# Information Systems Project Management (Lecture Note (INS 305)

# Lecture 1

# Introduction

- Definitions and Concepts regarding project and project management especially information system and its project and management

# Project

**Definitions**

Here are some Project definitions from different sources. They are formulated differently, but the meaning is the same

- a *temporary* **organization** to which **resources** are assigned to do work to bring about beneficial change. (The resources may be human, material or financial (*J. Rodney Turner*)
- a work system designed to produce a product and then go out of existence (*Steven Alter*)
- a temporary endeavor undertaken to create a unique product, service, or result (*Project Management Institute*)

## Characteristics of a Project

A project is a *temporary* endeavour

- that has definite ***starting point*** (beginning) and ***ending point*** (end)
- that is progressively (in incremental refinements) ***planned, controlled,*** and ***executed*** by people, working with some ***constraints*** on ***resources*** (time, money, etc),
- that results in a *unique product, service,* or *result*
- that isn't possible for the organization to achieve through its normal operations

Note: A key point to remember is that a project is 'temporal'. It's never infinite.

# Comparison of project work and operational (every day) work

This is illustrated in the table below:

**Tabel 1. Comparison of Project and Operations**

| Projects | Operations(Normal Routine) |
|---|---|
| **Differences**<br>Temporary | Ongoing |
| **Output**<br>Unique | Repetitive |
| **Purpose**:<br>● attain its (strategic) objective and then terminate<br>● Concludes when its specific objectives have been attained | ● Adopt new set of set of objectives and the work continues |
| **Similarities**<br>● Performed by people<br>● Constrained by limited resources<br>● Planned, executed, and controlled | ● Performed by people<br>● Constrained by limited resources<br>● Planned, executed, and controlled |

## Why Projects? Why do Organizations employ projects as part of its business strategy?

If we wish to achieve something purposefully (systematically), then main method is to use projects. This applies to any kind of problem solving, especially making changes.

Generally, in the context of organizations or firms, projects are means to implement strategic changes and organize corresponding activities. These activities are not possible to perform in frames of everyday work.

## Why Projects in Information System?

In the context of organizations information system, projects are means to manage changes concerning organizations information work (at any management level described earlier) and system work.

## Information system definition

Information system is a work system what comprises of organizational information and system work with respective IT infrastructure, methods and techniques. A work system is a system in which human participants and/or machines perform work using information, technology, and other resources to produce products and services for internal or external customers.

## Examples of information systems development projects

- building and introduction of new application systems (software) in organization
- modifying already existing application systems in organization
- transition to new technologies and business
- reorganizing work processes in organization
- adjusting and introducing information systems development framework

## Project Management

**Definitions**
Here are some definition to project management

- The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.
- Tools and methods by which the work of the resources assigned to the temporary organization(Project) is managed and controlled to deliver the beneficial change desired by the owner.(*Turner*)

- Project requirements = beneficial change desired by the owner

Project management includes:

- Planning. i.e., planning of temporary organizations work,

- Organizing. i.e., defining resources needed by work,
- Performance. i.e., work assigning to resources (resource allocation)
- Control. i.e., performance monitoring, making corrective actions to insure that required outcome (change) is achieved and this is capable of bringing benefits to the owner.

Project management also includes, among other things:

- understanding the project
- specifying clear and achievable goals
- balancing mutually competing requirements related with quality, scope, time and costs
- adapting definitions, plans and approaches to meet interests of several stakeholders . This is most difficult part
- risk management
- provides better possibilities to communicate (share information) and adapt to changing circumstances (concerning every aspect in project)

## Project Stakeholders

Project stakeholders refer to persons or organizations e.g.,

- customers
- sponsors
- the performing organization
- the Government
- or the public

who are actively involved in the project or whose interests may be positively or negatively affected by the performance or completion of the project.

They may have varying levels of responsibility and authority when participating on a project and these can change over the course of the project life cycle.

There are positive and negative stakeholders. Positive stakeholders gain form project outcomes some kind of benefit. Negative not. The interests of negative stakeholders are served by impeding the project's progress. Project Managers job is in the first place determine negative stakeholders, with them he/she must be cautious and of course positive stakeholders are they who give help to project manager when he/she is needed it.

## Main Roles in Project Management

These roles are presented on the following figure:


**Diagram: Main Roles in Project Management**

Role of the customer:

- The role of the customer is to give right and complete requirements of desired result to the executor (through project manager);
- to give appropriate preconditions to fill these requirements and to accept created result.

Role of the Manager

- manage executor´s work of fulfilling these requirements under customer´s preconditions

Role of the Executor

- The role of executor is to create the result under given preconditions.

## Basic function of the Project Manager

The **Project Manager** is as manager of little (temporary) company. He is responsive of everything what is needed to be project successful.

**Note:** Project success lies in bringing benefit to the owner. Full success lies in bringing optimal benefit to the owner. Project manager must be capable of

- listening,
- producing administrative documents,
- manage meetings
- acquire and manage information
- build and coordinate teams,
- perform team performance appraisal
- communicate and manage his time

## Reasons why Projects Fail

Below are some reasons why projects fail

- lack of user input
- lack of executive support
- unclear objectives
- project management incompetence
- technology incompetence

## General (but not exclusive) rule to follow in achieving Project success

- Introduce and follow Project management methodologies, standards and best practices
- have healthy mind, logical thinking and willingness and skills to work with people to insure satisfaction of all projects participants

Remember that a cardinal objective of project management is doing right projects right!

## Examples of System Development Methodologies:

- Waterfall
- Spiral
- RAD (Rapid Application Development)
- RUP (Rational Unified Process)
- Prototyping
- XP
- Scrum
- OpenUP
- Kanban

## Criteria for choosing System Development Methodology

- Nature and scope of system under development
- Project criticality
- Budget
- Team Size
- Used Technology
- Used Tools and Techniques
- Work culture in organization

## System Development *versus* Project Management Methodology

***System development methodology-*** deals with system and its creation determining principles for system development.

***Project management methodology-*** deals with work to be done determining management processes for work outputs and outcomes.

Project manager is responsible for ensuring that project meets its objectives using the appropriate system development methodology. Project management doesn´t depend on specific system development methodology but may be restricted by it.

**Project Management Framework (PMF)**

Definition:

PMF gives basis for project management methodology determination and directions to project management activities.

- A project management framework is a logical structure for categorizing and organizing the various aspects of project management. It thus enabling various parties associated with project to communicate and understand each other.

- PMF provides answers to questions like: what? how? where? who? when? why?

**Project Management Framework (PMF) in IS**

In the context of IS, Project Management is directed to IS change management. On the other hand, PMF helps define management aspects such as - goals, inputs, outputs and processes for system development and its monitoring and control. The PMF is otherwise known as the **Process Model.**

**THE PROCESS MODEL**

Definition/function:

- A process model shows a generic project framework.
- It shows the project divided into a number of stages which are followed in sequence from start to finish of the project.
- The process model can also be used to help define what is required of the Project Manager at each stage in the project and
- to define the inputs and outputs at each stage.

Points to Note

- A process model can be helpful to a project manager in planning the project but obviously cannot be followed blindly and must be tailored to meet the requirements of the Particular project.

- Not all elements of a process model will be appropriate but the model can be used as a checklist to ensure that nothing important is missed from the project.

Within the process model, the traditional system development life cycle must be considered and an appropriate model chosen. The process model can also be equated with a project's life cycle.

**Lecture 2**

# Stages of a generic Process Model

There are four stages:

1. **Start-up or Initiation stage** – This includes the project start-up stage
2. **Development stage** – this includes the Project Development stage on the process model
3. **Completion stage** – this stge of the process model includes
    - Site delivery
    - Site installation
    - Site acceptance
    - System commission
    - Customer take-over

4. **Operational stage** – this includes the in-service live running (i.e., bringing the system to life) and enhancement stages

## 1. Start-up Stage

This stage covers work which is carried out at the beginning of the project when the basic framework is put in place. This stage is sometimes called the **initiation stage.**

The project start-up stage answers the basic questions of:

***What*** is to be carried out?

***Why*** is it being carried out?

***Who*** is going to do it?

***How*** is it to be carried out?

***When*** is it to be carried out?

### What

- This documents the objectives, scope, constraints and interfaces which apply to the project.

- Most of the information will be available from other sources such as the feasibility study report, project brief, project terms of reference and contract documents.

### Why

Every project should have a **Business Case** which sets out the main problems or opportunities which are to be addressed. Here,

- cost of developing and maintaining the system is as against the anticipated benefits are clearly stated.

### Who

This covers

- project organization
- roles and responsibilities of all stakeholders involved in the project

### How and When

These two elements of the Project start-up stage relate to issues about Project planning (which is a distinct stage in PM). However, at the start-up stage i.e.,

- a **high-level plan** (i.e., Overview/Summary) of the project is produced. The next stages of the Process model will produce more **detailed plan** of the project.

## 2. The Development Stage

This is where most of the supplier's work is carried out. Many of the activities are under the day to day control of the supplier project manager.

**Comment:**

In the course of this lecture note, except otherwise stated, we assume that the waterfall model of the System Development Life Cycle is the development approach used.

**The stages involved in the development stage**

All projects vary depending on the nature of the project. However, the following is typical of a customer/supplier type of project.

- Requirements definition
- Design
- Implementation
- Integration and test
- System Test

**Requirements definition**

In this part of the project, the customer's requirements are specified in detail. The purpose is to ensure that all customers' requirements are

- captured and documented
- complete and consistent
- recorded in a precise and unambiguous manner

**Note:**

A good requirements specification is the foundation of all the rest of the development stage work and it follows therefore, that the work of the Project Manager should from that point, be relatively straightforward, at least in the sense that the 'target' has been clearly defined.

**Design**

This stage is the very first stage to address the question of **how** the requirements are to be achieved. The techniques to be used will be identified. The design will then be broken down into smaller, more manageable components which will form the basis of the program or module specification.

**Implementation**

The implementation part of the development stage is where the programming and unit testing take place. This depends largely on the programming environment to be used on the project and for most projects, *it is the part where the customer has the lowest level of involvement in the delivery of the products.*

**Integration and testing**

This part is concerned with integrating the individual components and checking that they work properly together. For instance, it is essential that the data passed from one module (part/section of

the entire program) to the next, is in the form in which the recipient expects it. Integration testing must be designed to ensure that all components communicate in the expected way.

**System testing**

This is carried out by the supplier to check that the whole system behaves according to the requirements specification. The supplier should check that the acceptance criteria set and agreed in the ***Requirements Definition*** part have been met.

Handling errors discovered during testing

If errors are discovered during Integration and System testing, the components of the projects will be reworked. Sometimes, if the errors are discovered to be as a result of incomplete or inadequate requirements specification, extra cost may be charged leading to an upward review of the project estimate.

However, the contractual position regarding who has responsibility for paying for this kind of correction (reworking of components) depends on what was agreed between the customer and supplier at the outset/beginning of the project.

# 3. The Completion Stage

The completion stage begins when the information system has been completed by the supplier and has been subjected to the full rigours of a systems test and every error and problem eradicated.
Other activities which should be fully completed include:

- Technical documentation
- User manuals
- Operating instructions
- Any other form of relevant documentation

This completion stage is where the customer receives the finished product.

## Steps involved in the completion stage

- Delivery to the customer/client of ALL the elements of the IS (project) including software, hardware and documentation.

- Training and documentation for the end – users, system administrators and other operators
- Carrying out of acceptance tests by the customer on the delivered products
- Acceptance by the customer
- System commissioning
- Final take-over by the customer.(*Where the customer formally accepts the project and the project comes to an end)*

**Note:** Not all of these steps will necessarily take place. For example, a customer may wish to carry out training without the assistance of the project supplier. Furthermore, the customer may decide to carry out the commissioning using internal resources and therefore not include the supplier.

## 4. The Operational Stage

The operational stage takes over when the live running begins.

Point to Note: The operational stage **does not** form part of the project. However, if there is an agreed arrangement for the supplier to provide support to the customer even after hand over of the project, then it is ok for the supplier to be around during the operational stage.

# Assignment 1 **(Deadline: Thurs Oct 1, 2014)**

1. Compare and contrast any two systems development life cycles.
2. Identify which you prefer of the two above, and support your choice with reason(s).

# Project Initiation

Definition: It is the **first phase** of project life cycle (Project Management) and is a process which starts with idea or proposal and then going through change-implementation and ends in positive case with approval to start formally with project.

In negative case, project will be rejected and will wait better times.

## Purpose of Project Initiation

The purpose of the initiation phase of a project is to identify scope and gain initial approval for a project or projects that will deliver tangible benefit to the business. Once it is approved, it is time to move on to the planning phase of the project. Initiating is committing the organization's resources to a project or project phases.

**Remark:** In the lecture notes, the concept "project" is used instead of "information system project" to emphasize the fact that all activities concerning project initiation is applicable to any domain project.

# Background (Factors relating to Project Initiation)

In order to explain project initiation context in the organization, we take a short overview of project connections with

- Organizations' strategic plans
- Location in composition of portfolios and/or programs and
- Stakeholders related to project and its management.

## (a) Projects and Strategic Planning

Projects are often utilized as a means of achieving an organization's strategic plan. They are originated when the need for change in organization is acknowledged. Projects are typically authorized as a result of one or more of the following strategic considerations:

- market demand
- strategic opportunity/business need
- customer request
- technological advance

- legal requirements

## (b) Programs or portfolios

Within programs or portfolios, projects are a means of achieving organizational goals and objectives (often in the context of a strategic plan). Projects or groups of projects within a program or portfolio can have discrete/distinct benefits, they can also contribute to:

- to the benefits of the program
- to the objectives of the portfolio
- to the strategic plan of the organization

## (c) Project Stakeholders

The project stakeholders include

- The **project sponsors**
- **Project management team** (Portfolio managers/portfolio review board (steering committee))
- **Project Management Office (PMO)** is an organizational body or entity assigned various responsibilities related to the centralized and coordinated management of those projects under its domain. It can provide project management support functions or actually be responsible for the direct management of a project.
- **Functional managers** are key individuals who play a management role within an administrative or functional area of the business - human resources; finance; accounting; procurement. They may provide subject matter expertise or their function may provide services to the project.
- **Operations management –** consists of individuals who have a management role in a core business area - research and development; design; manufacturing; provisioning, testing, or maintenance.
- **Customers /Users -** are persons or organizations that will use the project's product or service or result.
- **Sellers**(vendors, suppliers, or contractors) - are external companies that enter into a contractual agreement to provide components or services necessary for the project.
- **Business partners -** are also external companies that provide specialized expertise or fill a specified role - installation, customization, training, or support.

# Project Planning

This is the **Second phase** of project life cycle (Project Management) and it is the stage at which details regarding every aspect of the project are outlined in very clear terms. Research has found a positive relationship between effective project planning and positive project outcomes (Guinan et al., 1998; Kirsch, 2000).

Project planning involves

- defining clear, discrete activities
- defining the work needed to complete each activity within a single project
- making numerous assumptions about the availability of resources such as hardware, software, and personnel
- Scheduling tasks/activities according to precedence or dependency rules

**Note:**

Precedence = which activity comes before another activity?

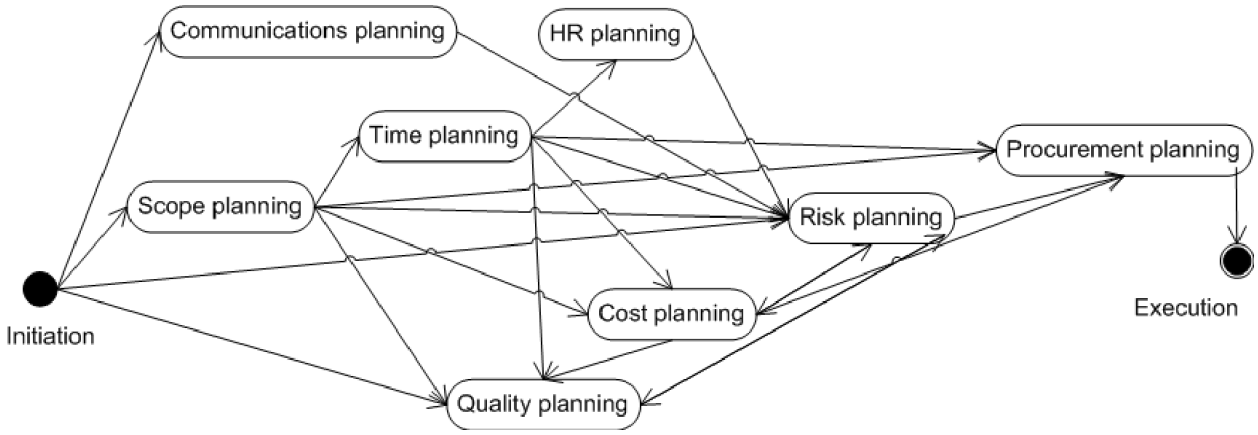
Dependency = which activity depends on another or which activity cannot begin except another has begun or has been completed?

## *Why do we need to plan?*

- **Developing an information system is a very complex undertaking** involving hardware, software, data capture, user training etc. Therefore, something of this complexity is only likely to succeed if planned carefully.
- **Job/role description of project team members**. The people involved in a project need to know exactly what their role is, what they are expected to produce and when it is wanted.
- **Developing confidence in Customers.** Customers need to be confident that the developers know what they are doing. Planning is a demonstration that some professional thought has been introduced into the job to be done and that the developers have a clear idea of where they are going.

- **Assisting the Project Manager in project scheduling.** Planning aids the Project Manager in determining whether the project is on schedule or not.

The diagram below shows the planning process and their relationships




Planning process and their relationships

# Breaking the work down

Having looked at the objectives of a project, the next logical step would be what needs to be done to meet the objectives. This step is called **Planning.**

There are two basic approaches to planning:

1. The work breakdown structure
2. Product breakdown structure

## The work breakdown structure (WBS)

- This is a more traditional approach and it involves the process of dividing the project into manageable tasks and logically ordering them to ensure a smooth evolution between tasks.

- The definition of tasks and their sequence is referred to as the **work breakdown structure** (PMBOK, 2004; Project Management Institute, 2002). PMBOK means Project Management Body of Knowledge.

**Points to note**

- Some tasks may be performed in parallel/simultaneously
- Some tasks must follow one another sequentially.

**Factors that determine task Sequence**

Task sequence depends on

- Which tasks produce deliverables (output/results) needed in other tasks
- When critical resources are available
- The constraints placed on the project by the client
- The process outlined in the SDLC.

## Example of WBS

An example for moving a set of offices and staff to a new building is given in the diagram below.

Each branch contains work items which are further broken down into work packages.

Note that tasks may have already been grouped into Work Packages as part of preparation for the bidding process.

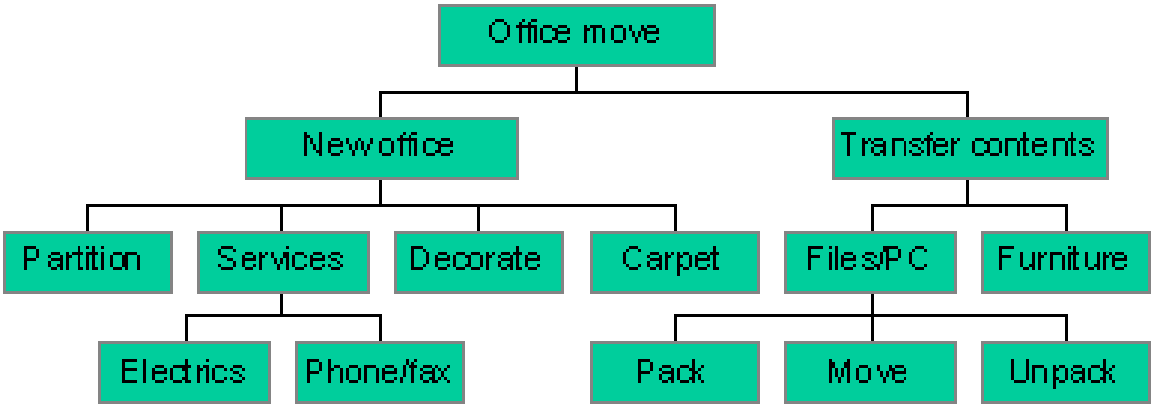



Diagram: The *Office-Move* Work Breakdown Structure

The level to which tasks are identified will depend on

- the size and nature of the project,
- the level at which a single individual or team can be assigned responsibility and
- the level at which costs are allocated. Not all branches of the WBS have to be broken down to the same level.

## The Product breakdown structure (PBS)

This approach to planning is based on the idea of considering the products that will result from the project.

**Advantages of the PBS**

- It ensures that the project's focus is on *what* is to be achieved rather than *how.* In other words, on ends rather than means.

- When approaching a new area of work, it is sometimes difficult to envisage exactly what you need to do (that is, what work is to be done)
- Once you have identified all the products, then you can associate other things with them.

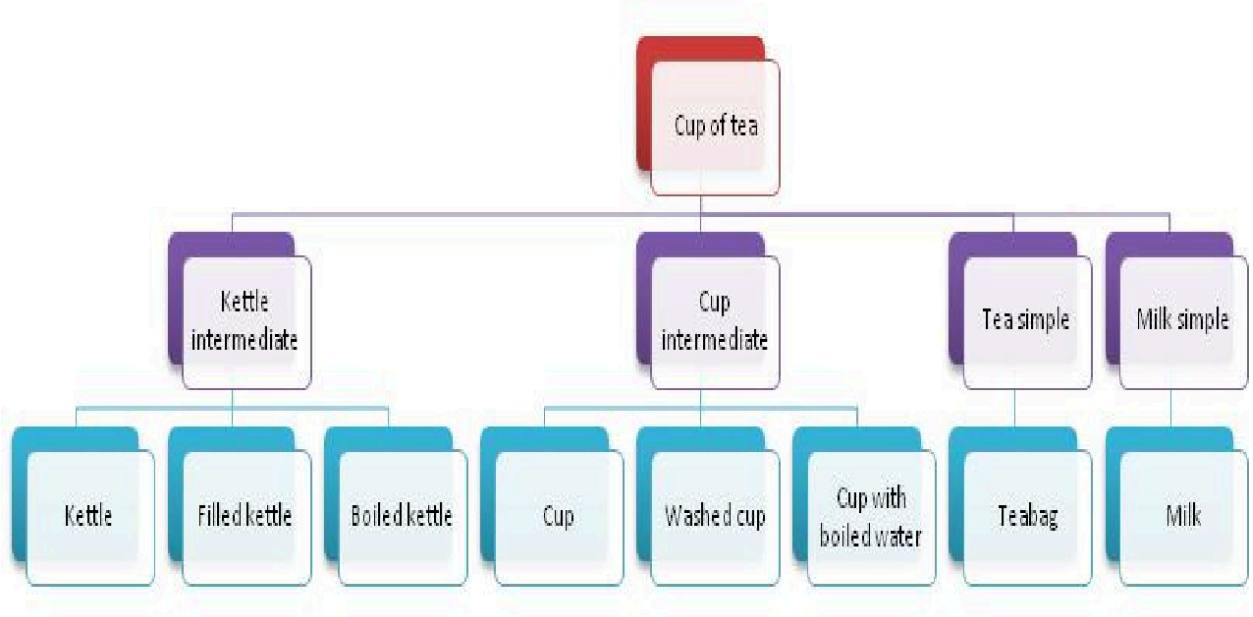



Diagram: The Product Breakdown Structure

The diagram above shows that a cup of tea is made up of four products:

1. the kettle intermediate group
2. the cup intermediate group
3. the tea simple product and
4. the milk simple product

The kettle and cup each have three sub-products.

Note that the PBS does not show sequence, though for something as simple as this example parts of the sequence can be implied, e.g. you get the kettle, fill it with water and bring the water to the boil.

So once you have completed the PBS the next job is to put it into sequence order.

**Note** that the second tier of the diagram does not represent actual products – these are there as labels for the groups of sub-products that go together. They could be omitted from the diagram.

## PROJECT MANAGEMENT (Defined)

**Project management** – This refers to the application of knowledge, skills, tools and techniques to achieve specific targets within specified budget and time constraints.

Project management activities include

- Planning the work
- Assessing the risks
- Estimating resources required to accomplish the work
- Organizing activities
- Acquiring human and material resources
- Reporting progress
- Controlling project execution
- Analyzing the results

### VARIABLES OF PROJECT MANAGEMENT

As in other areas of business, project management for information systems must deal with **5 major variables** – scope, time, cost, quality and risk.

1) Scope: This defines what work that will or will not be included in the project
2) Time: is the amount of time required to complete a project. Project management usually establishes the amount of time required to complete major components of a project. Each of these components are further broken down into activities and tasks.
3) Cost: is based on the time to complete a project multiplied by the cost of human resources to complete the project. Information system project costs also include the cost of hardware, software and work space. Project management develops a budget and monitors on going expenses.

4) Quality: This is how well the end result of a project satisfies the objectives specified by management. The quality of information systems project usually boils down to improved organizational performance and decision making. Quality also considers the accuracy and timeliness of information produced by the new system and ease of use.

5) Risk: This refers to the potential problems (i.e., vulnerabilities) that would threaten the success of a project. The vulnerabilities might prevent a project from achieving its objectives by increasing time and cost, lowering the quality of project output or preventing the project from being completed.

# Lecture 3

# PROJECT MANAGEMENT TOOLS/TECHNIQUES

## Network diagram

A **network diagram** is a graphical depiction of project tasks and their interrelationships. As with a Gantt chart, each type of task can be highlighted by different features on the network diagram.

### Features of a network diagram

The distinguishing features of a network diagram are

- the ordering of tasks is shown by connecting tasks—depicted as rectangles or ovals—with their predecessor and successor tasks.
- the relative size of a node (representing a task) or a gap between nodes does not imply the task's duration.

There are three (3) commonly used project management tools for documenting project plans. These are:-

- Gantt Chart
- Project Evaluation Review Technique (PERT)
- Critical Path Method (CPM) and

i) **Gantt Chart:**

This lists project activities and their corresponding start and completion dates. The Gantt chart visually represents the timing and duration of different tasks in a development project as well as their human resource requirements. The Gantt chart shows each task as a horizontal bar whose length is proportional to the time required to complete it.

**Disadvantage of Gantt Chart**

- They don't depict task dependencies
- They don't show how tasks should be ordered
- They don't show the effect on a tasks if another is behind schedule

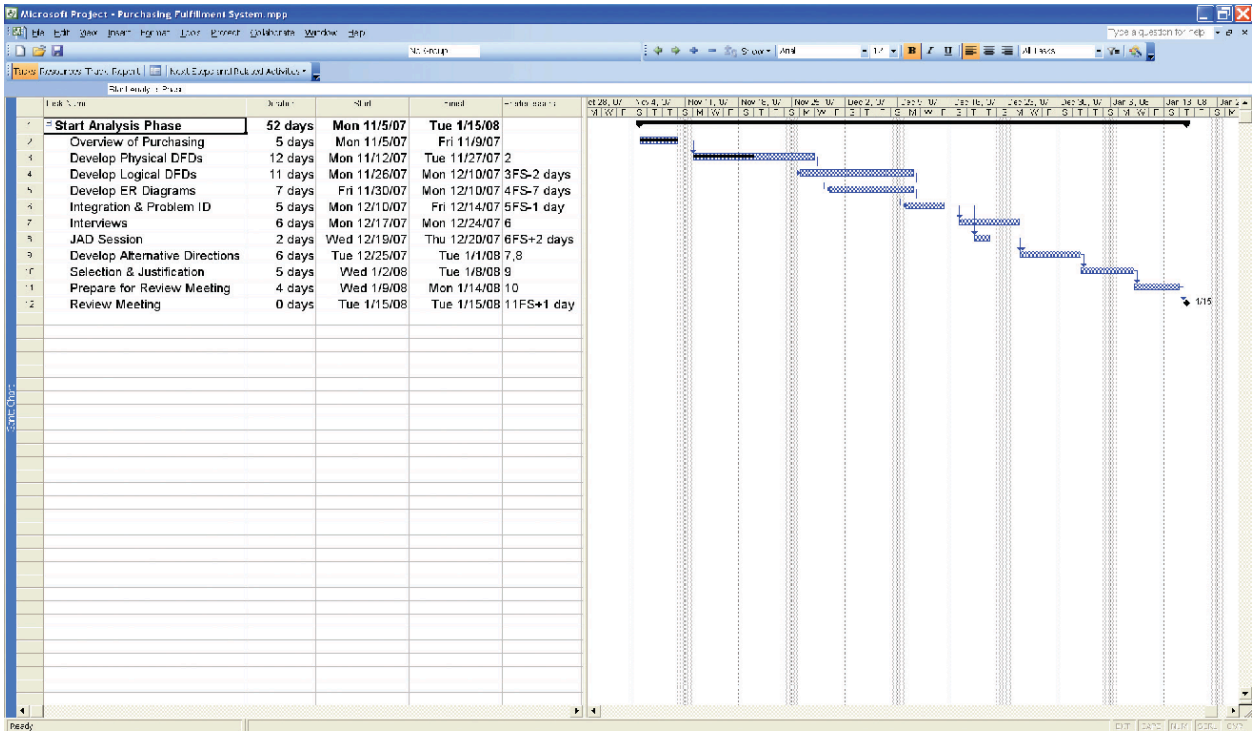


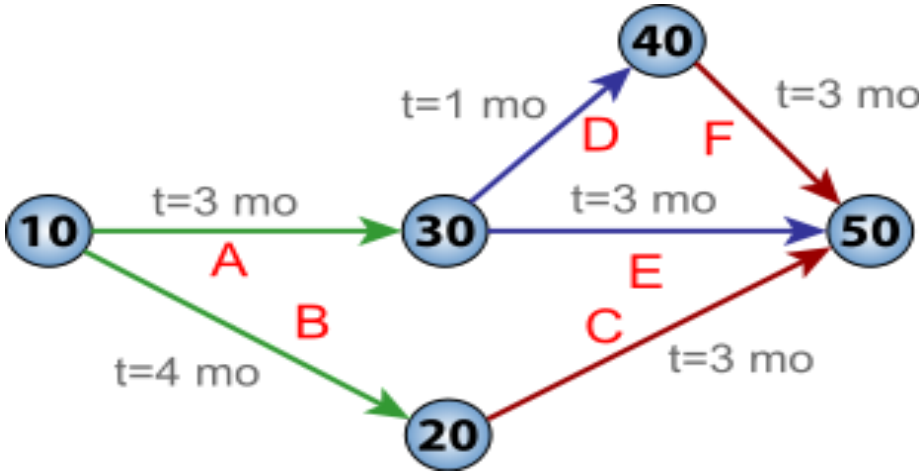

Diagram: Gantt chart showing progress of activities (right frame) versus planned activities (left frame)

### ii) **Pert Chart:**

It was developed by the US Navy in the 1950s.

- A PERT chart Graphically depicts project tasks and their interrelationships.
- It lists the specific activities that make up the project and the activities that must be completed before a specific activity can start as illustrated in the diagram below.

- The PERT chart portrays a project as a network diagram consisting of numbered nodes (either circles or rectangles) representing project tasks.
- Each node is numbered and shows the **tasks**, **its duration**, the **starting date**, and the **completion or end date.**
- The direction of the arrows on the lines indicates the sequence of tasks and shows which activities must be completed before the commencement of another activity.




A PERT network chart for a seven-month project with five milestones (10 through 50) and six activities (A through F).

## Terminologies used in PERT

- ***PERT event*:** a point that marks the start or completion of one or more activities. It consumes no time and uses no resources. When it marks the completion of one or more tasks, it is not "reached" (does not occur) until *all* of the activities leading to that event have been completed.
- ***predecessor event*:** an event that immediately precedes some other event without any other events intervening. An event can have multiple predecessor events and can be the predecessor of multiple events.

- ***successor event*:** an event that immediately follows some other event without any other intervening events. An event can have multiple successor events and can be the successor of multiple events.
- ***PERT activity***: the actual performance of a task which consumes time and requires resources (such as labor, materials, space, machinery). It can be understood as representing the time, effort, and resources required to move from one event to another. A PERT activity cannot be performed until the predecessor event has occurred.
- ***optimistic time* (O):** the minimum possible time required to accomplish a task, assuming everything proceeds better than is normally expected
- ***pessimistic time* (P):** the maximum possible time required to accomplish a task, assuming everything goes wrong (but excluding major catastrophes).
- ***most likely time* (M):** the best estimate of the time required to accomplish a task, assuming everything proceeds as normal.
- ***expected time* ($T_E$):** the best estimate of the time required to accomplish a task, accounting for the fact that things don't always proceed as normal (the implication being that the expected time is the average time the task would require if the task were repeated on a number of occasions over an extended period of time).

  $$T_E = (O + 4M + P) \div 6$$

- ***float* *or* *slack*** is a measure of the excess time and resources available to complete a task. It is the amount of time that a project task can be delayed without causing a delay in any subsequent tasks (*free float*) or the whole project (*total float*). Positive slack would indicate *ahead of schedule*; negative slack would indicate *behind schedule*; and zero slack would indicate *on schedule*.
- ***critical path*:** the longest possible continuous pathway taken from the initial event to the terminal event. It determines the total calendar time required for the project; and, therefore, any time delays along the critical path will delay the reaching of the terminal event by at least the same amount.
- ***critical activity*:** An activity that has total float equal to zero. An activity with zero float is not necessarily on the critical path since its path may not be the longest.
- **Slack time:** The amount of time that an activity can be delayed without delaying the project.

Example

| Activity | Predecessor | Time estimates | | | Expected time |
|---|---|---|---|---|---|
| | | Optimistic (*O*) | Normal (*M*) | Pessimistic (*P*) | |
| *A* | — | 2 | 4 | 6 | 4 |
| *B* | — | 3 | 5 | 9 | 5.33 |
| *C* | *A* | 4 | 5 | 7 | 5.17 |
| *D* | *A* | 4 | 6 | 10 | 6.33 |
| *E* | *B*, *C* | 4 | 5 | 7 | 5.17 |
| *F* | *D* | 3 | 4 | 8 | 4.5 |
| *G* | *E* | 3 | 5 | 8 | 5.17 |

### iii) CPM

The **critical path method (CPM)** is an algorithm for scheduling a set of project activities.

- It is an important tool for effective project management.
- The critical path method (CPM) is a project modeling technique developed in the late 1950s by Morgan R. Walker and James E. Kelley, Jr.
- Any project with interdependent activities can apply this method of mathematical analysis.

**Note:** Although the original CPM program and approach is no longer used, the term is generally applied to any approach used to analyze a project network logic diagram.

### Basic Technique of the CPM

1. A list of all activities required to complete the project (typically categorized within a work breakdown structure),
2. The time (duration) that each activity will take to completion, and
3. The dependencies between the activities.

Furthermore, using these values

- CPM calculates the longest path of planned activities to the end of the project, and the earliest and latest that each activity can start and finish without making the project longer.
- This process determines which activities are "critical" (i.e., on the longest path) and which have "total float" (i.e., can be delayed without making the project longer).

**Critical Path**

In project management, a critical path is the sequence of project network activities which add up to the **longest** overall duration. The critical path therefore

- determines the shortest time possible to complete the project.
- Any delay of an activity on the critical path directly impacts the planned project completion date (i.e. there is no float on the critical path).

**Float**

A float represents the period within which a project may be delayed without affecting the entire project time.

# Lectures 4 & 5

# Labs (Practice)

**(Note:** *Software used for demonstration is MS Project 201. It has been installed in the PCs in the Computer Lab*)

Following from the Example given in PERT above (page 27),

The first step to scheduling the project is to

- Determine the tasks that the project requires and the order in which they must be completed.
- The order may be easy to record for some tasks (*e.g.* When building a house, the land must be graded before the foundation can be laid)
- Additionally, the time estimates usually reflect the normal, non-rushed time.
- Many times, the time required to execute the task can be reduced for an additional cost or a reduction in the quality.

## USING PROJECT MANAGEMENT SOFTWARE

A wide variety of automated project management tools are available to help you manage a development project.
New versions of these tools are continuously being developed and released by software vendors.
An example of popular project management software is *Microsoft Project* Software.

### Common Features of Project Management Softwares

- the ability to define and order tasks
- assign resources to tasks
- easily modify tasks and resources

When using this system to manage a project, you need to perform at least the following activities:

- Establish a project starting or ending date.

- Enter tasks and assign task relationships.
- Select a scheduling method to review project reports.

## Establishing a Project Starting Date

Defining the general (global) project information includes

- obtaining the name of the project and the project manager
- obtaining the starting or ending date of the project

**Starting** and **ending** dates are used to schedule future activities or backdate others (see the following) based on their duration and relationships with other activities.

# Lab 1

Example 1

In the Example 1 below, there are :

- seven (7) tasks, labeled *A* through *G*.
- Some tasks can be done concurrently (*A* and *B*) while others cannot be done until their predecessor task is complete (*C* cannot begin until *A* is complete).
- Additionally, each task has three time estimates:
  - **Optimistic time** estimate **(*O*),**
  - **Normal time** estimate **(*M*),** and
  - **Pessimistic time** estimate **(*P*).**

The expected time ($T_E$) is computed using the formula $(O + 4M + P) \div 6$.

The result is given in the table below:

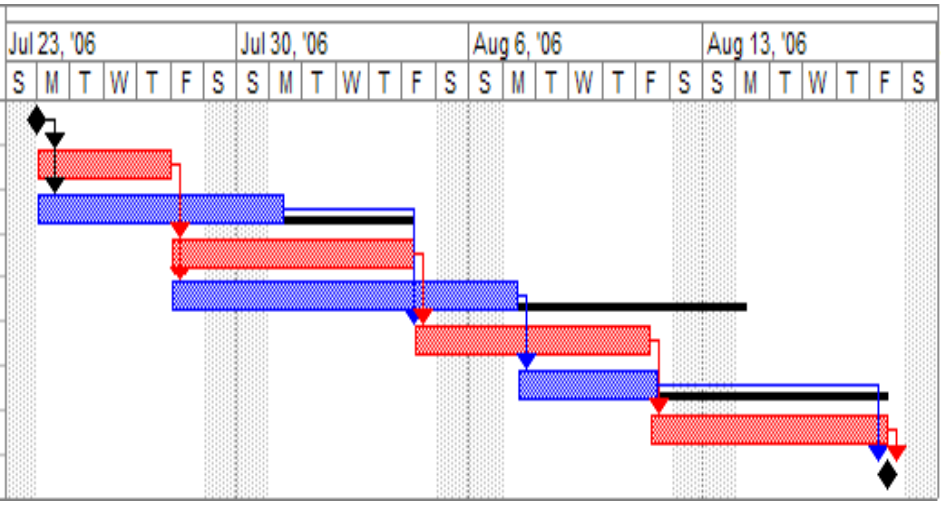
| Activity | Predecessor | Time estimates | | | Expected time |
|---|---|---|---|---|---|
| | | Opt. (*O*) | Normal (*M*) | Pess. (*P*) | |
| *A* | — | 2 | 4 | 6 | 4 |
| *B* | — | 3 | 5 | 9 | 5.33 |
| *C* | *A* | 4 | 5 | 7 | 5.17 |
| *D* | *A* | 4 | 6 | 10 | 6.33 |
| *E* | *B*, *C* | 4 | 5 | 7 | 5.17 |
| *F* | *D* | 3 | 4 | 8 | 4.5 |
| *G* | *E* | 3 | 5 | 8 | 5.17 |

Table showing activity description, dependencies and duration

Once this step is complete, one can draw a *Gantt chart* or a network diagram. This is done using the project management software – *Microsoft Project 2010.*

The screen shot is shown below

| ID | Task Name | Predecessors | Duration |
|---|---|---|---|
| 1 | Start | | 0 days |
| 2 | a | 1 | 4 days |
| 3 | b | 1 | 5.33 days |
| 4 | c | 2 | 5.17 days |
| 5 | d | 2 | 6.33 days |
| 6 | e | 3,4 | 5.17 days |
| 7 | f | 5 | 4.5 days |
| 8 | g | 6 | 5.17 days |
| 9 | Finish | 7,8 | 0 days |




A Gantt chart created using **Microsoft Project** (MSP).

Note

(1) the critical path is in red,

(2) the slack is the black lines connected to non-critical activities,

(3) since Saturday and Sunday are not work days and are thus excluded from the schedule, some bars on the Gantt chart are longer if they cut through a weekend.

# Assignment 2

**Reproduce the example 1 above on MS-project Software and produce the screen shots of the following:**

1. **The corresponding Gantt Chart**
2. **The Network Diagram**

**Mode of submission:**

**Submit a folder containing two files**

**(a) Your MS project file with source data**

**(b) An MS screen shot of you results of 1 (Gantt chart) and 2 (Network diagram)**

**Note: Your folder should have the format, 'INS305-Matno' (e.g., INS305-88888) Where 88888 is your Mat Number**

# Lab 2

Example 2 A ***purchasing fulfillment system*** project

Here,

Project **start date** = Monday, November 5, 2007.

## Step 1: Start Analysis Phase

This task represents a summary task that is used to group related tasks. The task entry screen, shown in the diagram below is similar to a financial spreadsheet program.

**How to enter the tasks**

The user moves the cursor to a cell with arrow keys or the mouse and then simply enters a

- textual ***Name*** and
- a numeric ***Duration***

## Step 2: Entering tasks and assigning task relationships

The next step after defining the **start** and **end** dates of the entire project, is to define project tasks and their relationships.

For our example *Purchasing Fulfillment System project*, we have 12 tasks to be completed. This is shown in the table below. The diagram represents MS Project's presentation of the project after entering the tasks and assigned duration.

The table below shows the global data for the project example

**Table information showing the Project tasks/activities and associated data**

| ID no | Tasks (Activities) | Duration (Days) | Start Dates | End Dates | Predecessors |
|---|---|---|---|---|---|
| 1 | Start Analysis phase | 52 | Mon 11/05/07 | | |
| 2 | Overview of purchasing | 5 | Mon 11/05/07 | | |
| 3 | Develop physical DFDs | 12 | Mon 11/12/07 | | 2 |
| 4 | Develop logical DFDs | 11 | Mon 11/26/07 | | 3FS - 2 days |
| 5 | Develop ER Diagrams | 7 | Fri 11/30/07 | | 4FS - 7 days |
| 6 | Integration and Problem Identification | 5 | Mon 12/10/07 | | 5FS - 1 days |
| 7 | Interviews | 6 | Mon 12/17/07 | | 6 |
| 8 | JAD session | 2 | Wed 12/19/07 | | 6FS + 2 days |
| 9 | Develop alternative directions | 6 | Tue 12/25/07 | | 7,8 |
| 10 | Selection and Justification | 5 | Wed 01/02/08 | | 9 |
| 11 | Prepare for Review meeting | 4 | Wed 01/09/08 | | 10 |

| | | | | | |
|---|---|---|---|---|---|
| 12 | Review meeting | 0 | Tue 01/15/08 | | 11FS + 1 days |

## Points to note

- For each activity, the Scheduled Start and Scheduled Finish are automatically entered **based on the project start date and duration.**
- To set an activity relationship, the ID number (or numbers) of the activity that must be completed before the start of the current activity is entered into the Predecessors column.

Additional codes under this column (i.e., Predecessors column) make the precedence relationships more precise. For example,

Consider the Predecessor column for ID 6.

The entry in this cell says that activity 6 cannot start until one day before the finish of activity 5. (Microsoft Project provides many different options for precedence and delays, as demonstrated in this example, but discussion of these is beyond the scope of our coverage.)

**Note:** The project management software uses this information to construct Gantt charts, network diagrams, and other project-related reports.

The diagram below illustrates establishing of project start date in MS Project for windows

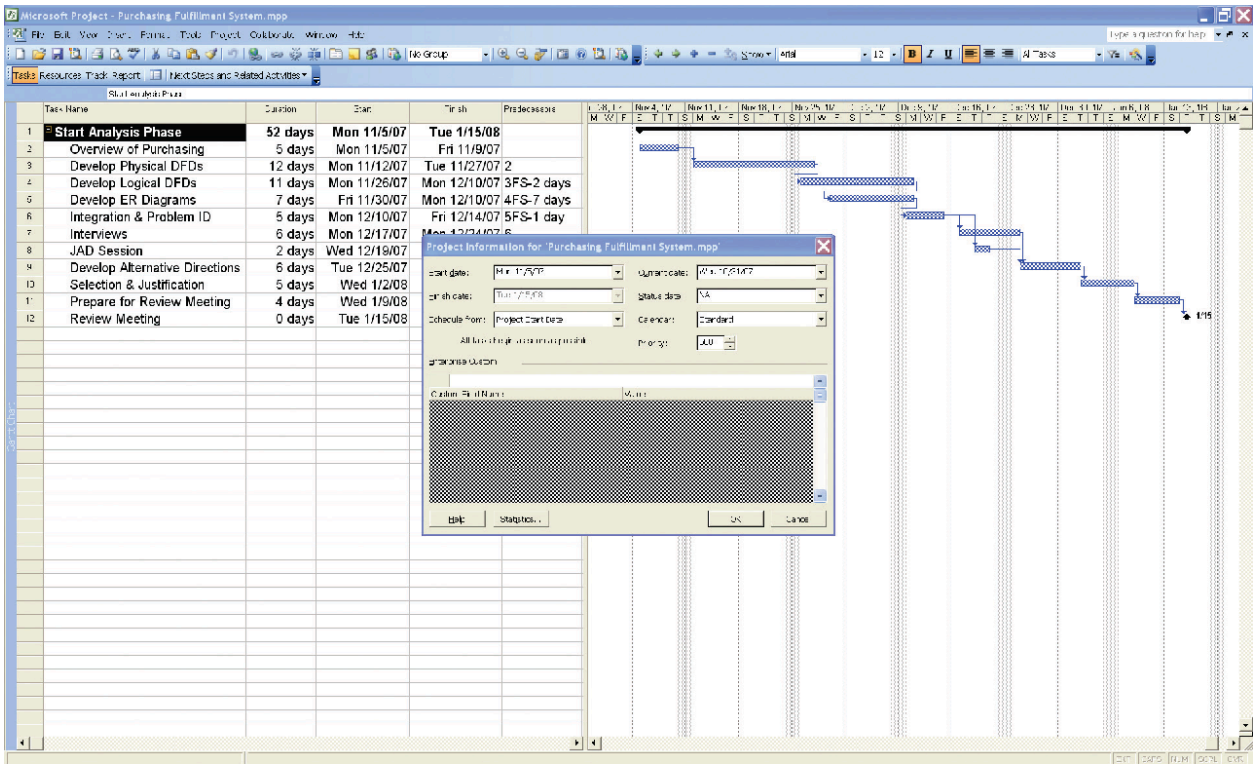



**Diagram:** Establishing a project starting date in Microsoft Project for Windows

# Lab 3

Example 3

Let's assume that a software development project is to be embarked upon in UTG as regards developing a software for automating CGPA computation of students.

Here are steps that a project manager in charge might follow:

1. *Identify each activity to be completed in the project.*

   *The project manager might have identified the following activities for the project*
   - Requirements collection
   - Screen design
   - Report design
   - Database construction
   - User documentation creation
   - Software programming
   - System testing
   - System installation
2. *Determine time estimates and calculate the expected completion time for each activity.*
3. *Determine the sequence of the activities and precedence relationships among all activities by constructing a Gantt chart and network diagram.*
4. *Determine the critical path.*

**Calculating the Expected time for the UTG-CGPA project**

The table below illustrates the activity information and the calculation of the Expected Time

| ID | ACTIVITY | TIME ESTIMATE (In weeks) o | r | p | EXPECTED TIME (ET) o+4r+p/6 |
|---|---|---|---|---|---|
| 1 | Requirements Collection | 1 | 5 | 9 | 5 |
| 2 | Screen Design | 5 | 6 | 7 | 6 |
| 3 | Report Design | 3 | 6 | 9 | 6 |
| 4 | Database Design | 1 | 2 | 3 | 2 |
| 5 | User Documentation | 3 | 6 | 7 | 5.5 |
| 6 | Programming | 4 | 5 | 6 | 5 |
| 7 | Testing | 1 | 3 | 5 | 3 |
| 8 | Installation | 1 | 1 | 1 | 1 |

Estimated time calculations for the UTG-CGPA Software project

**Sequence of activities within the UTG – CGPA Software project**

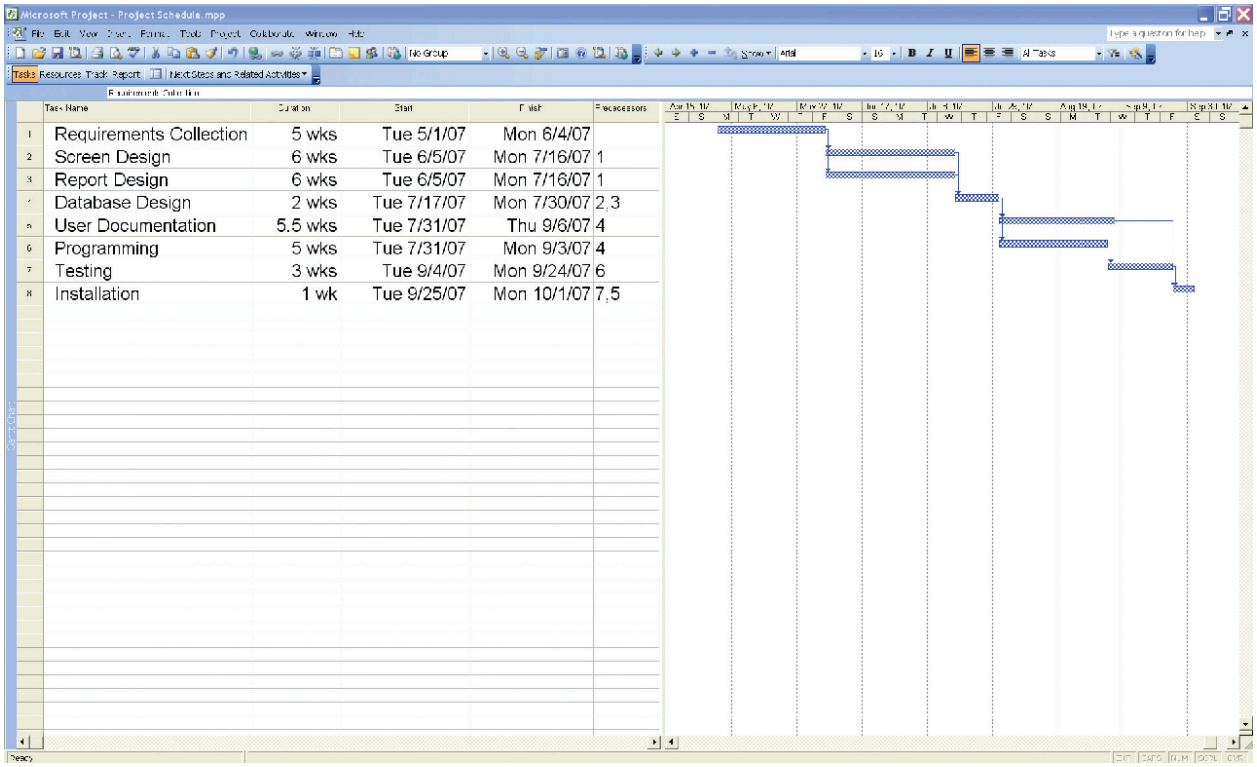
Shown below, is the sequence of activities within the UTG - CGPA Software development project

| ID | ACTIVITY | PRECEDING ACTIVITY |
|---|---|---|
| 1 | Requirements Collection | — |
| 2 | Screen Design | 1 |
| 3 | Report Design | 1 |
| 4 | Database Design | 2,3 |
| 5 | User Documentation | 4 |
| 6 | Programming | 4 |
| 7 | Testing | 6 |
| 8 | Installation | 5,7 |

Table of activities and precedence for the UTG-CGPA project

**Gantt Chart of the UTG-CGPA Software project**

Shown below, is the Gantt chart that illustrates the sequence and duration of each activity of the UTG-CGPA project.



## R e v i e w Q u e s t i o n s on Project Planning and Scheduling

1. Contrast the following terms:
    a. Critical path scheduling, Gantt, network diagramming, slack time
    b. Project, project management, project manager
    c. Project initiation, project planning, project execution, project closedown
    d. Project workbook, resources, work breakdown structure
2. Discuss the reasons why organizations undertake information systems projects.

3. List and describe the common skills and activities of a project manager. Which skill do you think is most important? Why?

4. Describe the activities performed by the project manager during project initiation.

5. Describe the activities performed by the project manager during project planning.

## Assignment 3

Refer to the Chapter 3 (Page 80) of the e-book provided produce the result for exercises 7 & 8

# Lecture 6

## Project Work Team Design (Building an effective project team)

**Project team:** A project team is a group that works together to execute the tasks necessary to meet customer requirements.

Before a project team meets for the first time, the project manager begins laying the foundation for effective teamwork.

Steps involved in building/designing a Project Team

### 1. Create a high-level resource plan

A resource plan requires you to understand and identify the work to be done and the human resources necessary to complete it.

- An initial resource plan is often a high-level outline (no details) and will be refined as you break down into parts the whole of your work.
- identify the departments and stakeholder groups that will need to commit resources, and the approximate number of individuals and man-hours that are required.

### 2. Get the right people on the team

To develop an effective team, you have to start by choosing the best people for the job. This sounds obvious, but determining the best candidates isn't always straightforward.

Factors to consider in deciding team members

- The skills required of them to complete project tasks
- Their level of influence in the organization
- Their access to a network of other resources

- Their capacity to participate effectively and ability to work well in a team environment

Pulling together a group of strong, results-oriented individuals for your project team is part science, part art. It is important to make sound decisions about who will perform well on your project team and who might be better suited to other opportunities.

**Note:** Sometimes, project managers don't have the luxury of choosing team members. Resources may be assigned to the project team. If this is your situation, it is vital that you take extra care to establish a relationship with your team members before the team begins to meet as a group. Otherwise, they may not feel connected to the rest of the project team or, worse, may feel put upon and lack any commitment to the project.

## 3. Part time Project Teams

In most cases, the project team is a part-time work team. This is a case where Team members have other work responsibilities and dedicate only a portion of their time to your project.

Part-time project team members are constantly juggling the demands of their project managers and functional managers. It is your role as project manager to work with your team members' functional managers to prevent conflicts.

### 4. Roles and responsibilities

Whether the project team is composed of part-time or full-time members, defining the responsibilities and role of each member type (such as technical lead, business process owner, and subject-matter expert) is critical.

As the project manager, you should

- draft the roles and responsibilities and use these definitions when discussing resource needs with functional managers.
- discuss and agree to these definitions with your team members.
- Discuss individually with the team members as members will feel free to share information when talking with you one-on-one than they will in front of a group.

- When work on the project begins, you can continue to build on this foundation by drawing on the relationships you established.

## 5. The team operating agreement

Part of the role of a project manager is to manage the expectations and assumptions of the project team. Therefore, discussing the rules of engagement up-front will be time well spent.

Team Operating Agreement (TOA)

The TOA serves as the guidelines and ground rules to help the team work productively together over the course of the project. It can be updated as the project progresses.

The TOA can be constructed to include the following:

- Team communications
- Decision-making
- Meetings (Who will lead meetings, how the time will be used, Venue etc)
- Roles and responsibilities (What is expected of each team and/or team member)
- Personal courtesies (Mobile device use during meetings, Reminders about "overtalking" etc)

**Note:** Project team members should draft the TOA together, and it should be signed by all members of the team.

## 6. Defining project objective and goals

The objective of the project — what the project will deliver i.e., as is dictated by the customer.

**Note:** Often, the *project sponsor* and *project manager* must work with the *customer*/*client* to define what is expected, and state in no uncertain terms what the project will produce and what the ultimate end result will be.

### 7. Assessing whether your team is set up for success

Ask yourself these questions:

- *Are the right people on your team*? Do you have an agreement from functional managers to dedicate the necessary resources to your project?
- *Have you set the goals and objective of the team*? Are they clear to everyone? Is there commitment from all team members to meet them? Are any goals in conflict with one another?
- *Are team roles clearly defined and accepted?* Does everyone know what is expected of them? Do roles overlap or conflict?
- *Have you established procedures that team members can follow* to work effectively together, such as a team operating agreement?
- *Are there influences outside the team that may affect performance*, and if so, have you identified and addressed them?

## General characteristics of effective project teams:

- **Team Identity:** There is a team identity, or esprit de corps, and a sense of pride.
- **Team support**: Team members support each other.
- **There is an emphasis on solving problems** rather than figuring out where to lay the blame.
- **Understanding roles:** Team members and the project manager understand their roles and are committed to fulfilling them.
- **Good skill level representation**: The appropriate skills and levels of authority are represented on the team.
- **Consensus decisions:** Decisions are made by consensus, and there is a defined plan for escalation and decision-making if consensus can't be reached.

- **Team member participation**: Team members listen well and participate in discussions.
- **Tolerance**: There is tolerance for conflict, and conflicts are openly and honestly discussed.

# Project Estimation Techniques

- Outline:
  - Estimation overview
  - Cocomo: concepts, process and tool.

Research quote:

"…Unrealistic expectations based on inaccurate estimates are the single largest cause of software failure." - Futrell, Shafer and Shafer, "Quality Software Project Management"

**Fundamental estimation questions**

- How much effort is required to complete an activity?
- How much calendar time is needed to complete an activity?
- What is the total cost of an activity?

**Note:** Project estimation and scheduling are interleaved management activities.

The Problems (What needs to be estimated or controlled)

1) **Information Systems Cost:** Predicting software cost
2) **Software schedule** : Predicting software schedule
3) **Software risk** : controlling software risk
4) **Project Tracking/Management**: Managing/tracking project as it progresses

## 1. Information Systems cost

The following consists of different sections of the IS project which require some form of costing

- Hardware and software costs.
- Travel and training costs.
- Effort costs (the dominant factor in most projects)
  - The salaries of engineers involved in the project;
  - Social and insurance costs.
- Effort costs must take overheads into account
  - Costs of building, heating, lighting.
  - Costs of networking and communications.
  - Costs of shared facilities (e.g library, staff restaurant, etc.).

**Facts about Costing and pricing**

- Estimates are made to discover the cost, to the developer, of producing a software system.
- There is not a simple relationship between the development cost and the price charged to the customer.
- Broader organisational, economic, political and business considerations influence the price charged.

Nature of Estimates

- Man Months (or Person Months), defined as 152 man-hours of direct-charged labor

- Schedule in months (requirements complete to acceptance)
- Well-managed program

## Estimation models

There are 4 Common (subjective) estimation models

i. Expert Judgment
ii. Analogy
iii. Parkinson's law
iv. Price to win

### i) Expert judgment

- One or more experts in both software development and the application domain use their experience to predict software costs. Process iterates until some consensus is reached.
- Advantages: Relatively cheap estimation method. Can be accurate if experts have direct experience of similar systems
- Disadvantages: Very inaccurate if there are no experts!

### ii) Estimation by analogy

- The cost of a project is computed by comparing the project to a similar project in the same application domain
- Advantages: May be accurate if project data available and people/tools the same
- Disadvantages: Impossible if no comparable project has been tackled. Needs systematically maintained cost database

### iii) Parkinson's Law

- The project costs whatever resources are available

- Advantages: No overspend
- Disadvantages: System is usually unfinished

**iv) Cost Pricing to win**

- The project costs whatever the customer has to spend on it
- Advantages: You get the contract
- Disadvantages: The probability that the customer gets the system he or she wants is small. Costs do not accurately reflect the work required.
- How do you know what customer has?
- Only a good strategy if you are willing to take a serious loss to get a first customer, or if Delivery of a radically reduced product is a real option.

**Top-down and bottom-up estimation**

Any of the first 4 approaches above may be used **top-down** or **bottom-up.**

**Top-down estimation**

– Start at the system level and assess the overall system functionality and how this is delivered through sub-systems.

**Bottom-up estimation**

– Start at the component level and estimate the effort required for each component. Add these efforts to reach a final estimate.

**Criteria for a Good Model**

- Defined—clear what is estimated
- Accurate and easy to use
- Objective—avoids subjective factors
- Results understandable

- Detailed and Stable
- Right Scope

## Empirical Cost Model

Example of an **Empirical Cost Model is the** Algorithmic cost model called COCOMO which has been used successfully in several organizations.

**Algorithmic cost modeling**

- Here, Cost is estimated as a mathematical function of product, project and process attributes whose values are estimated by project managers
- The function is derived from a study of historical costing data
- Most commonly used product attribute for cost estimation is LOC (LOC = Lines Of Code i.e., code size)
- Example of an Algorithmic cost modeling is COCOMO (COnstructive COst MOdel)

**COCOMO** (CONSTRUCTIVE COST MODEL) - First published by Dr. Barry Boehm, 1981

As one of the earliest algorithmic software cost models, COCOMO is the most widely accepted software cost and schedule estimation method. Over the years it has served as a benchmark for evaluating the performances of various cost estimation models and methods.

**Characteristics of COCOMO**

- Interactive cost estimation software package that models the cost, effort and schedule for a new software development activity.
  - Can be used on new systems or upgrades
- Provide computational means for deriving S/W cost estimates as functions of variables (major cost drivers)
- Derived from statistical regression of data

**COCOMO Models**

COCOMO has three models

- Basic Model
  - Used for early rough, estimates of project cost, performance, and schedule
- Intermediate Model
  - Introduces more details in cost estimation using the Effort Adjustment Factor (EAF) for cost drivers to arrive at more detailed estimate
- Detailed Model
  - Uses different Effort Multipliers (not just the EAF) for each phase of project (everybody uses intermediate model)

**Explaining how COCOMO works**

In using COCOMO, the estimator does the following

- makes assumptions about the software to be developed
- derives a set of numeric values from the assumptions
- employ the numeric values COCOMO equations to compute estimated
  - labor effort
  - monetary cost and
  - Duration of the project.

# Project Reporting

*When to start reporting*

Although reporting has been addressed in the Implementation Phase section, in reality management begins from the time you get involved with the project.

Therefore a reporting system must be negotiated up front with the Project Sponsor and must be in place from the beginning of the project. The content, format and frequency might vary as the project moves through its life cycle but regular reports happen throughout the entire project.

*What needs to be reported?*

Ask your stakeholders what they need to report to their stakeholders. This question will guide you with respect to the level of detail needed in your reports and the frequency.

It is a waste of time to report unnecessary detail but it is also a waste of time to report insufficient detail.

**There are four essential types of reports:**

**1. Project Proposal**

The Project Proposal is developed at the conclusion of the Project Initiation phase and requires "sign-off" or the authority to proceed to the next phase.

- It contains the summarised results of the initial high-level planning process.
- Detailed planning follows approval of the Project Proposal.

**2. Project Plan**

The Project Plan is developed at the conclusion of the Planning phase of the project. It is a detailed document comprising:

- Scope definition (items from the WBS listed with functionality under the headings of the key deliverables plus exclusions)
- Schedule (including project milestones)

- Budget
- Risk schedule (major project risks and management strategy)
- Project organization structure (reporting and approval pathways)
- Roles and responsibilities (project team and key stakeholders)
- Quality system (procedure and standards)
- Procurement schedule (human resources; goods and services)
- Communications strategy (protocols, templates, reporting schedule)
- Change management procedure

**3. Variance Request**

A Variance Request is a formal process that documents any changes to scope or any risks triggered which might result in variances to the project objectives, in terms of time, cost or quality.

**4. Status Report**

A Status report is required at *regular intervals* throughout the project. The frequency and the format should be negotiated with the Project Sponsor.

Essentially the status report summarizes the following:

- **Schedule** - original approved completion date, authorized changes and current estimated completion date
- **Budget** - original approved budget, authorized changes and current estimated budget.
- **Issues** - any issues or risks triggered that have resulted in approved changes to scope, schedule, budget, quality or functionality.

- *Issues & Risks Log* - ***It may also be useful to produce an Issues and Risk log. This helps keep track of issues or risks as they arise and records status, action, responsibility and closure of the issue or risk.***

*A note about detail*

Reporting is an essential part of project management. However the level of detail should be appropriate to the risks associated with the project.

**Note:** It is possible to spend all your time preparing reports leaving no time to manage the project!

# Communication

This is quick note about communications! Good communications is so easy to pay lip service to and so difficult to achieve effectively. Communications underpins the project success.

Assigning responsibility for Project Communications to a member of the project team who is a naturally good communicator often makes sure that the job is done and what's more the person enjoys doing it!

## Appropriate and timely information

The Communications Management ensures that those who need information receive it on time and in a format they can use and understand.

## Techniques used in Project Communication management

This includes

- Use of templates
- Feedback
- Through Written documents

- The use of templates

Standard templates save time and assist in achieving clarity of the information transfer. They must be clearly set out, without overcrowding of text, and the format should remain constant throughout the project.

Note: Take the time to explain the templates to the stakeholders so that they are familiar with the data layout and extent and what is required of them in terms of response.

- Feedback

It is good practice to require a response to your communication attempts so you can verify that the person receiving the information has received and understood.

- Written documents

Negotiations and agreements are usually transacted verbally however written clarification is always essential as a follow-up.

The purposes of written documents include:

- It is essential for your project records, in case of future disputes or disagreement.
- Putting the agreement in writing helps refine and clarify meanings between the parties concerned.

# Lecture 7

# Project Risk

## Identifying and Controlling Project Risks

### What is a Project Risk?

The formal definition of a risk is an event or occurrence that may negatively impact the project.

### Project Risk Planning

Key Ideas:

- Risk should be a primary driver for project selection
- Project planning and definition are the foundation to controlling risk
- Risk management should be maintained in a Project Risk Plan

To better understand risks, it is essential that we understand that risks fall into categories.

### Categories of Project Risks

**The major categories of risk are as follows:**

- **Stakeholder Risk:**

  Stakeholders are people who have any kind of vested interest in the performance of the project. Common examples of stakeholders are as regulators, customers, suppliers, managers, customers etc. Stakeholder risk arises from the fact that stakeholders may not have the inclination or the capabilities required to execute the project.

- **Regulatory Risk:**

  An organization faces several kinds of regulations. It faces rules from the local and state government where they operate. It faces rules of the national government where it operates. It also faces rules of international trade bodies. To add to all this there are internal regulations which have been put into place for better internal governance and avoiding fraud. All these represents risks to the Project in non compliance of the set rules/regulation by these bodies/agencies.

- **Technology Risk:**

  Many times the solution proposed by the project requires implementation of a new technology. However the organization may not be in a position to acquire these technologies due to financial or operational constraints. This poses obvious risks to the project as it can adversely affect the implementation of the proposed solution.

- **External Risk:**

  The execution of a project requires help and support from several outside vendors as well. The dependence on these vendors poses obvious risk to the execution of the project. These vendors lie outside the direct control of any organization. The organization may have very little ways to predict issues arising from external sources.

- **Execution Risk:**

  The project also faces risk of not receiving continued support from the organization. This is because the organization may discover better use of their resources in the additional time. It is also likely that the project may be poorly scoped causing it to spill over leading to wastage of resources prompting the management to abandon the project.

- **Project Management Team Risk:**

  This is the risks that emanates from the job or activities of the project management team spanning the entire project's life cycle from planning to project completion.

Our further discussions are based on Project Management Team Risks.

## Categories of Project Management Team Risk:

These are mainly 3 risks that affect project duration

**Risks affecting Project duration**

1) Scope Risk
2) Schedule
3) Resource Risk

### 1. Scope Risk

Using the PERIL database Kendrick (a researcher and author) cites that scope related risks account for approximately half of the cumulative schedule delay. He enumerates the ranked sources as:

1. Hardware defect
2. Software defect
3. Scope gap (ill defined scope)
4. Dependency change (unexpected legal, regulatory, etc.)
5. Integration defect (change due to unexpected behavior)

### 2. Schedule risk

Schedule is the second level of risks affecting project duration in the PERIL database. The top five categories of Schedule related risks are:

1. Project Dependencies
2. Parts Delays
3. Estimation errors

4. Decision Delay
5. Hardware Delay

Dependency on external parties is the largest sub-categorization of schedule risk in the database (editors note: as might be expected since it is always safe to blame the other party) followed by poor estimations.

**Reducing Schedule Risks**

To assist in reducing these risks, Kendrick explains that the Schedule process should

- start with the WBS and
- apply estimates for effort and resources.
- Finally, the use of scheduling tools is suggested, specifically the PERT and then determining the **critical path.**

## 3. Resource Risk

The final category of risks are the resource risks. The top five are:

- Outsourcing delays
- Lack of funds
- Attrition of resources
- People joining the team late
- Scarcity of skills

When planning one must determine the skill set required and to identify and reserve the people with those skills.

**Reducing Resource Risks**

- Use computerized tool: As with schedule sequencing, a computerized tool should be employed to properly look at staff loading (i.e., staff distribution /allocation ).
- The loading will need to be compared to other project's needs and resource availability.
- Conflicts need to be resolved and documented since this also indicates inherent risk in the project.

## General ways of Handling Project Risks

**The four ways of handling risk are:**

- *Avoidance* - Take action to avoid the risk
- *Mitigation* - Define actions to take when the risk occurs
- *Transfer* - Have someone else handle the risk i.e. insurance
- *Acceptance* - Identify the risk as acceptable and let it happen.

## Managing Project Risk

**Key Ideas:**

- Do root cause analysis
- Use one of the three methods of handling risk — mitigate, avoid, transfer
- Develop contingency plans for all risk
- Publicly display risks
- Look for ways to prevent risk

**Analyzing Project Risk**

Common project level risks include:

- Estimates that are excessively inaccurate
- Too aggressive a schedule
- Poor management
- Scope creep (poor change management)
- Large projects not staffed appropriately

**Monitoring and Controlling Risky Projects**

Execution of the project entails the Project Manager doing the following

- applying the plan,
- leading the team and
- monitoring the project status looking for trends that can indicate variations (good and bad) in the project execution.

Results of the analysis need to be communicated and adjustments made through a change management and/or issue resolution process.

### Controlling Project Risks

**Key Ideas:**

- Be religious on collecting status information ensure that it is only the status you need
- Monitor status and trends continuously
- Promptly address problems
- Communicate, communicate, communicate and communicate

## Project Budgetry Controls & milestonse

- Budget control can be set for costs and revenues at cost centre and project level for flexibility and passed through stakeholder signoff prior to going live.
- To facilitate logical planning and control, milestones can be set at any stage while weekly and monthly budgetary analysis enables you to take early remedial action on over-spending and under-billing.

### Setting budgets

Cost budgets can be entered as

- a series of transactions or
- as round sum values at cost centre level.
- They can be revised and amended (up or down) at any time.

The system keeps track of the original budget, all revisions and the current latest version.

### Weekly and monthly profiling

Both sales and purchase budgets can be profiled weekly and monthly, making it easier to

- monitor projects
- compare project to date numbers
- follow a budget cycle that is specific to the project rather than fiscal or calendar years (This is because a project may not have a duration that is up to the traditional calendar year)

### Allocating milestones

This facility facilitates logical project planning and enables your project managers to keep on top of deliverables.

- You can create unlimited project milestones and statuses within the software for total flexibility
- allocate target dates or values at both cost centre and project level.
- Milestones can be allocated to individual staff with automatic alerts to ensure people know when and what action is required.

**Closing Projects**

Proper closure of a project has significant benefits for reducing risk on future projects. Whether the project is considered a success or a failure the results should be documented and reviewed. These data can then be used in future planning processes to improve planning and reduce risk.

A project retrospective should be conducted and actions taken on the suggestions to improve processes for the future. Lack of action will reduce participation in subsequent retrospectives.

## Closing Projects

**Key Ideas:**

- Document the project results
- Recognize contributors
- Conduct a retrospective

# Project Quality Assurance

## Definitions of Quality

- The degree to which a set of inherent characteristics fulfill requirements (PMBOK, originally ISO 9000)

- the characteristic of having demonstrated the achievement of producing a product that meets or exceeds agreed-on requirements and/or international standards in line with applicable best practice standards of measurements and assessments.

Quality has two working definitions:

**Producer's Viewpoint** – The quality of the product meets the requirements.

**Customer's Viewpoint** – The quality of the product is "fit for use" or meets the customer's needs.

Achieving quality is not simply "meeting requirements", or producing a product that meets user needs and expectations.
Quality also includes:

- identifying the measures and criteria to demonstrate the achievement of quality
- the implementation of a process to ensure that the product created has achieved the desired degree of quality

## What does Project Quality Management entail?

Project Quality Management by PMBOK includes

- the processes and activities of the performing organization that determine quality policies, objectives, and responsibilities.
- Implementing the quality management system through policy and procedures with continuous process improvement activities conducted as appropriate.
- applies to all projects, regardless of the nature of their product.

- Product quality measures and techniques are specific to the type of product produced by the project.

Failure to meet product or project quality requirements can have serious negative consequences for any or all of the project stakeholders.

## Steps of Project quality management processes

The steps involved in Project quality management processes are -

1) Plan quality
2) Perform quality assurance
3) Perform quality control

### 1. Plan Quality

Plan Quality is the process of identifying quality requirements and/or standards for the project and product.

Plan quality also involves

- documenting how the project will demonstrate compliance.

**Note**: Quality planning should be performed in parallel with the other project planning processes.

**Steps involved in Planning Quality**

Planning quality has three step

- Plan Quality Inputs
- Plan Quality Tools and Techniques
- Plan Quality Outputs:

## 2. Perform Quality Assurance

Perform Quality Assurance is the process of auditing the quality requirements and the results from quality control measurements to ensure that appropriate quality standards and operational definitions are used.

Performing Quality Assurance also involves -

- Providing an umbrella for continuous process improvement

**Note:** Continuous process improvement reduces waste and eliminates activities that do not add value. This allows processes to operate at increased levels of efficiency and effectiveness.

**Steps involved in Planning Quality Assurance**

Performing Quality Assurance has three steps

- Perform Quality Assurance Inputs
- Perform Quality Assurance Tools and Techniques
- Perform Quality Assurance Outputs

## 3. Perform Quality Control

Perform Quality Control is the process of monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes.

**Facts about Quality control**

- Quality control is performed throughout the project.
- Quality control activities identify causes of poor process or product quality and recommend and/or take action to eliminate them.

**Steps involved in Planning Quality Assurance**

Performing Quality Control has three steps

- Perform Quality Control Inputs
- Perform Quality Control Tools and Techniques
- Quality Control Outputs

**Exercise:** What is the difference between Quality Control and Assurance?

***------END***