construction industry. In 1981, the PMI Board of Directors authorized the development of what has become a Guide To The project Management Body of Knowledge (PMBOK Guide), containing the standards and guidelines of practice that are widely used throughout the profession (Lewis, 2004). The International Project Management Association (IPMA), founded in Europe in 1967 has undergone a similar development and institute the IPMA Competence Baseline (ICB). The focus of the ICB also begins with knowledge as a foundation, and adds considerations about relevant experience, interpersonal skills, and competence. Both organizations are now participating in the development of an ISO project management standard (Brooks, 2004).

III. MATERIALS AND METHODS

This new system is designed to aid the user because it is user friendly, all you do is follow the instruction, then click, it is interactive and menu driven. Having gathered and analyzed the required data explicitly, system specification, which determined what the system should be doing and how it should be design to achieved the targeted objectives is written down, the purpose of the design is to determine the specific requirement of the application identify and select the software and needed computer resources and completely and other necessary to develop the application. During the design phase, system requirement are determined in details.

The exact layout of report and document also selected and additional needed resources, such as assistance in developing one or more application or access to data in a software or a mainframe are identified. These and related requirements are specified during the design phase.

The characteristics of the end user (i.e. input) computer application and how it is to functions should be carefully considered during the design phases in general, and user computing application should be designed with the following characteristics

- Easy to use and understand
- Visually attractive and easy to read
- Error assistant.
- Efficient in how to operate
- Completely documented with comments/ remarks
- Simple avoiding complicated logic and unnecessary loops.
- Compatible (to the extent possible) with other organization end user computing application or cooperate system
- Backed up to prevent the loss of important programs, data and work.

A. Software Algorithm

1. Understand the goal (why) and the scope (what) of the project.
2. Understand the external and internal constraints (factors) that impact the project
3. Plan (Who, does What, When and How) to reach the goal, considering #1 and #2.
4. Once planning is done, execute steps #5, #6 and #7, till #8 is satisfied.
5. Execute the plan.
6. Keep checking for changes in #2 and #1.
7. Modify the plan as needed.

8a. Do the above till the goal is reached.
8b. Drop the project if the project is no longer feasible due to changes in internal and external constraints.

B. Procedure Chart

This phase of the project shows the procedure used to design the new system using charts, as shown below:

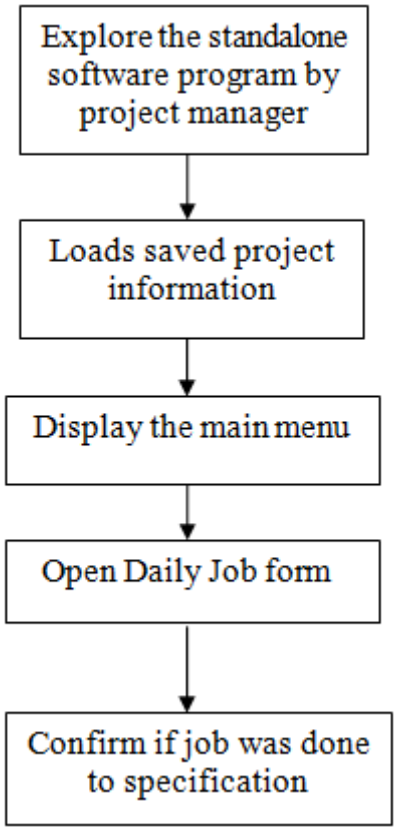

Figure 3.1 Procedure Chart

Code/Design view

This is where the magic takes place. Forms are designed graphically. In other words, the developer has a form on the screen that can be sized and modified to look the way it will be displayed to the application users. Controls are added to the form from the Toolbox, the colour and caption can be changed along with many other items. This centre window of the IDE is also where developers write the code that makes everything in the application work. The code is written in modules, or files, that are either connected to an object (Forms) or called specifically when needed.

Object Browser

By pressing F2 or selecting it into the View menu, it's possible to explore all the available objects of the libraries (types, functions...).

Review

The Visual Studio IDE is a complex and exciting work space for developers, providing many enhancements

and upgrades from the days of Visual Basic 4.0 or the introduction of C++. This section only serves as a mere introduction to this multi-functional interface.

D. Employing the C# (C Sharp) Programming Language

C# (pronounced "C sharp") is a simple, modern, object-oriented, and type-safe programming language. It will immediately be familiar to C and C++ programmers. C# combines the high productivity of Rapid Application Development (RAD) languages and the raw power of C++.
Visual C# .NET is Microsoft's C# development tool. It includes an interactive development environment, visual designers for building Windows and Web applications, a compiler, and a debugger. Visual C# .NET is part of a suite of products, called Visual Studio .NET, that also includes Visual Basic .NET, Visual C++ .NET, and the JScript scripting language. All of these languages provide access to the Microsoft .NET Framework, which includes a common execution engine and a rich class library. The .NET Framework defines a "Common Language Specification" (CLS), a sort of lingua franca that ensures seamless interoperability between CLS-compliant languages and class libraries. For C# developers, this means that even though C# is a new language, it has complete access to the same rich class libraries that are used by seasoned tools such as Visual Basic .NET and Visual C++ .NET. C# itself does not include a class library.

IV. SOFTWARE DOCUMENTATION AND IMPLEMENTATION

The C SHARP (C#) version 6.0 programming language is used to write this software using the Visual Studio. Project manager is a windows form application running on the Microsoft dotNET Framework 4.5
The Project Manager has 5 tabs User Interface that divides the application into five sections for a convenient user experience.

- **Home:** This is the Project Manager Control panel, this window displays the main work content of the project for instance the task bar, task description, task content and other pertinent entries that are needed for the management of the project.
- **Print:** Here you can print the work progress report displayed on the home page. It also leaves an option for printing preview.
- **Exit:** This tab gives an option to exit the application.
- **Options:** This tab provides options for changing the theme of the application and adjusting the application to be operated from touch sensitive devices.
- **About:** This tab provides both copyright and other vital information on the development of the software.

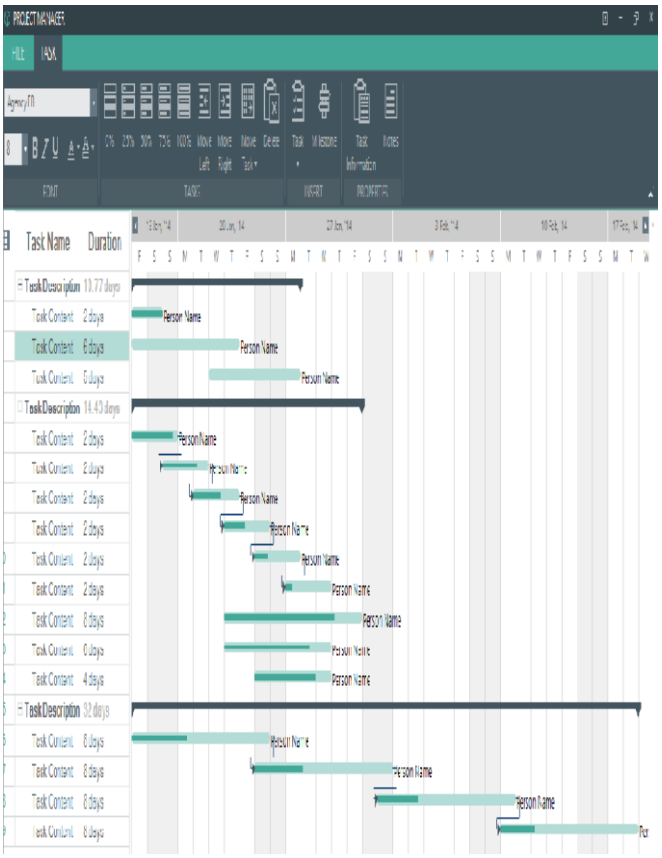

Figure 4.1 The Output Design View

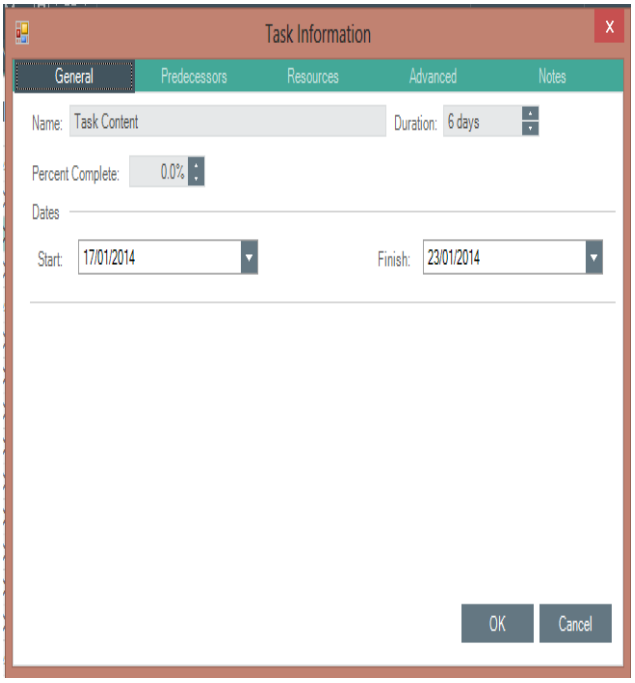

Figure 4.2 Task Information Window for General Description of the Job

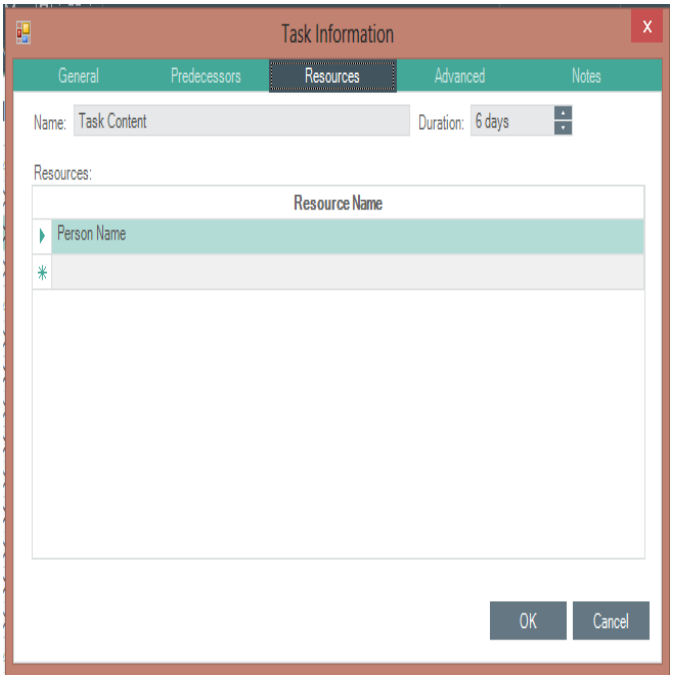

Figure 4.4 Task Information Window for Job Resources

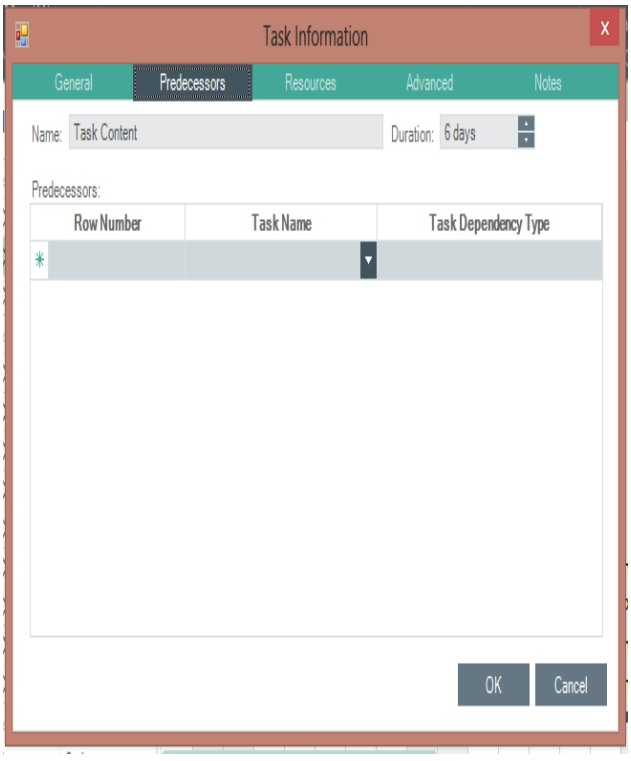

Figure 4.3 Task Information Window for Predecessor Description

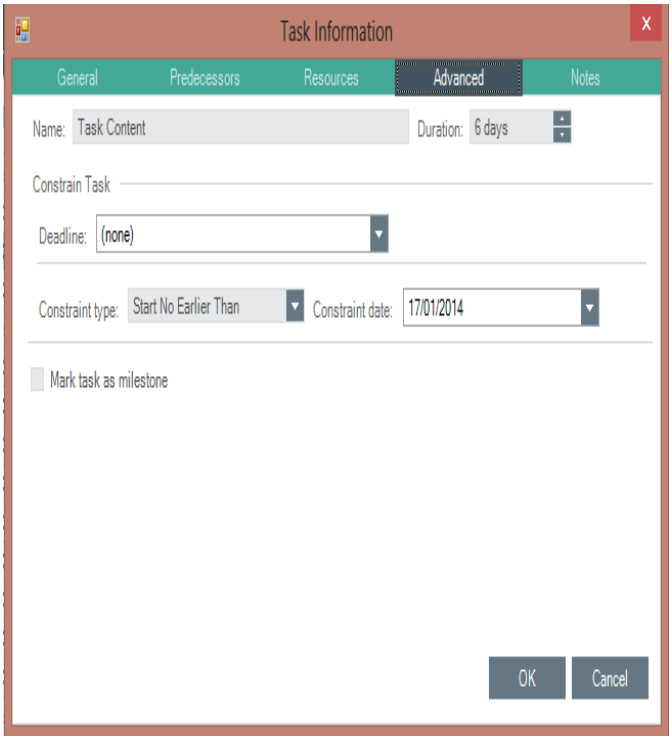

Figure 4.5 Task Information Window for Advances Description of the Task

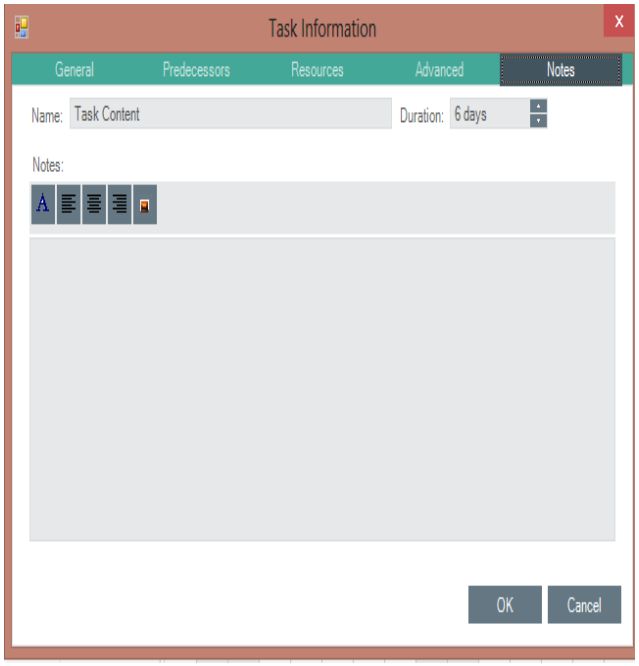

Figure 4.6 Task Information Window for Taking Notes

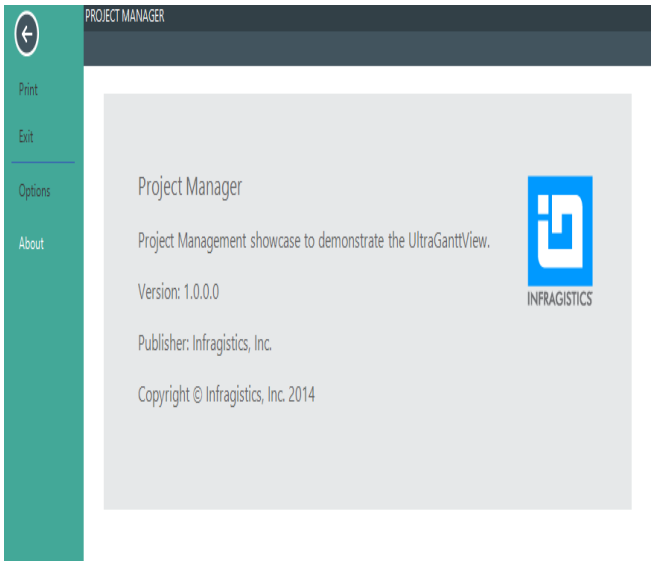

Figure 4.7 Windows Display for About the Software

A. Operation of the Software

This software Simulates a Software Based project Management System using the case study of the deployment of a fibre optics/back haul using microwave technology in Michael Okpara University of Agriculture, Umudike (MOUAU) contracted to TRAKATEL International limited Enugu.

For the deployment of such a project the following team players are involved and listed in a chronological order of work responsibility flow for the effective delivery of the job in line with the operational standard of TRAKATEL

- Negotiation with IT Manager
- Approval by the Company's Board of directors
- Allocation of Job to the Project Manager and Supervisors
- Consultancy (Usually by Click networks limited)
- Resource Procurement (Procurement Manager)
- RF(Radio Frequency) Engineering Survey
- Turnkey Engineering
- Equipment Procurement
- Rigging/Outdoor trunking
- BSS/NSS Engineering
- Network Engineering
- Indoor Trunking
- Data Communication Engineering

The above responsibilities will attain optimal efficacy with the incorporation of a Project Management Software and with cognizance of the fact that development of this prototype is well appreciated.

CONCLUSION

This Project provides the detail structure of the software. Project Management System synchronizes the working of all the stages of software. It looks on all aspects of an organization, its employees, team leader's manager, attendance and other co – curricular activities. Project Management System is the easiest way to manage all functionalities of a software development, which facilitates admin to maintain the functionality related to team leaders, managers and employees. A successful project management must simultaneously manage the four basic elements of a project: Resources, time, money, and most importantly, scope. All these elements are interrelated, each must be managed effectively. All must be managed together if the project and the project manager is to be a success. So there is need to achieve the basic element of project management.

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