Contents

Practical NO.1

AIM: Study and usage of OpenProj.

OpenProj : OpenProj is an open source project management softwareapplication. OpenProj operates on multiple platforms including Windows, Mac, Linux and Unix.OpenProj is a free, open-source project management solution. OpenProj is ideal for desktop project management and supports opening Microsoft or Primavera files. OpenProj 1.4 is an open source desktop project management application. This application is an alternative to Microsoft Project.

OpenProj provides control, tracking and management of projects. To create a new project the only field required is the Project Name on the Create New Project window and the start date of the project can be change it if you don?t want to start the day that you?re creating your project. You can add tasks in the Gantt diagram providing the start and end dates of each task; also you can add information to each task such the predecessors and successors tasks, resources, notes, etc. One great feature is that provides the Work Breakdown Structure (WBS) to order and control the tasks of the project for people who manages projects this is a very important tool. Another great feature is the Resource

Breakdown Structure (RBS) to define the structure of the resources, teams, providers, etc. Task Usage and Resource Usage are features to control your project and provide a good track on it. The Report tool provides information about the current status of your project.

The features of OpenProj are as follows:-

Gantt chart:- A Gantt chart is a type of bar chart, developed by Henry Gantt in the 1910s, that illustrates a project schedule. Gantt charts illustrate the start and finish dates of the terminal elements and summary elements of a project. Terminal elements and summary elements comprise the work breakdown structure of the project. Modern Gantt charts also show the dependency (i.e. precedence network) relationships between activities.

PERT graph:- The Program (or Project) Evaluation and Review Technique, commonly abbreviated PERT, is a statistical tool, used in project management, that is designed to analyze and represent the tasks involved in completing a given project. First developed by the United States Navy in the 1950s, it is commonly used in conjunction with the critical path method (CPM).

Resource Breakdown Structure (RBS) chart:- In project management, the resource breakdown structure (RBS) is a hierarchical list of resources related by function and resource type that is used to facilitate planning and controlling of project work. In some cases, a geographic division may be preferred. Each descending (lower) level represents an increasingly detailed description of the resource until small enough to be used in conjunction with the work breakdown structure (WBS) to allow the work to be planned, monitored and controlled.

Work Breakdown Structure (WBS) chart: - A work breakdown structure (WBS), in project management and systems engineering, is a deliverable oriented decomposition of a project into smaller components.A work breakdown structure element may be a product, data, service, or any combination thereof.

Steps of installation of OpenProj:

Figure 1: Download by clicking here

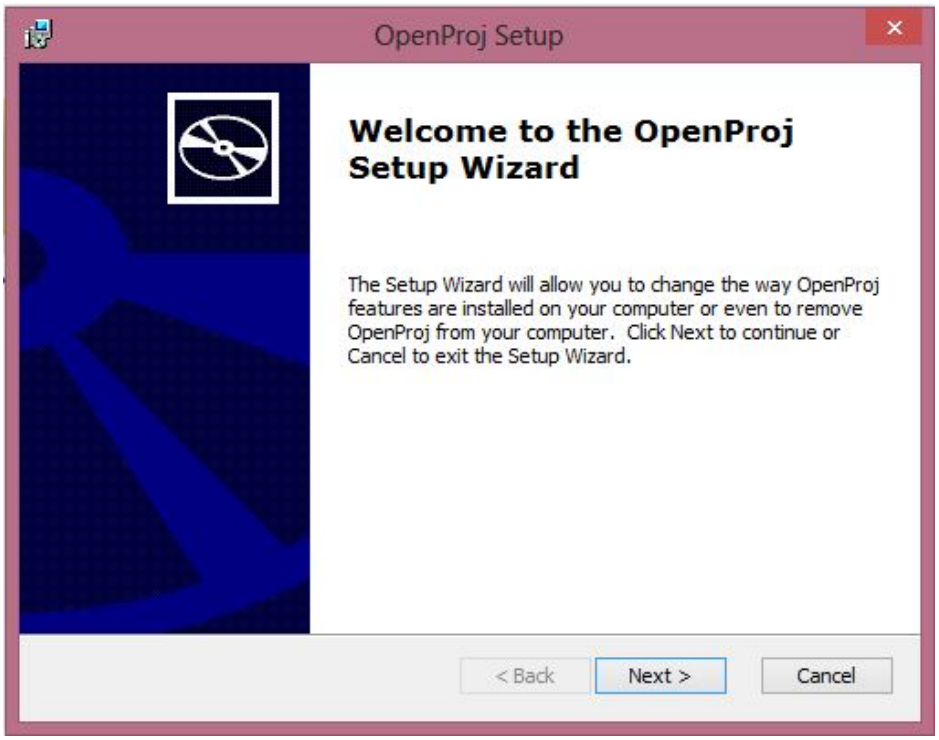


Figure 2: Run the executable file. Click Next in the welcome wizard.

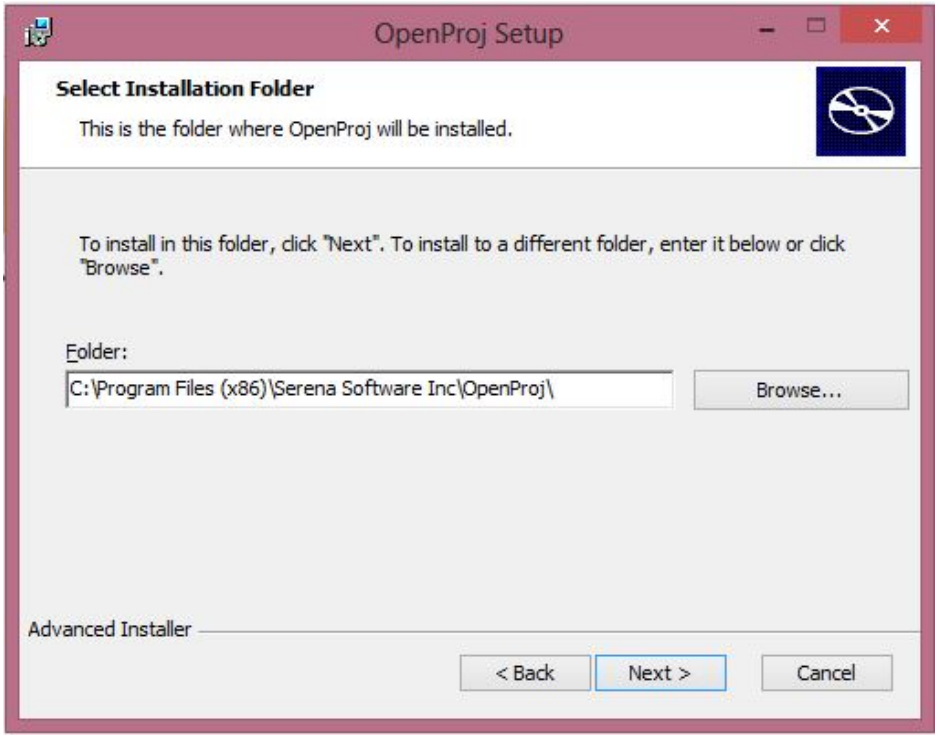


Figure 3: Click Install

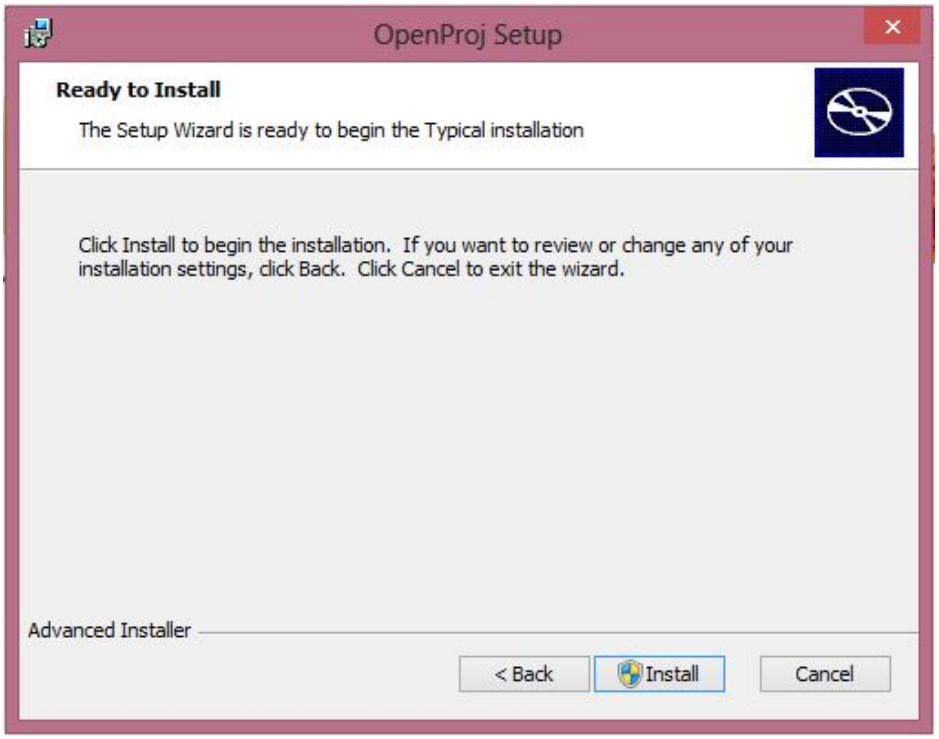


Figure 4: Click Finish

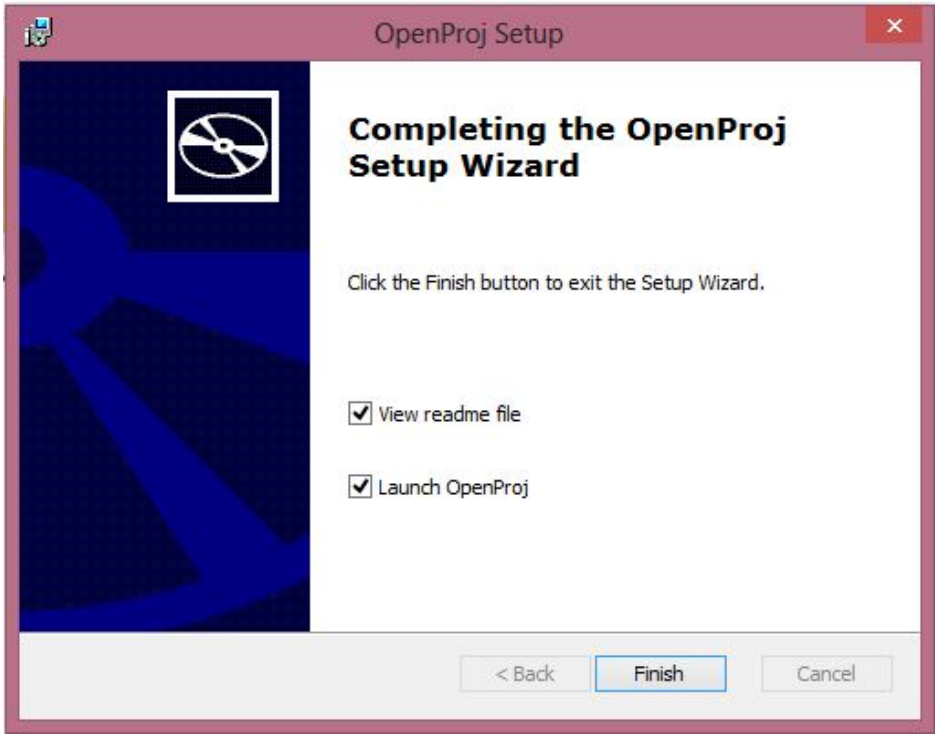


Figure 5: Create Project

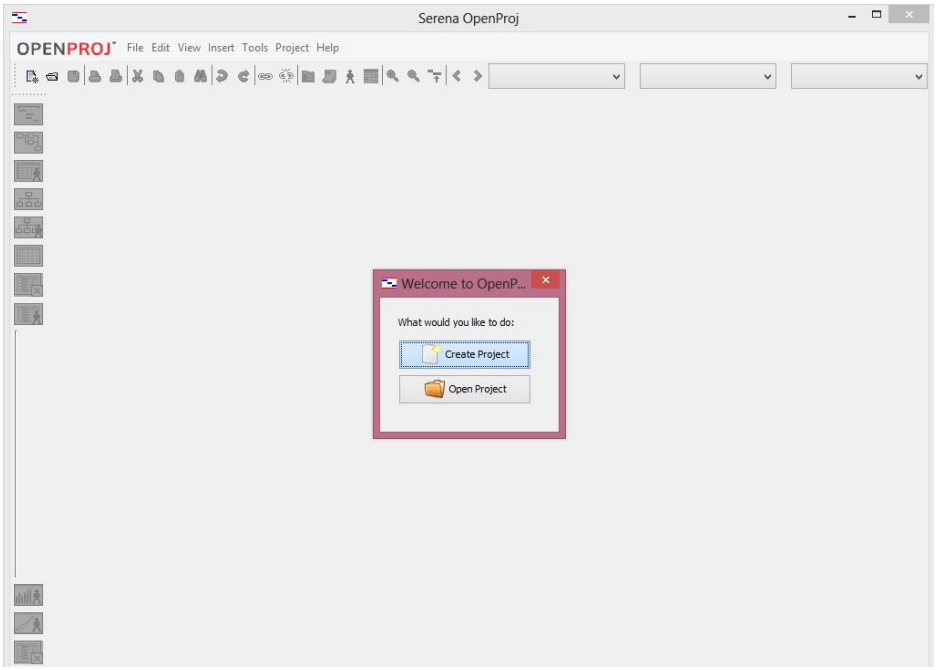


Figure 6: Create Project Name: Structured Index model

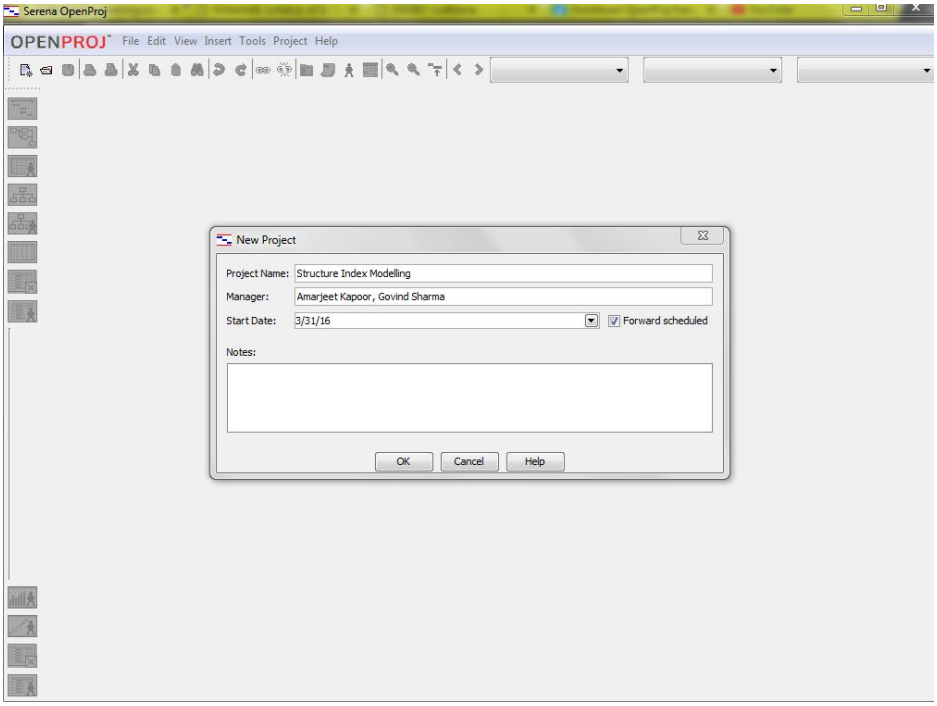


Figure 7: Click OK

Practical NO. 2

AIM: Study and usage of OpenProj to draft a project plan.

To create projects in OpenProj Software:

1. Having downloaded and installed the OpenProj software; start OpenProj from the start menu of Windows or via the icon on your desktop. After the license agreement, OpenProj starts with a choice of creating a new project or opening an existing one. Choose ?Create Project?.

2. Enter a name for the project, the project manager?s name and a start date (which can also be modified later if required). Provide a description in the Notes section as you see fit.

3. The application window will be displayed consisting of following main components:-

   Indicator Column:- In this column, symbols are displayed to show the status of the corresponding tasks (see right).

   Task Number Column:- Task numbers are assigned by OpenProj automatically when data is entered. The user does not enter information into this box.

   Time Scale:- In many views, OpenProj shows a timeline whose scale can be changed via the + and - magnifying glass icon on the menu above.

   Information View Type:- The area along the left side of the window lists a number of buttons representing the available views. Gantt, Network, Resources, WBS (work breakdown structure), RBS (resource breakdown structure), Reports, Task Usage and Resource Usage.

The lower view buttons open a split-screen where resource mapping tables and resource utilization as a graphic can be displayed. You can toggle views on and off by clicking the same button repeatedly.

To adjust the calendar while creating project in OpenProj Software:

For accurate tracking of your project it is essential to first set up the OpenProj calendar to reflect the working hours in your organization. OpenProj offers three default calendars:

- Standard Calendar (Mon-Fri, 08:00 to 17:00 with 1hr lunch break at noon)
- Night Shift (Mon-Sat 23:00 to 08:00 with a 1hr break from 03:00 to 04:00)

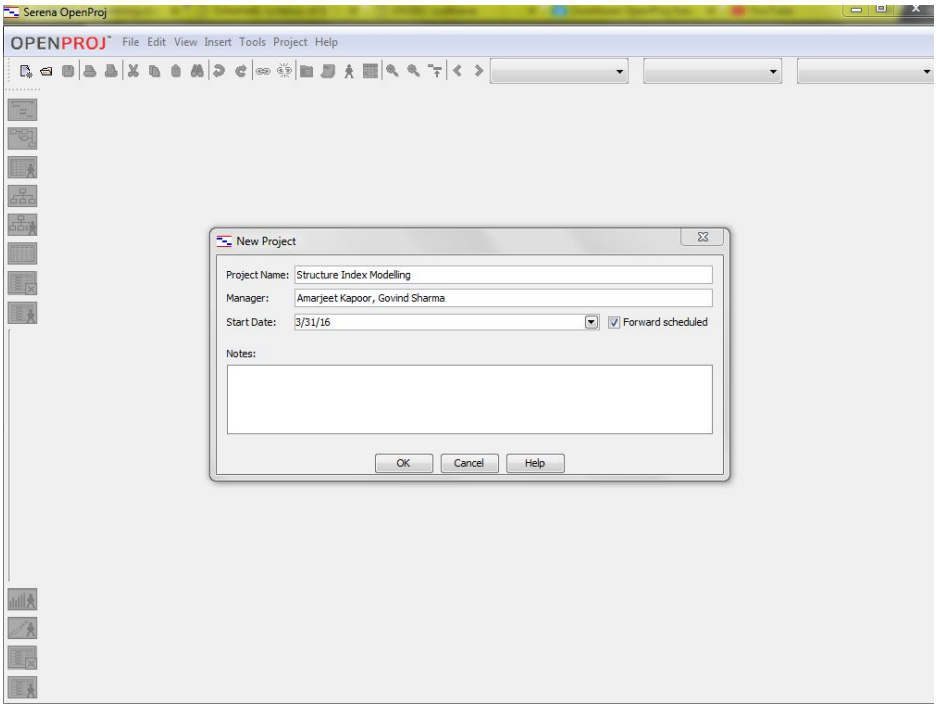


Figure 8: Creating Project

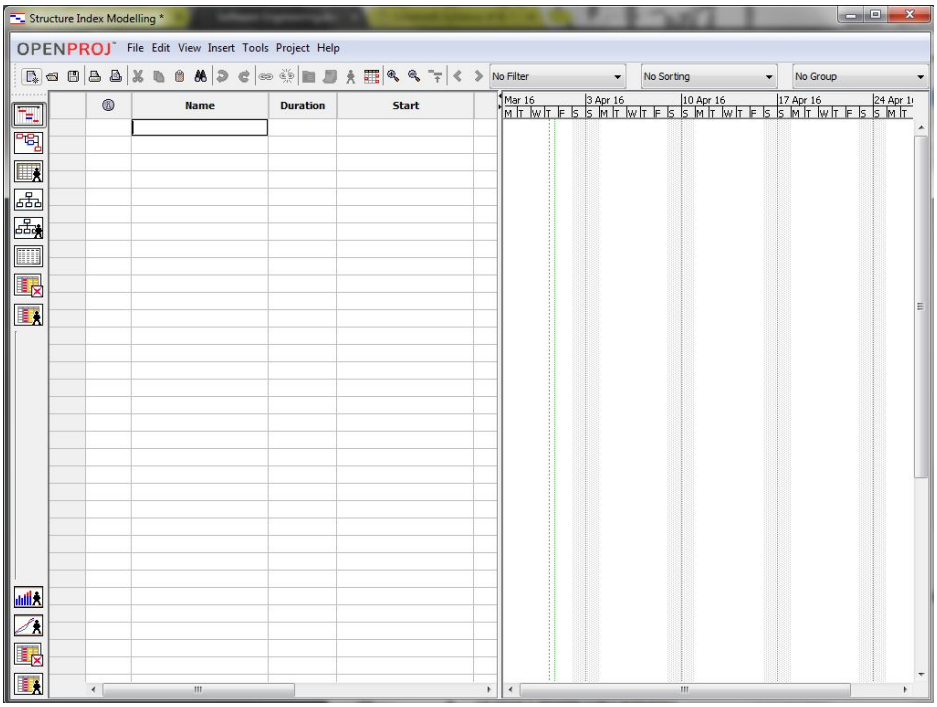


Figure 9: application window

- 24-Hour Calendar (24/7 schedule)

We can assign any one of these to be your project calendar; however none of the default calendars contain public holidays so it is often necessary to create your own custom calendar to reflect your company's general working hours.

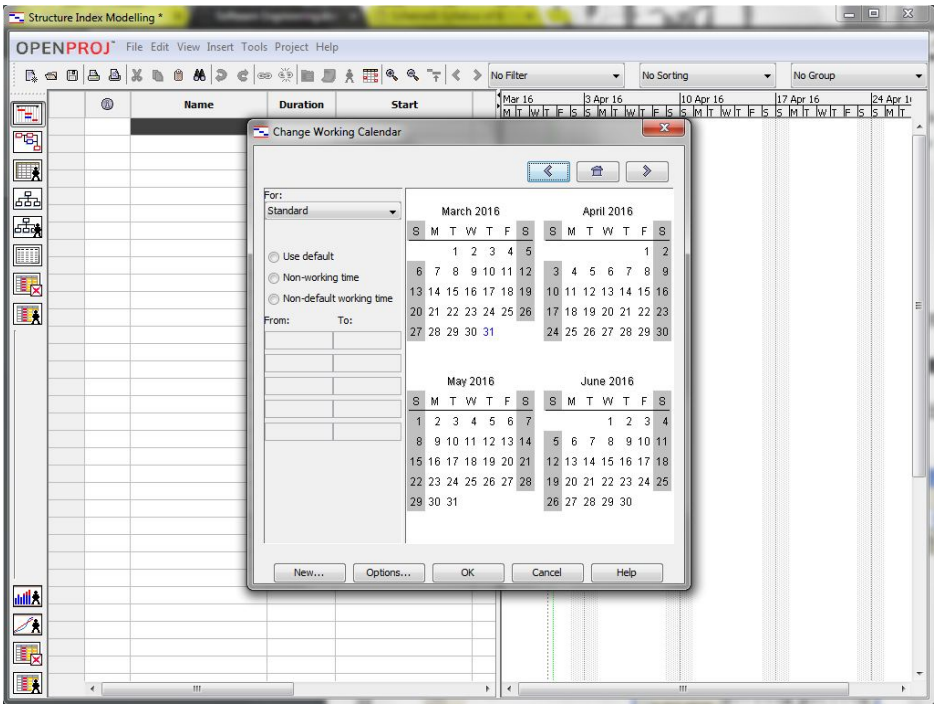


Figure 10: standard calender

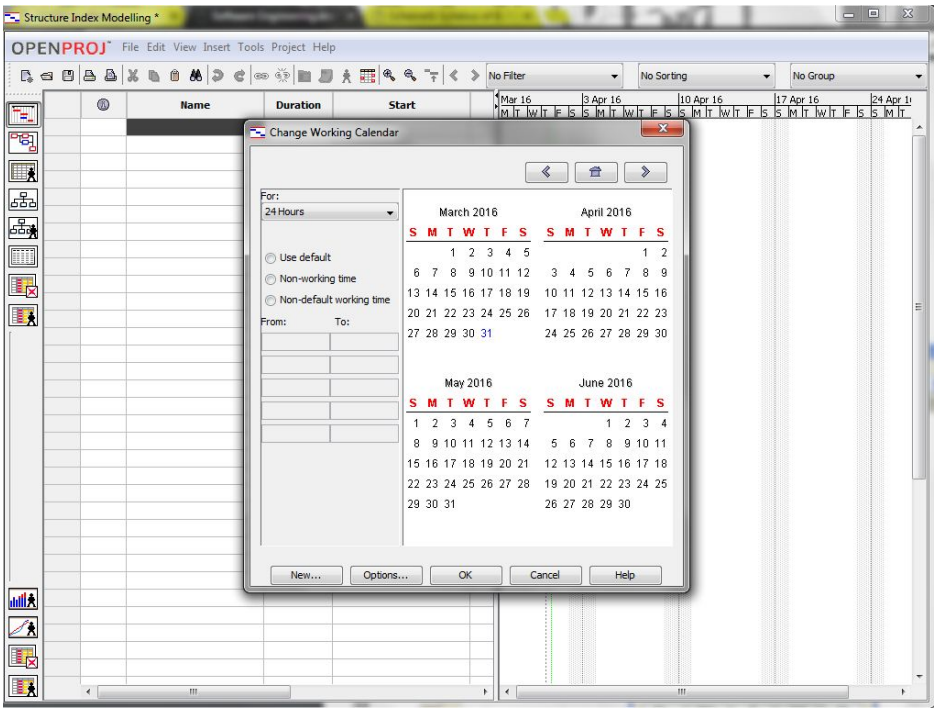


Figure 11: night calender

1. Open the Calendar with the menu tool Tools ? Change Working Calendar .
2. Click on New to create a new calendar.
3. Enter a name for your new calendar and click OK.

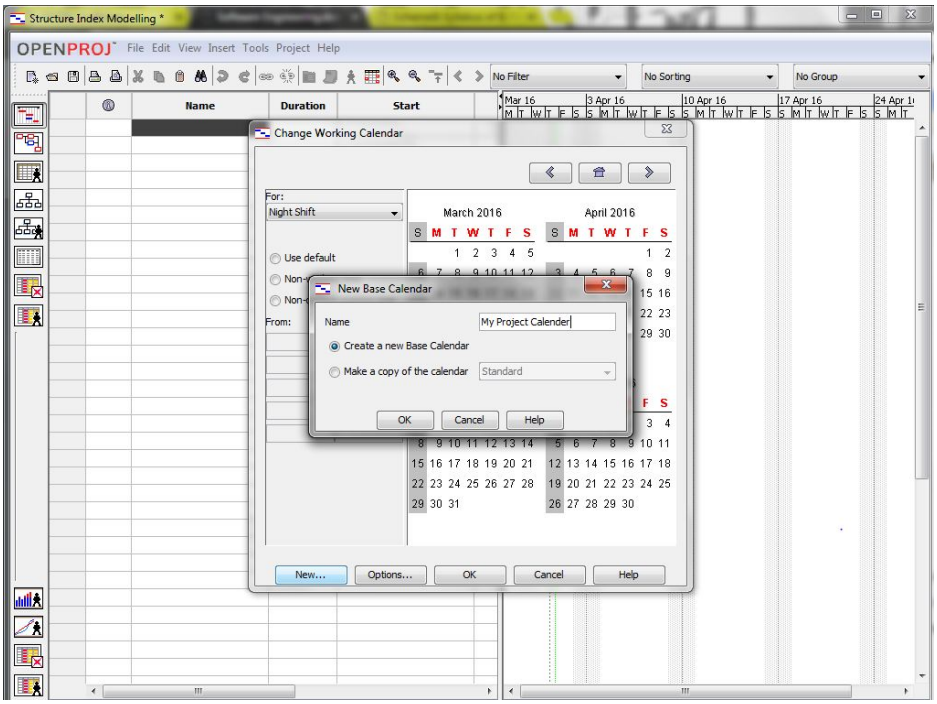


Figure 12: saving calender

4. Mark the days for which you want to change the working time (e.g. for all Fridays you can click the column header ?F?, or you can hold ctrl and click to select individual days). To make a global selection you would hold ctrl and click S,M,T,W,F,S in turn.

5. Click ?Non-default working time? on the left and change the working hours within the fields below.

6. To mark company or public holidays, select the relevant days as above and click ?Non-working time?.

7. Edited calendar entries will appear in red.

8. Click ?Options? at the bottom to set the corresponding working hours per day, hours per week and days per month. If you do not do this, OpenProj will not schedule the tasks correctly.

9. Confirm changes by clicking OK.

10. You must now assign your custom Project calendar to your project. To do this, click Project ?Project Information from the top menu and set the Base Calendar to your new custom base calendar name. This is also the screen where you enter the Project Start Date. Click close when done.

OpenProj can also associate calendars to individuals and to specific tasks. In this way you can designate individual vacation periods or you can specify a task to follow a different schedule to the one in your base calendar. So, in fact you can use three different types of calendars within your project:

1. Project calendar (your base calendar for the project as defined above)

2. Resource calendar (for individuals working time and vacation days)

3. Task calendar (for tasks that do not follow the regular working hours, e.g. a task cannot start on a Friday because it would be interrupted by the weekend or maybe a task that runs continuously for 24hrs). content...

The calendar is stored with the particular project file, so if you start another project it is necessary to create the user defined calendar again.

Practical NO. 3

AIM: Study and usage of OpenProj or similar software to track the progress of a project

To create Gantt Charts and Network charts in OpenProj Software: When you create a new project, OpenProj by default opens the Gantt chart view on the right pane and the task input table on the left pane. You can drag the vertical line dividing the two panes to fit your monitor as you desire. To enter a task:

1. Click in the Name column in the first row.
2. Enter a name for the task.
3. Confirm the input by clicking the mouse or pressing the tab button which takes you to the duration entry field.
4. If you do not know the duration at this stage you do not have to input it. OpenProj enters a default value of 1day? which you can alter at a later stage.
5. If you have an estimate of the duration, then feel free to enter it into the cell. OpenProj automatically converts the duration to days. For example, enter 1w (1 week) and OpenProj will set the duration to 5 days. The input of 1 month would result in a display of 20 days and 1 hour would be displayed as 0.125 days (or 1/8th of a day).
6. Confirm the input by pressing Enter or clicking on the next row.
7. It is important that you enter only task names and durations at this stage. Do not be tempted to enter any other information right now. Especially a starting date.
8. Its good practice even at this stage to enter general headings (phases) for tasks example ?Design? and then more specific tasks underneath, but never enter a duration for a general heading.

- **Gantt Chart** A Gantt chart, commonly used in project management, is one of the most popular and useful ways of showing activities (tasks or events) displayed against time. On the left of the chart is a list of the activities and along the top is a suitable time scale. Each activity is represented by a bar; the position and length of the bar reflects the start date, duration and end date of the activity. This allows you to see at a glance: What the various activities are When each activity begins and ends How long each activity is scheduled to last Where activities overlap with other activities, and by how much The start and end date of the whole project To summarize, a Gantt chart shows you what has to be done (the activities) and when (the schedule).

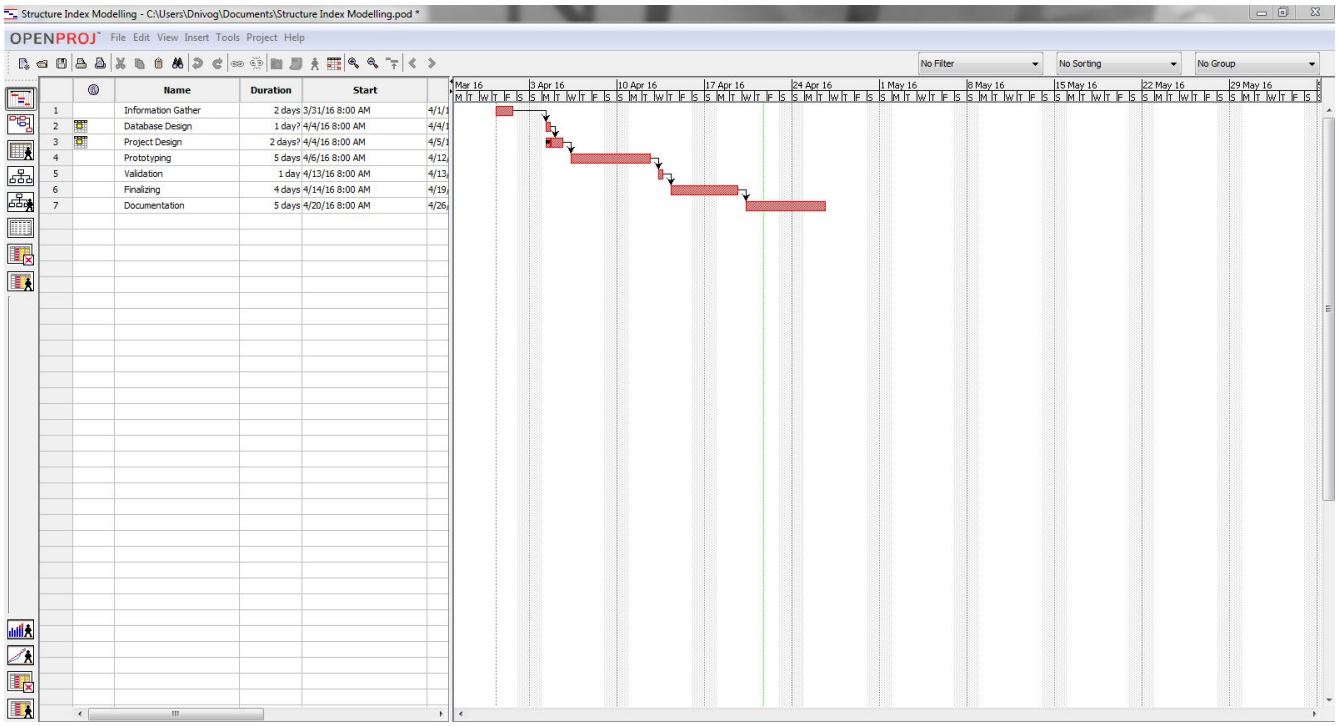


Figure 13: Gantt chart

- **Network Chart** A network diagram is essentially a flow chart that includes all of the project elements and how they relate to one another. It shows parallel activities and the links between each activity. Network logic is the collection of activity dependencies that make up a network diagram for a particular project. In other words, certain tasks are dependent on one another to complete the project. This creates a logical stream of events that will lead to completion of the project. The network diagram lets you do the following:

  - Define the project's path
  - Determine the sequence of tasks to be completed
  - Look at the relationship between activities
  - Determine the dependencies
  - Make adjustments as tasks are completed
  - Take a broad look at the project path and clearly see the relationships and dependencies between tasks

  CLICK ?View? and then ?Network diagram?. It will then generate the diagram shown below:

- **Work Breakdown Structure(WBS)** Awork breakdown structure (WBS), inproject managementandsystems engineering, is a deliverable-oriented decomposition of a project into smaller components. A work breakdown structure is a key project deliverable that organizes the team's work into manageable sections. The Project Management Body of Knowledge defines the work breakdown structure as a "A hierarchical decomposition of the total scope of

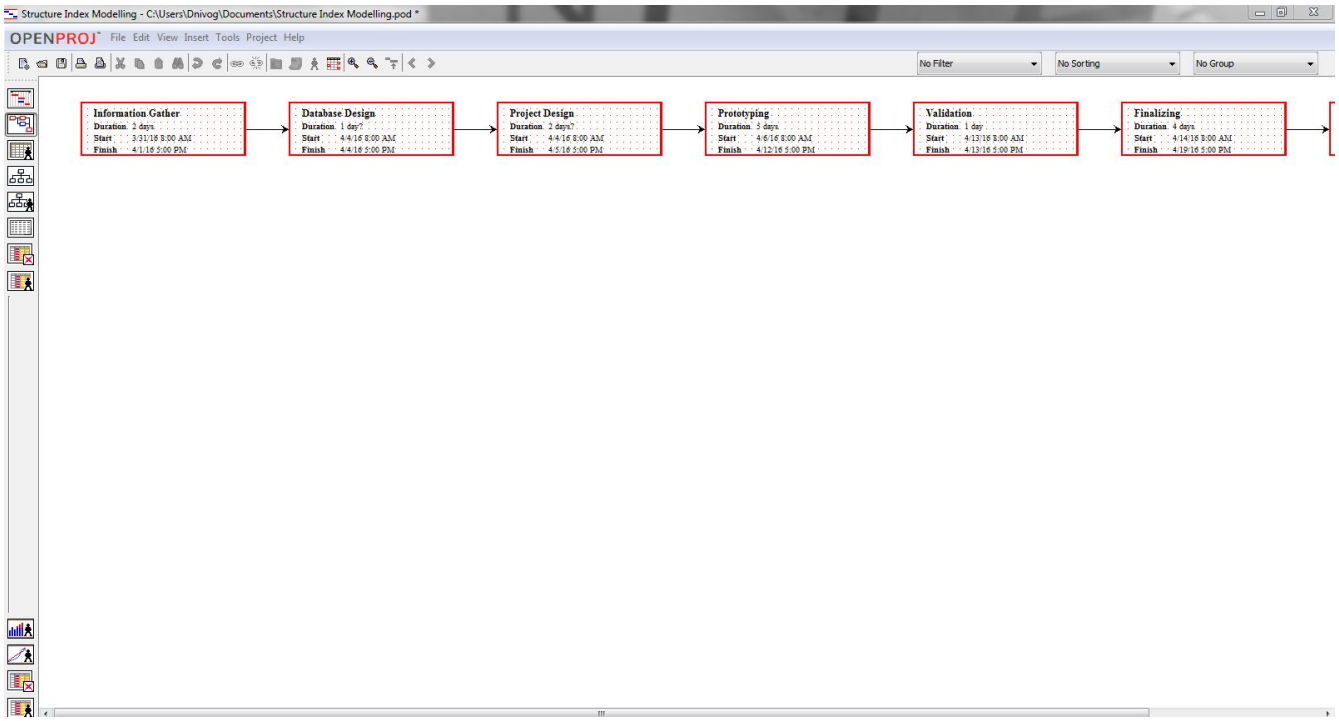


Figure 14: Network chart

work to be carried out by the project team to accomplish the project objectives and create the required deliverables." A work breakdown structure element may be aproduct,data,service, or any combination thereof. A WBS also provides the necessary framework for detailed cost estimating and control along with providing guidance for schedule development and control.

To set dependencies and establishes deadlines in OpenProj software: Dependencies allow you to show the relationships between tasks and set rules for when tasks can be started or finished. OpenProj uses four types of dependencies:

FS (Finish-to-Start) :- This is the default relationship in OpenProj. It defines that one task has to finish before the next one can start. For Example, ?printing a document? cannot start until ?editing the document? is finished.

SS (Start-to-Start) :- The start of a task is dependent on the start of its predecessor. In other words, the task can only start after the predecessor task has started (or at a later date).

FF (Finish-to-Finish) :- The completion of a task is dependent on the completion of its predecessor. In other words, the task can only finish at the same time (or after) the previous task has finished.

SF (Start-to-Finish) :- The finish of the next task depends on the start of the previous task. In other words, the first task begins after the second task ends. When dependencies are created, the start and finish dates of tasks are usually affected. OpenProj automatically edits start and finish dates so that they adhere to these new constraints. Any change to dependencies will update task dates and Gantt bars automatically.

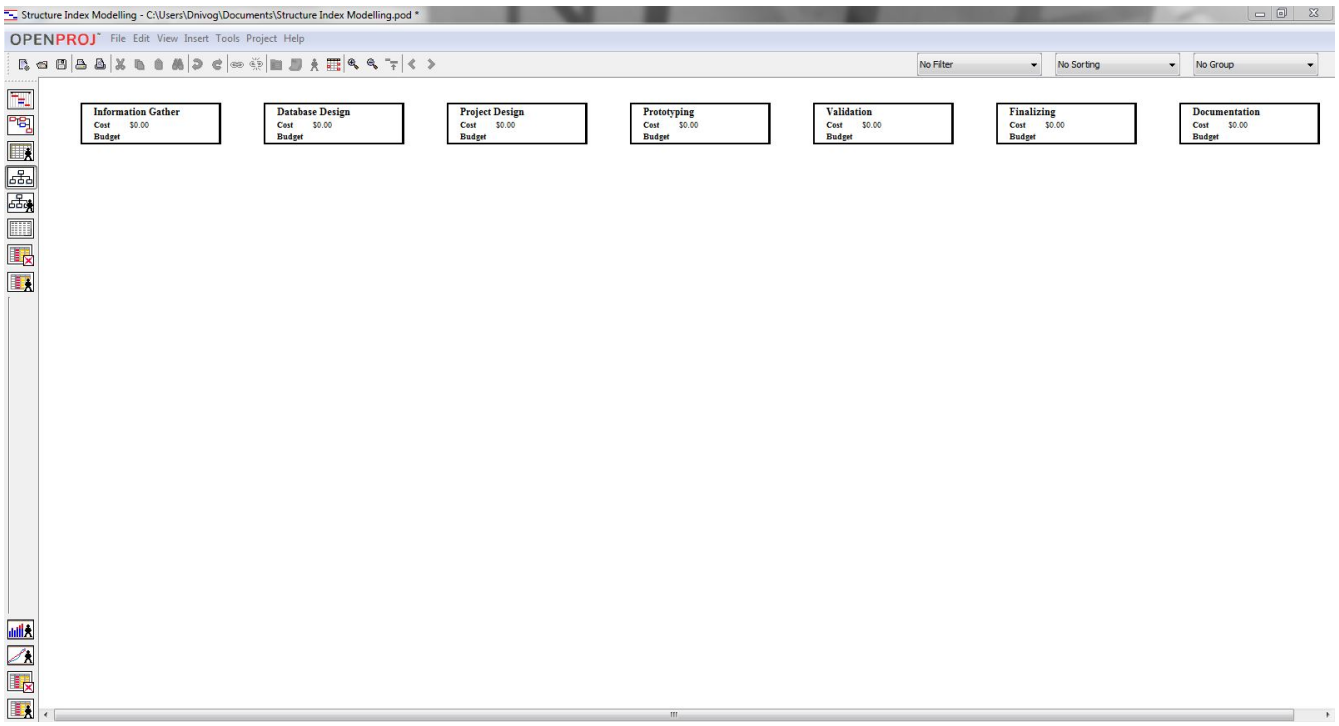
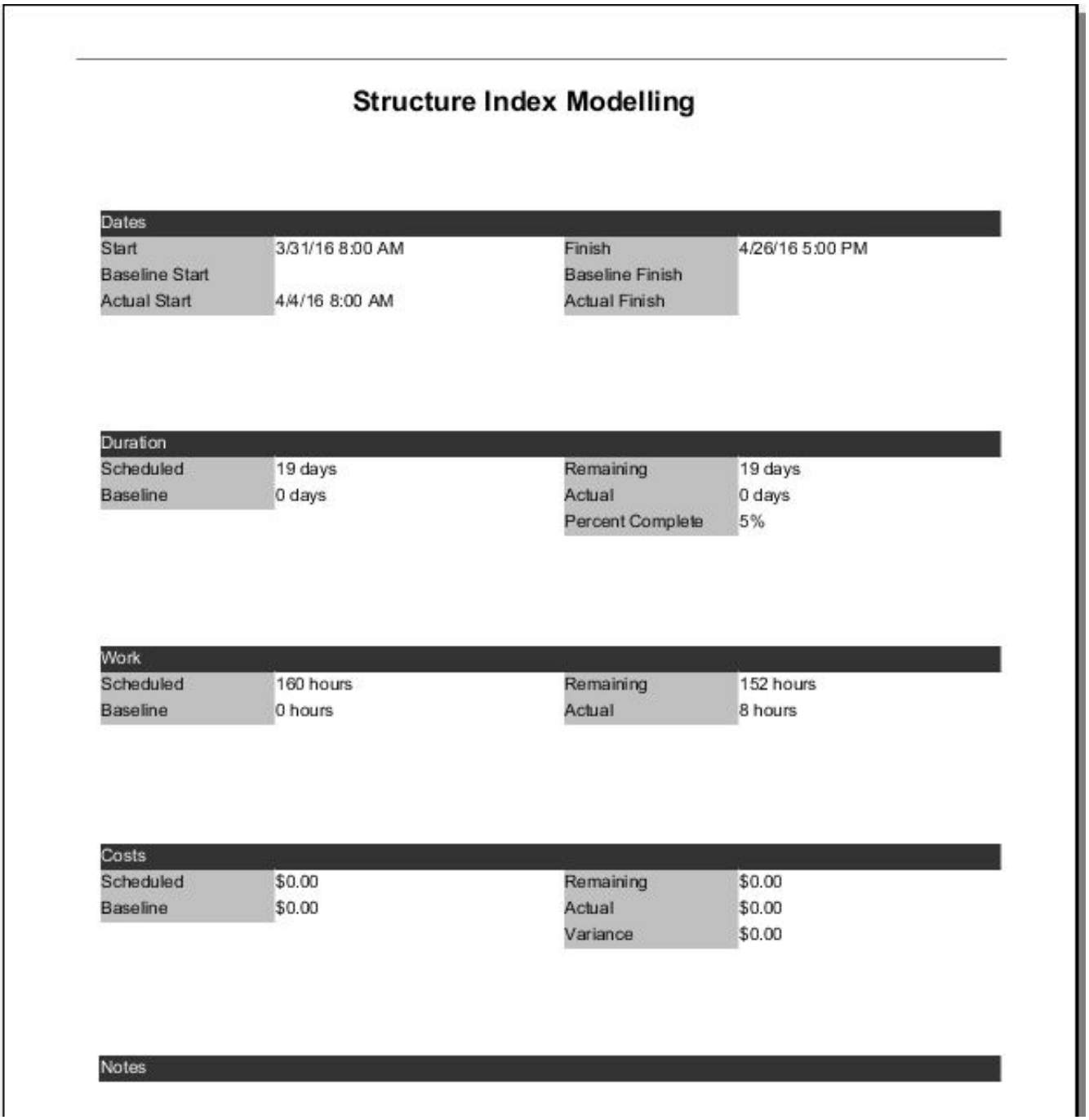


Figure 15: Work Breakdown Structure



Structure Index Modelling

Dates			
Start	3/31/16 8:00 AM	Finish	4/26/16 5:00 PM
Baseline Start		Baseline Finish	
Actual Start	4/4/16 8:00 AM	Actual Finish	

Duration			
Scheduled	19 days	Remaining	19 days
Baseline	0 days	Actual	0 days
		Percent Complete	5%

Work			
Scheduled	160 hours	Remaining	152 hours
Baseline	0 hours	Actual	8 hours

Costs			
Scheduled	$0.00	Remaining	$0.00
Baseline	$0.00	Actual	$0.00
		Variance	$0.00

Notes

Figure 16: Report Chart

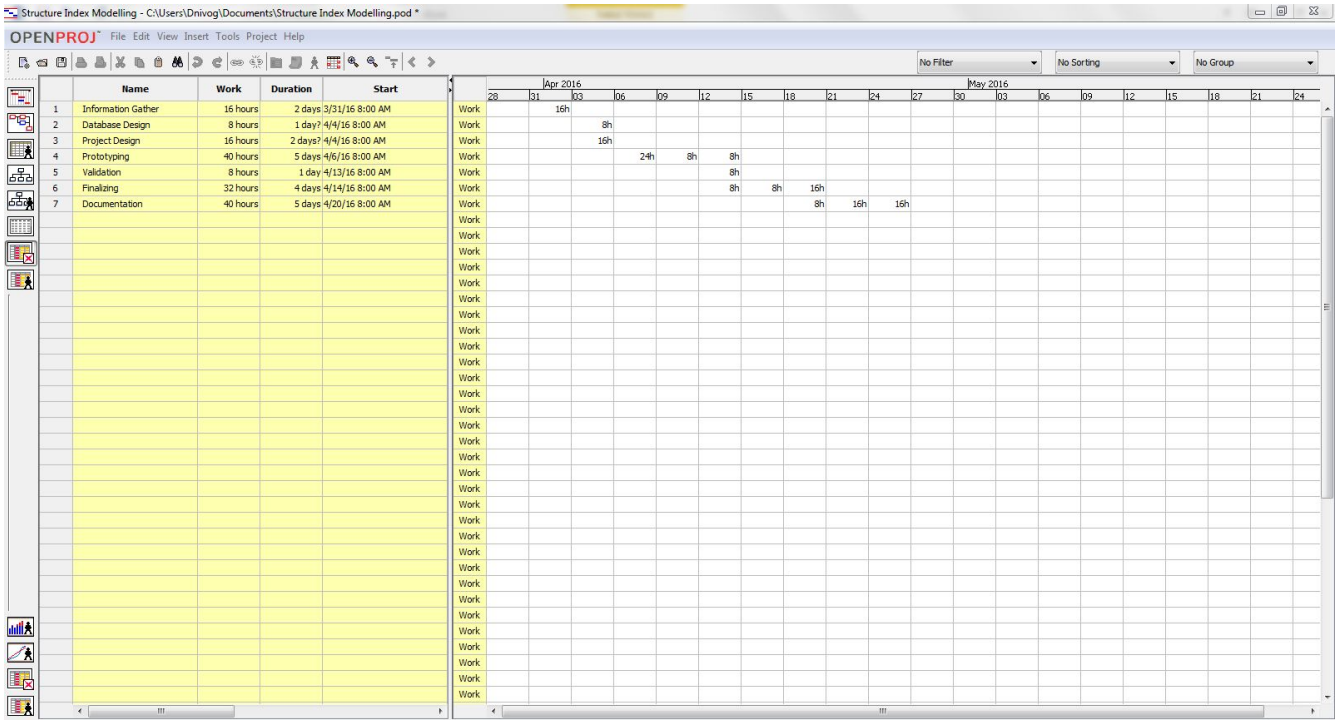


Figure 17: Task Usage chart

Practical NO. 4

AIM: Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents for some problems

Software Requirement Specification Document

An SRS is basically an organization's understanding (in writing) of a customer or potential client's sy stem requirements and dependencies at a particular point in time (usually) prior to any actual design or development work. It's a two-way insurance policy that assures that both the client and the organization understand the other's requirements from that perspective at a given point in time.

The SRS document itself states in precise and explicit language those functions and capabilities a software sy stem (i.e., a software application, an ecommerce Web site, and so on) must provide, as well as states any required constraints by which the sy stem must abide. The SRS also functions as a blueprint for completing a project with as little cost growth as possible. The SRS is often referred to as the "parent" document because all subsequent project management documents, such as design specifications, statements of work, software architecture specifications, testing and validation plans, and documentation plans, are related to it.

It's important to note that an SRS contains functional and nonfunctional requirements only ; it doesn't offer design suggestions, possible solutions to technology or business issues, or any

other information other than what the development team understands the customer's sy stem requirements to be. A well-designed, well-written SRS accomplishes four major goals:

- It provides feedback to the customer. An SRS is the customer's assurance that the development organization understands the issues or problems to be solved and the software behavior necessary to address those problems. Therefore, the SRS should be written in natural language (versus a formal language, explained later in this article), in an unambiguous manner that may also include charts, tables, data flow diagrams, decision tables, and so on.

- It decomposes the problem into component parts. The simple act of writing down software requirements in a well-designed format organizes information, placesborders around the problem, solidifies ideas, and helps break down the problem into its component parts in an orderly fashion.

- It serves as an input to the design specification. As mentioned previously , the SRS serves as the parent document to subsequent documents, such as the software design specification and statement of work. Therefore, the SRS must contain sufficient detail in the functional sy stem requirements so that a design solution can be devised.

- It serves as a product validation check. The SRS also serves as the parent document for testing and validation strategies that will be applied to the requirements for verification.

SRSs are typically developed during the first stages of "Requirements Development," which is the initial product development phase in which information is gathered about what requirements are needed–and not. This information-gathering stage can include onsite visits, questionnaires, survey s, interviews, and perhaps a return-on-investment (ROI) analy sis or needs analy sis of the customer or client's current business environment. The actual specification, then, is written after the requirements have been gathered and analy zed. Why Technical Writers should be involved with Software Requirements Specifications? Unfortunately , much of the time, sy stems architects and programmers write SRSs with little (if any) help from the technical communications organization. And when that assistance is provided, it's often limited to an edit of the final draft just prior to going out the door. Having technical writers involved throughout the entire SRS development process can offer several benefits:

- Technical writers are skilled information gatherers, ideal for eliciting and articulating customer requirements. The presence of a technical writer on the requirements-gathering team helps balance the ty pe and amount of information extracted from customers, which can help improve the SRS.

- Technical writers can better assess and plan documentation projects and better meet customer document needs. Working on SRSs provides technical writers with an opportunity for learning about customer needs firsthand–early in the product development process.

- Technical writers know how to determine the questions that are of concern to the user or customer regarding ease of use and usability . Technical writers can then take that knowledge and apply it not only to the specification and documentation development, but also to user interface development, to help ensure the UI (User Interface) models the customer requirements.

- Technical writers, involved early and often in the process, can become an information resource throughout the process, rather than an information gathered at the end of the process.

In short, a requirements-gathering team consisting solely of programmers, product marketers, sy stems analy sts/architects, and a project manager runs the risk of creating a specification that may be too heavily loaded with technology -focused or marketing-focused issues. The presence of a technical writer on the team helps place at the core of the project those user orcustomer requirements that provide more of an overall balance to the design of the SRS, product, and documentation. **What Kind of Information Should an SRS Include?** You probably will be a member of the SRS team (if not, ask to be), which means SRS development will be a collaborative effort for a particular project. In these cases, y our company will have developed SRSs before, so y ou should have examples (and, likely , the company 's SRS template) to use. But, let's assume y ou'll be starting from scratch. Several standards organizations (including the IEEE) have identified nine topics that must be addressed when designing and writing an SRS:

1. Interfaces

2. Functional Capabilities

3. Performance Levels

4. Data Structures/Elements
5. Safety
6. Reliability
7. Security /Privacy
8. Quality
9. Constraints and Limitations

Begin with an SRS Template The first and biggest step to writing an SRS is to select an existing template that y ou can fine tune for y our organizational needs (if y ou don't have one already). There's not a "standard specification template" for all projects in all industries because the individual requirements that populate an SRS are unique not only from company to company , but also from project to project within any one company . The key is to select an existing template or specification to begin with, and then adapt it to meet y our needs. In recommending using existing templates, I'm not advocating simply copy ing a template from available resources and using them as y our own; instead, I'm suggesting that y ou use available templates as guides for developing y our own. It would be almost impossible to find a specification or specification template that meets y our particular project requirements exactly . But using other templates as guides is how it's recommended in the literature on specification development. Look at what someone else has done, and modify it to fit your project requirements. (See the sidebar called "Resources for Model Templates" at the end of this article for resources that provide sample templates and related information.)

A sample of a more detailed SRS outline

1. Scope
   (a) An STAAD PRO parsing application using C++, My SQL, make, Doxy gen, HTML, Py thon, Shell script, CSV Sy stem overview.
   (b) i. Getting and validating a STAAD PRO file through a web interface from the user.
   ii. Parsing the STAAD Pro file and storing the information in the database.
   iii. Processing the database based on the user queries and presenting the output.
   (c) Document overview. A civil engineer can use this project to infer some very useful information in matter of seconds from the already existent STAAD PRO file. At the same time the information is being stored in a database that can be made available to a community of engineers for research and reference. This document comprises six sections:
      - Scope
      - Referenced documents
      - Requirements
      - Testing and Coding

2. Referenced Documents

   (a) STAAD PRO technical manual.

   (b) Material database.

3. Requirements

   (a) An interface for navigating through the various parts of a 3 dimensional structure.

   (b) Properly abstracted options for queries on various elements of the building using Structured Query Language.

   (c) A web interface for uploading files and excessing the processed data from any sy stem over the web.

   (d) Flexibility to incorporate any changes in the standard sy ntax of the STAAD PRO scripting methods.

Design Documents

A software design document (SDD) is a written description of a software product, that a software designer writes in order to give a software development team overall guidance to the architecture of the software project. An SDD usually accompanies an architecture diagram with pointers to detailed feature specifications of smaller pieces of the design. Practically , a design document is required to coordinate a large team under a single vision. A design document needs to be a stable reference, outlining all parts of the software and how they will work. The document is commanded to give a fairly complete description, while maintaining ahigh-level view of the software. There are two kinds of design documents called HLDD (high-level design document) and LLDD (low-level design document).

HLD - High Level Design (HLD) is the overall sy stem design - covering the sy stem architecture and database design. It describes the relation between various modules and functions of the sy stem. data flow, flow charts and data structures are covered under HLD. High Level Design gives the overall Sy stem Design in terms of Functional Architecture details and Database design. This is very important for the ETL developers to understand the flow of the sy stem with function and database design wise. In this phase the design team, testers and customers are play s a major role. Also it should have projects standards, the functional design documents and the database design document also.

LLD - Low Level Design (LLD) is like detailing the HLD. It defines the actual logic for each and every component of the sy stem. Class diagrams with all the methods and relation between classes comes under LLD. Programs specs are covered under LLD. This document is need to do during the detailed phase, the view of the application developed during the high level design is broken down into separate modules and programs for every program and then documented by program specifications.

Software testing is an investigation conducted to provide stakeholders with information about the quality of the product or service under test. Software testing can also provide an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation. Test techniques include, but are not limited to, the process of executing a program or application with the intent of finding software bugs (errors or other defects).

It involves the execution of a software component or sy stem to evaluate one or more properties of interest. In general, these properties indicate the extent to which the component or sy stem under test:

- meets the requirements that guided its design and development,
- responds correctly to all kinds of inputs,
- performs its functions within an acceptable time,
- is sufficiently usable,
- can be installed and run in its intended environments, and
- Achieves the general result its stakeholder?s desire.

As the number of possible tests for even simple software components is practically infinite, all software testing uses some strategy to select tests that are feasible for the available time and resources. As a result, software testing ty pically (but not exclusively) attempts to execute a program or application with the intent of finding software bugs (errors or other defects). Software testing can provide objective, independent information about the quality of software and risk of its failure to users and/or sponsors. [Software testing can be conducted as soon as executable software (even if partially complete) exists. The overall approach to software development often determines when and how testing is conducted. For example, in a phased process, most testing occurs after sy stem requirements have been defined and then implemented in testable programs. In contrast, under an Agile approach, requirements, programming, and testing are often done concurrently

Test documentation is the complete suite of artefacts that describe test planning, test design, test execution, test results and conclusions drawn from the testing activity . As testing activities ty pically consume 30project. Testing activities must therefore be fully documented to support resource allocation, monitoring and control. This page identifies the ty pes of documents y ou need to set up and run y our test program and summarizes their content.

Test Plan

The test plan describes the testing process in terms of the features to be tested, pass/fail criteria and testing approach, resource requirements and schedules.

1. Introduction
2. Test items
3. Features to be tested
4. Testing approach
5. Item pass/fail criteria
6. Suspension and resumption
7. Deliverables
8. Tasks

9. Environmental needs
10. Responsibilities11. Staffing and training needs
11. Costs and schedule
12. Risks and contingencies

Test Design Description

The Test Design Description refines the Test Plan's approach, identify ing specific features to be tested and defining the test cases and test procedures that will be used.

1. **Features to be tested**
    - Test items covered
    - Feature or feature combinations to be tested
    - References to software requirements specifications and software design descriptions
2. **Testing approach**
    - Testing techniques to be used
    - Method of analy zing test results (e.g. automated or manual)
    - Reasons for selection of various test cases
    - Environmental needs of test cases
3. **Test identification for each feature to be tested provide:**
    - Test procedure identifiers and descriptions
    - Test case identifiers and descriptions
    - The pass/fail criteriaFlow Chart Of StudentData Flow Diagram

DFD

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information sy stem, modelling its process aspects. A DFD is often used as a preliminary step to create an overview of the sy stem, which can later be elaborated. DFDs can also be used for the visualization of data processing (structured design).

A DFD shows what kind of information will be input to and output from the sy stem, where the data will come from and go to, and where the data will be stored. It does not show information about the timing of process or information about whether processes will operate in sequence or in parallel

Data flow diagrams are also known as bubble charts. DFD is a designing tool used in the top-down approach to Sy stems Design. This context-level DFD is next "exploded", to produce a

Level 1 DFD that shows some of the detail of the sy stem being modeled. The Level 1 DFD shows how the sy stem is divided into sub-sy stems (processes), each of which deals with one or more of the data flows to or from an external agent, and which together provide all of the functionality of the sy stem as a whole. It also identifies internal data stores that must be present

in order for the sy stem to do its job, and shows the flow of data between the various parts of the sy stem.

Data flow diagrams are one of the three essential perspectives of the structured-sy stems analy sis and design method SSADM. The sponsor of a project and the end users will need to be briefed and consulted throughout all stages of a sy stem's evolution. With a data flow diagram, users are able to visualize how the sy stem will operate, what the sy stem will accomplish, and how the sy stem will be implemented. The old sy stem's dataflow diagrams can be drawn up and compared with the new sy stem's data flow diagrams to draw comparisons to implement a more efficient sy stem. Data flow diagrams can be used to provide the end user with a phy sical idea of where the data they input ultimately has an effect upon the structure of the whole sy stem from order to dispatch to report. How any sy stem is developed can be determined through a data flow diagram model.

In the course of developing a set of levelled data flow diagrams the analy st/designer is forced to address how the sy stem may be decomposed into component sub-sy stems, and to identify

the transaction data in the data model.

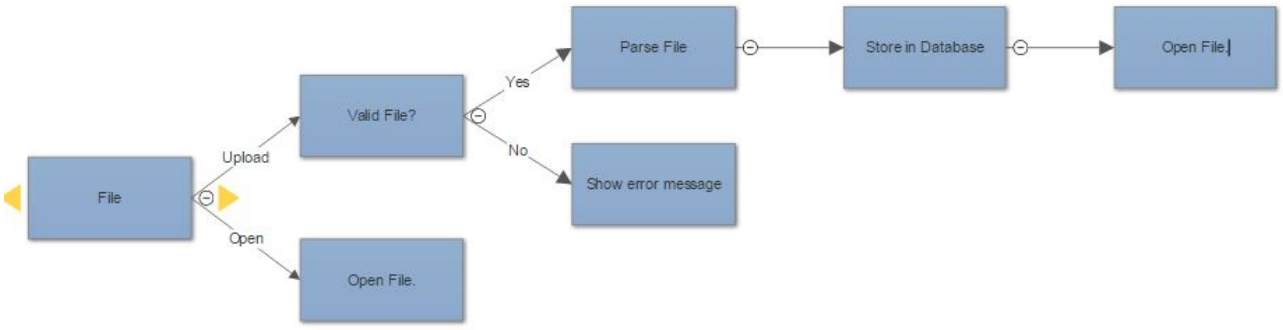


Figure 18: Decision Tree

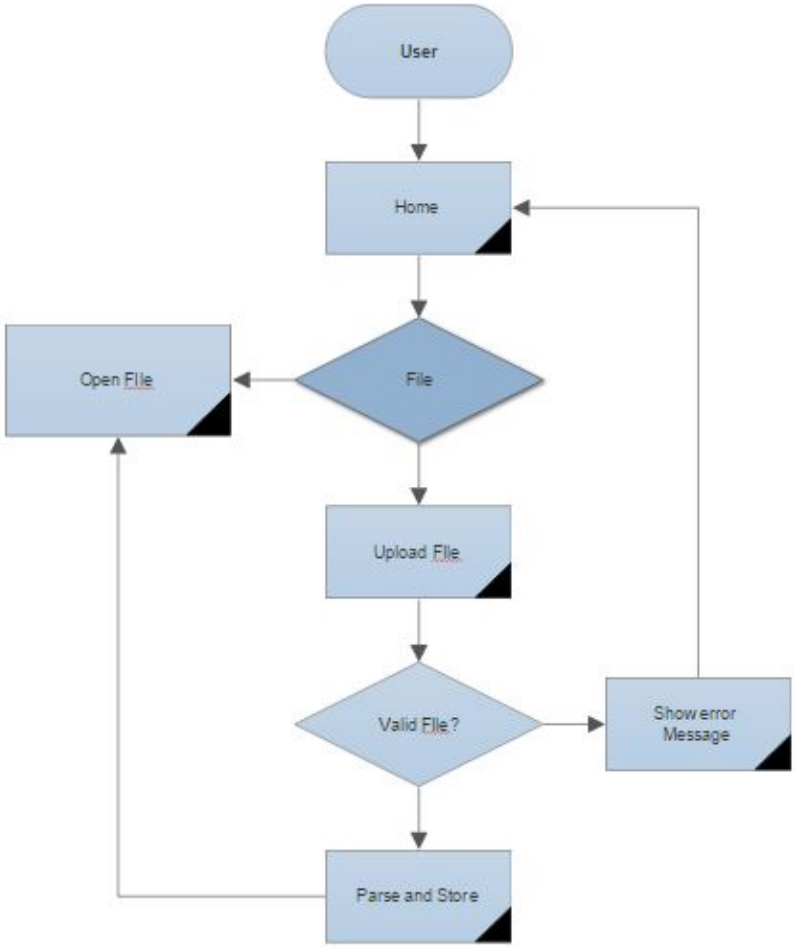


Figure 19: Flow Chart of SIM

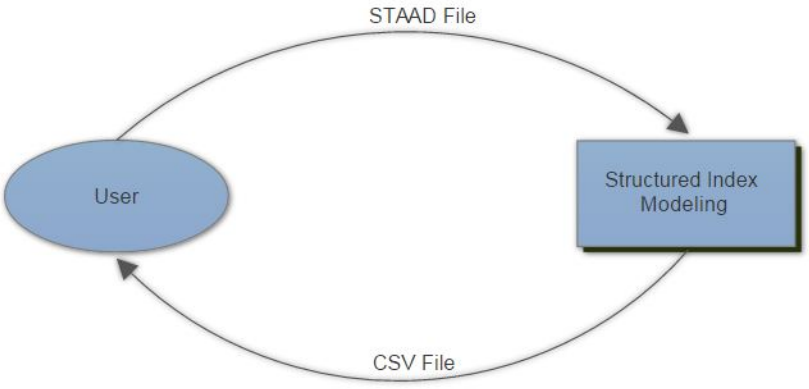


Figure 20: DFD level 0

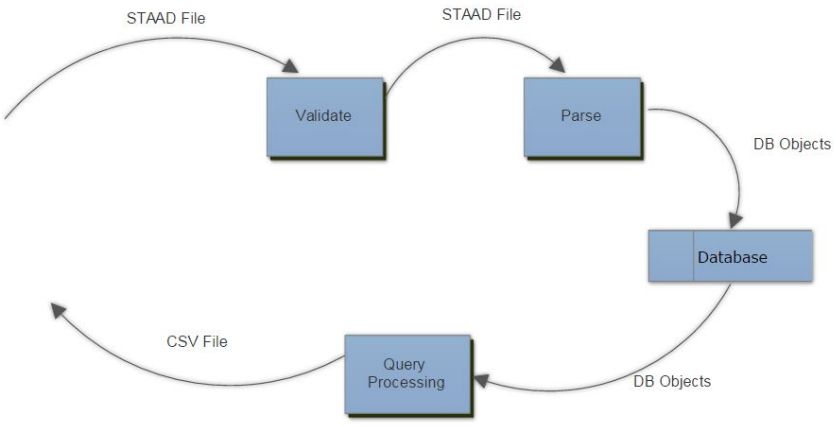


Figure 21: DFD level 1

Practical NO.5

AIM: INTRODUCTION TO UML (UNIFIED MODELING LANGUAGE) AND UMBRELLO SOFTWARE

The Unified Modelling Language (UML) is a general-purpose, developmental, modelling language in the field of software engineering that is intended to provide a standard way to visualize the design of a system.

UML was originally motivated by the desire to standardize the disparate notational systems and approaches to software design developed by Grady Booch, Ivar Jacobson and James Rum Baugh at Rational Software in 1994?95, with further development led by them through 1996.

In 1997 UML was adopted as a standard by the Object Management Group (OMG), and has been managed by this organization ever since. In 2005 the Unified Modelling Language was also published by the International Organization for Standardization (ISO) as an approved ISO standard. Since then it has been periodically revised to cover the latest revision of UML

The Unified Modelling Language (UML) offers a way to visualize a system's architectural blueprints in a diagram (see image), including elements such as:

- Any activities (jobs) Individual components of the system
- And how they can interact with other software components.
- How the system will run
- How entities interact with others (components and interfaces)
- External user interface

Although originally intended solely for object-oriented design documentation, the Unified Modelling Language (UML) has been extended to cover a larger set of design documentation (as listed above), and been found useful in many contexts.

List of UML Diagram Types

Types of UML diagrams with structure diagrams coming first and behavioural diagrams starting from position 8. Click on any diagram type to visit that specific diagram type?s description.

- Class Diagram
- Component Diagram

- Deployment Diagram
- Object Diagram
- Package Diagram
- Profile Diagram
- Composite Structure Diagram
- Use Case Diagram
- Activity Diagram
- Sequence Diagram

Class Diagram

Class diagrams are arguably the most used UML diagram type. It is the main building block of any object oriented solution. It shows the classes in a system, attributes and operations of each class and the relationship between each class.

In most modelling tools, a class has three parts, name at the top, attributes in the middle and operations or methods at the bottom. In large systems with many related classes, classes are grouped together to create class diagrams. Different relationships between classes are shown by different types of arrowsClass Diagram

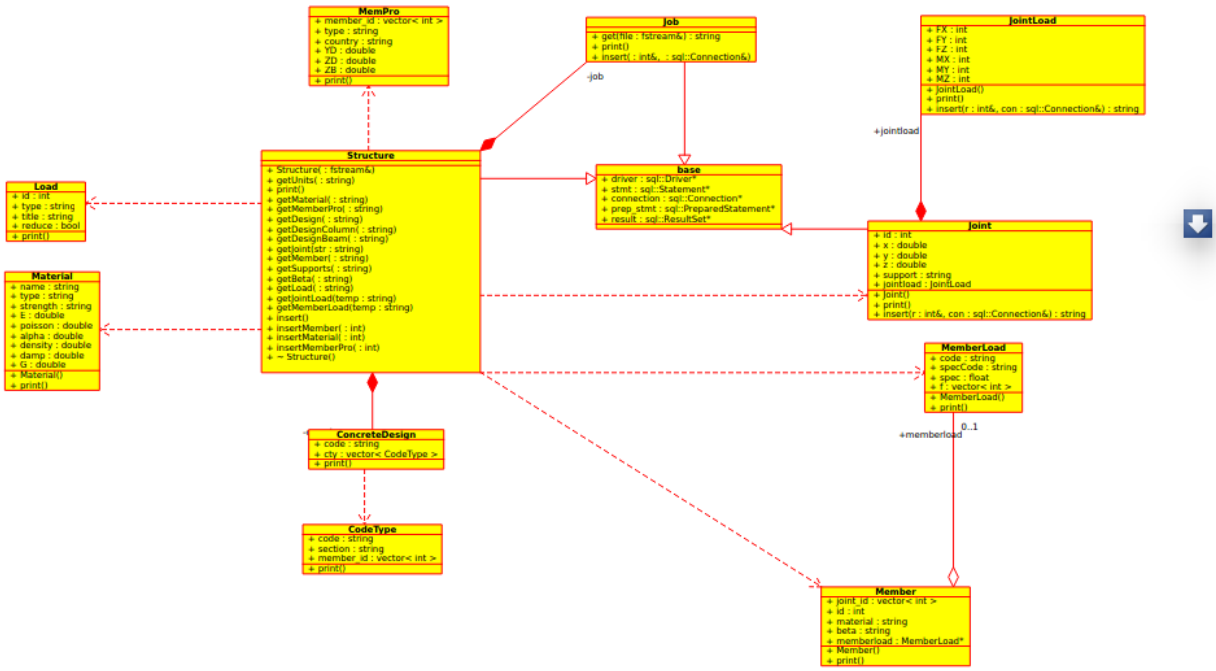


Figure 22: class Diagram

Sequence diagram:

A Sequence diagram is an interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart. A sequence diagram shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams are typically associated with use case realizations in the Logical View of the system under development. Sequence diagrams are sometimes called event diagrams or event scenarios.

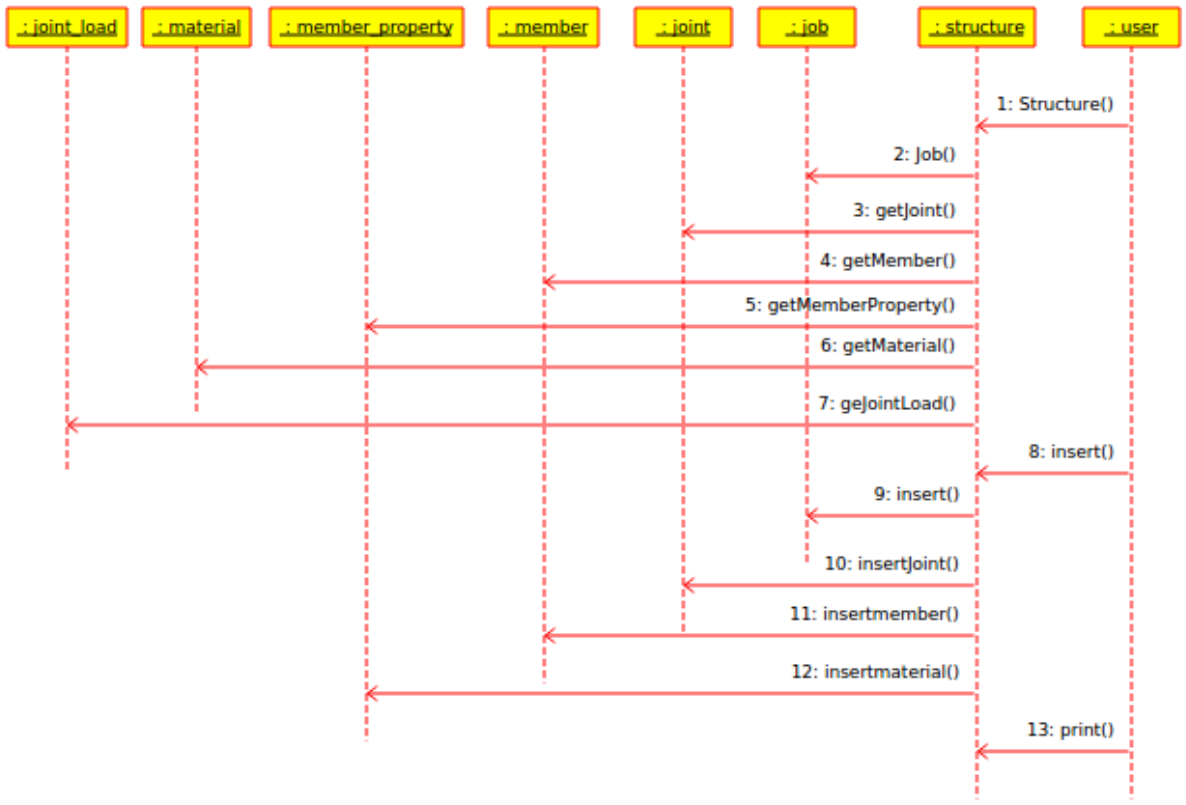


Figure 23: Sequence diagram

Use Case Diagram

As the most known diagram type of the behavioural UML diagrams, Use case diagrams give a graphic overview of the actors involved in a system, different functions needed by those actors and how these different functions are interacted. It?s a great starting point for any project discussion, because you can easily identify the main factors involved and the main processes of the system Activity diagram is another important diagram in UML to describe dynamic aspects of the system. Activity diagram is basically a flow chart to represent the flow form one activity to another activity. The activity can be described as an operation of the system. So the control flow is drawn from

one operation to another. This flow can be sequential, branched or concurrent. Activity diagrams deals with all type of flow control by using different elements like fork, join etc.

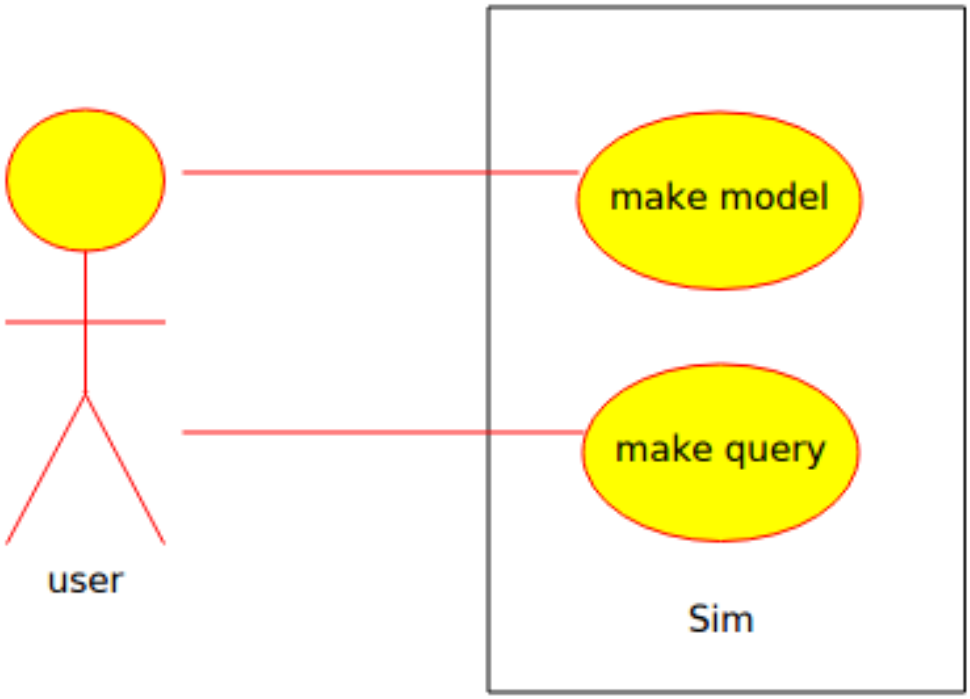


Figure 24: Use Case Diagram

State chart diagram

The name of the diagram itself clarifies the purpose of the diagram and other details. It describes different states of a component in a system. The states are specific to a component/object of a system. A State chart diagram describes a state machine. Now to clarify it state machine can be defined as a machine which defines different states of an object and these states ,are controlled by external or internal events

Umbrello software

Umbrello UML Modeller is a Unified Modelling Language (UML) diagram program based on KDE Technology. UML allows you to create diagrams of software and other systems in a standard format to document or design the structure of your programs. You may take a look at the screenshots to see umbrello in action. Our handbook gives a good introduction to Umbrello and UML

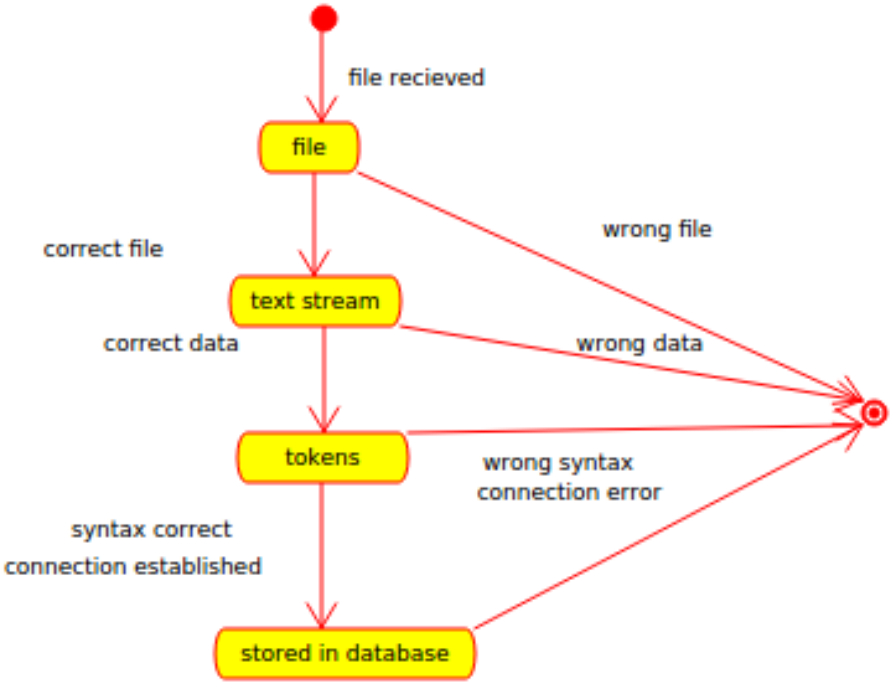


Figure 25: Use Case Diagram

modelling.Umbrello comes with KDE SC, included with every Linux distribution and available through your package manager. See Installation to install Umbrello.

AIM:Study and usage of any Design phase CASE Tool.

CASE stands for Computer Aided Software Engineering. It means, development and maintenance of software projects with help of various automated software tools.

Case Tools:

CASE tools are set of software application programs, which are used to automate SDLC activities. CASE tools are used by software project managers, analysts and engineers to develop software system.

There are number of CASE tools available to simplify various stages of Software Development Life Cycle such as Analysis tools, Design tools, Project Management Tools, Database Management tools, Documentation tools are to name a few.

Use of CASE tools accelerates the development of project to produce desired result and helps to uncover flaws before moving ahead with next stage in software development.

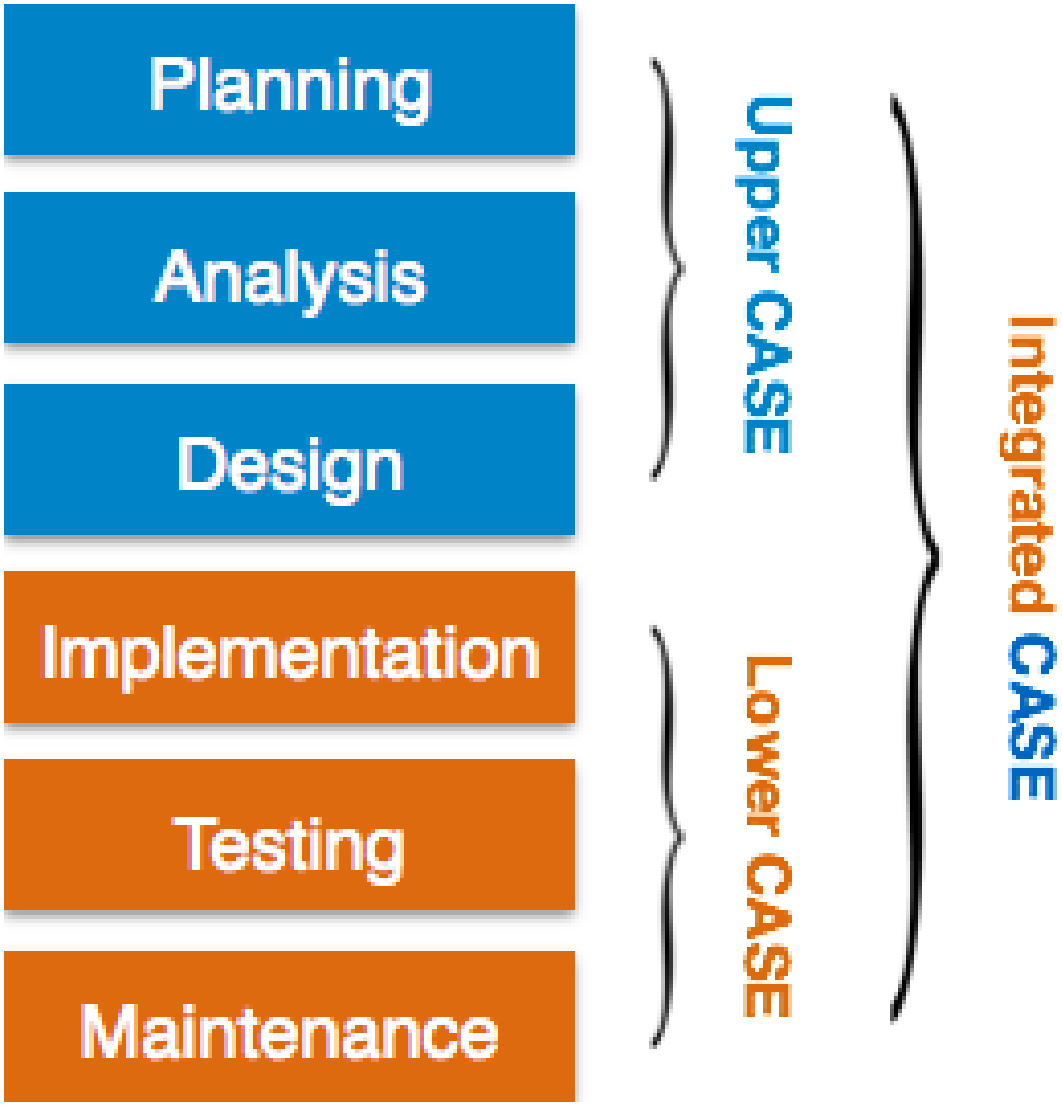
Components of CASE Tools:

CASE tools can be broadly divided into the following parts based on their use at a particular SDLC stage:

- **Central Repository** CASE tools require a central repository, which can serve as a source of common, integrated and consistent information. Central repository is a central place of storage where product specifications, requirement documents, related reports and diagrams, other useful information regarding management is stored. Central repository also serves as data dictionary.
- **Upper Case Tools** Upper CASE tools are used in planning, analysis and design stages of SDLC.
- **Lower Case Tools** Lower CASE tools are used in implementation, testing and maintenance.
- **Integrated Case Tools** Integrated CASE tools are helpful in all the stages of SDLC, from Requirement gathering to Testing and documentation.

CASE Tools Types

- **Diagram Tools** These tools are used to represent system components, data and control flow among various software components and system structure in a graphical form. For example, Flow Chart Maker tool for creating state-of-the-art flowcharts.
- **Process Modelling Tools** Process modelling is method to create software process model, which is used to develop the software. Process modelling tools help the managers to choose a process model or modify it as per the requirement of software product. For example, EPF Composer.
- **Project Management Tools** These tools are used for project planning, cost and effort estimation, project scheduling and resource planning. Managers have to strictly comply project execution with every mentioned step in software project management.



- **Documentation Tools** Documentation tools generate documents for technical users and end users. Technical users are mostly in-house professionals of the development team who refer to system manual, reference manual, training manual, installation manuals etc. The end user documents describe the functioning and how-to of the system such as user manual. For example, Doxygen, DrExplain, Adobe RoboHelp for documentation.

- **Analysis Tools** These tools help to gather requirements, automatically check for any inconsistency, inaccuracy in the diagrams, data redundancies or erroneous omissions. For example, Accept 360, Accompa, CaseComplete for requirement analysis, Visible Analyst for total analysis.

- **Design Tools** These tools help software designers to design the block structure of the software, which may further be broken down in smaller modules using refinement techniques. These tools provides detailing of each module and interconnections among modules. For example, Animated Software Design.

- **Change Control Tools** These tools are considered as a part of configuration management tools. They deal with changes made to the software after its baseline is fixed or when the software is first released. CASE tools automate change tracking, file management, code management and more. It also helps in enforcing change policy of the organization.
- **Programming Tools** These tools consist of programming environments like IDE (Integrated Development Environment), in-built modules library and simulation tools. These tools provide comprehensive aid in building software product and include features for simulation and testing. For example, Cscope to search code in C, Eclipse.

Points of CASE Tools

1. They provides better perceptive of system.
2. Facilitates communication among team members.
3. Tools are more effective for large scale systems and immense projects.
4. CASE tools provide visibility of processes and logic.
5. CASE tools improve quality and productivity of software.
6. CASE tools reduce the time for error correction and maintenance.
7. CASE tools provide clear readability and maintainability of the system.

Factor influencing the success of CASE

CASE tools facing many troubles in creating a suitable place in market e.g.

1. Even after the completion of the design it is not necessary that it will fulfill the requirements.
2. Though CASE tools are helpful for the developer but do not assure that the design is according to the requirements.
3. Good quality CASE tools are very expensive and prove costly for the development.
4. CASE tools also required training for the user that increase the overall cast of development.
5. Almost every tool has its limitation that decreases its use and popularity.
6. Some tools may have very limited functionality and may not address all possible domain activities.
7. Every tool has a specific methodology for designing and modelling of the system. Due to this you?re bound to follow them that decrease the flexibility which decrease the use of CASE tools.
8. Frequent users get used to it and afterward developers try to use the same approach and tool for other projects whether the tool addresses the target projects problems or not.

Use of CASE Tools

The purpose of CASE is to reduce the cost and time required for the system development and the focus is on the quality of the end product. CASE is not being used as it was being expected. Most of the companies are reluctant to adopt the CASE tools. It is observed that CASE is being used but not in many companies.The reasons for abandonment included cost, lack of measurable returns, and unrealistic expectations. Organizations that used CASE tools and found that large numbers of their systems developers were not using CASE tools. He reported that in 57% of the organizations surveyed that were using CASE tools, less than 25% of the systems developers used the tools (Diane Lending 1998). And in those companies where CASE is adopted only few people are using CASE tools. In a survey of 67 companies it has been observed that 69% companies had never used CASE tools. And those people who are using CASE tools admitted that the use of CASE tools improved the standard of documentation and in result the system was easier to test and maintain. But people who used CASE tools also admitted that using CASE tools requires more time and effort and also adds in overall development time.

Less than 30% of the potential users and developers use the CASE and those who use it, uses the simplest and basic functionality of the CASE tools. This shows that even after getting so much popular CASE tools are not adopted and used so much in the software development industry as they expected or as they should be used. Just after one year of introduction 70% of CASE tools are never used, 20 are used by one group and 5% of CASE tools are used in general [Juhani Iivar,1996].It has been observed that CASE Tools are not being used from the time CASE got recognition. CASE is being approached experimentarily and involves a very long learning curve.

Conclusion

CASE tools plays an important role in Software Development and getting its appreciation in software development industry slowly but surly. But CASE is still in growth and there are different perceptions about CASE.CASE tools are not being used as they are expected to. Though, there are many new CASE tools available in the market and integrated CASE tools provides significant help and support for developers and programmers throughout SDLC in design and development activities but CASE tools have never been first choice for the majority of developers. Research about CASE usage in different organizations has shown that CASE is not always welcomed by developers and programmers and has never been as a tool of choice in organizations. And where CASE is used, the developers are using only minimal required functionality.

Practical NO.6

AIM: Preparation of Software Configuration Management and Risk Management related documents

The purpose of Software Configuration Management is to establish and maintain the integrity

of the products of the software project throughout the project's software life cy cle. Software Configuration Management involves identify ing configuration items for the software project, controlling these configuration items and changes to them, and recording and reporting status and change activity for these configuration items.

Configuration management (CM) refers to a discipline for evaluating, coordinating, approving or disapproving, and implementing changes in artefacts that are used to construct and maintain software sy stems. An artifact may be a piece of hardware or software or documentation. CM enables the management of artifact from the initial concept through design, implementation, testing, base lining, building, release, and maintenance.

CM is intended to eliminate the confusion and error brought about by the existence of different versions of artifacts. Artifact change is a fact of life: plan for it or plan to be overwhelmed by it. Changes are made to correct errors, provide enhancements, or simply

reflect the evolutionary refinement of product definition. CM is about keeping the inevitable change under control. Without a well-enforced CM process, different team members (possibly at different sites) can use different versions of artifacts unintentionally ; individuals can create versions without the proper authority ; and the wrong version of an artifact can be used inadvertently . Successful CM requires a well-defined and institutionalized set of policies and standards that clearly define

- The set of artifacts (configuration items) under the jurisdiction of CM (Models that will be used)
- How artifacts are named (division of models into admin, student and company module)
- How artifacts enter and leave the controlled set (various logins and logouts)
- How an artifact under CM is allowed to change (admin has the sole authority)
- How different versions of an artifact under CM are made available and under what conditions each one can be used (whether to register , participate or work as admin)
- How CM tools are used to enable and enforce CM

These policies and standards are documented in a CM plan that informs every one in the organization just how CM is carried out. Aspects Peculiar to Product Lines CM is, of course, an integral part of any software development activity , but it takes on a special significance in the product line context. As illustrated in the following figure, CM for product lines is generally viewed as a multidimensional version of the CM problem for one- of-a-kind sy stems. Configuration Management and Software Product Lines The core assets constitute a configuration that needs to be managed, each product in the product line constitutes a configuration that must be managed, and the management of all these configurations must be coordinated under a single process. CM for product lines is therefore more complex than it is for single sy stems. CM capabilities such as parallel development, distributed engineering, build and release management, change management, configuration and workspace management, and process management must be supported by the tools, processes, and environments put in place for CM in a product line context.

- In single-sy stem CM, each version of the sy stem has a configuration associated with it that defines the versions of the configuration items that went into that sy stem's production. In product line CM, a configuration must be maintained for each version of each product.
- In single-sy stem CM, each product with all of its versions may be managed separately . In product line CM, such management is untenable, because the core assets are used across all products. Hence, the entire product line is usually managed with a single, unified CM process.
- Product line CM must control the configuration of the core asset base and its use by all product developers. It must account for the fact that core assets are usually produced by one team and used in parallel by several others. Single-sy stem CM has no such burden: the component developers and product developers are the same people.
- Only the most capable CM tools can be used in a product line effort. Many tools that are adequate for single-sy stem CM are simply not sufficiently robust to handle the demands of product line CM. (See the "Tool Support" practice area for a more complete discussion of tools.)

The mission of product line CM is allowing the rapid reconstruction of any product version that may have been built using various versions of the core assets and development/operating environment plus various versions of product-specific artifacts. One product line manager summed up the problem this way : "Sometime, in the middle of the night, one of y our customers is going to call y ou and tell y ou that his version of one of y our products doesn't work. You are going to have to duplicate that product in y our test lab before y ou can begin to troubleshoot.

Risk Management Plan:

Purpose of the Risk management plan

A risk is an event or condition that, if it occurs, could have a positive or negative effect on a project?s objectives. Risk Management is the process of identify ing, assessing, responding to, monitoring, and reporting risks. This Risk Management Plan defines how risks associated with the ¡Project Name¿ project will be identified, analy zed, and managed. It outlines how risk management activities will be performed, recorded, and monitored throughout the lifecy cle of the project and provides templates and practices for recording and prioritizing risks.

The Risk Management Plan is created by the project manager in the Planning Phase of the CDC Unified Process and is monitored and updated throughout the project. The intended audience of this document is the project team, project sponsor and management.

Risk management Procedure:

The project manager working with the project team and project sponsors will ensure that risks are actively identified, analy zed, and managed throughout the life of the project. Risks will be identified as early as possible in the project so as to minimize their impact. The steps foraccomplishing this are outlined in the following sections. The ¡project manager or other designee¿ will serve as the Risk Manager for this project.

Risk Identification

Risk identification will involve the project team, appropriate stakeholders, and will include an evaluation of environmental factors, organizational culture and the project management plan including the project scope. Careful attention will be given to the project deliverables, assumptions, constraints, WBS, cost/effort estimates, resource plan, and other key project documents.

A Risk Management Log will be generated and updated as needed and will be stored electronically in the project library located at ¡file location¿

In our project Function Organiser also we looked at various aspects of risks that could occur. We looked at the environmental factors and our organizational culture pertained to the student body of the college

Project scope included serving and notifications of various events for which the students registered, so that it reduces the manual work and the sy stem of organizing events could come easy . Assumptions of student body and companies that would participate and cost of project was also designed.

Risk Analysis

All risks identified will be assessed to identify the range of possible project outcomes. Qualification will be used to determine which risks are the top risks to pursue and respond to and which risks can be ignored Qualitative Risk Analy sis

The probability and impact of occurrence for each identified risk will be assessed by the project manager, with input from the project team using the following approach:

Probability

- **High** Greater than 70 probability of occurrence
- **Medium** Between 30 and 70 probability of occurrence
- **Low** Below 30 probability of occurrence

Impact

- **High** Risk that has the potential to greatly impact project cost, project schedule or performance (problem in working of registration window as in case of our project)
- **Medium** Risk that has the potential to slightly impact project cost, project schedule or performance (students not aware of the functionality of the project Function Organiser.

- **Low** Risk that has relatively little impact on cost, schedule or Performance (connection or connectivity issues as in terms of the project)

Risks that fall within the RED and YELLOW zones will have risk response planning which may include both a risk mitigation and a risk contingency plan.

Quantitative Risk Analysis

Analy sis of risk events that have been prioritized using the qualitative risk analy sis process and their effect on project activities will be estimated, a numerical rating applied to each risk based on this analy sis, and then documented in this section of the risk management plan.

Practical NO.7

AIM: To perform unit testing and integration testing.

Unit Testing

In computer programming, unit testing is a software testing method by which individual units of source code, sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures are tested to determine if they are fit for use. Intuitively, one can view a unit as the smallest testable part of an application. In procedural programming, a unit could be an entire module, but it is more commonly an individual function or procedure. In object-oriented programming, a unit is often an entire interface, such as a class, but could be an individual method. Unit tests are short code fragments created by programmers or occasionally by white box testers during the development process. Ideally, each test case is independent from the others. Substitutes such as method stubs, mock objects, fakes, and test harnesses can be used to assist testing a module in isolation. Unit tests are typically written and run by software developers to ensure that code meets its design and behaves as intended.

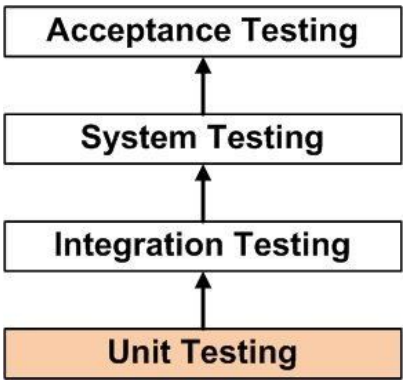


Figure 26: Testing

Unit Testing is performed by using the White Box Testing method.

TASKS of unit test

- Unit Test Plan
  - Prepare
  - Review
  - Rework

  - Baseline

- Unit Test Cases/Scripts
  - Prepare
  - Review
  - Rework
  - Baseline

- Unit Test
  - Perform

Benefits of Unit testing

The goal of unit testing is to isolate each part of the program and show that the individual parts are correct. A unit test provides a strict, written contract that the piece of code must satisfy. As a result, it affords several benefits.

Integration Testing

To perform integration testing, first, all unit testing has to be completed. Upon completion of unit testing, integration testing begins. Integration testing is black box testing. The purpose of integration testing is to ensure distinct components of the application still work in accordance to customer requirements. Test cases are developed with the express purpose of exercising the interfaces between the components. This activity is carried out by the test team. Integration testing is considered complete, when actual results and expected results are either in line or differences are explainable, or acceptable, based on client input.

step1 **Identify Unit Interfaces**: The developer of each program unit identifies and documents the unit's interfaces for the Responding to queries from terminals for information, Managing transaction data entered for processing, Obtaining, updating or creating transactions on computer files , Passing or receiving information from other logical processing units, Sending messages to terminals, Providing the results of processing to some output device or unit

Step 2 **Reconcile Interfaces for Completeness**: The information needed for the integration test template is collected for all program units in the software being tested. Whenever one unit interfaces with another, those interfaces are reconciled. For example, if program unit A transmits data to program unit B, program unit B should indicate that it has received that input from program unit A. Interfaces not reconciled are examined before integration tests are executed.

Step 3 **Create Integration Test Conditions**: One or more test conditions are prepared for integrating each program unit. After the condition is created, the number of the test condition is documented in the test template.

Step 4 **Evaluate the Completeness of Integration Test Conditions**: The following list of questions will help guide evaluation of the completeness of integration test conditions recorded on the integration testing template. This list can also help determine whether test conditions created for the integration process are complete.

Table 1: unit testing

Test Case ID	Test Case Name	Description	Pre-Condition	Execution Step	Expected Result	Status
Ek001	Network Test	The system works over a network through a web interface hence the first test is to check if there is proper transferring of the required data over the network.	1. Proper Network access. 2. Correct working URL for the SIM system.	1. Open the web browser and open the SIM executable file using localhost. 2. Upload a file or open an existing project to see if the system is working.	The System should work properly using the web browser and all of its offered options shall work properly.	passed
Ek002	File Exist Test	The file uploaded by the user must exist for the system to further parse and store it. This test checks for that.	1. The file must be of .STD format. 2. The file selected by the user must be supplied in full and no network issues shall halt this process.	1. Select the upload file option from the home page. 2. Upload the file with proper location and address of the file.	The system shall generate appropriate error message if the selected file does not exist in the user?s computer. Otherwise proper functioning of the system is assumed.	passed

Table 2: unit testing

Test Case ID	Test Case Name	Description	Pre-Condition	Execution Step	Expected Result	Status
Ek003	File Valid Test	The file provided by the user may be in simple text form but the data inside the file must be in strict accordance to the STAAD PRO file otherwise the system must handle the wrong format of the input data.	1. File must be uploaded completely. 2. It must be of .STD extension.	1. Select the upload file option from the home page. 2. Upload any file from your system.	In case the selected file is not of the right extension or the contents of the file are in accordance to the rules of STAAD PRO, then the system shall report the error via a message and return to the home page. Otherwise usual functioning shall proceed.	passsed
Ek004	Database Test	Database Test Things that are parsed by the system and converted in Database object form are needed to be stored in the database back at the server end, this tests checks if this is working properly.	1. The parsing of the file must execute correctly. 2. Proper database administration rights must be awarded. 3. The storage space must be sufficient.	1. Upload a correct STAAD PRO file or open an existing project. 2. Restart the parsing process for the selected/uploaded file. 3. Save the parsed contents into a new database entry.	The valid file should be parsed properly and to completion. No information in the file shall be skipped and no false information shall be assumed. Every result parsed shall be stored in the database under proper file names and corresponding structure identities and Job Id?s.	passsed

Table 3: table for integration testing

Test Case ID	Test Case Name	Description	Pre-Condition	Execution Step	Expected Result	Status
MA001	Converting a STAAD PRO file into a Database file.	A file when loaded and validated by the system is parsed by the system and the parsed elements are stored in the database. This is about half the job.	The network should be working properly and the file should be with correct form and syntax.	1. Select the upload option from the home page. 2. Upload a file. 3. Perform the parsing to completion. 4. Store the result in the database.	After the test, an equivalent database and csv file is generated at the specified location on the computer.	Passed
MA002	Converting a Database file into a STAAD PRO file.	A file when loaded and validated by the system is parsed by the system and the parsed elements are stored in the database. This is about half the job. The other half comprises of actually recreating the entire file from only the information stored in the database. This is like performing a query of the highest level on the database.	The network should be working properly and the file should be with correct form and syntax.	1. Select the upload option from the home page. 2. Upload a file. 3. Perform the parsing to completion. 4. Store the result in the database. 5. Delete the original file. 6. Retrieve the file from the database	After the test, an equivalent STAAD PRO file is generated at the specified location on the computer.	Passed

Practical No.8

AIM: To perform various white box and black box testng techniques.

White Box Testing Technique

White-box testing (also known as clear box testing, glass box testing, transparent box testing, and structural testing) is a method of testing software that tests internal structures or workings of an application, as opposed to its functionality (i.e. black-box testing). In white-box testing an internal perspective of the system, as well as programming skills, are used to design test cases. The tester chooses inputs to exercise paths through the code and determine the appropriate outputs. This is analogous to testing nodes in a circuit, e.g. in-circuit testing (ICT).

White-box testing can be applied at the unit, integration and system levels of the software testing process. Although traditional testers tended to think of white-box testing as being done at the unit level, it is used for integration and system testing more frequently today. It can test paths within a unit, paths between units during integration, and between subsystems during a system level test. Though this method of test design can uncover many errors or problems, it has the potential to miss unimplemented parts of the specification or missing requirements. White-box test design techniques include the following code coverage criteria:

- Control flow testing
- Data flow testing
- Branch testing
- Statement coverage
- Decision coverage
- Modified condition/decision coverage
- Prime path testing
- Path testing

Basic Procedures

White-box testing's basic procedures involve the understanding of the source code that you are testing at a deep level to be able to test them. The programmer must have a deep understanding of the application to know what kinds of test cases to create so that every visible path is exercised

for testing. Once the source code is understood then the source code can be analyzed for test cases to be created. These are the three basic steps that white-box testing takes in order to create test cases:

- Input involves different types of requirements, functional specifications, detailed designing of documents, proper source code, security specifications. This is the preparation stage of white-box testing to layout all of the basic information.
- Processing involves performing risk analysis to guide whole testing process, proper test plan, execute test cases and communicate results. This is the phase of building test cases to make sure they thoroughly test the application the given results are recorded accordingly.
- Output involves preparing final report that encompasses all of the above preparations and results.

Advantages

White-box testing is one of the two biggest testing methodologies used today. It has several major advantages:

- Side effects of having the knowledge of the source code is beneficial to thorough testing.
- Optimization of code by revealing hidden errors and being able to remove these possible defects.
- Gives the programmer introspection because developers carefully describe any new implementation.
- Provides traceability of tests from the source, allowing future changes to the software to be easily captured in changes to the tests.
- White box tests are easy to automate.
- White box testing give clear, engineering-based, rules for when to stop testing.

Disadvantages

Although white-box testing has great advantages, it is not perfect and contains some disadvantages:

- White-box testing brings complexity to testing because the tester must have knowledge of the program, including being a programmer. White-box testing requires a programmer with a high-level of knowledge due to the complexity of the level of testing that needs to be done.
- On some occasions, it is not realistic to be able to test every single existing condition of the application and some conditions will be untested.
- The tests focus on the software as it exists, and missing functionality may not be discovered.

Black Box Testing Technique

Black-box testing is a method of software testing that examines the functionality of an application without peering into its internal structures or workings. This method of test can be applied to virtually every level of software testing: unit, integration, system and acceptance. It typically comprises most if not all higher level testing, but can also dominate unit testing as well.

Test Cases

Test cases are built around specifications and requirements, i.e., what the application is supposed to do. Test cases are generally derived from external descriptions of the software, including specifications, requirements and design parameters. Although the tests used are primarily functional in nature, non-functional tests may also be used. The test designer selects both valid and invalid inputs and determines the correct output without any knowledge of the test object's internal structure.

Test design techniques

Typical black-box test design techniques include:

- Decision table testing
- All-pairs testing
- State transition analysis
- Equivalence partitioning
- Boundary value analysis
- Causeeffect graph
- Error guessing.

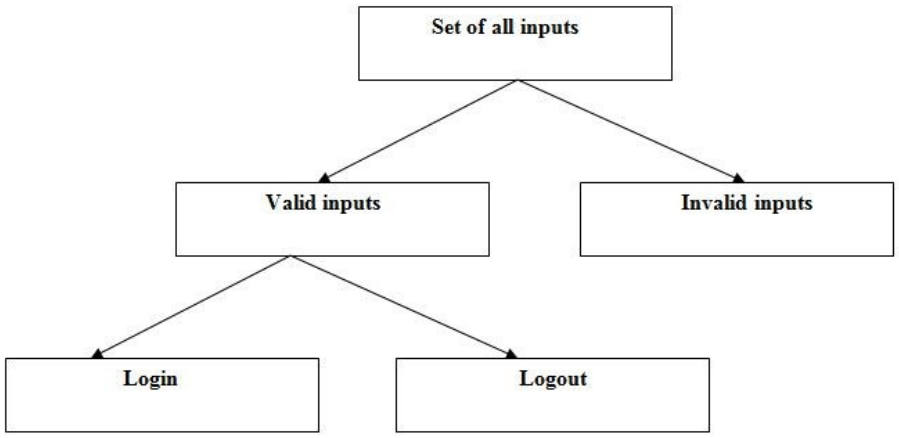


Figure 27: Black Box Testing

Practical No.9

AIM: System testing of software.

Requirement

The software to be designed will create an index model for a 3 dimensional civil structure like a building or any other civil engineering project. This requires a software for designing such structures using a computer, the one used in SIM is STAAD PRO. In STAAD PRO the engineer draws the structure using various graphical tools and accordingly a .STD file is created that has all information about the building structure. Alternatively the engineer can choose to work from this file only and creating the elements of the building by writing pre-defined instructions into the file just like a script. It is this file that serves as the fundamental requirement for SIM. SIM parses this file and stores the parsed information into a database which is of object orientation nature.

SIM will serve multiple users at a time. This is achieved by providing a web interface to things so that various user can access it from their web browsers. The user is required to make a decision at the home page of whether to upload a new file or open an already uploaded file. If the user chooses the former then the user must provide with a valid and complete STAAD PRO file for the system to further process. SIM must be able to provide the following services to the users:

1. The user must be able to change the working file without having to restart the system every time. This means that there must be navigational features in the system to move back and forth with different files in the same session.

2. The file provided by the user maybe half complete and/or with errors or outright empty. So the system must be able recognize these issues and offer the correct error message in response.

3. The user must be able to apply queries on the information stored in the databases.

4. Just like in a query when the user retrieves certain information about the structure from the database, the user should be able if he/she wishes to, construct a whole, complete file from the information stored in the database.

A user must be able to abort a file in processing at any time i.e. at the time of uploading as well as parsing.

SIM communicates with the database back at the server end and interact to store and retrieve information. A processing of the file is considered complete only if all of the file has been parsed, it database objects has been created by the corresponding function and the objects have been properly transferred to the database at the back end. If this is not the case then no changes shall be made to the database and its consistent state must be maintained.

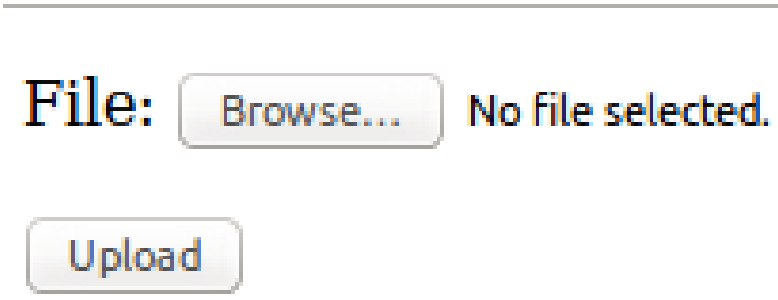


Figure 28: Main screen

If the system recognizes that the file in consideration is not correct then it must point that out to the user and also be able to tell that in what manner is the file wrong. For example, if the file is wrong syntactically then the correct syntactic suggestion must be provided to the user. If the file is not complete then simply a message must be passed to the user.

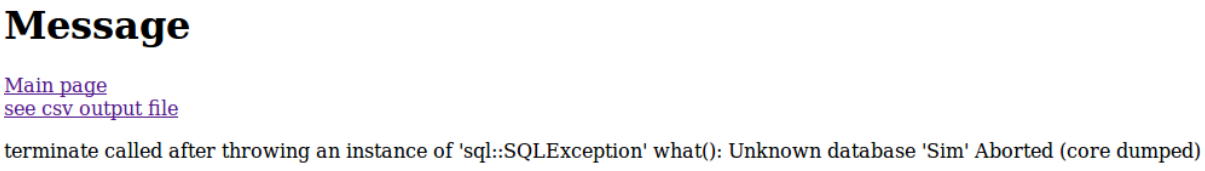


Figure 29: Message

Table 4: table for integration testing

Test Case ID	Test Case Name	Description	Expected Result	Status
MA001	Change file	The user must be able to change the working file without having to restart the system every time. This means that there must be navigational features in the system to move back and forth with different files in the same session.	Without having to create a new session the user must be able to change the working files.	Passed
MA002	valid file	The file provided by the user maybe half complete and/or with errors or outright empty. So the system must be able recognize these issues and offer the correct error message in response.	The system must accept those files that are correct and complete otherwise proper redirection to the home page with an error message must be provided.	Passed
MA003	query proccessing	The user must be able to apply queries on the information stored in the databases.	All user queries that are valid must be answered properly	Passed
MA004	File retrival	Just like in a query when the user retrieves certain information about the structure from the database, the user should be able if he/she wishes to, construct a whole, complete file from the information stored in the database.	The whole file must be created from the informtion in the database	Passed