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Assalam-o-Alykum VU Students,

This is MS Rehman from MS-Team, and I hope you are all doing well. As you all know, we have been providing assistance to VU students through our virtual university WhatsApp groups and communities for quite some time now.

Currently, many of you are preparing for the final term exams, and we understand the importance of having access to previous years' papers to prepare effectively. That's why we have created a special group named "Final Term current papers," where we are collecting papers from various sources and sharing them with you all.

We also understand the significance of keeping these papers for future use, which is why we are creating video files of these papers and uploading them on our channel "MS CreatiVePlatForm" for your convenience. We are also compiling all the papers of each date and subject into separate files to make it easier for you to find and use them.

I would like to take this opportunity to thank the entire MS-Team for their tireless efforts in providing assistance to VU students. We are a group of dedicated individuals who believe in helping students achieve their academic goals. We provide support not only for exams but also for assignments, GDBs, and other academic activities.

- **We hope that our efforts are helpful to you, and we encourage you to join our communities and groups to stay updated with the latest information and assistance.**

  Best of luck for your exams.

  JazakAllah Khair.

As we continue on our academic journey

I humbly request your prayers for our team and the success of our shared goals.

May Allah bless **us** with the strength, guidance, and wisdom to achieve our academic pursuits, and may our efforts be fruitful and beneficial for ourselves and others.

Jazak Allah Khairan (may Allah reward you with goodness)."

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EFFORTS by MS-Team

Important Note!

Some questions are concept-based, so finding exact answers directly from the slides or handouts was not always possible. Therefore, we have tried our best to search, analyze, and extract the most relevant material from the provided handouts or slides so that students can properly understand the concepts instead of simply memorizing answers.

For a few questions, additional explanations and guidance have also been incorporated with the help of ChatGPT and other learning resources to make the answers more comprehensive and easier to understand. However, our primary effort has been to keep the content aligned with the course handouts, slides, and concepts as much as possible.

We hope this file proves helpful to you. We have made every effort to provide the most relevant and authentic answers; however, since some questions may slightly differ from the actual paper or course material, we strongly recommend that students verify the answers according to their own handouts, slides, and understanding before using them.

May Allah grant us all success, ease our efforts, and bless us with wisdom, patience, and perseverance. Keep your faith strong, because with prayer and hard work every difficulty becomes easier. We also request you to remember us in your prayers.

Thank you, and best of luck with your exams!

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As a Project Manager, should you add extra features not mentioned in specifications?

Answer:

Normally, **extra features should not be added without stakeholder approval** because it can cause:

- Scope creep
- Increased cost
- Schedule delay
- Additional maintenance issues

Project Scope Management ensures:

"The project includes all the work required, and only the work required."

However, if the feature:

- adds customer value,
- improves quality,
- increases usability,
- or fulfills future business needs,

then it may be proposed through proper change management and stakeholder approval.

Value added by extra features:

- Better customer satisfaction
- Improved product quality
- Competitive advantage
- Increased usability and efficiency
- Higher customer delivered value

Long Questions

Q1

FAST e-commerce stakeholders disagree with checkout workflow. Facilitate negotiation and use QFD to prioritize.

Answer:

In this situation, the project manager should first arrange meetings with stakeholders and facilitate effective negotiation.

According to handouts:
Negotiation helps resolve conflicts and reach agreements.

Steps to handle disagreement:

1. Understand stakeholder concerns
2. Keep people and problems separate
3. Focus on issues, not positions
4. Seek win-win solutions

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5. Improve communication among stakeholders

After negotiation, use **QFD (Quality Function Deployment)** to prioritize requirements.

QFD helps to:

- Translate customer needs into technical requirements
- Identify most important checkout features
- Prioritize features according to customer value

For example:
Stakeholders may prioritize:

- Fast checkout
- Secure payment
- Easy navigation
- Guest checkout
- Mobile compatibility

The project manager selects features with highest customer importance first.

Result:

- Better stakeholder satisfaction
- Reduced conflicts
- Improved software quality
- Better alignment with customer needs

Q2

Low motivation and unrealistic deadlines are people problems. Analyze impact on software quality and give two solutions.

Answer:

Low motivation and unrealistic deadlines negatively affect software quality.

Impacts on software quality:

1. Increased errors and bugs
2. Poor testing and incomplete documentation
3. Low productivity
4. Stress and burnout
5. Delayed project delivery
6. Reduced customer satisfaction

According to handouts:

- Unrealistic deadlines are a major warning sign of project failure.
- People are the most important factor in project success.

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Two solutions:

1. Improve motivation

Project manager should:

- Encourage teamwork
- Provide rewards and recognition
- Maintain good communication
- Create positive work environment

2. Set realistic schedules

Project manager should:

- Properly estimate tasks
- Allocate sufficient time
- Avoid excessive workload
- Use effective planning and scheduling

Conclusion:

Motivated teams and realistic deadlines improve:

- productivity,
- software quality,
- and project success.

Q1

If you are a project manager, what are the two primary activities to manage risk for a software project?

As a project manager, you perform two primary activities to manage risks for software project:

- Risk Analysis
  - Risk identification
  - Risk quantification
- Risk management

Q2

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Identify stakeholders who actively work in software engineering management.

Expected Answer:

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The main stakeholders are:

1. **Senior Managers**
   - Define business issues and organizational goals.
2. **Project Managers**
   - Plan, organize, motivate, and control software teams.
3. **Practitioners / Developers**
   - Provide technical skills to develop software.
4. **Customers**
   - Specify software requirements.

5. **End Users**
   - Use the software after deployment.

According to handouts relevant concept given below:

1. The Players

The software process (and every software project) is populated by players who can be categorized into one of five constituencies:

1. **Senior managers** who define the business issues that often have significant influence on the project.

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2. **Project (technical) managers** who must plan, motivate, organize, and control the practitioners who do software work.
3. **Practitioners** who deliver the technical skills that are necessary to engineer a product or application.
4. **Customers** who specify the requirements for the software to be engineered and other stakeholders who have a peripheral interest in the outcome.

2. End-users

Who interact with the software once it is released for production use. Every software project is populated by people who fall within this taxonomy. To be effective, the project team must be organized in a way that maximizes each person's skills and abilities. And that's the job of the team leader.

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Long Questions

Q1

Suppose you developed and implemented a software project successfully and customer now needs maintenance.

(a) Will this maintenance be considered part of the project?

Answer:

Yes, maintenance can be considered part of the software life cycle because maintenance is included as a phase in software development lifecycle models.

According to handouts:
The Waterfall model includes:

- Requirements
- Design
- Implementation
- Testing
- Maintenance

Maintenance includes:

- fixing errors,
- improving performance,
- and adding enhancements after deployment.

(b) Will this maintenance be provided before the closedown of the project?

Answer:

Usually, maintenance is provided after implementation and may continue even after the main development activities are completed.

However, if maintenance support is included in the project agreement or contract, then it may continue before complete project closure.

According to handouts:
Project closing phase includes:

- delivering the project,
- evaluating success,
- and transition activities.

Maintenance is generally part of operational support after delivery.

Q2

A company creates software and as a project manager you need to balance time, cost, and quality. Evaluate constraints and focus on one constraint.

Answer:

Software project management depends on balancing major project constraints:

1. **Time**
   - Project should be completed on schedule.
2. **Cost**
   - Project should remain within approved budget.
3. **Scope/Quality**
   - Software must meet customer requirements and quality standards.

According to handouts:
Projects must:

- be delivered on time,
- within cost,
- within scope,
- and meet customer quality requirements.

This relationship is called the **Trade-Off Triangle** or **Triple Constraint**.

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Focus on Quality Constraint:

Quality is the central theme of project management because poor quality software can cause:

- customer dissatisfaction,
- system failure,
- maintenance cost increase,
- and business loss.

Project Quality Management ensures:

- quality planning,
- quality assurance,
- quality control,
- and quality improvement.

Conclusion:

A successful project balances:

- time,
- cost,
- and quality,

but quality should never be ignored because software success depends heavily on customer satisfaction and reliable performance.

Long Questions

⇒ **Baselines vs. Interim Versions**

SCM differentiates between baselines and interim versions. A baseline is a tested and certified version of a system. Baselines can be assigned version numbers such as 1.0, 2.0, 3.0, and so on. A baseline usually undergoes intensive testing. Interim versions, on the other hand, have version numbers, such as 1.1 or 1.2. The interim version is a temporary version. Interim versions have a short life and survive only during bug fixing, testing, or debugging. However, interim versions also have a unique version number or name. Baselines are more visible with the marketing team and the vendors than the interim versions. However, as part of SCM, all versions of changes are saved, clearly labeled, and archived. Archiving is the process of maintaining controlled copies of prior versions. Archiving helps in re-creating earlier versions in the event of data loss or data corruption.

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Short Conceptual Difference:

- **Baseline** = approved stable version
- **Interim version** = temporary working version

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Short Questions

1) Definitions di thi aur batana tha project ki kaunsi aur program ki kaunsi

Project Definition

“A temporary endeavor undertaken to create a unique product or service.”

Program Definition

"A coordinated portfolio of projects that change organizations to achieve benefits of strategic importance."

Simple Difference:

- **Project** → single temporary task with specific goal
- **Program** → group of related projects managed together

2) Fill table by Project / Program

Important Concept:

Project	Program
Temporary activity	Collection/portfolio of projects
Has definite start and end	May continue for long duration
Produces unique product/service	Achieves strategic business objectives
Smaller scope	Larger scope
Managed by Project Manager	Managed by Program Manager
Focus on product delivery	Focus on organizational benefits
One deliverable	Multiple related projects
Limited resources and goals	Coordinated management of projects

According to handouts:

- Project = "temporary endeavor undertaken to create unique product or service."
- Program = "coordinated portfolio of projects.

1.4 What is a 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"

Endeavor means struggle , kosish
Undertaken's means start,shoro

Projects are often implemented as a means of achieving an organization's strategic plan. Operations and projects differ primarily in that operations are ongoing and repetitive while projects are temporary and unique. A project can thus be defined in terms of its distinctive characteristics—***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. For many organizations, projects are a means to respond to those requests that cannot be addressed within the organization's normal operational limits.

1.12 Project vs. Program Management

⇒ **What is a Program?**

"A coordinated portfolio of projects that change organizations to achieve benefits of strategic importance"

Program management is the process of managing multiple on going projects. An example would be that of designing, manufacturing and providing support infrastructure for an automobile make.

2) Project requirements finalize ho chukki hain aur client new feature add karna chahta hai. Kya karein?

Answer:

Project manager should first analyze:

- impact on cost,
- time,
- scope,
- and quality.

Then feature should only be added through proper **change management** and stakeholder approval.
Project Scope Management ensures:

"only the work required" should be included in project.

If feature directly adds customer value and stakeholders approve it, then requirements and schedule should be updated.

Otherwise unnecessary changes may cause:

- scope creep,
- delay,
- and increased cost.

Long Questions

1) 80/20 Rule

Answer:

The 80/20 rule is also called **Pareto Principle**.

Some Sample 80/20 Rule Applications

80% of process defects arise from 20% of the process issues.
20% of your sales force produces 80% of your company revenues.
80% of delays in schedule arise from 20% of the possible causes of the delays.
80% of customer complaints arise from 20% of your products or services.

Benefits:

- Better productivity
- Improved quality
- Better time management
- Efficient resource usage

5. Project Quality Management

Project Quality Management includes the processes required to ensure that the project will satisfy the needs for which it was undertaken. It includes "all activities of the overall management function that determine the quality policy, objectives, and responsibilities and implements them by means such as quality planning, quality assurance, quality control, and quality improvement, within the quality system.

Main Objectives:

1. Deliver high-quality software
2. Meet customer requirements
3. Reduce defects and errors
4. Improve reliability and performance

Quality Planning

Defines:

- quality standards,
- procedures,
- and metrics.

Quality Assurance

Ensures development processes are properly followed.

Quality Control

Checks and tests software to identify defects.

Quality Improvement

Continuously improves processes and product quality.

Importance:

Good quality management:

- **increases customer satisfaction,**
- **reduces maintenance cost,**
- **and improves project success.**

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Now the following notes/questions have been taken from the below-mentioned reference source:

Reference:

CS615 - Software Project Management

Reference Short Notes for Mid Term Papers

By Muhammad Faisal Dar (MIT 4th Semester)

faisalgrw123@gmail.com

The 80:20 Rule: (page 11)

The 80:20, rule was originated by Vilfredo Pareto, an Italian economist who studies the distribution of wealth in a variety of countries around 1900. He discovered a common phenomenon: about 80% of the wealth in most countries was controlled by a consistent minority -- about 20% of the people. Pareto called this a "predictable imbalance." His observation eventually became known as either the "80:20 rule" or "Pareto's Principle."

A project has five phases: (page 13)

⇒ Initiation
⇒ Planning
⇒ Executing
⇒ Controlling
⇒ Closing

Project Life Cycle includes the following Phases: (page 16)

A. Concept Phase
B. Requirements Phase
C. Design Phase
D. Development Phase
E. Operation Phase

(page 29)
In managing competing project requirements Project managers often talk of a triple constraint:

– Project scope
– Time and
– Cost

(page 31)
The role of the Leader in project management is one of great responsibility. It's the project manager's job to direct and supervise the project from beginning to end. Here are some other roles:

(a) Leadership
(b) Communications
(c) Problem Solving
(d) Negotiating
(e) Influencing the Organization
(f) Mentoring
(g) Process and technical expertise

PM's nine Knowledge Areas (page37)

1. Project Integration Management
2. Project Scope Management
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

Difference between Leaders and Managers: (page45)

Leadership is path finding
Management is path following
Management is about doing things right
Leadership is about doing the right things

Supporting detail (page57)

Supporting detail for organizational planning varies by application area and project size. Information frequently supplied as supporting detail.

Software engineering practices: (page58)

- Span of control
- Authority
- Responsibility
- Delegation
- Chain of command
- Accountability
- Line authority
- Staff departments

The Software Crisis: (page60)
Some of the reasons to which you can attribute the software crisis include:

- Software developers used-multiple programming languages.
- Most of the requirements were complex with regard to the existing capabilities,
- Software developers poorly mapped requirements to the actual product.
- Software maintenance was costly.
- Hardware developed at a faster rate than software.

Status reports: (page62)

Status reports should be required from every member of the development team, without exception. The reports should be submitted periodically, usually weekly or bi-weekly, and should contain at least the following three sections.

1. Activities during the report period
2. Planned activities for the next report period
3. Problems

A typical software project includes the following phases: (page67)

- Software requirement analysis phase
- Software Design Phase
- Software Planning Phase
- Software construction phase
- Software testing phase
- Software acceptance and maintenance phase

The primary software project management areas that you need to concentrate on include: **(page70)**

- Managing Resources
- Managing Cost
- Managing Risk
- Managing Schedule
- Managing the project plan
- Managing quality

(page 73)

As a **project manager**, you perform **two primary activities to manage risks for software project**:

- Risk Analysis
  - Risk identification
  - Risk quantification
- Risk management

(page 77)

The project management phases can be broadly categorized as follows;

i. Project initiation
ii. Project closedown
iii. Project planning, control, and tracking
iv. Product implementation

Product Implementation **(page80)**

Product implementation activities involve defining processes related to the implementation of the software product at the customer site. Some of the tasks that you perform for product implementation are mentioned below:

I. Implementation plan creation
II. Support plan creation
III. Training plan creation
IV. User acceptance plan

Project Closedown **(page80)**

The final activity for a project manager is project closedown. For most software projects, the project closedown activities take place in the post-implementation phase. The tasks that you perform in project closedown are mentioned below:

i. Prepare closedown report
ii. Identify learning
iii. Identify reusable software components
iv. Create reference material

Problems in Software Projects **(page85)**

You can classify the problems that affect software projects into the following four categories:

I. People-related problems
II. Process-related problems
III. Product-related problems
IV. Technology-related problems

⇒ **People-related problems** **(page85)**

- Low motivation
- Problem employees
- Unproductive work environment
- Inefficient project management style
- Lack of stakeholder interest
- Ineffective project sponsorship by management

⇒ **Process- related Problems** **(page86)**

- Unrealistic schedule
- Insufficient identification
- Unsuitable life cycle model selection
- Abandoning quality under pressure of deadlines
- Unstructured and hurried software development

⇒ **Product-related Problems** **(page87)**

- Product scope changed toward the end of the project life cycle
- Research-oriented software development
- III-defined scope
- Fuzzy users

⇒ **Technology-related problems** **(page89)**

- Overestimated savings from reusable components and new tools and methods
- Switching tools in mid way
- Integrating different software products in cross-platform implementation

Requirements analysis **(page93)**

Requirements analysis is a software engineering task that bridges the gap between system level requirements engineering and software design. Software requirements analysis may be divided into five areas of effort:

1. Problem recognition,
2. Evaluation and synthesis,
3. Modeling
4. Specification, and
5. Review

There is also Requirements Analysis includes: **(page96)**

Evaluation and Synthesis, Models, Specification & Concerns for Review

Requirements Elicitation for Software **(page98)**

(1) Initiating the Process
(2) Facilitated Application Specification Techniques
(3) Quality Function Deployment
(4) Use Cases
(5) Analysis Principles
(6) Software Prototyping

The Software Requirements Specification (page103)

- Quality
- Timeliness and
- Completeness of SW product

(page106)
The **bibliography** contains references to all documents that relate to the software. These include other software engineering documentation, technical references, vendor literature, and; standards.

(page106)
The **appendix** contains information that supplements the specifications. Tabular data, detailed description of algorithms, charts, graphs and other material, are presented as appendixes.

Attributes of SW Design: (page107)

Software design is actually a multi step process that focuses on four distinct attributes of a program:

- Data structure,
- Software architecture,
- Interface representations, and procedural (algorithmic) detail.

Modularity (page108)

Modularity (in both program and data) and the concept of abstraction enable the designer to simplify and reuse software components.

Standard design approaches (page 109)

- Exception handling,
- Localization
- Portability
- Reuse
- Input/output
- Memory management,
- Performance

Software Configuration Management (page 109)

Software configuration management (SCM) takes care of changes in a software process. SCM identifies controls, audits, and reports modifications that occur during software development. SCM helps maintain the integrity of configurable items produced during software development. SCM is an integral part of Software Quality Assurance (SQA). SCM involves assessing the impact of the changes made during SQA activities and making decisions based on cost and benefit analysis.

Software Configuration Management Activities **(page 110)**

SCM is used to establish and maintain integrity of software items and ensure that they can be traced easily. Using SCM, you can define a library structure for storage and retrieval of software items. SCM needs to be performed at all phases in the SDLC of a software project. The various SCM activities are:

1. Identifying Objects
2. Controlling Versions
3. Controlling Changes
4. Auditing
5. Communicating Changes

Software Configuration management important topics: **(page 115)**

Read these topics from handout

> Controlling Changes
> Communicating Changes
> Software Configuration Management Vs Software Maintenance
> Baselines vs. Interim Versions

Software Configuration management important topics: **(page 115)**

Read these topics from handout

> Controlling Changes
> Communicating Changes
> Software Configuration Management Vs Software Maintenance
> Baselines vs. Interim Versions

Quality Control **(page 119)**

Quality control is a series of review activities, such as:

- Inspections
- Reviews and
- Tests, used throughout the SDLC of the software product

Quality Factors **(page 120)**

McCall (MCC77) and his colleagues proposed some software quality factors based on three most important aspects of a software product:

1. Product operation
2. Product revision and
3. Product transition

1. Product Operation Factors (page120)

Correctness	Accuracy of the program and the extent to which it fulfills design specifications
Reliability	Extent to which the program is secure and its ability to recover quickly from failure.
Efficiency	Performance of the program and its ability to perform tasks within a time frame
Integrity	Ability of the program to take care of security and the extent to which it can prevent unauthorized.
Usability	Ease with which a user can learn, operates, and uses the program.

2. Product Revision Factors (page121)

Maintainability	Ease with which a program is debugged.
Flexibility	Ease with which a program is modified.
Testability	Ease with which a program is tested.

3. Product Transition Factors (page121)

Portability	Efficiency with which a program runs on different platforms or operating systems
Reusability	Extent to which the program can be used in more than one program or system
Interoperability	Effort needed to transfer a program to another system
Configurability	Ability of the program to be installed at more than one location with different features at each location
Expandability	Ability of the program to support an increase in data and users

Software Quality Assurance Activities (page122)

SQA is the process of evaluating the quality of a product and enforcing adherence to software product standards and procedures. It is an umbrella activity that ensures conformance to standards and procedures throughout the SDLC of a software product. There are a large number of tasks involved in SQA activities. These include:

- Formulating a quality management plan
- Applying software engineering techniques
- Conducting formal technical reviews
- Applying a multi-tiered testing strategy
- Enforcing process adherence
- Controlling change
- Measuring impact of change
- Performing SQA audits
- Keeping records and reporting

Software Review (page124)

Software review is an effective way of filtering errors in a software product. Typically, an error found after the product release costs 50 times as much to correct as one detected during the design phase. Software review is used as a filter at various points of software development. Reviews conducted at each of these phases, analysis, design, coding, and testing reveal areas of improvement in the product. Some of the most common software review techniques, practiced across software organizations include:

a) Inspection
b) Walkthrough
c) Formal technical reviews

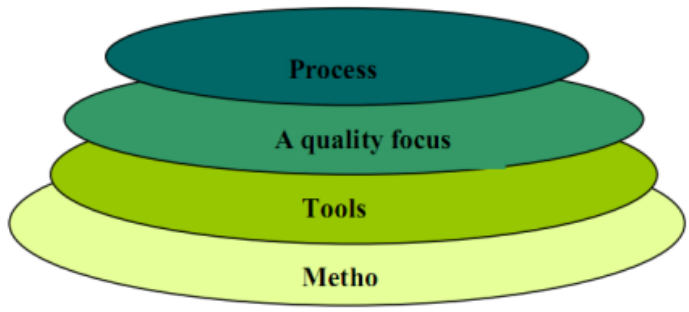
Software Process (page128)

When you build a product or system, it's important to go through a series of predictable steps – a road map that helps you create a timely, high-quality result, The road map that you follow is called a 'software process'.

Software Process Vs Software Engineering (page129)

Software engineering is performed by creative, knowledgeable people who should work within a defined and mature software process that is appropriate for the products they build, and the demands of their marketplace. A software process defines the approach that is taken as software is engineered. But software engineering also encompasses technologies that populate the process-technical methods and automated tools.

Software engineering layers (page130)

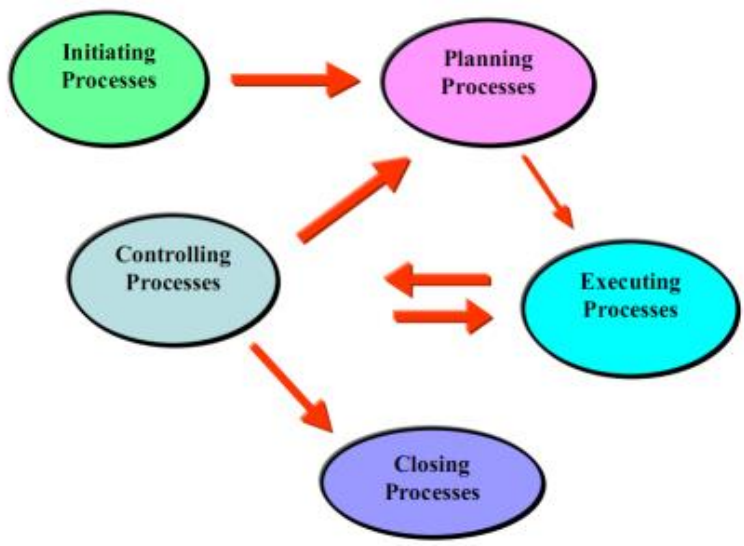


PM Process Groups (page131)

Project management processes can be organized into five groups of one or more processes each:

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

PM Phase interactions (page132)



Initiating Process Inputs **(page134)**

- Product Description
- Strategic Plan
- Selection Criteria
- Historical Information

Initiating Process Outputs **(page134)**

- Project Charter
- Project Manager assignments
- Constraints
- Assumptions

Initiating Process Tools and Techniques **(page134)**

- Project selection methods
- Expert judgment

The tasks performed for project initiation are: **(page134)**

- Requirement gathering
- Scope determination
- Resource allocation
- Initial project plan

SMARTER is abbreviated as: **(page136)**

Specific
Measurable
Acceptable
Realistic
Time frame
Extending
Rewarding

Planning Process Tasks **(page138)**

1. Scope Planning
2. Scope Definition
3. Activity Definition
4. Activity Sequencing
5. Activity Duration Estimating
6. Resource Planning
7. Cost Estimating

8. Cost Budgeting Risk Planning
9. Schedule Development
10. Quality Planning
11. Communications Planning
12. Organization Planning
13. Staff Acquisition
14. Procurement Planning
15. Project Plan Development

Executing Process Tasks **(page139)**

1. Project Plan Execution
2. Quality Assurance
3. Team Development
4. Information Distribution
5. Solicitation
6. Source Selection
7. Contract Administration

Executing Process Tasks **(page139)**

1. Project Plan Execution
2. Quality Assurance
3. Team Development
4. Information Distribution
5. Solicitation
6. Source Selection
7. Contract Administration

Controlling Process Tasks **(page140)**

1. Integrated Change Control
2. Scope Verification
3. Scope Change Control
4. Schedule Control
5. Cost Control
6. Quality Control
7. Performance Reporting
8. Risk Response Control

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Management Aspect **(page107)**

– **Major design styles**
• Object, structured, data-structured design

– **Foundational design concepts**
• Information hiding, abstraction, encapsulation, Inheritance, basic algorithms & data structures, ...

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