Software Project Management Concepts

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What is management?

We now look at the ‘management’ aspect of software project management. It has been suggested that management involves the following activities:

- Planning – deciding what is to be done;
- Organizing – making arrangements;
- Staffing – selecting the right people for the job etc.;
- Directing – giving instructions;
- Monitoring – checking on progress;
- Controlling – taking action to remedy hold-ups;
- Innovating – coming up with new solutions;
- Representing – liaising with clients, users, developer, suppliers and other stakeholders

What is Project Management?

- Project Management is the art of maximizing the probability that a project delivers its goals on **Time**, to **Budget** and at the required **Quality.**
- The art of planning for the future has always been a human trait.
- In essence a project can be captured on paper with a few simple elements: a start date, an end date, the tasks that have to be carried out and when they should be finished, and some idea of the resources (people, machines etc) that will be needed during the course of the project.
- Project management is the **application of knowledge, skills, tools,** and **techniques** to project activities to meet project requirements.
- Project management is accomplished through the use of the processes such as: initiating, planning, executing, controlling, and closing.

What is Software Project Management?

- Concerned with activities involved in ensuring that software is delivered on time and on schedule and in accordance with the requirements of the organizations developing and procuring the software.
- Project management is needed because software development is always subject to budget and schedule constraints that are set by the organization developing the software

What is Project?

- A project is an activity with specific goals which takes place over a finite period of time.
- A temporary organization that is needed to produce a unique and pre-defined outcome or result at a pre-specified time using pre-determined resources.
- Operations and projects differ primarily in that operations are ongoing and repetitive while projects are temporary and unique.
- A project is a **temporary** endeavor undertaken to create a **unique** product or service.
- **Temporary** means that every project has a definite beginning and a definite end.
- **Unique** means that the product or service is different in some distinguishing way from all other products or services.

Definition of a Software Project (SP)

Software : Software is the program and all associated documentation and configuration data which is needed to make programs operate correctly.

Project : A project is a sequence of unique, complex and connected activities that have one goal or purpose and that must be completed by a specific time, within budget and according to specification.

The following characteristics distinguish projects:

- Non-routine tasks are involved;
- Planning is required;
- Specific objectives are to be met or a specified product is to be created;
- The project has a predetermined time span;
- Work is carried out for someone other than yourself;
- Work involves several specialisms;
- People are formed into a temporary work group to carry out the task;
- Work is carried out in several phases;
- The resources that are available for use on the project are constrained;
- The project is large or complex.

A software projects

- A Software Project is the complete procedure of software development from requirements gathering to testing and maintenance, carried out according to the execution methodologies in a specified period of time to achieve intended software product.
- Software projects have several properties that make them very different from other kinds of engineering project.
- The product is intangible.
  - Its hard to claim a bridge is 90% complete if there is not 90% of the bridge there.
  - It is easy to claim that a software project is 90% complete, even if there are no visible outcomes.
- Large software projects are often bespoke.
  - Most large software systems are one-off, with experience gained in one project being of little help in another.
- The technology changes very quickly.
- Software processes are variable and organization specific.

- Software Project has the objective of developing a software product or maintaining an existing software product. Software projects have several general attributes, as follows:
  - The project has a definite beginning and a definite end.
  - The project deliverable is functional software and related artefacts.
  - Activities that may be included in a software project are user and software requirements, software design, software construction, software testing, acceptance testing, and software delivery, deployment, and handover.
  - Activities not included in a project are the activities of project selection/acquisition and post-handover.

Some of the more unique attributes of software development projects include:

- **The primary output is not physical:** in the sense that the primary deliverable is functional software and no tangible components are delivered almost everything is inside a computer.
- **Process inspection does not facilitate progress assessment:** functional software or at least the code is the real measure of progress. In a manufacturing organization, one can see semifinished goods. The proof of work being performed is in the noise made by machines. In a software development organization, visual assessment is not enough to ensure that a person is performing. One needs to walk through the code being developed to ensure that the person is working.
- Despite **significant progress** in software engineering tools and diagramming techniques, they do not rise to the level of precision of the engineering drawings used in other engineering disciplines.

- Professional associations in software development and standards organizations have not defined standards or practices for developing software as has occurred in other engineering practices. The International Organization for Standardization (ISO) and the Institute of Electrical and Electronic Engineers (IEEE) have defined a number of standards, but these standards are not at the same level of granularity as other engineering standards.
- Although significant improvements in software development methodologies have been made, these methodologies are still largely dependent on human beings for productivity and quality.
- Tools are available to help in development or testing, but they still have not been able to rise to the level set by the standards and tools used in fabrication/ inspection/testing in other engineering disciplines.

Software projects versus other types of project

- Many of the techniques of general project management are applicable to software project management, but the products of software projects have certain characteristics that make them different.
- Software projects have numerous properties that make them exceptionally different to other kinds of engineering project. The properties of Software Projects are as follows:
- **Invisibility** When a physical artefact such as a bridge is constructed the progress can actually be seen. With software, progress is not immediately visible.
- Software project management can be seen as the process of making the invisible visible.
- **Complexity** Per dollar, pound or euro spent, software products contain more complexity than other engineered artefacts.

- **Conformity** The ‘traditional’ engineer usually works with physical systems and materials like cement and steel. These physical systems have complexity, but are governed by consistent physical laws.
- Software developers have to conform to the requirements of human clients. It is not just that individuals can be inconsistent.
- **Flexibility** That software is easy to change is seen as a strength. However, where the software system interfaces with a physical or organizational system, it is expected that the software will change to accommodate the other components rather than vice versa.
- Thus software systems are particularly subject to change.

Importance of software project management

- Software is said to be an intangible product. Software development is a kind of all new stream in world business and there's very little experience in building software products.
- Most software products are tailor made to fit client's requirements.
- The most important is that the underlying technology changes and advances so frequently and rapidly that experience of one product may not be applied to the other one.
- All such business and environmental constraints bring risk in software development hence it is essential to manage software projects efficiently.

Fig: The Project management Triangle

- The image above shows triple constraints for software projects. It is an essential part of software organization to deliver quality product, keeping the cost within client’s budget constrain and deliver the project as per scheduled.
- There are several factors, both internal and external, which may impact this triple constrain triangle. Any of three factors can severely impact the other two.
- Therefore, software project management is essential to incorporate user requirements along with budget and time constraints.

Activities Covered by Software Project Management

- A software project is not only concerned with the actual writing of software. In fact, where a software application is bought ‘off the shelf’, there may be no software writing as such, but this is still fundamentally a software project because so many of the other activities associated with software will still be present.
- Usually, there are three successive processes that bring a new system into being.

1. **The feasibility study:** assesses whether a project is worth starting – that it has a valid *business case*.

- The developmental and operational costs, and the value of the benefits of the new system, will also have to be estimated. With a large system, the feasibility study could be a project in its own right with its own plan.
- The study could be part of a strategic planning exercise examining a range of potential software developments.
- There are several fields of a feasibility study including economic feasibility, operational feasibility, schedule, legal and technical feasibility.
- The goal is to determine whether the system can be implemented or not.

2. Planning:

- If the feasibility study indicates that the prospective project appears viable, then project planning can start.
- For a large project, detailed planning is not done at the beginning, An outline is formulated for the whole project and detailed planning is done for the first stage.
- We create an outline plan for the whole project and a detailed one for the first stage. Because we will have more detailed and accurate project information after the earlier stages of the project have been completed, planning of the later stages is left to nearer their start.
- Plans must be regularly revised as new information becomes available. Various different types of plan may be developed to support the main software project plan that is concerned with schedule and budget.

3. Project execution:

- The project can now be executed. The execution of a project often contains *design* and *implementation* sub-phases.
- Design is thinking and making decisions about the precise form of the *products* to be created. This could relate to the external appearance of the software, that is, the user interface, or the internal architecture.

- The plan details the *activities* to be carried out to create these products.
- Planning and design can be confused because at the most detailed level, planning decisions are influenced by design decisions. Thus a software product with five major components is likely to require five sets of activities to create them.

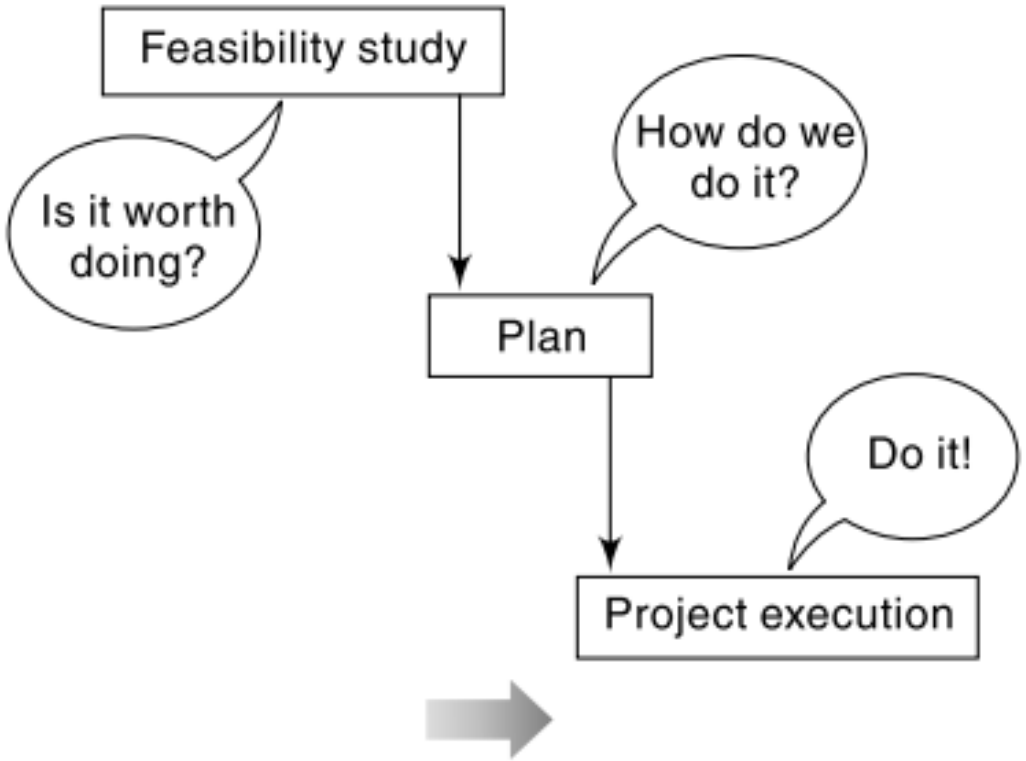


Fig: The feasibility study/plan/execution cycle

- The typical sequence of software development activities recommended in the international standard ISO 12207. Some activities are concerned with the *system* while others relate to *software*.

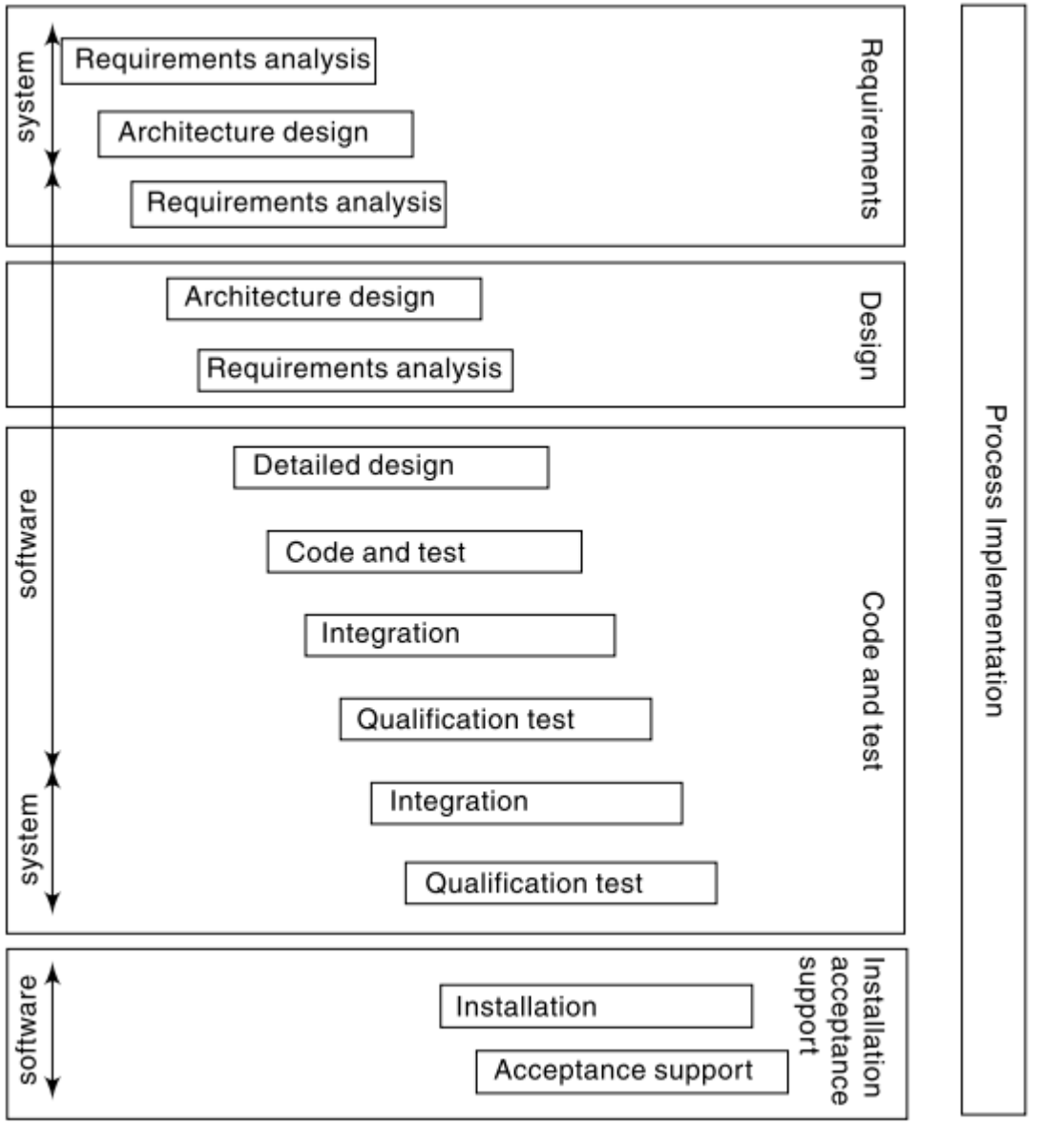


Figure: The ISO 12207 Software development life cycle.

- **Requirements analysis** starts with requirements elicitation or requirements gathering which establishes what the potential users and their managers require of the new system.
- It could relate to a *function* – that the system should do something.
- It could be a quality requirement – how well the functions must work.
- **Architecture design** The components of the new system that fulfil each requirement have to be identified. Existing components may be able to satisfy some requirements. In other cases, a new component will have to be made. These components are not only software: they could be new hardware or work processes.
- For example, have to take account of existing legacy systems with which they will interoperate. The design of the *system architecture* is thus an input to the *software requirements*. A second architecture design process then takes place that maps the software requirements to *software components*.
- **Detailed design** Each software component is made up of a number of software units that can be separately coded and tested. The detailed design of these units is carried out separately.
- **Code and test** refers to writing code for each software unit. Initial testing to debug individual software units would be carried out at this stage.

- **Integration** The components are tested together to see if they meet the overall requirements. Integration could involve combining different software components, or combining and testing the software element of the system in conjunction with the hardware platforms and user interactions.
- **Qualification testing** The system, including the software components, has to be tested carefully to ensure that all the requirements have been fulfilled.
- **Installation** This is the process of making the new system operational. It would include activities such as setting up standing data (for example, the details for employees in a payroll system), setting system parameters, installing the software onto the hardware platforms and user training.
- **Acceptance support** This is the resolving of problems with the newly installed system, including the correction of any errors, and implementing agreed extensions and improvements.
- Software maintenance can be seen as a series of minor software projects.

Project Success Factors

- The successful design, development, and implementation of information technology (IT) projects is a very difficult and complex process.
- However, although developing IT projects can be difficult, the reality is that a relatively small number of factors control the success or failure of every IT project, regardless of its size or complexity.
- Some of the factors that influence projects and may help them succeed are
    - Executive Support
    - User involvement
    - Experienced project managers
    - Limited scope
    - Clear basic requirements
    - Formal methodology
    - Reliable estimates

The role of project manager

- The project manager is the driving force in the management control loop. This individual seldom participates directly in the activities that produce the end result, but rather strives to maintain the progress and productive mutual interaction of various parties in such a way that overall risk of failure is reduced.
- A project manager is often a client representative and has to determine and implement the exact needs of the client, based on knowledge of the firm he/she is representing.
- The ability to adapt to the various internal procedures of the contracting party, and to form close links with the nominated representatives, is essential in ensuring that the key issues of cost, time, quality, and above all, client satisfaction, can be realized.
- In whatever field, a successful project manager must be able to envisage(predict) the entire project from start to finish and to have the ability to ensure that this vision is realized.
- When they are appointed, project managers should be given terms of reference that define their:
    - Objectives;
    - Responsibilities;
    - Limits of authority.

Responsibilities of a Project Manager

- The objective of every project manager is to deliver the product on time, within budget and with the required quality.
- Although the precise responsibilities of a project manager will vary from company to company and from project to project, they should always include planning and forecasting.
- Three additional areas of management responsibility are:

Interpersonal responsibilities, which include:

- Leading the project team;
- Liaising with initiators, senior management and suppliers;
- Being the 'figurehead', i.e. Setting the example to the project team and representing the project on formal occasions.

Informational responsibilities, which include:

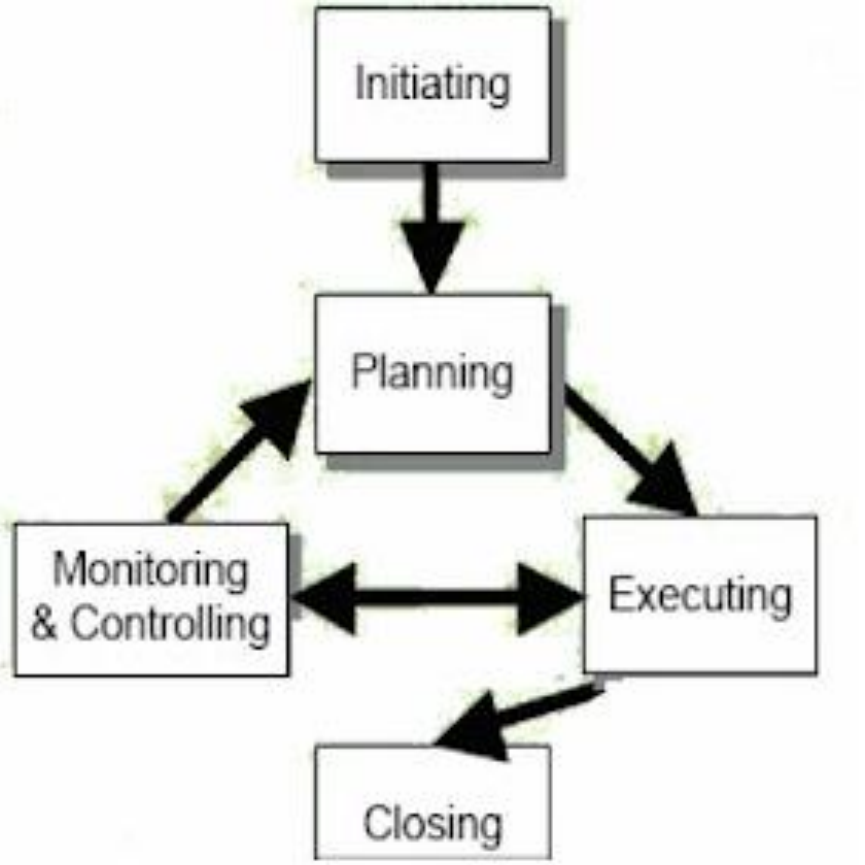
- Monitoring the performance of staff and the implementation of the project plan;
- Disseminating information about tasks to the project team;
- Disseminating information about project status to initiators and senior management;
- Acting as the spokesman for the project team.

Decisional responsibilities, which include:

- Allocating resources according to the project plan, and adjusting those allocations when circumstances dictate (i.e. The project manager has responsibility for the budget);
- Negotiating with the initiator about the optimum interpretation of contractual obligations, with the company management for resources, and with project staff about their tasks;
- Handling disturbances to the smooth progress of the project such as equipment failures and personnel problems.

The Project Life Cycle

- **The Project Life Cycle** refers to a logical sequence of activities to accomplish the project's goals or objectives. Regardless of scope or complexity, any project goes through a series of stages during its life.
- There is first an Initiation or Starting phase, in which the outputs and critical success factors are defined.
- Planning phase, characterized by breaking down the project into smaller parts/tasks.
- Execution phase, in which the project plan is executed.
- Closure or Exit phase, that marks the completion of the project.



Project Initiation:

- The initiation stage determines the nature and scope of the development. If this stage is not performed well, it is unlikely that the project will be successful in meeting the business's needs.
- The initiation stage should include a plan that encompasses the following areas:
  - Analyzing the business needs/requirements in measurable goals.
  - Reviewing of the current operations.
  - Conceptual design of the operation of the final product.
  - Equipment and contracting requirements including an assessment of long lead time items.
  - Financial analysis of the costs and benefits including a budget.
  - Stakeholder analysis, including users, and support personnel for the project.
  - Project charter including costs, tasks, deliverables, and schedule.

Planning & Design:

- After the initiation stage, the system is designed. Occasionally, a small prototype of the final product is built and tested.
- Testing is generally performed by a combination of testers and end users, and can occur after the prototype is built or concurrently. Controls should be in place that ensures that the final product will meet the specifications of the project charter.
- The results of the design stage should include a product design that:
    - Satisfies the project sponsor (the person who is providing the project budget), end user, and business requirements.
    - Functions as it was intended.
    - Can be produced within acceptable quality standards.
    - Can be produced within time and budget constraints.

Execution & Controlling:

- Monitoring and Controlling consists of those processes performed to observe project execution so that potential problems can be identified in a timely manner and corrective action can be taken, when necessary, to control the execution of the project.
- Monitoring and Controlling includes:
  - Measuring the ongoing project activities (where we are);
  - Monitoring the project variables (cost, effort, scope, etc.) against the project management plan and the project performance baseline (where we should be);
  - Identify corrective actions to address issues and risks properly (How can we get on track again);
  - Influencing the factors that could circumvent integrated change control so only approved changes are implemented
- In multi-phase projects, the Monitoring and Controlling process also provides feedback between project phases, in order to implement corrective or preventive actions to bring the project into compliance with the project management plan.

- Project Maintenance is an ongoing process, and it includes:
  - Continuing support of end users
  - Correction of errors
  - Updates of the software over time

Closure:

- Closing includes the formal acceptance of the project and the ending thereof. Administrative activities include the archiving of the files and documenting lessons learned. This phase consists of:
  - Project close: Finalize all activities across all of the process groups to formally close the project or a project phase.
  - Contract closure: Complete and settle each contract (including the resolution of any open items) and close each contract applicable to the project or project phase.

Overview of Project Management

Planning is the most difficult process in project management. The framework described is called the Stepwise method to help to distinguish it from other methods.

Stepwise project planning

Outline of Step Wise Project Planning

The framework of basic steps in project planning illustrates the various activities involved in the development process.

An outline of Step Wise planning is listed below:

- Selecting project
- Project scope & objectives
- Project infrastructure
- Analyze project characteristics
- Project products and activities

- Estimation effort
- Activity risks
- Allocate resources
- Review plan
- Execute plan

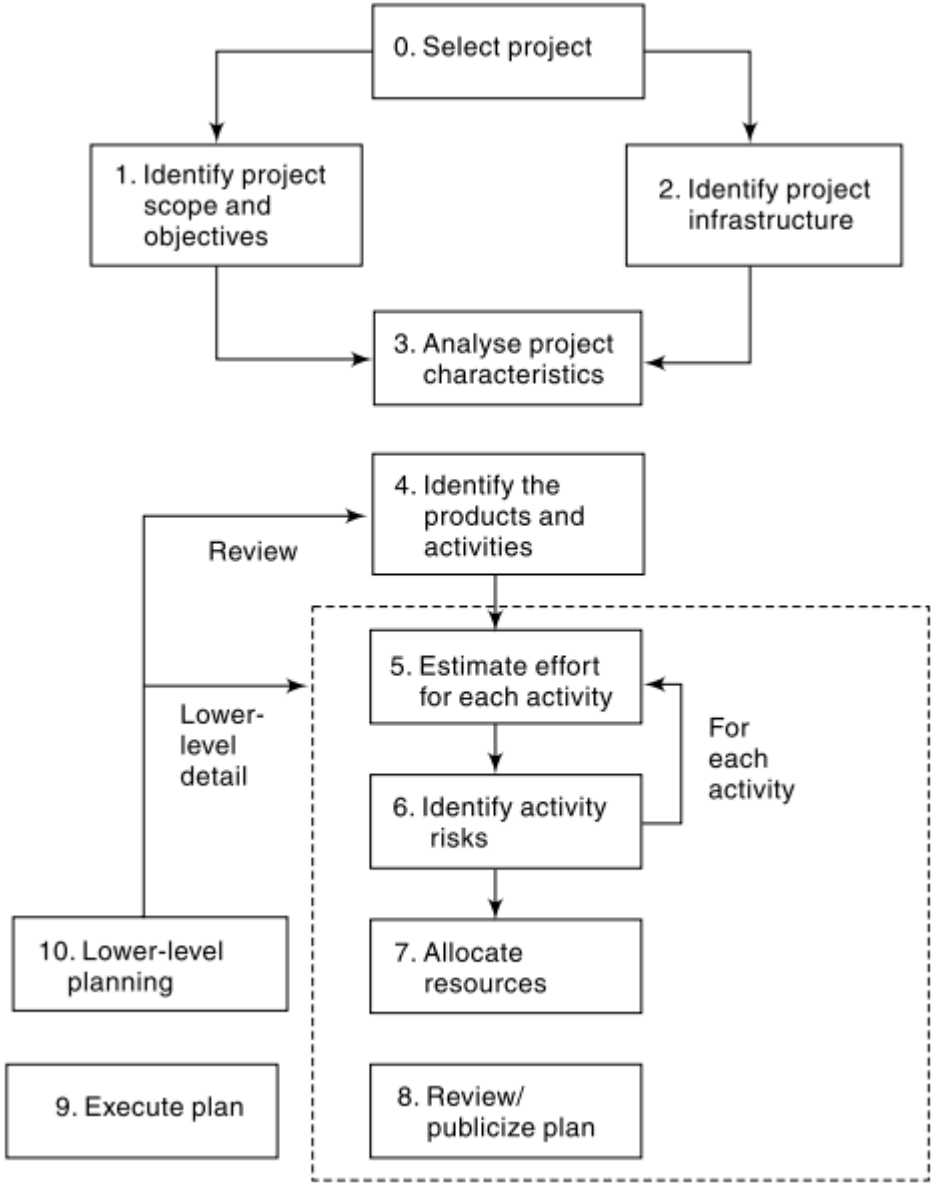


Fig: An overview of Step Wise

Table: An outline of Step Wise planning activities

Step	Activities within step
0	Select project
1	Identify project scope and objectives 1.1 Identify objectives and measures of effectiveness in meeting them 1.2 Establish a project authority 1.3 Identify stakeholders 1.4 Modify objectives in the light of stakeholder analysis 1.5 Establish methods of communication with all parties
2	Identify project infrastructure 2.1 Establish relationship between project and strategic planning 2.2 Identify installation standards and procedures 2.3 Identify project team organization
3	Analyse project characteristics 3.1 Distinguish the project as either objective- or product-driven 3.2 Analyse other project characteristics 3.3 Identify high-level project risks 3.4 Take into account user requirements concerning implementation 3.5 Select general life-cycle approach 3.6 Review overall resource estimates

4	Identify project products and activities
	4.1 Identify and describe project products (including quality criteria)
	4.2 Document generic product flows
	4.3 Recognize product instances
	4.4 Produce ideal activity network
	4.5 Modify ideal to take into account need for stages and checkpoints
5	Estimate effort for each activity
	5.1 Carry out bottom-up estimates
	5.2 Revise plan to create controllable activities
6	Identify activity risks
	6.1 Identify and quantify activity-based risks
	6.2 Plan risk reduction and contingency measures where appropriate
	6.3 Adjust plans and estimates to take account of risks
7	Allocate resources
	7.1 Identify and allocate resources
	7.2 Revise plans and estimates to take account of resource constraints

8	Review/publicize plan 8.1 Review quality aspects of project plan 8.2 Document plans and obtain agreement
9/10	Execute plan/lower levels of planning This may require the reiteration of the planning process at a lower level

Step 0: Selecting Project

- This is the initial step which starts well outside the project planning process.
- Feasibility study of the project helps in choosing the appropriate one.
- Strategic planning process helps in evaluating the metrics of selecting the project.
- Different methodologies are inevitable, stemming directly from the questions of what constitutes a methodology and what are a methodology's underlying principles.
- Projects differ according to size, composition, priorities, and criticality.
- The people on a project have different biases based on their experiences, principles, and fears.
- These issues combine so that, what is optimal differs across projects.
- Projects are undertaken to produce a product or a service for various reasons.
- This includes factors like market share, financial benefits, return on investment, customer retention and loyalty, and public perceptions.
- Organizations might receive several projects at a time. They have to select the best among the received projects request.
- They make decisions based on the best information they have about a particular project at a given point of time when selecting the project.

Step 1: Project Scope and Objectives

- Every stakeholder involved in the project must agree on the objectives defined in determining the success of the project.
- Scope statements may take many forms depending on the type of project being implemented and the nature of the organization.
- The scope statement details the project deliverables and describes the major objectives.
- The objectives should include measurable success criteria for the project.
- The Scope Statement should also include the list of users using the product, as well as the features in the resulting product.
- As a baseline scope statements should contain:
    - The project name
    - The project charter
    - The project owner, sponsors, and stakeholders
    - The problem statement

    - The project goals and objectives
    - The project requirements
    - The project deliverables
    - The project non-goals
    - Milestones
    - Cost estimates
- In more project oriented organizations the scope statement may also contain these and other sections:
    - Project Scope Management Plan
    - Approved change requests
    - Project assumptions and risks
    - Project acceptance criteria
- The project objectives are identified and practical measures are analyzed in achieving them.

Step 2: Project Infrastructure

- Project Infrastructure refers to the organizational structure, processes, tools, techniques and training an organisation puts in place to make projects more successful.
- Organizational Structure – Organizational structure including such support mechanisms as project management office, project recruiting function, financial
- monitoring area etc. It also covers lines of communication and escalation.
- Processes – Typically methodologies, checklists and guidelines.
- Tools – Software and templates
- Techniques – Repeatable processes such as kick off meetings, PIRs, analysis techniques, etc.
- Training – Formal and informal training and reference documentation
- Organization must give priorities for multiple projects to be carried out.
- Strategic decisions must be documented within the strategic plan in identifying the relationship between multiple projects.
- Change control must be implemented without affecting the original objectives.

- Configuration and procedural standards are defined for quality checks at regular intervals of the SDLC process and documented in separate manual.
- Measurement programme determines the control policy and monitors the progress of the project.
- Project manager must have an overall control of any project planning and control standards adopted.
- Project leader takes the responsibility of building the project team as an organized, well-built and effective one yielding excellent results.
- Team members must work together as a team and resolve conflicts.

Step 3: Analyze Project Characteristics

- The project is categorized as either product-driven or an objective-driven.
- A project has several characteristics:
    - Projects are unique.
    - Projects are temporary in nature and have a definite beginning and ending date.
    - Projects are completed when the project goals are achieved or it’s determined the project is no longer viable.
    - A successful project is one that meets or exceeds the expectations of your stakeholders.

Step 4: Project Products and Activities

- Identify the project deliverables i.e. the end product that has to been given over to the client.
- Some products are identified as intermediate products during the creation of deliverables.
- Project products can be System products, module products or management products.
- Technical products include training materials and operating instructions in managing the quality of the project.
- Describe the project products into components and sub-components related to individual modules in each step.
- Every activity must be carried out for each stage of the development process.
- Management products include progress of the project that is developed.
- Product descriptions contain the identity, purpose, derivation, composition, form, relevant standard and the quality criteria that apply.
- Not all products are independent. Some products depend on other products for their creation.

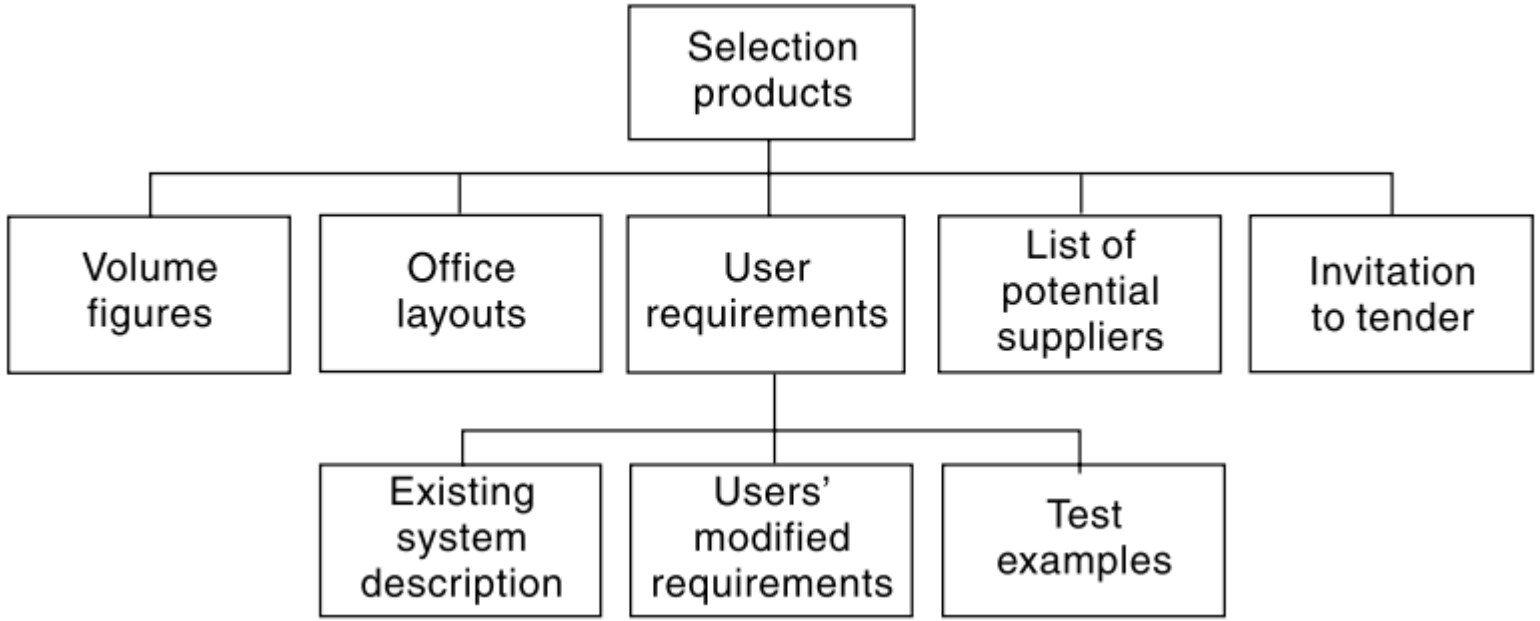


Fig: A Product Breakdown Structure (PBS) for the products needed to produce an invitation to tender (ITT)

- Product flow diagram represents the flow of the product being developed.
- Product instances must be recognized when a product is related to more than one product.

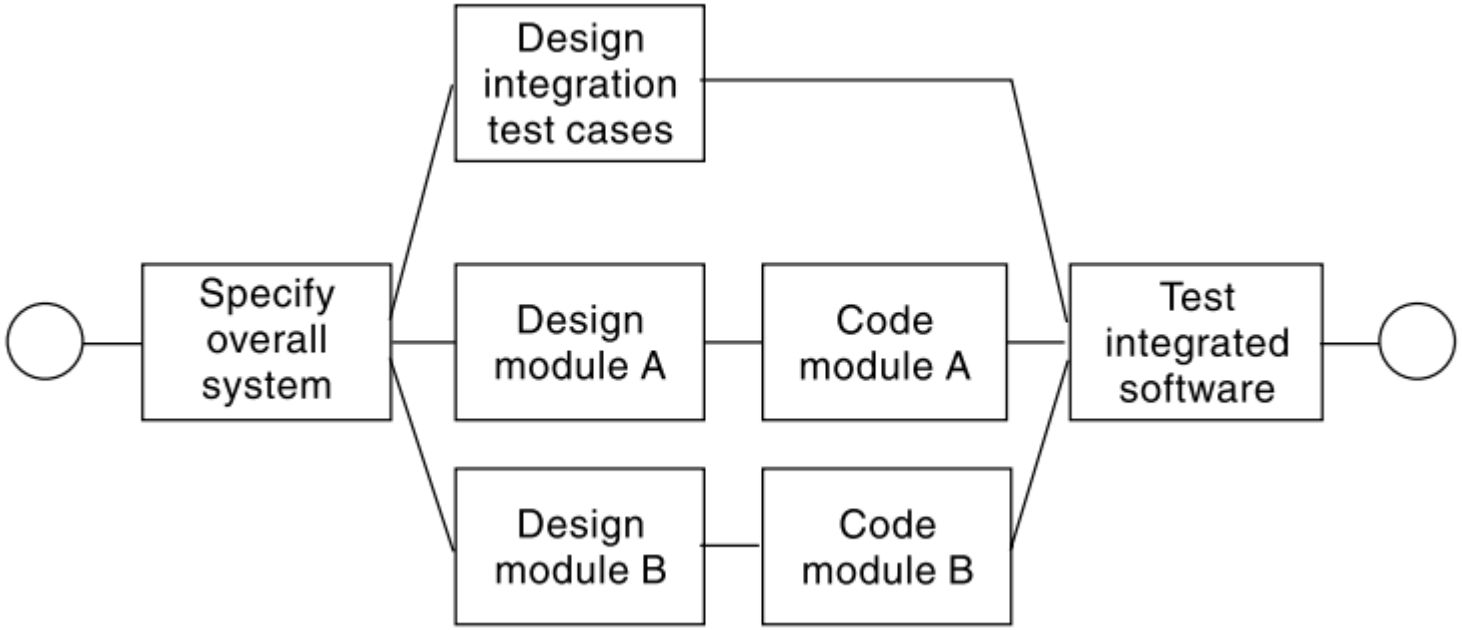


Fig: An example of an activity network.

- An activity network is created for generating the product that depends on another product describing every task associated with it.
- Sequencing of activities minimizes the overall duration for the project.
- For a complex project, the entire project can be divided into stages and checkpoints can be formulated at each specific stage for compatibility.
- Milestones represents the completion of important stages of the project.

Step 5: Estimating Effort

- The effort estimation for the staff required, the probable duration and the non staff resources needed for every activity is determined.
- These estimates depend on the type of the activity.
- Effort is the amount of work that has to be done.
- Software development efforts estimation is the process of predicting the most realistic use of effort required to develop or maintain software based on incomplete, uncertain and/or noisy input.
- Effort estimates may be used as input to project plans, iteration plans, budgets, investment analyses, pricing processes and bidding rounds.
- Elapsed time is the time between the start and end of a task.
- With all the activities defined, the overall duration of the project can be calculated using the activity network.
- There are many ways of categorizing estimation approaches. The top level categories are the following:
    - Expert estimation: The quantification step, i.e., the step where the estimate is produced based on judgmental processes.

    - Formal estimation model: The quantification step is based on mechanical processes, e.g., the use of a formula derived from historical data.
    - Combination-based estimation: The quantification step is based on a judgmental or mechanical combination of estimates from different sources.
- The most common measures of the average estimation accuracy is the MMRE (Mean Magnitude of Relative Error), where MRE is defined as: **MRE = |actual effort - estimated effort| / |actual effort|**
- These factors are essential even when using formal estimation models, because much of the input to these models is judgment-based.
- The psychological factors found in work by Jorgensen and Grimstad describes,
    - It's easy to estimate what you know.
    - It's hard to estimate what you know you don't know.
    - It's very hard to estimate things that you don't know you don't know.

Step 6: Identify Activity Risks

- Activity based risks are identified for every activity based on number of assumptions.
- Risk planning reduces the impact of identified risks.
- To materialize the risk, contingency plans are specified.
- New activities can reduce risks to a certain extent when there is change in plans.
- Risks fall into three broad categories — controllable known, uncontrollable known and unknown.
- The former two, are those risks happen before they can determine how to manage them. This is done using root cause analysis.
- As the name implies its goal is to look for the root cause on the problem and solve it at that point.
- 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.
- Determining which option to chose is primarily financial, but schedule and manpower may be involved.
- As a tool, a number of "checklist" opinions for looking at each of these options.
- Contingency planning is briefly discussed for scope, resource and schedule.

Step 7: Allocate Resources

- Resource allocation is used to assign the available resources in an economic way. It is part of resource management. In project management, resource allocation is the scheduling of activities and the resources required by those activities while taking into consideration both the resource availability and the project time.
- Staff needed and available are identified for each activity and allocated their respective tasks.

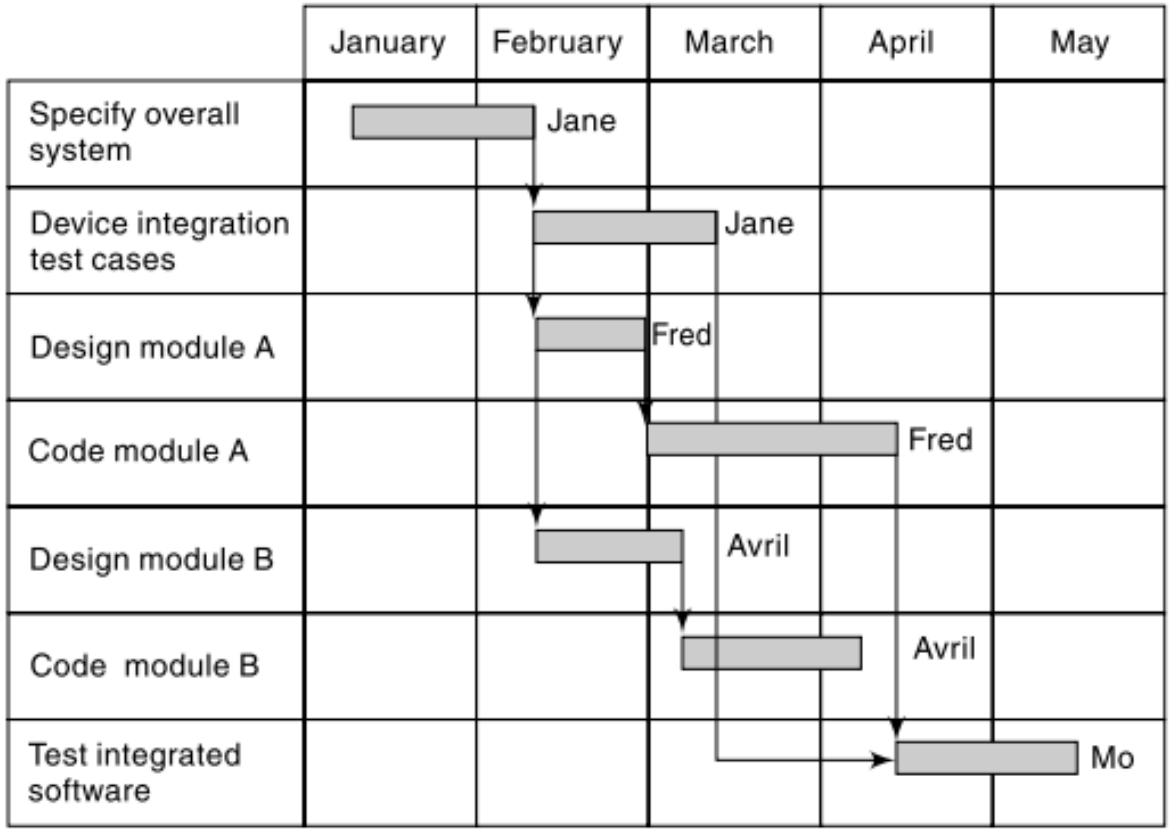


Fig: Gantt chart showing when staff will be carrying out tasks

- Staff priority list is generated based on the task allotted to them because some staffs are used for more than one task.
- A Gantt chart pictorially represents when activities have to take place and which one has to be executed at the same time.
- The chart represents when staff will be carrying out the tasks in each month. It also shows staff involved in more than one task.
- When allocating resources the constraints associated is estimated and included in the overall cost.

Step 8: Review Plan

- When a task is completed it leads to the quality review. These quality checks have to be passed before the activity is completely signed-off.
- Every plan has to be documented and all stakeholders must have agreed to all constraints and understand the project.
- There are some steps involved in project plan review.

Define the problem: This activity provides the background for decisions about the scope and focus of the Project Review. Here are some simple questions the Project Review Team can ask themselves before creating a plan for the project. Use our Planning Tool to capture the background on your project.

- What, if any, review work has already been done?
- What is the problem we are trying to solve?
- What would success look like?
- Scope the Project. How big was it? How long did it take? How many people were involved?
- What is the investment the team would like to make?

Determine the focus: The focus of the Project Review is the question that the team will ask themselves as they investigate the events that occurred during the project. This is the fundamental question that will guide the decisions that the team will make while planning the Project Review. It is always stated as a question. A commonly used question that project teams ask is:

- What are the root causes of events that determined or impacted resources, schedule, or quality?

Select the appropriate tools: Now that the scope, the goal and the problem are known, the data set needed for the project review are identified along with the various activities that will used.

Identify the participants: The Project Review Leadership Team guides the Postmortem effort. As a group they determine the focus if the investigation, select the tools that will be used, review the output from each step, decide who should participate in each activity, and are responsible for reporting lessons learned and recommendations for action. The Project Review Team usually consists of the movers and shakers that drove the project or event. They work together to manage

- The Project Review process. The team should consist of folks most intimate with the project including any of the following representatives:
    - Project Managers
    - Product Managers
    - Development Leads
    - Quality Leads
    - Content Experts
    - Customer Support Lead
    - Management

Document the review plan: The project review template can be used so that everyone responsible for implementation has a copy of the plan.

Step 9: Execute Plan

- Finally, the execution of the project is drawn with each specified activity as it is approached.
- Detailed planning of later stages is necessary because more information will be available than the start stage.
- Project planning and execution becomes an iterative process where as each activity which is to be carried out approaches, they should be reviewed in detail.