

Module 4

Introduction to Project Management

Introduction

- A software project includes all steps of software development, from gathering requirements to testing and maintenance.
- It follows specific methods and is completed within a set timeframe to create the intended software product.
- Software is an intangible product.
- Software development is a relatively new field in global business with limited experience in creating such products.
- Most software is custom-made to meet client needs.
- Technology in software development evolves quickly, making past experience less applicable to future projects.
- These factors, along with business and environmental challenges, create risks in software development.
- Effective management of software projects is essential to address these risks.

What is a project?

- **Dictionary Definitions:**
 - "A specific plan or design."
 - "A planned undertaking."
 - "A large undertaking, e.g., a public works scheme."
 - Key elements include planning and the size of the task.
- **Other Definitions:**
 - A **unique process** with coordinated and controlled activities.
 - It has a **start and finish date** and aims to meet specific objectives under constraints like time, cost, and resources.
 - A project often involves multiple tasks with defined precedence relationships.
- **Examples of Non-Software Projects:**
 - Organizing a wedding.

- Completing an MBA program.
 - Building a house.
 - Running a political election campaign.
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What is a Task?

- **Definition of a Task:**
 - A small piece of work with a straightforward goal.
 - Usually involves a few people and takes no more than a few hours.
 - Tasks may or may not belong to a larger project.
 - Often repetitive (e.g., replacing a tire, buying groceries).
 - **Examples of Non-Software Tasks:**
 - Attending a lecture.
 - Buying a chocolate bar.
 - Booking a train ticket.
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Types of Activities:

1. **Repetitive Jobs:**
 - Similar tasks done repeatedly, like replacing a tire or giving a lecture.
 - These tasks are well-defined with little uncertainty.
 - Process management is more relevant here than project management.
 2. **Exploratory Activities:**
 - Often uncertain and open-ended, like research projects.
 - Hard to plan precisely but generally follow a broad approach.
 3. **Projects:**
 - Fall between repetitive tasks and exploratory activities.
 - Have clear desired outcomes but come with risks and uncertainties.
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Characteristics of Projects:

A task becomes more project-like if it is:

- **Non-routine:** Not repetitive or typical work.
- **Planned:** Requires advance preparation.
- **Targeted:** Aims at specific outcomes.
- **Customer-oriented:** Often done for someone else.
- **Temporary:** Managed by a team assembled for this purpose only.
- **Specialized:** Involves diverse expertise.
- **Phased:** Progresses through multiple stages.
- **Constrained:** Bound by time, budget, and resources.
- **Large or Complex:** Requires significant coordination and effort.

Why is Project Management Important?

- **Significant Investment in ICT:**
 - Large amounts of money are spent on Information and Communication Technology (ICT) projects.
 - Example: In 2003-2004, the UK government spent £2.3 billion on ICT contracts, compared to £1.4 billion on road construction.
- **High Failure Rates in ICT Projects:**
 - Many ICT projects fail to meet expectations.
 - According to the Standish Group, only about one-third of ICT projects are successful.
 - Common issues include:
 - 82% of projects were delivered late.
 - 43% of projects exceeded their budget.
- **Impact of Poor Project Management:**
 - Ineffective project management is a major reason for these failures.
 - Poor planning, execution, and monitoring can lead to delays, cost overruns, and unmet goals.
- **Criticism of Findings:**
 - The Standish Group's research methodology has been questioned by some experts.

- Despite this, there is widespread acknowledgment that ICT project failures are common and costly.
- **Role of Project Management:**
 - Good project management ensures:
 - Clear goals and realistic timelines.
 - Proper allocation of resources, including budget and personnel.
 - Risk management to address potential issues early.
 - Effective communication among stakeholders.
 - It maximizes the chances of delivering projects on time, within budget, and meeting objectives.

What is Contract Management?

- **Definition:**
 - Contract management involves managing the creation, execution, and analysis of contracts.
 - It aims to maximize operational and financial performance while minimizing risks.
 - **Key Goals of Contract Management:**
 - Ensures all parties meet their contractual obligations.
 - Tracks contract performance to ensure targets are met.
 - Makes necessary adjustments to align with project goals and resolve issues.
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Types of Contracts

1. Fixed Contracts:

- **What It Is:** A predetermined price is set for the entire project or specific deliverables.
- **Advantages:**
 - Provides cost certainty for the client.
 - Encourages efficiency since the contractor is paid a fixed amount regardless of time or resources used.
- **Disadvantages:**

- Risk for the contractor if costs exceed the agreed amount.

2. Time and Material Contracts:

- **What It Is:** The client pays for the actual time spent by the contractor and the materials used.
- **Advantages:**
 - Flexible and adaptable to changes in project scope.
 - Suitable for projects where the scope is uncertain.
- **Disadvantages:**
 - Costs can escalate if not closely monitored.

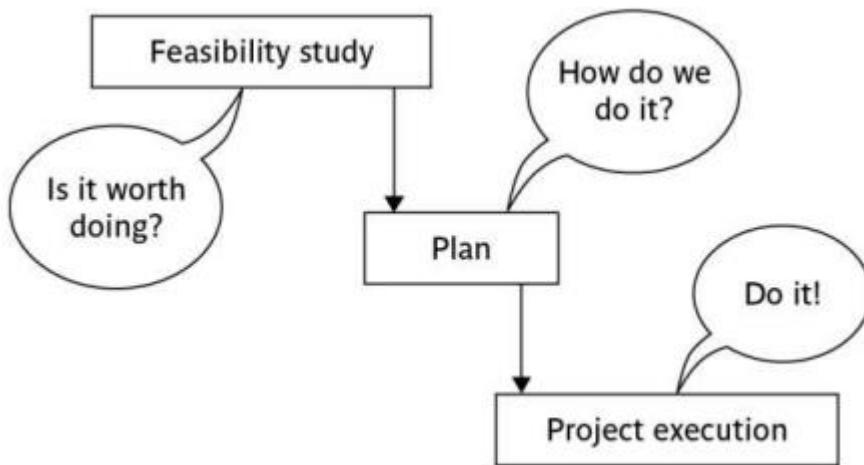
3. Cost-Reimbursement Contracts:

- **What It Is:** The client reimburses the contractor for allowable costs incurred during the project, plus an additional fee.
 - **Advantages:**
 - Reduces financial risk for the contractor.
 - Encourages transparency in spending.
 - **Disadvantages:**
 - Requires rigorous tracking of costs.
 - The client bears the risk of potential cost overruns.
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Importance of Contract Management

- Ensures clarity and alignment between parties on expectations, deliverables, and deadlines.
- Reduces the risk of disputes by defining roles, responsibilities, and terms clearly.
- Helps in monitoring performance and ensuring quality deliverables.
- Provides a structured way to handle changes and unforeseen challenges during a project.
- Protects both parties by managing risks related to costs, delays, or non-compliance.

Activities covered by project management



Project management ensures a project is completed successfully by covering various key activities. These include:

1. Feasibility Study

- **Purpose:** Determines whether the project is viable and beneficial.
 - **Key Questions Addressed:**
 - Is the project technically feasible?
 - Can the required technology, skills, and resources deliver the project?
 - Is it worthwhile from a business perspective?
 - Will the project bring value or benefits compared to its costs and risks?
 - **Outcome:** Helps decide whether to proceed with the project.
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2. Planning

- **Purpose:** Lays the groundwork for project execution by defining how and when tasks will be done.
- **Activities Involved:**
 - **Scheduling:**
 - Breaks the project into smaller tasks and assigns timelines to each.
 - Identifies milestones and deadlines to track progress.
 - **Monitoring Plan:**

- Establishes how progress will be tracked and measured.
 - Defines tools or systems for monitoring (e.g., Gantt charts, project management software).
 - **Outcome:** A clear roadmap for the team to follow, ensuring the project stays on track.
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3. Execution

- **Purpose:** Turns plans into action by implementing or developing the project.
 - **Activities Involved:**
 - **Implementation:**
 - Executes tasks as per the project plan.
 - Coordinates team efforts to meet goals.
 - **Development:**
 - Builds or creates the actual deliverables, whether a product, service, or system.
 - **Problem-Solving:**
 - Addresses challenges and adjusts as needed to keep the project moving forward.
 - **Outcome:** The project progresses as planned, with deliverables being created and refined.
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Summary

- **Feasibility Study:** Decides if the project is worth doing.
- **Planning:** Creates a detailed roadmap for execution.
- **Execution:** Implements the plan to achieve the project's goals.

Each step is essential for ensuring the project is efficient, effective, and aligned with its objectives.

Plans, Methods, and Methodologies in Project Management

1. Plans

- **What Are Plans?**
 - A detailed proposal outlining how to achieve specific objectives.

- Focuses on organizing tasks, resources, and timelines to ensure success.
 - **Purpose of Plans:**
 - **Provides Direction:** Clearly defines what needs to be done and when.
 - **Aligns Resources:** Ensures people, tools, and finances are appropriately allocated.
 - **Sets Timelines:** Establishes deadlines and milestones to track progress.
 - **Examples of Plans:**
 - **Project Plan:** Outlines tasks, timelines, and deliverables for the entire project.
 - **Risk Management Plan:** Identifies potential risks and how to mitigate them.
 - **Quality Plan:** Defines standards and procedures to ensure quality deliverables.
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2. Methods

- **What Are Methods?**
 - Specific procedures or techniques used to accomplish tasks in a project.
 - Focuses on how individual tasks are carried out in a systematic way.
 - **Purpose of Methods:**
 - **Systematic Execution:** Ensures tasks are performed efficiently and effectively.
 - **Consistency:** Reduces variability and maintains standards across tasks.
 - **Examples of Methods:**
 - **Waterfall:** A sequential approach where each phase is completed before moving to the next.
 - **Agile:** A flexible, iterative approach emphasizing collaboration and adaptability.
 - **Scrum:** A specific Agile framework using sprints to deliver incremental progress.
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3. Methodologies

- **What Are Methodologies?**
 - A structured system of practices, techniques, procedures, and rules.
 - Provides a high-level framework for managing entire projects or disciplines.
- **Purpose of Methodologies:**

- **Framework for Consistency:** Ensures all team members follow standardized practices.
 - **Quality Assurance:** Helps maintain high standards across all phases of a project.
 - **Scalability:** Allows projects to be managed effectively regardless of size or complexity.
- **Examples of Methodologies:**
 - **PRINCE2:** A process-driven methodology focusing on defined stages and roles.
 - **Lean:** Emphasizes eliminating waste and maximizing value.
 - **Agile Methodology:** A broader system that includes frameworks like Scrum and Kanban.
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Summary

- **Plans:** Focus on *what* to do and *when* to do it (e.g., project plans).
- **Methods:** Focus on *how* to execute tasks (e.g., Agile, Waterfall).
- **Methodologies:** Provide a complete *system* for managing projects (e.g., PRINCE2, Lean).

Together, these elements ensure projects are well-organized, executed systematically, and aligned with best practices.

Categorizing Software

Categorization helps in selecting appropriate project approaches for different types of tasks. Here's a detailed breakdown:

1. Information Systems vs. Embedded Systems

- **Information Systems:**
 - **Focus:** Managing data, building software applications, and creating user interfaces.
 - **Approach:**
 - Use agile methodologies for flexibility.
 - Employ rapid prototyping to quickly test ideas.
 - Practice continuous integration for regular updates.

- **Examples:**
 - Customer Relationship Management (CRM) systems.
 - Enterprise Resource Planning (ERP) software.
 - Online banking systems.
 - **Embedded Systems:**
 - **Focus:** Integrating software with hardware, real-time processing, and ensuring system reliability.
 - **Approach:**
 - Follow the V-Model or waterfall model for systematic development.
 - Conduct thorough testing and validation to ensure safety and functionality.
 - **Examples:**
 - Automotive control systems.
 - Medical devices.
 - Internet of Things (IoT) devices.
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2. Objective-Based vs. Product-Based

- **Objective-Based Projects:**
 - **Goal:** Focused on achieving specific outcomes or performance improvements.
 - **Approach:**
 - Track progress using milestones.
 - Use performance metrics to measure success.
 - Adapt plans based on evolving needs.
 - **Examples:**
 - Optimizing website performance.
 - Enhancing cybersecurity measures.
 - Improving sales processes.
- **Product-Based Projects:**
 - **Goal:** Deliver a tangible product or service.
 - **Approach:**

- Use the stage-gate process for structured development.
 - Perform detailed requirements analysis.
 - Gather and incorporate user feedback.
- **Examples:**
 - Developing a new mobile app.
 - Creating consumer electronics.
 - Building an e-commerce platform.
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3. Voluntary Systems vs. Compulsory Systems

- **Voluntary Systems:**
 - **Definition:** Participation is optional and based on individual or organizational choice.
 - **Examples:**
 - Open-source software projects.
 - Participation in optional training programs.
 - **Compulsory Systems:**
 - **Definition:** Participation is mandatory due to laws, regulations, or organizational policies.
 - **Examples:**
 - Adhering to mandatory safety regulations.
 - Implementing systems required by legal compliance.
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This structured categorization ensures the right approach is applied for each project type, optimizing outcomes and efficiency.

Stakeholders in a Project

Stakeholders are individuals or groups with an interest or "stake" in the success of a project. Here's a detailed explanation in simple terms:

1. Who Are Stakeholders?

- People directly or indirectly affected by the project or its outcomes.
 - Can include:
 - **Users/Clients:** Those who will use or benefit from the project's outcome.
 - **Developers/Implementers:** Those responsible for building or delivering the project.
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2. Types of Stakeholders by Proximity

- **Within the Project Team:**
 - Team members directly working on the project, such as developers, testers, and project managers.
 - **Outside the Project Team but Within the Same Organization:**
 - People in related departments or management overseeing the project.
 - Examples: Senior executives, department heads.
 - **Outside Both the Project Team and the Organization:**
 - External entities impacted by the project.
 - Examples: Clients, suppliers, government regulators.
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3. Stakeholders Have Diverse Objectives

- Different stakeholders may have varying goals and concerns:
 - A **client** wants the product to meet their requirements and be delivered on time.
 - A **developer** might focus on learning new skills, solving complex problems, or meeting personal financial needs.
 - An **executive** might prioritize staying within budget and achieving organizational goals.
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4. Importance of Common Objectives

- Stakeholders must align on shared project objectives:
 - Define clear and agreed-upon goals that serve the project's success.
 - Ensure all stakeholders understand and accept these objectives.
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5. Balancing Individual and Project Goals

- While each stakeholder has personal or departmental priorities, these should not conflict with the overall project vision.
 - Example:
 - A developer's personal goal (e.g., learning a new technology) can align with the project's goal of using innovative tools.
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6. Key Takeaway

- Managing stakeholders effectively involves:
 - Identifying all stakeholders early.
 - Understanding their unique goals and concerns.
 - Establishing clear communication to align everyone with the project's primary objectives.

This approach ensures collaboration and minimizes conflicts, leading to a more successful project.

Setting Objectives for Project Success

Setting clear and actionable objectives is crucial for achieving project success. Here's a detailed explanation in simple bullet points:

1. Key Question: "What Do We Have to Do to Succeed?"

- Define the steps and outcomes needed to successfully execute the project.
 - Ensure alignment with the goals of stakeholders and the overall project vision.
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2. Need for Project Authority

- A project authority is essential to:
 - **Control Finances:** Allocate and approve budgets for the project.
 - **Monitor and Modify Objectives:** Oversee progress and adjust objectives as needed.
- Responsibilities of a project authority:
 - **Set Project Scope:** Clearly define what the project will and won't include.

- **Approve Costs:** Manage and authorize spending.
 - This role can be filled by:
 - **An individual.**
 - **A group**, such as:
 - Project Board.
 - Project Management Board.
 - Steering Committee.
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3. Importance of SMART Objectives

- **SMART** stands for **Specific, Measurable, Achievable, Relevant, Time-Related**:
 - **Specific:**
 - Gather all requirements from stakeholders to avoid surprises later.
 - **Measurable:**
 - Ensure each requirement can be tested and verified as complete.
 - **Achievable:**
 - Review requirements for feasibility within the given time and budget.
 - Negotiate with stakeholders if some goals are unrealistic.
 - **Relevant:**
 - Focus only on requirements that directly contribute to the product or project goals.
 - Remove anything irrelevant.
 - **Time-Related:**
 - Confirm all requirements can be met within the deadline and budget.
 - Eliminate requirements that risk overspending or delays.
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4. Goals and Sub-Objectives

- **What Are Goals/Sub-Objectives?**
 - Intermediate steps towards achieving the main objective.
- **Allocating Responsibility:**

- Goals can be assigned to individuals, but the overall objective requires team collaboration.
 - **Example:**
 - **Objective:** Achieve user satisfaction with the software product.
 - **Analyst Goal:** Accurately capture user requirements.
 - **Developer Goal:** Deliver reliable and high-performing software.
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5. Measuring Effectiveness

- **How to Know Goals and Objectives Are Achieved:**
 - Conduct **practical tests** to confirm functionality and user satisfaction.
 - Monitor indicators of success, such as:
 - **Repeat Business:** Clients returning for additional services.
 - **Low Number of Complaints:** Fewer issues reported by end-users.
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This structured approach ensures clarity in objectives, accountability for goals, and measurable success, increasing the likelihood of delivering a successful project.

The Business Case for a Project

The business case explains why a project is worth pursuing. It helps stakeholders understand the value of the project by comparing costs and benefits. Here's a detailed explanation in simple terms:

1. Key Principle

- **The benefits of the project must outweigh its costs** to make it a worthwhile investment.
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2. Costs of a Project

- Costs are the expenses incurred during:
 - **Development:** Expenses related to designing, building, testing, and deploying the project.
 - **Operation:** Costs of running and maintaining the system after it is delivered.
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3. Benefits of a Project

- Benefits represent the positive outcomes of completing the project. They can be:
 - **Quantifiable:**
 - These can be measured and assigned a financial value.
 - Examples:
 - Increased revenue.
 - Reduced operating costs.
 - Savings on manual labor.
 - **Non-quantifiable:**
 - These cannot be directly measured or assigned a precise financial value.
 - Examples:
 - Improved customer satisfaction.
 - Enhanced brand reputation.
 - Better employee morale.

4. Challenges in Quantifying Benefits

- It is not always possible to calculate the exact financial value of a project's benefits.
- For example:
 - Improved efficiency may save time, but its monetary impact may be hard to quantify.

5. Client's Willingness to Pay

- A client's decision to invest in the project indicates that:
 - They have assessed its value, even if not in precise financial terms.
 - They perceive the project as beneficial enough to justify the costs.

6. Summary

- A strong business case demonstrates:
 - **Costs:** A clear understanding of all expenses.
 - **Benefits:** Both measurable and perceived advantages.

- The goal is to ensure the project delivers enough value to justify its investment, satisfying both the client and stakeholders.

Project Success and Failure

The success or failure of a project depends on various factors, including the degree to which its objectives are met. Here's a detailed explanation in simple terms:

1. Measuring Project Success

- Success is determined by the extent to which the project achieves its **defined objectives**.
 - For example, delivering a working product on time and within budget.
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2. The Project Triangle

- The "project triangle" consists of three key elements:
 - **Time**: Project schedule and deadlines.
 - **Cost**: Budget and expenses.
 - **Scope**: Features and deliverables of the project.
 - Adjustments within this triangle can help recover a project that is struggling:
 - **Running out of time?**
 - Reduce the project scope.
 - Increase the budget to speed up work (e.g., hire more resources).
 - **Budget constraints?**
 - Reduce scope or extend the timeline.
 - **Scope pressure?**
 - Increase costs or extend deadlines.
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3. Other Success Criteria

- Beyond meeting immediate objectives, success can also be evaluated based on long-term and less tangible benefits:
 - **Improved Skills and Knowledge**:

- Team members learn new techniques, tools, or processes during the project.
 - Enhances the organization's capability for future projects.
- **Creation of Reusable Assets:**
 - Development of tools, software libraries, or templates that can be used in future projects.
 - Saves time and reduces costs in subsequent initiatives.
 - **Improved Customer Relationships:**
 - Building trust and satisfaction with clients can lead to repeat business and long-term partnerships.
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4. Summary

- **Short-term success:** Meeting objectives within the constraints of the project triangle.
- **Long-term success:** Gaining valuable assets, enhancing skills, and fostering relationships that benefit the organization beyond the immediate project.
- A project can be considered successful even if minor adjustments are made to the triangle, as long as the overall value and broader benefits are achieved.

Project Management

Project management involves several activities to ensure the project runs smoothly and achieves its objectives. Here's a breakdown:

1. Core Activities

- **Planning:**
 - Deciding what needs to be done and setting objectives.
 - Outlining the project scope and deliverables.
- **Organizing:**
 - Making arrangements for resources, tools, and workflows.
 - Ensuring everything is in place for smooth execution.
- **Staffing:**
 - Selecting and assigning the right people to the right tasks.

- Matching skills to project requirements.
 - **Directing:**
 - Providing clear instructions and guidance to the team.
 - Ensuring everyone knows their responsibilities.
 - **Monitoring:**
 - Regularly checking progress to ensure the project stays on track.
 - Identifying any deviations from the plan.
 - **Controlling:**
 - Taking corrective actions to address delays or issues.
 - Adjusting resources or timelines as needed.
 - **Innovating:**
 - Solving problems creatively when challenges arise.
 - Thinking of new ways to improve processes and outcomes.
 - **Representing:**
 - Acting as a liaison between clients, users, developers, and other stakeholders.
 - Ensuring communication is clear and expectations are aligned.
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Project Planning

Planning is a critical phase that continues throughout the project life cycle. It starts with an initial plan during the initiation stage and evolves as the project progresses.

1. Initial Plan

- Created during the **project initiation stage**.
- Provides a broad outline of tasks, resources, and timelines.

2. Continuous Refinement

- As the project proceeds:
 - The plan is **monitored** to check progress.
 - The plan is **refined** to include new details, constraints, or insights.
 - Adjustments are made to stay aligned with objectives.

3. Key Planning Activities

- **Estimation:**

- Estimating the resources, time, and costs required for the project.
 - **Scheduling:**
 - Creating a timeline for project activities.
 - Allocating tasks to team members with clear deadlines.
 - **Staffing:**
 - Assigning roles and responsibilities to the project team.
 - Ensuring the team has the skills required for success.
 - **Risk Management:**
 - Identifying potential risks and challenges.
 - Planning strategies to mitigate these risks before they impact the project.
 - **Miscellaneous Plans:**
 - Covering other essential aspects, such as:
 - Communication plans (ensuring effective stakeholder communication).
 - Quality assurance plans (maintaining high standards for deliverables).
 - Resource allocation (managing tools, equipment, and materials).
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This structured approach to managing and planning projects ensures that objectives are achieved efficiently while adapting to challenges and new information along the way.

Modern Project Management: Key Features Explained in Detail

1. Planning Incremental Delivery

- **Shift from Long-Term Planning:**
 - Traditional methods focus on creating a fixed plan for the entire project at the start.
 - Modern approaches adopt **short-term, flexible planning**.
- **Incremental Delivery:**
 - The project is broken into smaller parts, and each part is delivered as a usable increment.

- Functionalities evolve with each increment, allowing adjustments and improvements based on feedback.
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2. Quality Management

- **Customer-Focused Quality:**
 - Emphasis on ensuring the product meets customer expectations and needs.
 - Quality is not just about finishing on time but also about delivering a product that adds value to the customer.
 - **Continuous Improvement:**
 - Quality checks are integrated into every increment.
 - Feedback from clients is used to refine and enhance the product.
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3. Change Management

- **Traditional Approach:**
 - In traditional systems, changes are discouraged after the project plan is finalized ("sign-off").
 - This rigid approach can lead to products that no longer meet client needs by the time they are delivered.
 - **Modern Approach:**
 - **Incremental Delivery with Customer Feedback:**
 - Allows flexibility to accommodate changes during the project.
 - Encourages customer feedback at every stage to ensure alignment with evolving needs.
 - **Version Control:**
 - Critical for managing incremental delivery.
 - Each increment creates a new version, requiring robust tracking to maintain consistency and avoid errors.
 - Ensures that previous versions can be referenced or restored if needed.
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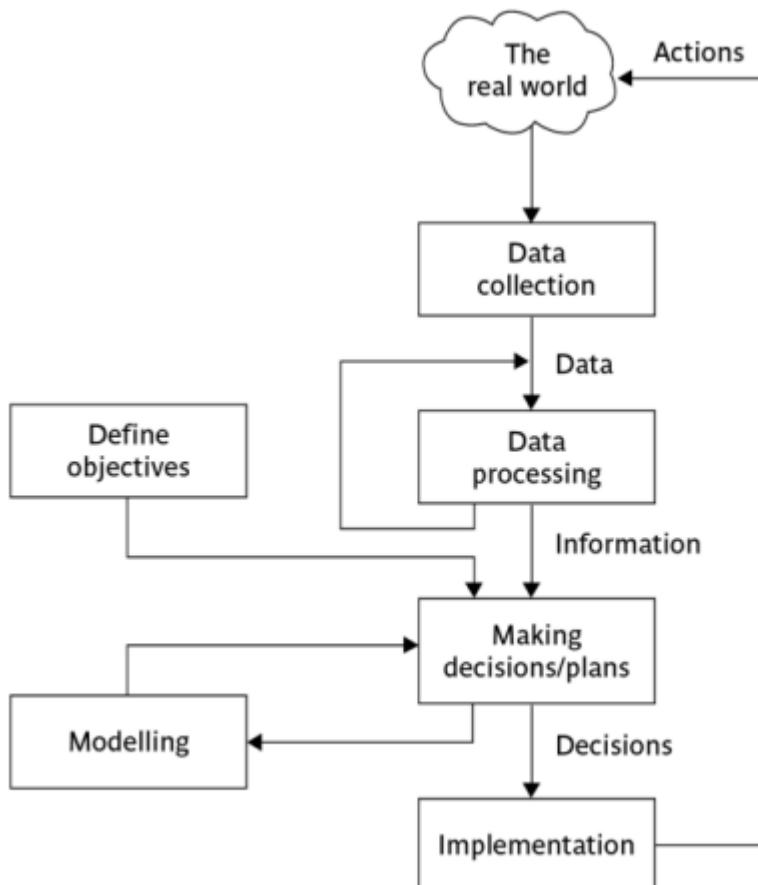
Summary

- **Incremental Planning:** Short-term, adaptable plans deliver functional pieces of the product over time.

- **Quality Focus:** Prioritizes meeting customer needs over rigid delivery timelines.
- **Adaptable to Changes:** Modern systems welcome changes and customer feedback, unlike traditional methods.
- **Version Management:** Essential for tracking progress and maintaining clarity in an incremental delivery model.

This approach ensures flexibility, customer satisfaction, and high-quality outcomes.

Management Control

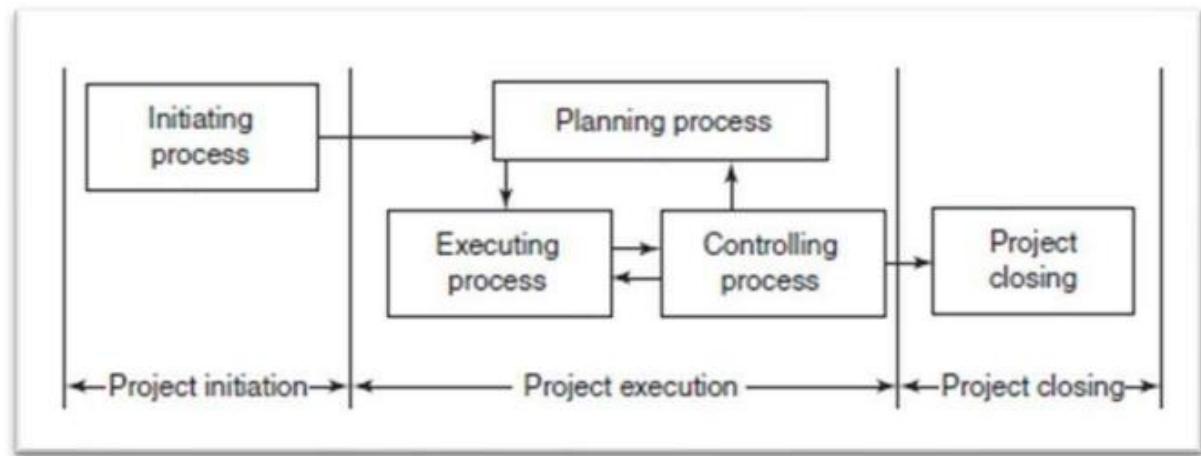


- **Data:**
 - Raw facts and figures that are unprocessed.
 - Example: "6,000 documents processed at location X."
- **Information:**
 - Data that has been processed to make it meaningful and useful.
 - Example: "Productivity is 100 documents a day."

- **Comparison with Objectives/Goals:**
 - Evaluating the information against set targets or objectives to identify gaps.
 - Example: "We will not meet the target of processing all documents by 31st March."
- **Modelling:**
 - Analyzing different scenarios to predict the outcomes of potential decisions.
 - Example: "If we hire two more staff at location X, how quickly can we finish processing the documents?"
- **Implementation:**
 - Taking actions based on the decisions made to address the situation or improve outcomes.
 - Example: Hiring two additional staff to speed up document processing.

Each of these steps helps in effective decision-making and ensures that management can achieve its goals efficiently.

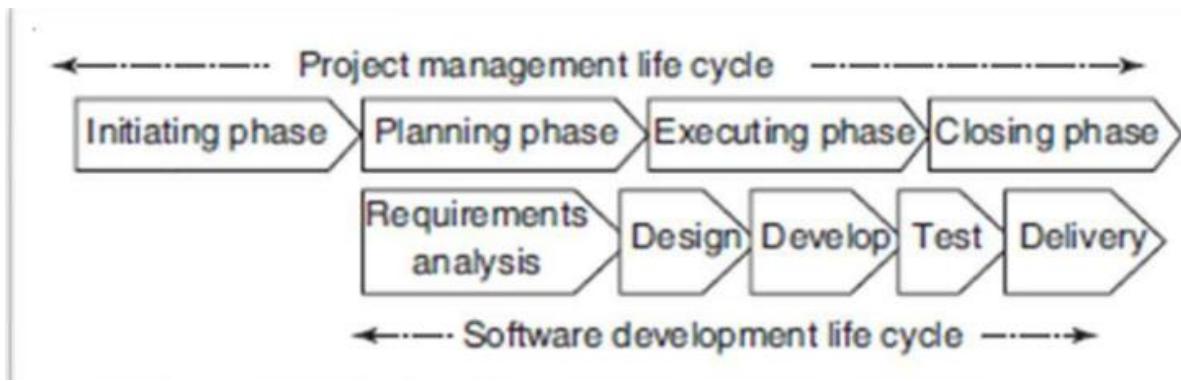
Project Management Processes:



In the project initiation stage, an initial plan is made. As the project starts, the project is executed and controlled to proceed as planned. Finally, the project is closed.

Project Management Life Cycle

During the software development life cycle, the software developers carry out several types of development processes. On the other hand, during the software project management life cycle, the software project manager carries out several project management processes.



Detailed Explanation of Project Phases in Simple Terms

Project Initiation

- **Purpose:** Understand the key aspects of the project before starting.
- **W5HH Principle (by Barry Boehm):**
A framework of questions to define the project's key characteristics:
 - **Why:** Why is the software being built? (Purpose and objectives)
 - **What:** What needs to be done? (Scope of work)
 - **When:** When will the work be completed? (Timeline)
 - **Who:** Who will handle each task? (Responsibilities)
 - **Where:** Where are the team members located? (Organizational structure)
 - **How (Technically):** How will the work be done? (Technical methods and tools)
 - **How (Managerially):** How will the work be managed? (Processes and plans)
 - **How Much:** How much of each resource is needed? (Resources like time, budget, and staff)

Project Planning

- **Purpose:** Develop detailed plans to guide the project.
- **Types of Plans:**
 - **Project Plan:** Assign resources and set timelines for each task.
 - **Resource Plan:** Identify manpower, equipment, and other resources required.
 - **Financial Plan:** Estimate costs for manpower, equipment, and other expenses.
 - **Quality Plan:** Set quality targets and plan quality control processes.

- **Risk Plan:** Identify potential risks, prioritize them, and outline actions to manage them.
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Project Execution

- **Purpose:** Implement the project according to the plan.
 - Key Activities:
 - Execute tasks as planned.
 - Continuously monitor and control progress to ensure alignment with the plan.
 - Take corrective actions when deviations from the plan occur.
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Project Closure

- **Purpose:** Finalize the project and ensure completion of all aspects.
 - Steps:
 - Confirm that all planned work is completed.
 - Ensure all project management processes have been executed.
 - Formally recognize project completion (agreement from all stakeholders).
 - Deliver final outputs and necessary documentation to the customer.
 - Release resources (e.g., staff and equipment) and terminate vendor agreements.
 - Settle all pending payments.
 - Conduct a post-implementation review to:
 - Analyze the project's performance.
 - Document lessons learned for future projects.
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This structured approach ensures that a project moves systematically from planning to completion while addressing challenges and learning for improvement.