

Information Technology Project Management

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Objectives

This document is created for the purpose of helping organisations understand the essential components of project management. The primary goals of this document is to summarise the concepts and practices of project management to educate workers in the information technology industry on the importance of teamwork and work coordination to achieve the required results of organisations' objectives and hence, its survival in the competitive market.

Apart from the these objectives, the document also serves to provide basic knowledge on project management, and introduces various knowledge areas and processes that Project Managers should work towards acquiring so that in obtaining the necessary skills, they can deliver better quality services in managing any given project.

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- Critical need for better project management in the information technology field
- Overview of the field of project management
- Definitions of fundamental terms
- Relationship between project management and other disciplines
- Brief history of the field and how it has changed
- Introduction to project management certification and ethics

2. The Project Management Context and Processes

- Project management context
- Understand how projects fit into an entire organisational system
- Applies common project management terms to concepts used in the IT field
- Introduces the project management process groups – initiating, planning, executing, controlling, and closing
- Briefly describes PM processes and differentiate it from product process groups
- Provides a matrix relating the process groups to knowledge areas

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1. Introduction to Project Management

- ❑ What is a project and examples of information technology projects
 - ❑ What is project management and its key elements of framework
 - ❑ Project management relations to other disciplines
 - ❑ History of project management
 - ❑ Need for better project management, especially information technology projects
 - ❑ Project management certification
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- Project Management's primary focus prior to 1980s was in providing schedule and resource data to senior management
 - In the 1990s, with new technologies, changes have fueled for more sophisticated projects
 - Need for better project management
 - Success today need conversancy use of modern project management techniques
 - Many organisations claim that using project management grants them advantages, such as:
 - a) Better control of financial, physical and human resources
 - b) Improved customer relations
 - c) Shorter development times
 - d) Lower costs
 - e) Higher quality and increased reliability
 - f) Higher profit margins
 - g) Improved productivity
 - h) Better internal coordination
 - i) Higher worker morale
 - **A project is a temporary endeavour undertaken to accomplish a unique purpose**, involving several people performing interrelated activities
 - The main sponsor for the project primary focus is on effective use of resources to complete project in an efficient and timely manner
 - *A project has a unique purpose.* Every project should have a well-defined objective
 - *A project is temporary.* It has a definite beginning and a definite end
 - *A project requires resources, often from various areas.* These include people, hardware, software, or other assets, crossing departmental and/or other boundaries in order to achieve their unique purposes through collaboration
 - *A project should have a primary sponsor or customer.* Most projects have various parties or stakeholders, but someone must take the primary role of sponsorship, usually the directive and funding factor of the project
 - *A project involves uncertainty.* Because every project is unique, it is difficult to clearly define the project's objectives, estimate how long it will take to complete or how much it will cost – the main reasons why project management is needed
 - A good project manager is the key to a project's success
 - *Project managers* work with the project sponsors, project team, and other people involved in delivering the project scope and goals
 - Each *project* is *constrained* by its scope, time goals, and cost goals (*triple constraint*)
 - *Scope*: What is the objective of project? What unique product or service does sponsor expect?
 - *Time*: How long should it take to complete the project? What is the project's schedule?
 - *Cost*: What should it cost to complete the project?
 - Successful project management means meeting the *triple constraint* of goals and satisfying the project's sponsor
 - **Triple constraint** of project management: Scope goals, Cost goals and Time goals

- Managing the triple constraint involves making trade-offs between scope, time and cost goals for a project
- Due to uncertain nature of projects and competition for resources, it is rare to complete projects according to the exact scope, time and cost plans originally predicted
- Project's sponsor, team members or other stakeholders might have different views of the project as time progresses
- Example: To generate project ideas by conducting a survey, coordinating responses, assigning key contacts in each department
- While the triple constraint describes the basic elements of a project, other elements can also play significant roles, such as, quality, a key factor in projects as is customer or sponsor satisfaction
- Good project management knows how to avoid problems that occur when you meet scope, time and cost goals, but lose sight of quality or customer satisfaction?
- **Project Management** is “the application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project” – *Project Management Institute (PMI) Standards Committee, A Guide to PMBOK*
- Key elements of the *framework of project management*: project stakeholders, project management knowledge areas, and project management tools and techniques
- **Stakeholders**: people involved in or affected by project activities and include project sponsor, project team, support staff, customers, users, suppliers, and even opponents to the project
- **9 Knowledge areas**: key competencies that project managers must develop, the **four core knowledge areas** include **project scope, time, cost and quality management**, the **four facilitating knowledge areas** are **human resources, communications, risk and procurement management**, and the knowledge area of **project integration management**
- Human resources, communications risk and procurement management are called **facilitating knowledge areas** because they are the means through which the project objectives are achieved
- **Project integration management** is an over-arching function that affects and is affected by all of the other knowledge areas
- Project managers must have knowledge and skills in all nine of these areas
- Project management **tools and techniques** assist project managers and their teams in carrying out scope, time, cost and quality management
- Additional tools can help project managers and teams carry out human resources, communications, risk, procurement, and integration management (e.g. Gantt charts, network diagrams, and critical path analysis)
- The advantages of project management is not a silver bullet that guarantees success on all projects – what works on one project may not work on another
- Knowledge in project management is mainly unique to the discipline of project management, although experience in general management and the understanding of the application area of the project is necessary in order to work effectively
- Example: general management areas in organisational behaviour, financial analysis, planning techniques, etc
- Example: Project involving sales force automation needs to understand the sales process, sales automation software, and mobile computing
- Convergence of Project Management, General Management and Application Area Knowledge and Practice
- Distinction between project management with general or operations management is the nature of the projects, which are unique, temporary and involve various resources, focus on integrating all the various activities required to succeed in contrast with repetitive, ongoing and done as day-to-day activities and tasks
- General or operations managers focus more on a particular discipline or functional area
- Project management requires knowledge of particular industry or knowledge area of project (e.g. IT projects which would be difficult for someone with little or no background of IT to become the project manager)

- History of Project Management in its modern concept of PM began with the Manhattan Project, which the US military led to develop the atomic bomb
- In 1917, Henry Gantt developed the famous Gantt chart as a tool for scheduling work in job shops, showing tasks to be performed against a calendar timeline
- Program Evaluation and Review Technique (PERT) charts were first used in 1958 by Navy Polaris missile/submarine project
- Project managers need to understand the problems at hand to manage a project successfully
- The challenge of the manager is to understand the concepts of project management and determine what tools and techniques should be applied on specific projects
- Code of Ethics – PMP shall maintain high standards of personal and professional conduct, including, acceptance of responsibilities for actions; undertake project only if qualified by training and experience or after disclosure to employers or clients of pertinent qualifications; maintain skills at the state of the art and recognise the importance of continued personal development and education; advance the integrity and prestige of the profession by practicing in a dignified manner; support code; support professional society by participation; obey laws of the country in which work is being performed

2. The Project Management Context and Processes

- Understand the systems view of project management and how it applies to information technology projects
 - The four general phases in the project life cycle
 - Project development versus Product development
 - Analyse a formal organisation using the four frames of organisations
 - Differences among functional, matrix, and project organisational structures
 - Important skills and attributes of a good project manager
 - Brief description of the 5 process groups of project management, the typical level of activity for each, and the interactions among them
 - Basic view of how the project process groups relate to the project management knowledge areas
- Project managers must consider many different components when managing projects, such as using a systems approach, following a project life cycle, understanding organisations, developing important skills for project management and integrating the project management process groups
 - Although projects are temporary and is unique, organisations cannot run projects in isolation and must operate in a broad organisational environment
 - To effectively handle complex situations, PM need to take a holistic view of a product and understand how it is situated within the larger organisation, that is, a *systems view of project management*
 - Taking a holistic view of projects and the organisations is called *systems thinking*
 - The term *systems approach* emerged in the 1950s to describe a holistic and analytical approach to solving complex problems that includes using a *systems philosophy*, systems analysis and systems management
 - A *systems philosophy* is an overall model for thinking about things as *systems*
 - *Systems* are sets of interacting components working within an environment to fulfill some purpose
 - *Systems analysis* is a problem-solving approach that requires defining the scope of the system to be studied, dividing it into its component parts, and then identifying and evaluating its problems, opportunities, constraints and needs, examining alternative solutions for improving the current situation against the entire system

- **System management** addresses the business, technological, and organisational issues related to each project in order to identify and satisfy key stakeholders and do what is best for the entire organisation
- Although it is easier to focus on the immediate and sometimes narrow concerns of a particular project, project managers and other staff must keep in mind the effects of any project on the health and needs of the entire system or organisation
- Three-sphere model for systems management – business, organisation, technology
- When you integrate business and organisational issues into project planning and look at projects as a series of interrelated phases to ensure a better job of ensuring project success
- Example: Does it make financial sense to pursue this new technology? Should this software be developed in-house or purchased off-the shelf?
- Projects operate as part of a system and involve uncertainty, hence, is good practice to divide into several *phases*
- A **project life cycle** is a collection of **project phases**
- Project phases vary by project or industry, but some general phases include *concept, development, implementation, and close-out*
- The first two phases, *concept and development*, focus on planning and are often referred to as **project feasibility**
- The last two phases, *implementation and close-out*, focus on delivering the actual work and are often referred to as **project acquisition**
- Each phase must be successfully complete before moving on to the next
- In the concept phase of a project, PM briefly describe the project, develop a very high level summary plan, a preliminary rough cost estimate and an overview of the work involved is created
- Project work is usually defined in a **work breakdown structure** (WBS), an outcome oriented document that defines the total scope of the project
- The WBS during the phase of the study might partition the work to include a competitive analysis
- Phases of the Project Life Cycle:

Project Feasibility		Project Acquisition	
Concept	Development	Implementation	Close-out
Management Plan	Project Plan	Last work package	Completed work
Preliminary cost estimate	Budgetary cost estimate	Definitive cost estimate	Lessons learned
3-level WBS	6+-level WBS	Bulk of time spent here	Customer acceptance

- A **systems development life cycle** (SDLC) is a framework describing the phases involved in developing and maintaining information systems
- Common names of these general phases are information systems planning, analysis, design, implementation, and support
- Popular models of a SDLC include: *waterfall model, the spiral model, the incremental release model, and the prototyping model*
- **Waterfall model**: well-defined, linear stages of systems development and support
- **Spiral model**: based on experience with various refinements of the waterfall model
- **Incremental release model**: provides for progressive development of operational software, with each release providing added capabilities
- **Prototyping model**: used for developing software prototypes to clarify user requirements for operational software
- A project must successfully pass through each of the project phases in order to continue to the next
- Management review should occur after each phase to evaluate progress, likely success, continued compatibility with organisation goals

- These management reviews are called *phase exits* or *kill points*, which plays an important role in keeping projects on track and determine its continuity, redirection or termination
- Having specific deliverables and kill points at the end of project phases helps managers make better decisions about whether to proceed, redefine, or kill a project
- Improvement in IT project success rates has been due, in part, to an increased ability to know when to cancel failing projects, that is, “know when to stop beating a dead horse” (Thomas Edison – his key to success)
- The systems approach to project management requires that project managers always view their projects in the context of the larger organisation (e.g. spend enough time identifying stakeholders, especially oppositions; political context of project in organisation)
- *Organisations* have four different frames: *structural*, *human resources*, *political*, and *symbolic* (Bolman, Lee, 1991, *Reframing Organisations*, Jossey: Bass Publishers)
- *Structural* frame: how the organisation is structured (depicted in org chart) with focus on different groups’ roles and responsibilities to meet the goals and policies set by top management
- *Human Resource* frame: producing harmony between the needs of the organisation and the needs of the people, recognising mismatches between the needs of the organisation and the needs of individuals and groups, working towards resolving potential problems
- *Political* frame: addresses organisational and personal politics, which take the form of competition between groups or individuals for power and leadership
- *Symbolic* frame: focuses on symbols and meanings; the importance about any event in an organisation is not what actually happened, but what it means (e.g. Is it a good sign that the CEO came to a kickoff meeting for a project, or is it a threat? How does the people dress? How many hours do they work? How do they run meetings?)
- Organisational structures: *functional*, *project*, and *matrix*
- *Functional* organisation: the hierarchy most people think of when picturing an org chart where functional managers possess staff with specialised skills in respective disciplines
- *Project* organisation: a hierarchical structure, reporting to CEO instead of functional managers, consisting of staff with variety of skills needed to complete particular projects
- *Matrix* organisation: represents the middle ground between functional and project structures, where personnel report to both a functional manager and one or more project managers, exercising possible strong, weak, or balanced strength, based on the amount of control exerted by the project managers
- Since the purpose of project management is to meet or exceed stakeholder needs and expectations, it is critical the project managers take adequate *time to identify, understand, and manage relationships* with all project stakeholders
- To be an effective project manager, he must be able to identify and address the needs of different stakeholders and understand how his project relates to the entire organisation
- Top three areas for the success of IT projects: *user involvement, executive management support, and a clear statement of requirements*
- To achieve the top three areas of successful IT project, the project manager requires *strong management skills, strong communication, leadership, political skills, skills in organisation, teamwork, coping, and making effective use of technology*
- *Fifteen Project Management Job Functions:*
 - 1) Define scope of project
 - 2) Identify stakeholders, decision-makers, and escalation procedures
 - 3) Develop detailed task list (work breakdown structures)
 - 4) Estimate time requirements
 - 5) Develop initial project management flow chart
 - 6) Identify required resources and budget
 - 7) Evaluate project requirements
 - 8) Identify and evaluate risks
 - 9) Prepare contingency plan

- 10) Identify interdependencies
 - 11) Identify and track critical milestones
 - 12) Participate in project phase review
 - 13) Secure needed resources
 - 14) Manage the change control process
 - 15) Report project status
- Each of the project management job functions requires different performance criteria, technical knowledge, foundation skills, and personal qualities
 - Effective project managers provide leadership by example, are visionary, technically competent, decisive, good communicators, good motivators, stand up to upper management when necessary, support team members, and encourage new ideas
 - Characteristics and behaviours of positive leaders include: team builder, communicator, high self-esteem, focusing on results, demonstrating trust and respect, and setting goals
 - Project management is an integrative endeavour; decisions and actions taken in one knowledge area at a certain time will usually affect other knowledge areas
 - Project management consists of a number of interlinked processes
 - A *process* is a series of actions directed toward a particular result
 - Project management *process groups* progress from *initiation activities to planning activities, executing activities, controlling activities, and closing activities*
 - *Initiating* processes: actions to commit to begin or end projects and project phases, defining the business need for the project, identifying project sponsor and person to take up the role of project manager at each phase of a project
 - *Planning* processes: devising and maintaining a workable scheme to meet business need that project was undertaken to address, with project plans to define each knowledge area as it relates to the project at that point in time
 - *Executing* processes: coordinating people and other resources to carry out project plans and produce the products or deliverables of the project or phase
 - *Controlling* processes: ensure that project objectives are met, with PM and staff monitoring and measuring progress against plans and take corrective action when necessary, such as performance and status reviews, where changes are identified, analysed and managed
 - *Closing* processes: formalising acceptance of the project or phase and bringing it to an orderly end, which include administrative activities such as archiving project files, documenting lessons learnt, receiving formal acceptance of work delivered as part of the project or phase
 - Process groups are not discrete, one-time events, and relate to each other in terms of the typical level of activity, time frame, and overlap
 - The *planning process* include completion of a work breakdown structure (WBS), project schedule, and project budget
 - "A dollar spent up front in planning is worth one hundred dollars spent after the system is implemented" is a saying emphasising the importance of project planning because in IT projects, it takes a huge amount of effort to change a system once it has been implemented
 - The *executing process* involves taking the actions necessary to ensure that the work described in the planning activities will be completed, the main outcome of which is the delivery of the actual work of the project
 - *Controlling* is the process of measuring progress towards the project objectives, monitoring deviation from the plan, and taking corrective action to match progress with the plan, the ideal outcome of which is to successfully complete a project by delivering the agreed upon project scope within time, cost, and quality constraints
 - If changes to project objectives or plans are required, *controlling processes* ensure that they are made in an efficient and effective manner to meet stakeholder needs and expectations
 - During the *closing processes*, the project team works to gain acceptance of the end product and bring the phase or project to an orderly end, the key outcomes of which are

formal acceptance of the work and creation of closing documents such as a project audit and lessons-learnt report

- The project management process groups – *initiating, planning, executing, controlling,* and *closing* – provide a framework for understanding project management and apply to most projects (Information technology and non-information technology) most of the time and along with the project management knowledge areas – *integration, scope, time, cost, quality, human resources, communications, risk,* and *procurement* – help project managers look at the big picture of managing a project

3. Quality Control

Quality

In our highly competitive marketplace, quality, consistency, and service are what differentiates a company from its competitors. Most companies talk about and strive for a quality product or service, but quality is more than just a buzzword. So what is quality?

The International Organisation of Standardisation (ISO) defines quality as "the totality of characteristics of a product or service that bear on its ability to satisfy stated or implied needs". Basically, quality covers meeting the customer's agreed requirements and expectations based on certain influential factors. Many definitions for quality exist today.



Now that we have defined quality, what do you think are some of the reasons for quality? Why do people everywhere stress on quality? When you strike a deal with another person or organisation, you would aim to purchase a quality product or service. On the other hand, if you are the supplier, you would then aim to provide a quality product or service.

We have identified 5 common reasons for quality. They are:



Product and Process Quality

When you manage quality for an IT project, you mainly deal with two types of quality, product quality and process quality. Before we even look at product and process quality, let's first define a product and a process.

A product is seen as the end result of a process. A process is seen as the steps or procedure that will result in producing an end product. In short, a process is how the work is done. It includes a set of interrelated work activities with specific input, value added tasks and specific outputs.

Take for example, ComputerFreeks, a small company that assembles personal computers. Now, ComputerFreeks would have established a process to assemble the personal computers so as to achieve optimum productivity.

Now that we have defined a product and a process, let's look at product and process quality. Software product quality is a function of development process quality.

Product quality is the degree to which customer needs and expectations are satisfied. On the other hand, process quality is the effectiveness and efficiency of the process that produces the product.

Quality Considerations

Sometimes we hear that even large and well-known organisations face difficulties and failures when conforming to quality standards. Why do you think this happens? Large organisations should already have established good sets of standards and guidelines to adhere by when it comes to quality. However, they also fall into the trap of failures as well.

When it concerns product development and deployment, we have to understand that **some failures are unexpected**. What are some of the major quality hurdles an organisation or supplier faces in delivering a product or service? Below are **three major hurdles to quality in product development and deployment**.

They are:

[Failure to understand the requirements.](#)

[Failure to meet the requirements, and](#)

[The inability to demonstrate compliance with the requirements.](#)

Quality Considerations

From the organisational perspective, let's move on to the second consideration in software quality: **requirements definition**. What do we mean by requirements definition? Well, if we are to precisely **meet the requirements**, then we must **know what they are very precisely** and clearly, right? Only then will we be able to meet the requirements of our customers.

There are certain important features that a requirements definition should have. It should be:

1. [complete](#)
2. [consistent](#)
3. [quantified](#)
4. [feasible](#)
5. [verifiable](#)

Quality Considerations

The third quality consideration that you should take note of is the **development process**. It is very vital that a clear and well-defined process has already been established for the development phase of a software. This will ensure quality at each step of development is taken care of.

What the process does is it **identifies at each stage** the **development risk** of each major component and the **best strategy to improve that risk**. There are three types of risks that may or may not occur at each stage of the development phase.

The next quality consideration that you should be aware of is the **verification and validation process**. So, what's the difference between verification and validation?

From the questions posed for each process, we can conclude that **verification focuses more on the right process** and **validation focuses on the end product**. For instance, reviews are verification tasks while different types of testing are validation tasks. Let's take a look at the development process and the stages where we can apply verification and validation.

The final quality consideration that you should take note of is **defect management**. The verification process usually has its failures, which implies the product still has detectable defects.

The **users and developers should set up in advance a process for deciding what to do about defects**. This is known as defect management.

So, there are altogether five essential considerations when you deal with quality for the product you develop. From the organisational perspective, you need to know the people involved and their roles and responsibilities. Then, there are the 3 processes: Requirements Definition Process, Development Process, and the Verification and Validation Process. And finally, you need to know that both parties involved, user and developer, have an existing plan for defects.

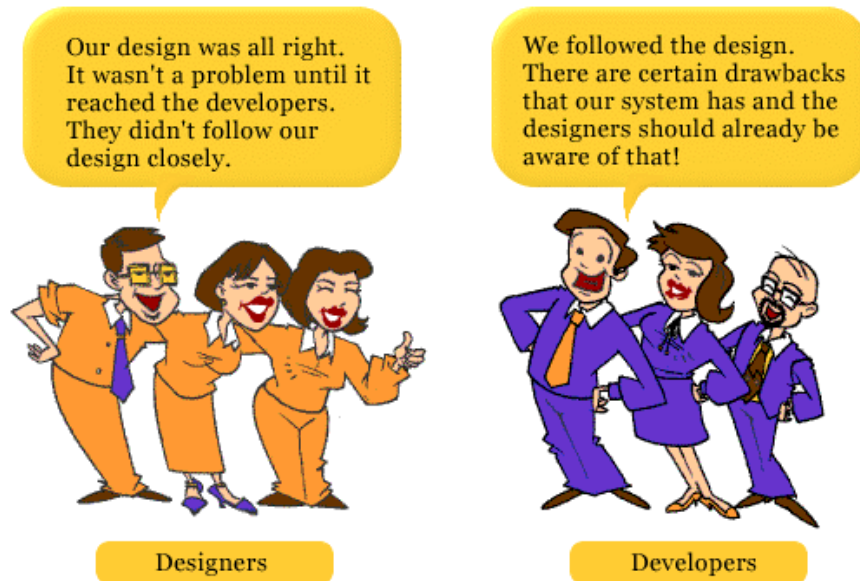
Project Quality Plan

Most customers now insist that their suppliers demonstrate their ability to achieve the highest standards of quality. This generally manifests itself in the request for Quality Plans which show how products are going to be manufactured and how quality is to be ensured at every stage of this process. The Quality Plan ensures the existence of team commitment to quality on a project-by-project basis.

The Quality Plan document should:

- define measurable quality objectives such as "Goals for error prevention and early error detection"
- define standards, guidelines for execution of the many phases and the respective deliverables
- define input (entry) and output (exit or acceptance) criteria of each phase
- identify the various type of testing (validation) and review (verification) activities
- specify and assign the responsibilities for quality related activities

Quality Control Techniques

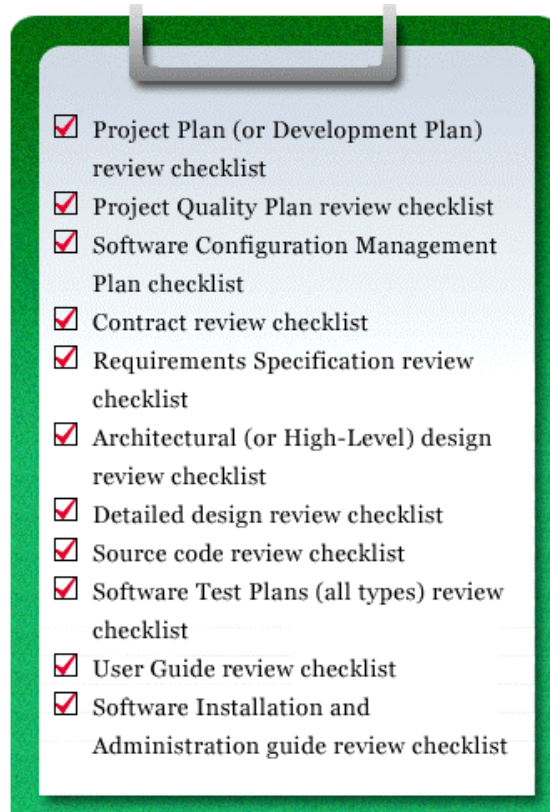


Quality control involves monitoring specific project results to determine if they comply with relevant quality standards. It also involves identifying ways to eliminate causes of unsatisfactory results. So, as a Project Manager, you should be aware of the general control techniques used for quality.

Your Quality Management System that has been developed should have formal (procedure based) quality control and quality assurance techniques. Below are Project Managers who have used the different types of control techniques.

Checklists

Since checklists are used throughout the software development process, let's take a look at the types of checklists to be created for a project.



The checklists used by an organisation can be tailored to reflect the application domain, platform and languages, technologies used, and team skills. It is also necessary to update the checklists based on feedback from review participants (concerning their suitability and effectiveness).

Software Testing

What is software testing? Does the situation in the picture look familiar? Well, testing is the most important, yet overlooked part of modifying or building of application software. It involves operation of a system or application under controlled conditions and evaluating the results. For instance, if the user is in interface A of the application while using hardware B, and does C, then D should happen. The controlled conditions should include both normal and abnormal conditions. In other words, testing should intentionally attempt to make things go wrong to determine if things happen when they shouldn't or things don't happen when they should! Software testing is a process that is used to establish confidence that a program or a system (several integrated programs) does what it is supposed to do correctly.



The IEEE/ANSI definition for software testing is as follows:

"The process of operating a system or component under specified conditions, observing or recording the results, and making an evaluation of some aspect of the system or component. (Std 610.12-1990)".

What happens when testing is in progress? Well, you could try it out by clicking on the door to enter the testing room. And then, click on each requirement to view its status. Happy testing!

Basically, the software testing process involves executing the designed and coded programs in a controlled environment with an intention to find out all types of errors (or defects). The software testing process is also regarded as a measurement of software quality that is attributed to the system.

Software Quality Management Framework



Systematic Planning



Communication



Tools



Commitment



Quality Organisation



Culture

The Basis

Frameworks help organisations improve their processes and systems. In general, the use of frameworks is to improve quality in software development projects and project management. We realise that the customer-supplier relationship is the core of Quality Management Frameworks. However, on its own, it will not be enough. A typical Quality Management Framework should address the following elements that are essential ingredients in placing a framework for Quality Management which will be relevant to every business, whatever its size or function.

The six elements making up the support mechanisms of the central core of the Quality Management Framework are the essential ingredients for a successful programme. International Standard Organisation's ISO 9000 Series, Standards and Guidelines and the Capability Maturity Model of the Software Engineering Institute (SEI of Carnegie Mellon University) are two popular frameworks which can be applied to IT industry.

4. Summary

Project Management Knowledge Areas:

1. Project Integration
2. Project Scope
3. Project Time Management
4. Project Cost Management
5. Project Quality Management
6. Project Human Resource Management
7. Project Communications Management
8. Project Risk Management
9. Project Procurement Management

Integration
Scope
Time
Cost
Quality
Human Resource
Communications
Risk
Procurement

<p>1. Project Management Integration</p> <ul style="list-style-type: none"> • Project Plan Development • Project Plan Execution • Overall Change Control 	<p>2. Project Scope</p> <ul style="list-style-type: none"> • Initiation • Scope Planning • Scope Definition • Scope Verification • Scope Change Control 	<p>3. Project Time Management</p> <ul style="list-style-type: none"> • Activity Definition • Activity Sequencing • Activity Duration/ Estimating • Schedule Development • Schedule Control
<p>4. Project Cost Management</p> <ul style="list-style-type: none"> • Resource Planning • Cost Estimating • Cost Budgeting • Cost Control 	<p>5. Project Quality Management</p> <ul style="list-style-type: none"> • Quality Planning • Quality Assurance • Quality Control 	<p>6. Project Human Resource Management</p> <ul style="list-style-type: none"> • Organisational Planning • Staff Acquisition • Team Development
<p>7. Project Communications Management</p> <ul style="list-style-type: none"> • Communications Planning • Information Distribution • Performance Reporting • Administrative Closure 	<p>8. Project Risk Management</p> <ul style="list-style-type: none"> • Risk Identification • Risk Quantification • Risk Response Development • Risk Response Control 	<p>9. Project Procurement Management</p> <ul style="list-style-type: none"> • Procurement Planning • Solicitation Planning • Solicitation • Source Selection • Contract Administration • Contract Close-out

Project Management Process Groups:

1. Initiating
2. Planning
3. Executing
4. Controlling
5. Closing

Quality Control:

1. Rising Competition
2. Rising product complexity
3. Lowering lifetime costs
4. Quick product turn around time
5. Corporate image enhancement

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