SCS 3208 – Software Project Management

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About The Course

- Credits – 02
- 02 Lecture Hours per week
- Lectures – 02 Hour x 15 weeks = 30 Hours
- Evaluation – 20% Assignments, 80% Exam Paper
- Exam Paper – 02 Hours
  - 4 Compulsory Questions (20 MCQs and 3 structured questions)
- Assignments – 2 or more - will be announced

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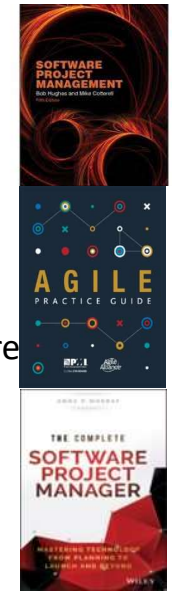
References/Recommended Text



1. Hughes, B., & Cotterell, M. (2010). Softwar project management- 5th edition, Tata McGraw-Hill Education.
2. PMI (2017). Agile Practice Guide, Project Management Institute, Inc. Newtown Square, Pennsylvania
3. Murray, A. P. (2016). The Complete Software Project Manager: Mastering Technology from Planning to Launch and Beyond. John Wiley & Sons

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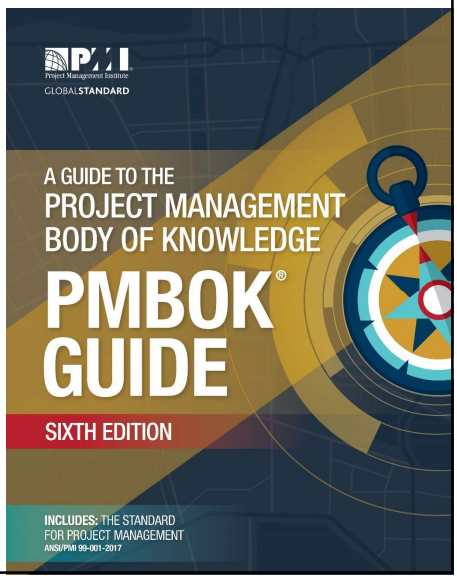
Project Management Institute

PMBOK® Guide – Seventh Edition (https://www.pmi.org/pmbok-guide-standards/foundational/pmbok)



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Course Outline

1. Introduction to Software Project Management	3 hrs
2. Project Initiation and Evaluation Methods	5 hrs
3. Project Planning and Scheduling	4 hrs
4. Risk Management	3 hrs
5. Allocation of Resources	3 hrs
6. Software Effort Estimation	3 hrs
7. Monitoring and Control	3 hrs
8. Contract Management and Termination	2 hrs
9. Communication Management	2 hrs

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1. Introduction to Software Project Management

After following this section, you should be able to;

- Define what software project management is
- Compare s/w projects and other types of projects
- Describe typical issues of s/w projects
- Define the usual stages of a software project and management
- Identify the stakeholders and their roles
- Define the success criteria for a s/w project

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What is a Project?

A project is a temporary endeavour undertaken to create a unique product, service, or result.

A sequence of unique, complex, and connected activities which

- has a goal or purpose and
- must be completed by a specific time,
- should be completed within budget, and
- according to specification.

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Characteristics of a Project in an organisation

- **Temporary** – every project must have a defined start and end in time
  - Has a defined scope and resources
- **Unique** – not a routine activity, there should be a goal, a specific set of operations to achieve the goal
- **Business Value Creation** – (net quantifiable benefit)– New assets, Tools, Public benefits, and brand recognition that can drive change in the organisation

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Examples for Projects

- Writing a report
- Setting up a sales kiosk for a professional accounting meeting
- Developing a software
- Writing a new piano piece
- Designing a new product

- The outcome of an organizational project may result in a standard product or a process for the organization

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Exercise 1

i) Give three examples for projects and routine activities and discuss how projects differ from routine activities.

ii) Which of the following is a project?

A. Running a donut shop
B. Building another library in your area, which might take a long time
C. Keeping a network up and running in a university department
D. Running a warehouse

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Characteristics of a Software Project

- Non-routine tasks are involved
- Planning is required
- Specific objectives are to be met or a specific product is to be created
- The project has a pre-determined time plan
- Work is often carried out for someone other than yourself
- Work involves several specialisms

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Characteristics of a S/W Project contd..

- People are formed into temporary groups to carry out the task
- Work is carried out in several phases
- The resources available for use on the project are constrained.
- The project can be large or complex

More the factors apply → the more difficult the task will be.
More staff needs → requires more additional coordination

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Exercise 2

- What is the difference between software projects and other types of project?

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Software Projects Vs Other Projects

- Invisibility
  - Physical artefacts such as bridges and roads are visible, unlike a software product.
- Conformity
  - Other projects interact with physical materials, while software projects interact only with human clients. People can change their attitudes and beliefs easily.

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Software Projects Vs Other Projects Contd.

- Complexity
  - Software projects are more complex due to the Complexity factors and characteristics they possess.
- Flexibility
  - Software can be changed easily. Therefore, subject to change according to the needs or changes of other components.

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Classification of S/W Projects

- Objective based Vs Product-based
- Compulsory user-based Vs Voluntary user-based
- Information Systems Vs Embedded Systems

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Objective based Vs Product based

- An on-line voting system for general public to select the most popular sportsman of the year
- An on-line educational game for primary students

Exercise 3: Categorize the following projects into two groups: Objective-based projects and Product-based projects

1. A payroll system for a business organization
2. An information and news website for a government ministry
3. A software system for a survey to determine the mobile phone usage of selected government servants (in order to consider for a communication allowance)

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Compulsory User-based Vs Voluntary User-based

- An online home delivery/take-away food ordering system
- A payroll system for a business organization

Exercise 4: Categorize the following projects into Compulsory User-based projects and Voluntary User-based projects

1. An information and news website for a government ministry
2. An online educational game for primary students
3. A CCTV camera-based surveillance system for a defense authority
4. An online registration system for internal students at a university
5. An online market survey system for a multi-national company

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Information Systems Vs Embedded Systems

- **Information systems** –enable staff to carry out office processes
  - E.g. Stock control system
- **Embedded systems-** control machines
  - E.g. A system to control air conditioning equipment in a building
- **Systems having elements of both**
  - E.g. A stock control system which can control an automated warehouse

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What is Project Management?

Refers to the application of knowledge, skills, tools and techniques to achieve specific **targets** within specified **budget** and **time** constraints.

1. Planning – what is to be done
2. Organizing – making arrangements
3. Directing – giving instructions
4. Monitoring – checking on progress
5. Controlling – taking actions to remedy hold-ups
6. Innovating – coming up with new solutions
7. Representing – liaising with users

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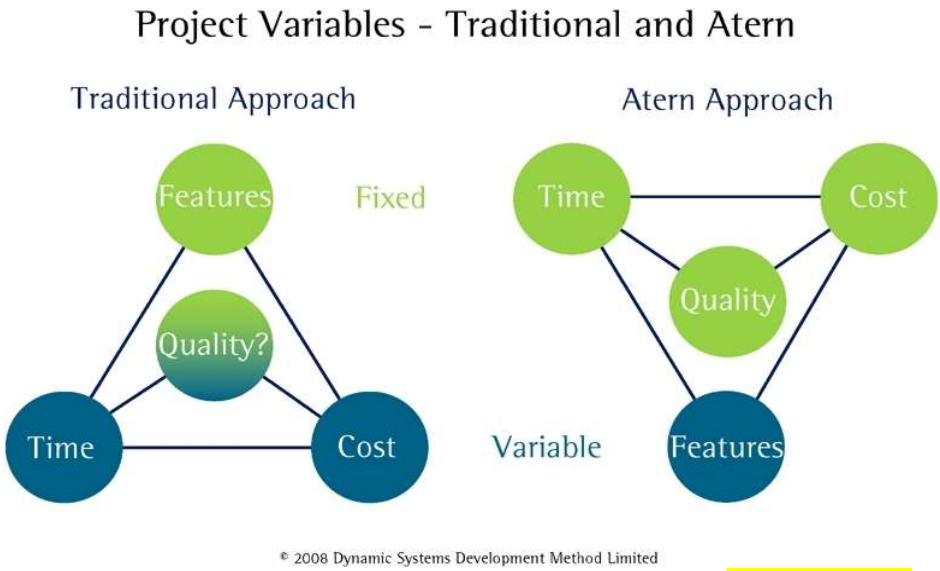

- There are six major factors to be considered: scope, cost, time, quality, risks and benefits

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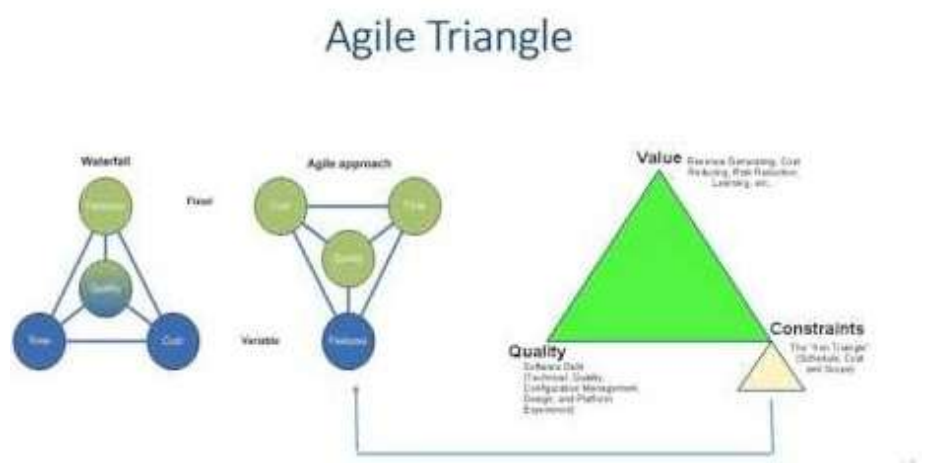
Watch this video in the VLE?



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Importance of Project Management

- Meet business objectives
- Satisfy stakeholder expectations
- Be more predictable
- Increase chances of success
- Deliver the right products at the right time
- Resolve problems and issues
- Respond to risks in a timely manner

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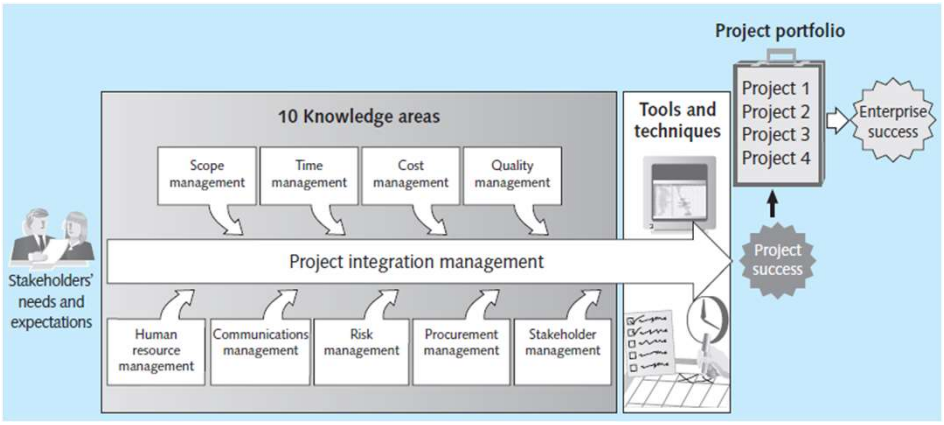
Project Management Framework



Master of Computer Science/ Master of Science in Computer Science

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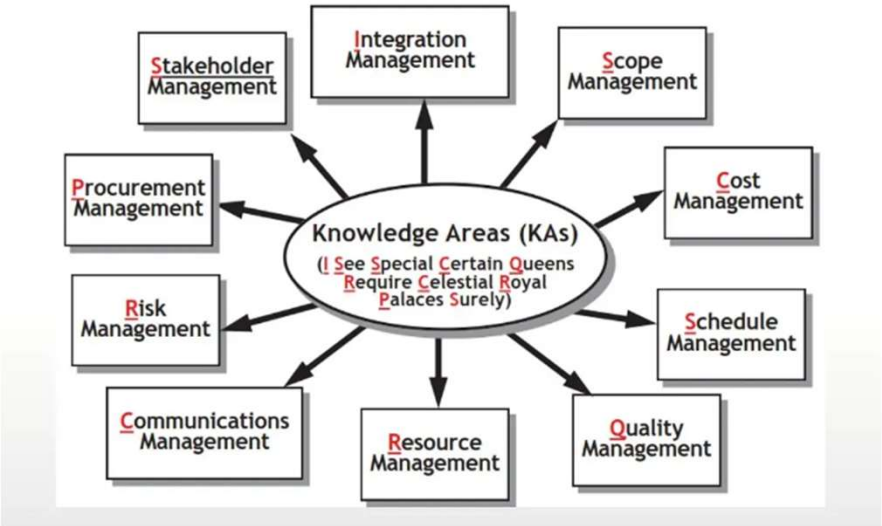
PM Knowledge Areas



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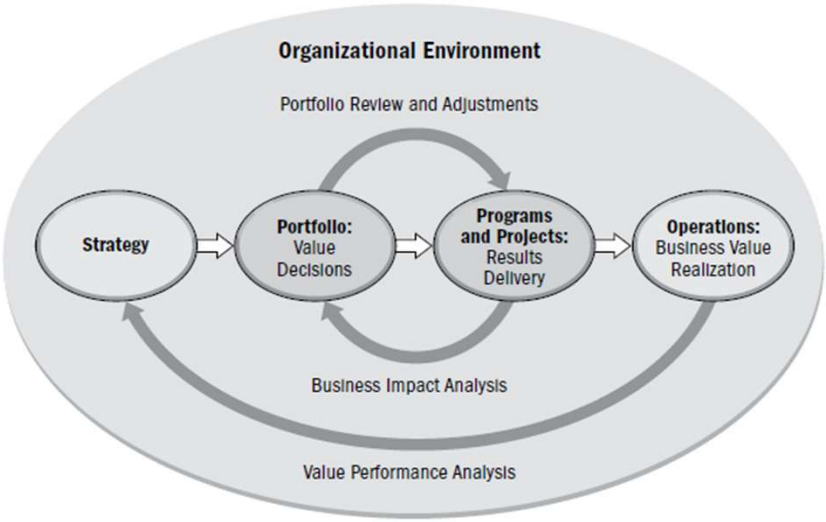
Organizational Project Management



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Project Management Approach

1. Predictive – Scope/cost/time determined and known at the onset of the project (Waterfall project management)
2. Adaptive
   - Iterative - Scope known upfront. Cost and time estimates are to be modified and finalized as the understanding of the project increases
   - Incremental – Deliverables developed through a series of iterations

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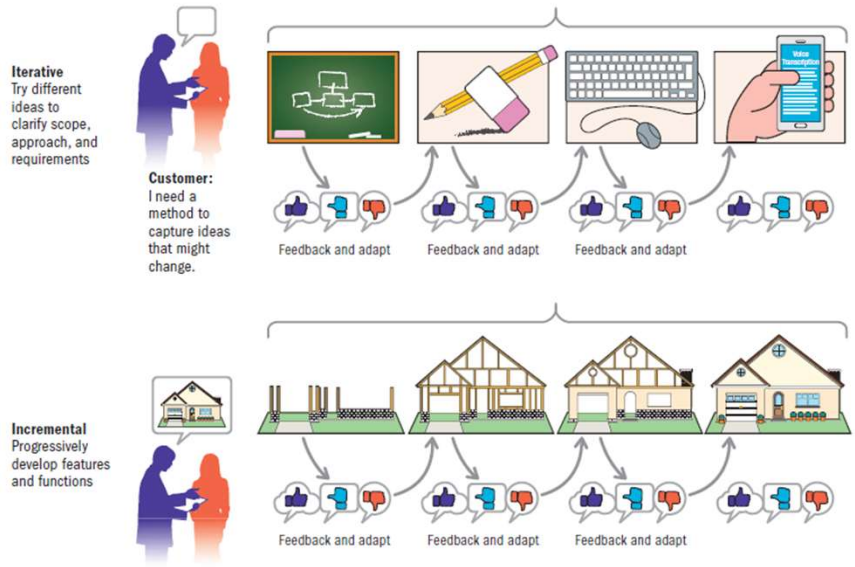
Iterative and Incremental Development



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Software Project Mgt Methods

1. **Traditional/Waterfall method** - Best when scope, budget and time factors are known
2. **Kanban** – Uses a board to visually represent work items. Ensures a manageable number of active items are in progress at a time. Focuses on continuous improvement and helps to find the weak spots in the workflow.
3. **Scrum** - A prescriptive framework that employs an iterative, incremental approach to optimize predictability and control the risks. The project works in short cycles or sprints, each producing a potentially rich deliverable product.
4. **Scrumban** - A combination of both that actually puts the Kanban practices on top of Scrum and makes it easy for Scrum teams to focus on continuous improvement

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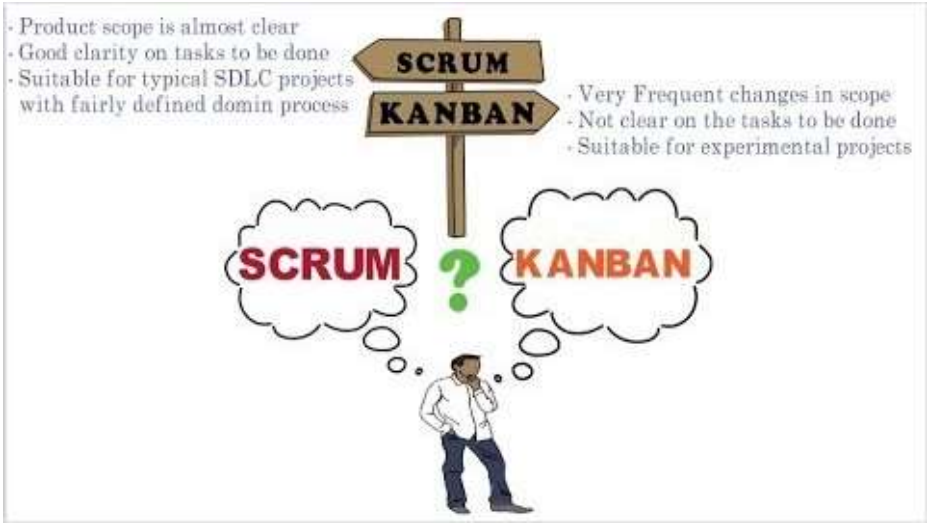
Scrum or Kanban, Which is the best?



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What is Scrumban?

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Considerations for Selecting a Development Approach

1. Product, Service, or Result

- Degree of innovation
- Requirements certainty
- Scope stability
- Ease of change
- Delivery options: Delivered in pieces or as one product/result/service
- Risk: Products of inherently high risk require analysis first
- Safety requirements: Products with rigorous safety requirements require a predictive approach
- Regulations-With a required process, documentation, and demonstration needs

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Considerations for Selecting a …contd.

2. Project

- **Stakeholders** -Projects that use adaptive methods require significant stakeholder involvement throughout the process.
- **Schedule constraints** – An iterative or adaptive approach is beneficial if there is a need to deliver something early.
- **Funding availability-** Projects that work in an environment of funding uncertainty can benefit from an adaptive or iterative approach.

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Considerations for Selecting a …contd.

3. Organization

- Organizational structure – A rigid reporting structure and substantial bureaucracy frequently uses a predictive approach
- Culture - A predictive approach fits better in an organization with a culture of managing and directing, where the work is planned out, and progress is measured against baselines
- Capability - Organizational policies, ways of working, reporting structure, and attitude should all be aligned in order to employ adaptive methods successfully
- Project team size - Adaptive approaches, especially agile methods, often work better with project teams of 7 ± 2.
- Location - Adaptive approaches also favour project teams that are located in the same physical space.

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Roles in Project Management

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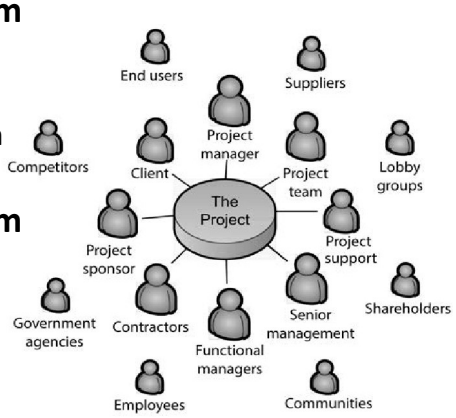
Project Stakeholders

- **Internal to the project team**
  - Be under the direct control of the project leader
- **External to the project team but within the same organization**
  - Users of the system who can do system testing
- **External to the project team and the organization**
  - Users of the system – customers or contractors



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Contract Management and Technical Project Management

- Project Manager in Client Organization
  - Contract Supervision
- Project Manager in Software Supplier Org.
  - Technical Management

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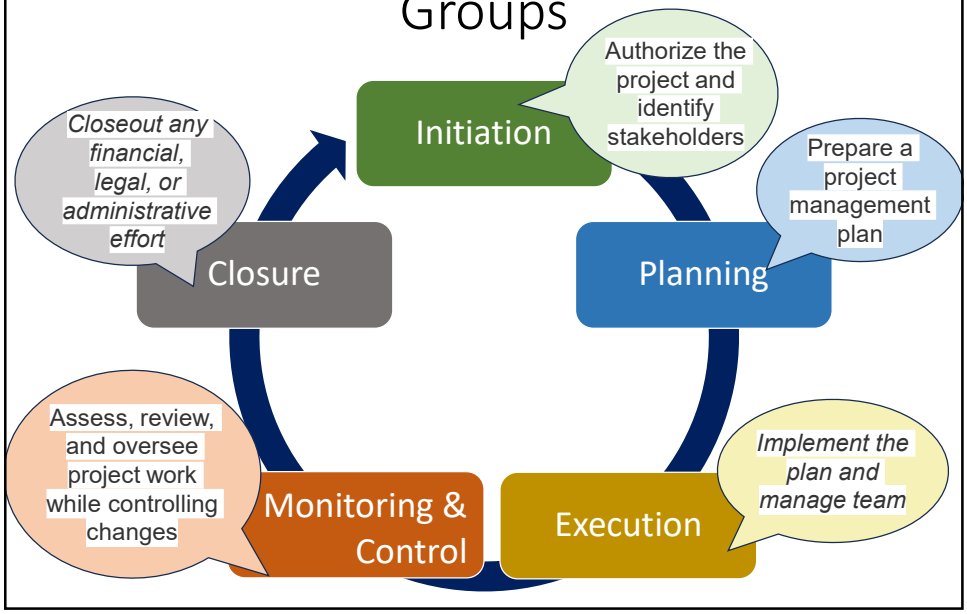
Project Life Cycle with 5 Major Process Groups



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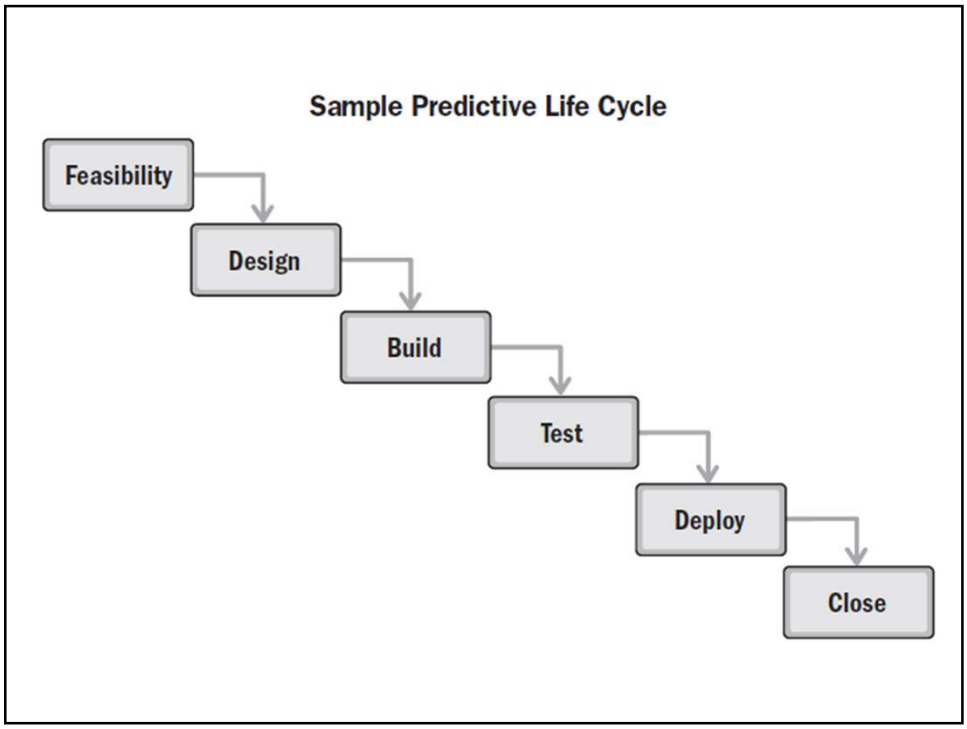
Sample Predictive Life Cycle
Feasibility
Design
Build
Test
Deploy
Close

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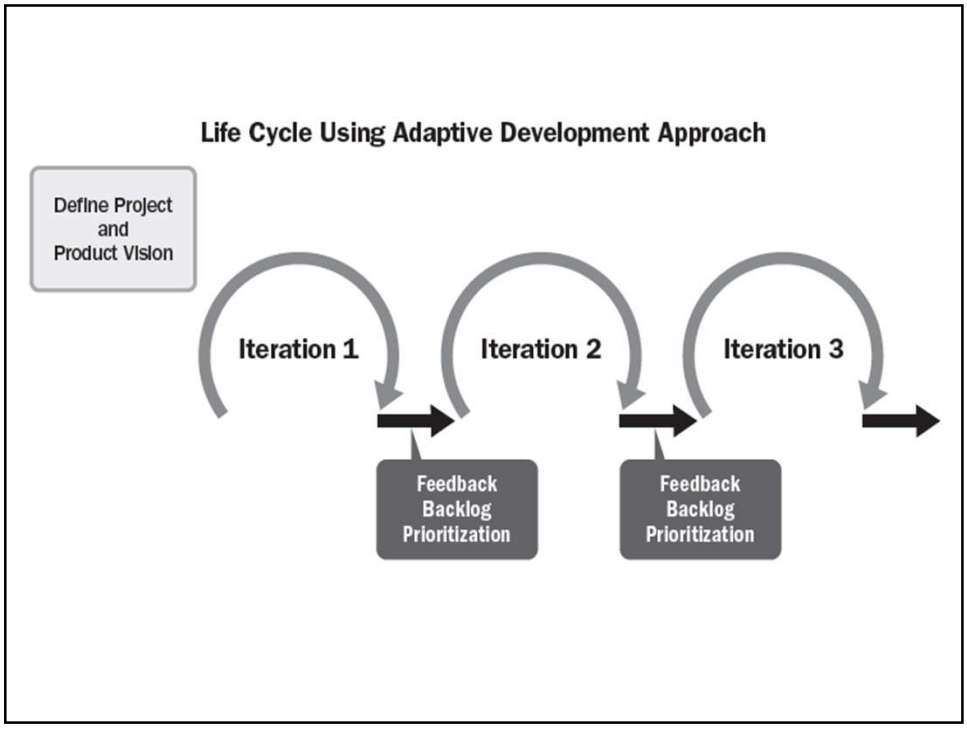
Life Cycle Using Adaptive Development Approach
Define Project and Product Vision
Iteration 1
Iteration 2
Iteration 3
Feedback Backlog Prioritization
Feedback Backlog Prioritization

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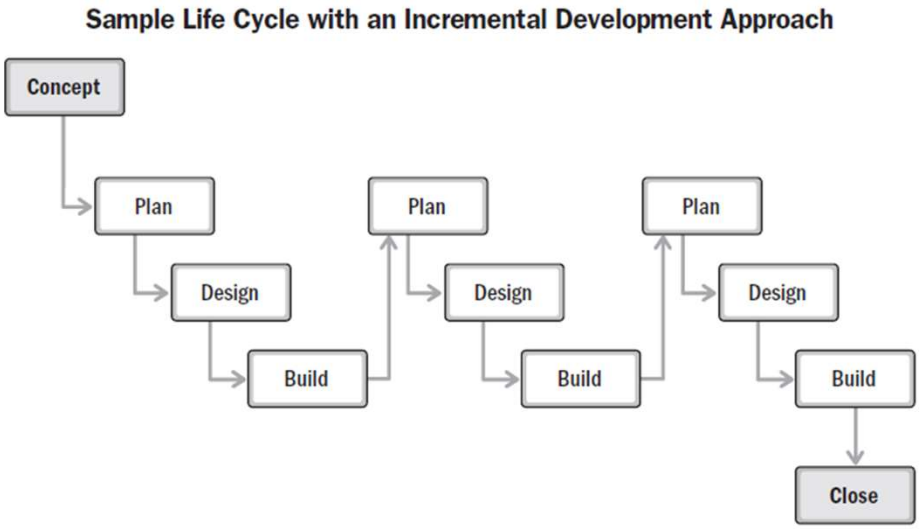

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Exercise 6

i. Remind the software project you carried out during your 2nd Year.
   1. What type of software project was it?
   2. List the problems that you have encountered when you engaged with software development project.
   3. How could have you minimized the effect of the problems you stated in question 2?

ii. UCSC is going to outsource the development of a library management system.
   1. Identify the stakeholders of this system.
   2. Group them into three major categories
   3. What would be the objective of this project?

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