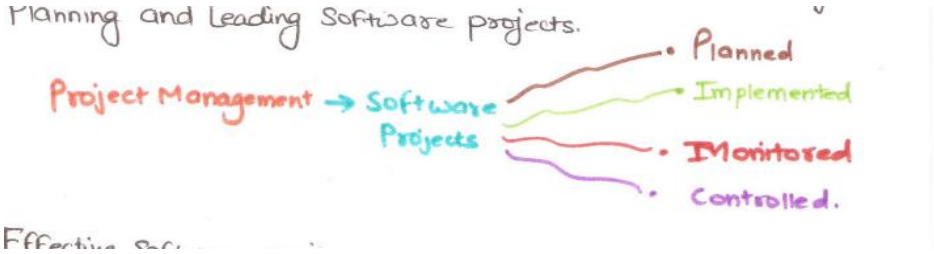
Software Project Management

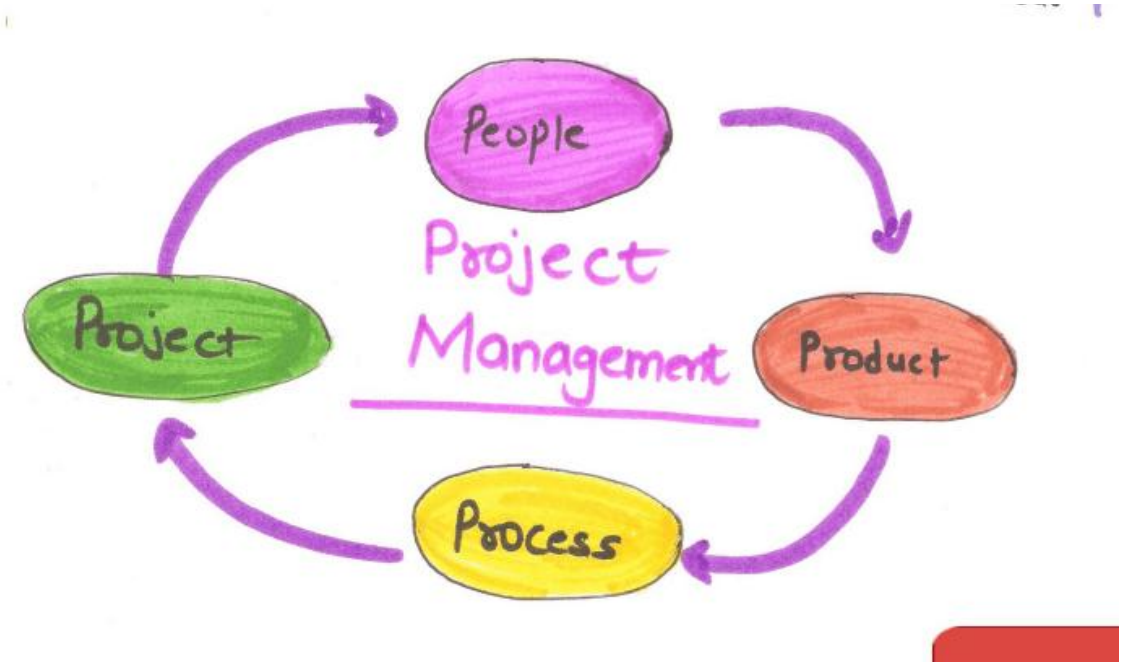
Project Management Concept:

It is an art and science of planning and leading software projects.



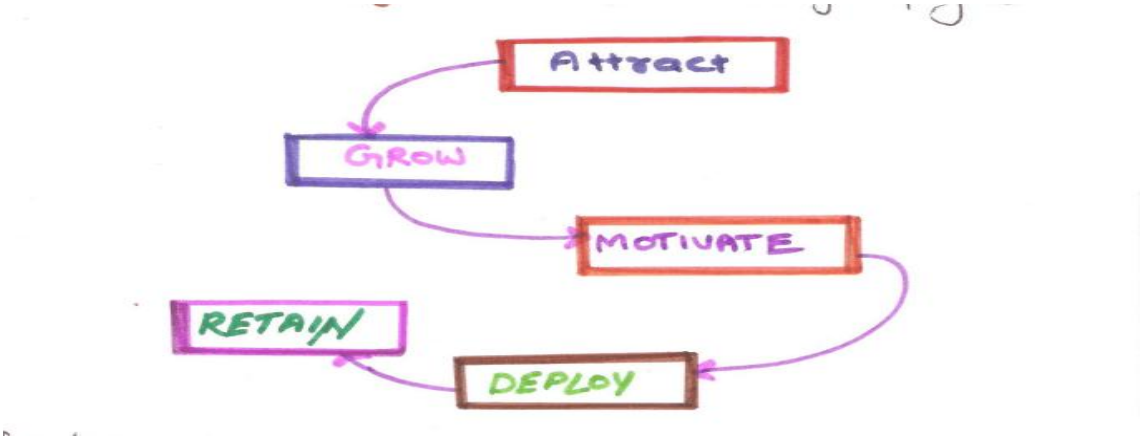
Project Management-> software project- planned, implemented, Monitored, controlled.

Effective software project management focuses on the four P's:



The People: It deals with the cultivation of motivated, highly skilled people.

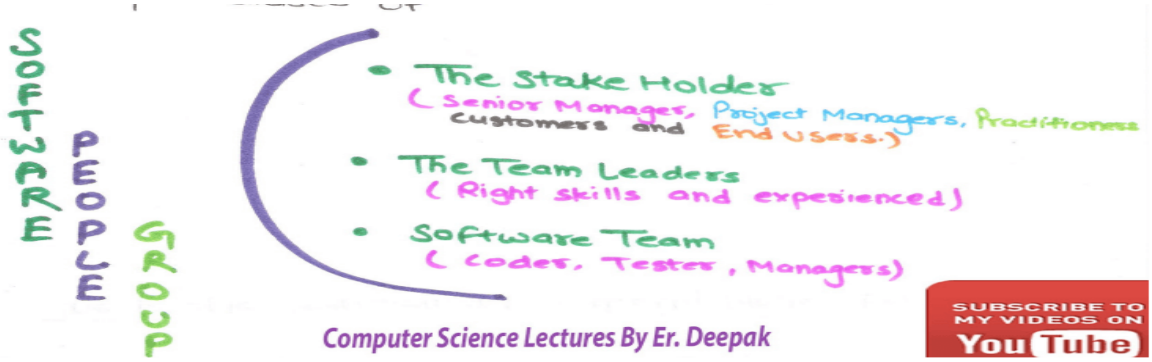
Software engineering institute has developed a people management capability maturity model (PM-CMM) to enhance the readiness of the



software organizations to undertake increasingly Complex Applications by helping to the talented needed to improve their software development capability.

The People management maturity model focuses on

People consists of



The People: The Stakeholder:

There are mainly 5 categories of stakeholder:

- **Senior Manager:** Define business issues that often have significant influence on the project.

- **Project (Technical) Managers:** They **"Plan, Motivate, Organised, and Control"** the practitioners who do the work.

- **Practitioner:** They deliver the technical skills that are necessary to engineer a product or application.

- **Customers:** Specify the requirement for the software to be engineered and other stakeholders who have a peripheral interest in the outcome.

- **End users:** Interact with the software once it is released for production use.

The people: Team leaders

Team Leader Qualities:

- **Motivational-** the ability to encourage technical people to produce to their best ability.

- **Organisation-** the ability to mold existing processes.

- **Ideas or innovations-** ability to encourage to go beyond their skills.

Another set of useful leadership Traits:

●- **problem solving:** Diagnose, structure a solution, apply lessons learned, remain flexible.

●- **Managerial Identity:** Take charge of the project, have confidence to assume control, have a assurance to allow good people to do their jobs.

●-**Achievement :** Reward initiative, demonstrate that control risk taking will not be punished.

●-**Influence and team building:** Be able to ' read' people, understand verbal and nonverbal signals. Able to react to the signals, remain under control in high- stress situations.

The people: The software team

Seven project factors to be considered when selecting a software development team.

Four Organizational paradigm for Software Development Teams :

● **1. Closed paradigm:** Traditional hierarchy of authority works well when producing software similar to past efforts, members are less likely to be innovative .

●**2. Random paradigm:** Depends on individual initiative of team members , work well for project requiring innovation technological break.

●**3. Open paradigm:** hybrid of the closed and random paradigm, works well for solving Complex problems, requiring collaboration, communication, and censensus among members.

4. synchronous paradigm: Organizes team members based on the network pieces of the problem, members have little communication outside of their subgroups.

Project Management Concept

The Product:

The scope of the software development must be established and bounded:

● **Context:** How does the software to the built fit into a larger system, product, or business context and what constraint are imposed as a result of the context?

● **Information Objective** - what customer visible data objects are produced as output from the software? What data object are required for input?

● **Function and performance:** What function does the software performance to transform input data into output? Are there any special performance characteristics to be addressed.

Software Project scope must be unambiguous and understand at both the "Managerial and Technical levels".

The Process:

The project manager must decide process model is most appropriate based on

The customer who have requested the product and the people who will do the work.

The characteristics of the product itself

The project environment in which the software team works <

The Project :

Planning and controlling a software project is done for one the primary reason. It is the only known way to manage complexity.

W5HH principle

A series of questions that like to add definition of the key project characteristic and resultant project plan.

●- why is the system being developed?

Assesses the validity of business reason and justifications.

●- what will be done?

Establishing the task set required for the project.

● -When will be done -

Establishes a project schedule.

● -Where are they organizationally located?

->Notes the organisational location of the team members, customers and other stakeholder.

●-Who is responsible for functional-

defines the role and responsibility of each member.

●- How will the job is done technically and managerially?

-> establishes the management and Technical strategy for the project.

●- how: much of each resources is needed?

-> Establishes estimates based on the answer to the previous questions.

What is software project management?

Software project management is an art and discipline of planning and supervising software projects. It is a sub-discipline of software project management in which software projects planned, implemented, monitored and controlled.

It is a procedure of managing, allocating and timing resources to develop computer software that fulfills requirements.

In software Project Management, the client and the developers need to know the length, period and cost of the project.

Prerequisite of software project management?

There are three needs for software project management. These are:

1. Time
2. Cost
3. Quality

It is an essential part of the software organization to deliver a quality product, keeping the cost within the client?s budget and deliver the project as per schedule. There are various factors, both external and internal, which may impact this triple factor. Any of three-factor can severely affect the other two.

Project Manager

A project manager is a character who has the overall responsibility for the planning, design, execution, monitoring, controlling and closure of a project. A project manager represents an essential role in the achievement of the projects.

A project manager is a character who is responsible for giving decisions, both large and small projects. The project manager is used to manage the risk and minimize uncertainty. Every decision the project manager makes must directly profit their project.

Role of a Project Manager:

1. Leader

A project manager must lead his team and should provide them direction to make them understand what is expected from all of them.

2. Medium:

The Project manager is a medium between his clients and his team. He must coordinate and transfer all the appropriate information from the clients to his team and report to the senior management.

3. Mentor:

He should be there to guide his team at each step and make sure that the team has an attachment. He provides a recommendation to his team and points them in the right direction.

Responsibilities of a Project Manager:

1. Managing risks and issues.
2. Create the project team and assigns tasks to several team members.
3. Activity planning and sequencing.
4. Monitoring and reporting progress.
5. Modifies the project plan to deal with the situation.

Activities

Software Project Management consists of many activities, that includes planning of the project, deciding the scope of product, estimation of cost in different terms, scheduling of tasks, etc.

The list of activities are as follows:

1. Project planning and Tracking
2. Project Resource Management
3. Scope Management
4. Estimation Management
5. Project Risk Management
6. Scheduling Management

7. Project Communication Management
8. Configuration Management

Now we will discuss all these activities -

1. Project Planning: It is a set of multiple processes, or we can say that it a task that performed before the construction of the product starts.

Project Planning

Project planning is one of the most important activities and is an ongoing effort throughout the life of the project.

Project planning complete the essential activities:

●- Estimating the following attributes of the project

● **Project size:** What will be problem complexity in terms of the effort and time required to develop the product.

●**Cost:** How much is it going to cost to develop the project?

●**Duration:** How long is it going to take to complete the software project development.

●**Effort:** How much effort would be required?

●-Scheduling manpower and other resources.

●- Staff Organization and Staffing Plans.

●- Risk Identification, Analysis, and Abatement Planning.

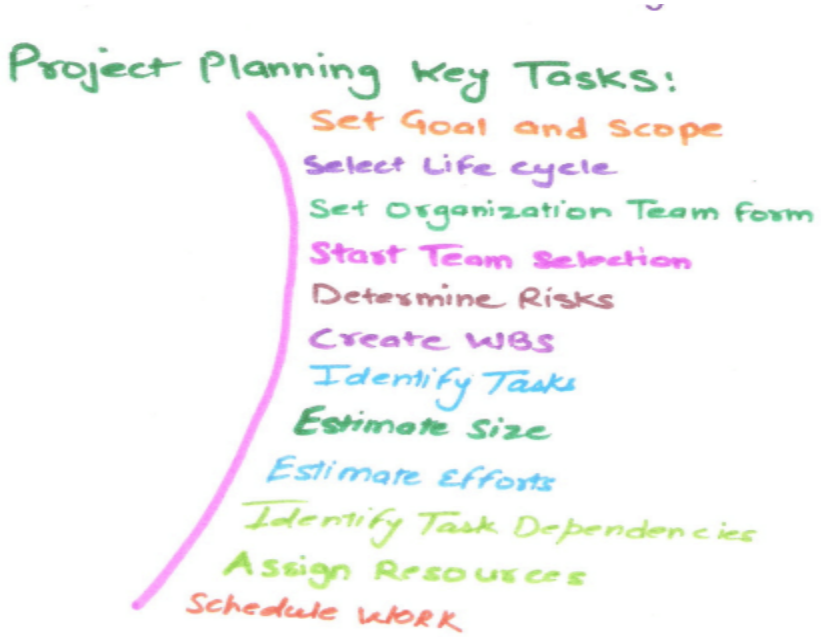
●- Miscellaneous plans such as quality assurance plan, configuration management plan,etc.

Who does Project Management:

Software Project Managers- using information selected from customers and software engineer and software metrics data collected from the past projects.

How to do that?

A simple table delineating the task to be performed, the functions to be implemented and the cost, efforts and time involved for each is generated. A list of required for that resources is also produced .



Project Planning key tasks: Set goal and scope, select life cycle,set organisational team form, start team selection ,determine risks, create wbs, identify tasks, estimate size, estimate effort,identify task dependencies, assign resources, schedule work.

2. Scope Management: It describes the scope of the project. Scope management is important because it clearly defines what would do and what would not. Scope Management create the project to contain restricted and quantitative tasks, which may merely be documented and successively avoids price and time overrun.

3. Estimation management: This is not only about cost estimation because whenever we start to develop software, but we also figure out their size(line of code), efforts, time as well as cost.

If we talk about the size, then Line of code depends upon user or software requirement.

If we talk about effort, we should know about the size of the software, because based on the size we can quickly estimate how big team required to produce the software.

If we talk about time, when size and efforts are estimated, the time required to develop the software can easily determine.

And if we talk about cost, it includes all the elements such as:

- Size of software
- Quality
- Hardware
- Communication
- Training
- Additional Software and tools
- Skilled manpower

4. Scheduling Management: Scheduling Management in software refers to all the activities to complete in the specified order and within time slotted to each activity. Project managers define multiple tasks and arrange them keeping various factors in mind.

For scheduling, it is compulsory -

- Find out multiple tasks and correlate them.
- Divide time into units.
- Assign the respective number of work-units for every job.
- Calculate the total time from start to finish.
- Break down the project into modules.

Project Scheduling

Project-task scheduling is a significant project planning activity. It comprises deciding which functions would be taken up when. To schedule the project plan, a software project manager wants to do the following:

1. Identify all the functions required to complete the project.
2. Break down large functions into small activities.
3. Determine the dependency among various activities.
4. Establish the most likely size for the time duration required to complete the activities.
5. Allocate resources to activities.
6. Plan the beginning and ending dates for different activities.
7. Determine the critical path. A critical way is the group of activities that decide the duration of the project.

The first method in scheduling a software plan involves identifying all the functions required to complete the project. A good judgment of the intricacies of the project and the development process helps the supervisor to identify the critical role of the project effectively. Next, the large functions are broken down into a valid set of small activities which would be assigned to various engineers. The work breakdown structure formalism supports the manager to breakdown the function systematically after the project manager has broken down the purpose and constructs the work breakdown structure; he has to find the dependency among the activities. Dependency among the various activities determines the order in which the various events would be carried out. If an activity A necessary the results of another activity B, then activity A must be scheduled after activity B. In general, the function dependencies describe a partial ordering among functions, i.e., each service may precede a subset of other functions, but some functions might not have any precedence ordering describe between them (called concurrent

function). The dependency among the activities is defined in the pattern of an activity network.

Once the activity network representation has been processed out, resources are allocated to every activity. Resource allocation is usually done using a Gantt chart. After resource allocation is completed, a PERT chart representation is developed. The PERT chart representation is useful for program monitoring and control. For task scheduling, the project plan needs to decompose the project functions into a set of activities. The time frame when every activity is to be performed is to be determined. The end of every action is called a milestone. The project manager tracks the function of a project by audit the timely completion of the milestones. If he examines that the milestones start getting delayed, then he has to handle the activities carefully so that the complete deadline can still be met.

5. Project Resource Management: In software Development, all the elements are referred to as resources for the project. It can be a human resource, productive tools, and libraries.

Resource management includes:

- Create a project team and assign responsibilities to every team member
- Developing a resource plan is derived from the project plan.
- Adjustment of resources.

6. Project Risk Management: Risk management consists of all the activities like identification, analyzing and preparing the plan for predictable and unpredictable risk in the project.

Several points show the risks in the project:

- The Experienced team leaves the project, and the new team joins it.
- Changes in requirement.
- Change in technologies and the environment.
- Market competition.