

Week 1 – Introduction to the Unit (Lecture 1)

COS30049-Computing Technology Innovation Project

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Acknowledgement of Country

We respectfully acknowledge the Wurundjeri People of the Kulin Nation, who are the Traditional Owners of the land on which Swinburne's Australian campuses are located in Melbourne's east and outer-east, and pay our respect to their Elders past, present and emerging.

We are honoured to recognise our connection to Wurundjeri Country, history, culture, and spirituality through these locations, and strive to ensure that we operate in a manner that respects and honours the Elders and Ancestors of these lands.

We also respectfully acknowledge Swinburne's Aboriginal and Torres Strait Islander staff, students, alumni, partners and visitors.

We also acknowledge and respect the Traditional Owners of lands across Australia, their Elders, Ancestors, cultures, and heritage, and recognise the continuing sovereignties of all Aboriginal and Torres Strait Islander Nations.



Objectives of Today

- Unit Overview
- Project Overview
- Describe the characteristics of a project
- What is Project Management
- Project management phases overview



Unit Overview

What this unit is about?

This is a project-based unit where students collaborate in teams to develop innovative solutions for industry challenges.

What are you going to learn?

The primary focus of this project is to apply a range of IT techniques and analysis methods to effectively address these challenges

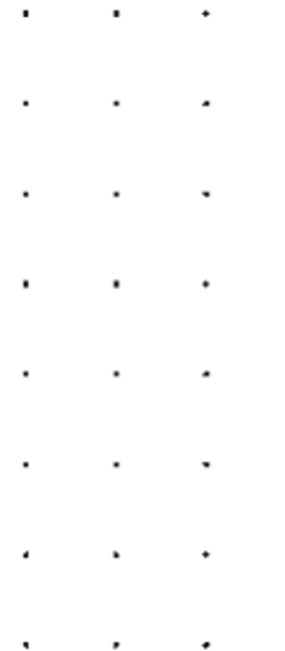
How much time do you need to dedicate to studying?

- Lecture 01: 1 hr
- Lecture 02: 1hr
- Workshop: 2 hrs
- Complete the post-class activities and assessments: Approx. 8 hrs

How to pass the unit?

All assessments for this unit will be handled in the semester, and there are a total of 3 group assignments, which will make up 100% of the unit's mark, implying no exam. (Please consult Canvas for more details on all assessments.)

To pass, your overall unit total must be over 50% (50 out of 100 marks), with at least 40% in each assignment.



Unit Overview

We can categorize this unit into three parts: Project Management, Artificial Intelligence, and Web Development.

Part I Project Management (Week 1-3): In this section, you will learn the basics of project management, including scope management, time management, and risk management. You'll also explore essential tools like the Work Breakdown Structure (WBS), Gantt Charts, and Meeting Minutes. These concepts and tools will help you manage projects effectively and lead your team to success.

Part II Machine Learning (Week 4-7): In this section, you will learn skills related to machine learning, including the data preprocessing, regression, clustering, and using Python for classification tasks. These skills will help you adopt machine learning as a tool to solve real-world problems.

Part III Web Development (Week 8-12): In this section, you will learn the essentials of web development using ReactJS and FastAPI. ReactJS will enable you to create dynamic, responsive user interfaces, while FastAPI will allow you to build high-performance APIs with Python. Together, these skills will equip you to develop robust and efficient web applications, handling both client-side and server-side aspects.



Unit Overview

- **Artificial intelligence:** AI is the simulation of human intelligence processes by machines, especially computer systems. Essentially it involves computer programs to reason on the same model as a human brain, by focusing on three cognitive skills – reasoning, learning and self-correction.
- **Web development:** Web development is the process of creating and maintaining websites and web applications, encompassing various aspects such as web design, web content development, client-side/server-side scripting, and network security configuration. It involves using technologies like HTML for structuring content, CSS for styling, and JavaScript for adding interactivity. Modern web development often includes frameworks and libraries like React, a powerful JavaScript library for building user interfaces, which enables developers to create reusable UI components and manage application state efficiently. Web development can range from creating simple static pages to complex dynamic applications, with front-end development focusing on user interface and experience, and back-end development managing server-side logic, database interactions, and application performance.

Projects Overview

Students will collaborate to build a web-based AI project focused on following topics:

- 1. Misinformation Detection on Social Media:** Detect misinformation on social media platforms. Students will collect real-world social media data, extract useful features (like text content and user behaviour), and train models to identify false or misleading posts. The goal is to help improve online safety and address a key cybersecurity challenge in today's digital world.
- 2. Spam or Malware Detection:** Detect spam messages and potential malware threats. Students will work with datasets containing emails, messages, or files, extract relevant features (such as text patterns or file properties), and build models to classify harmful content. The project aims to help protect users from digital threats and improve cybersecurity in communication systems.
- 3. Detecting Software Vulnerabilities:** Detect security vulnerabilities in software code. Students will analyse source code to identify patterns that may lead to bugs or exploits, and train models to automatically flag risky code. The goal is to help developers find and fix vulnerabilities early, improving the overall security of software systems.
- 4. Network Traffic Classification for Anomaly Detection:** Classify network traffic and detect unusual or potentially malicious activity. Students will analyse network data, extract features such as packet size and timing, and train models to distinguish normal behaviour from anomalies. The goal is to support early detection of cyberattacks and improve network security.

Assignment Overview

Assignment 1 (15%)

Requires teams to develop a comprehensive project management plan and prototype design for a chosen machine learning project related to cybersecurity, focusing on planning, scheduling, risk analysis, and front-end design.

Assignment 2 (40%)

Builds on this by implementing and evaluating machine learning models for the selected topic, including data collection, preprocessing, modeling, and submitting a report with code, processed datasets, and documentation.

Assignment 3 (45%)

Requires you to build a full-stack web app using React.js and FastAPI that integrates your AI model from Assignment 2, lets users input data, runs predictions on the backend, and displays results with interactive visualizations.

!! Hurdle!!

What We Expect from You

Practice the Workshop/Tutorials

The weekly workshop practice is highly relevant to All Assignments.
What you build in class will help you complete the real assignment tasks.

Make Time for Self-Study

Set aside time to strengthen your skills in React and Python.
We'll teach the fundamental parts that relate to your assignment, but you'll need to practice independently to keep up.

Email Responsibly

We'll do our best to respond to questions via email.
However, please avoid sending assignment-related emails **within 48 hours before the deadline**, as due dates usually fall on Sunday, and your email may land on a **weekend** — this limits our response time and may cause **avoidable last-minute stress**.

Your Week 1 Task

This unit is a large team-based course that brings together students with diverse backgrounds.

Every student must register for one group, with each group comprising three students. During the first week of this semester, students can select the group they wish to join autonomously. However, if any student fails to join a group within this timeframe, we will step in. To foster a cohesive team environment where each member is familiar with one another, we strongly encourage students to take the initiative to self-organize into teams of three and then join a group together. To facilitate this process, we have outlined the following steps:

Go to the People section, to join a group from the list, simply select the one that best aligns with your preferences and click to confirm your choice. Feel free to switch between different groups until you find the right fit. However, please note that once you have submitted the first assignment, group changes will no longer be allowed. Within each group, one student will be designated as the group leader, responsible for coordinating and leading the team's projects.

Groups (50)

▶ Group 3-1

2 / 3 students

▼ Group 3-2

0 / 3 students

There are currently no students in this group. Add a student to get started.

How Would You Define a Project?

Project is a temporary group activity undertaken to create a unique product, service, or result.

A project include:

- **Unique Deliverables:** Produces a unique product, service, or result.
- **Temporary Nature:** Start and End Dates, A Temporary Group
- **Constraints:** Time, Budget, Resources (i.e., money, people, equipment).

What Is an IT Project?

An IT project is a type of project that deals with IT infrastructure, information systems or computers.

Examples: web development, software development, mobile app development, and so on.



Fun Fact: Only 30% of projects are successful

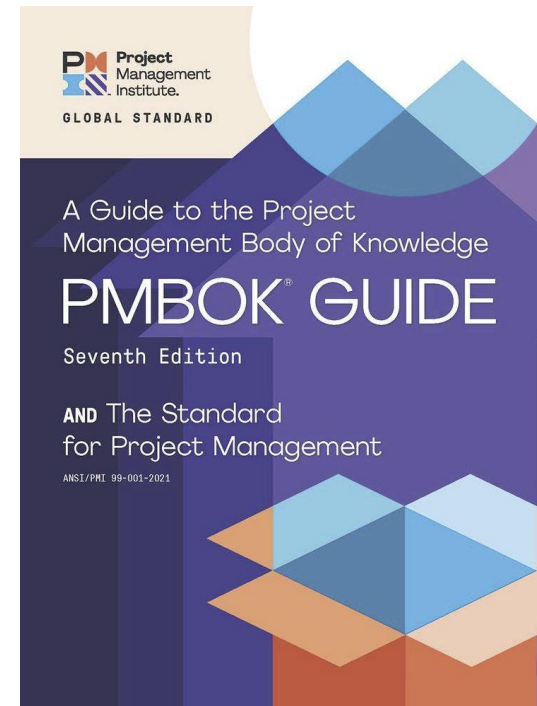
An IT project successful rate is even less, an example is:

- The Myki system, Melbourne's public transport ticketing system, has faced significant criticism and challenges, often leading to it being labeled as an IT project failure.
- **Delays and Cost Overruns:** The Myki project experienced substantial delays and cost overruns. Originally planned to be operational by 2007, it was not fully implemented until 2010, and the cost ballooned from an initial estimate of AUD \$500 million to over AUD \$1.5 billion.



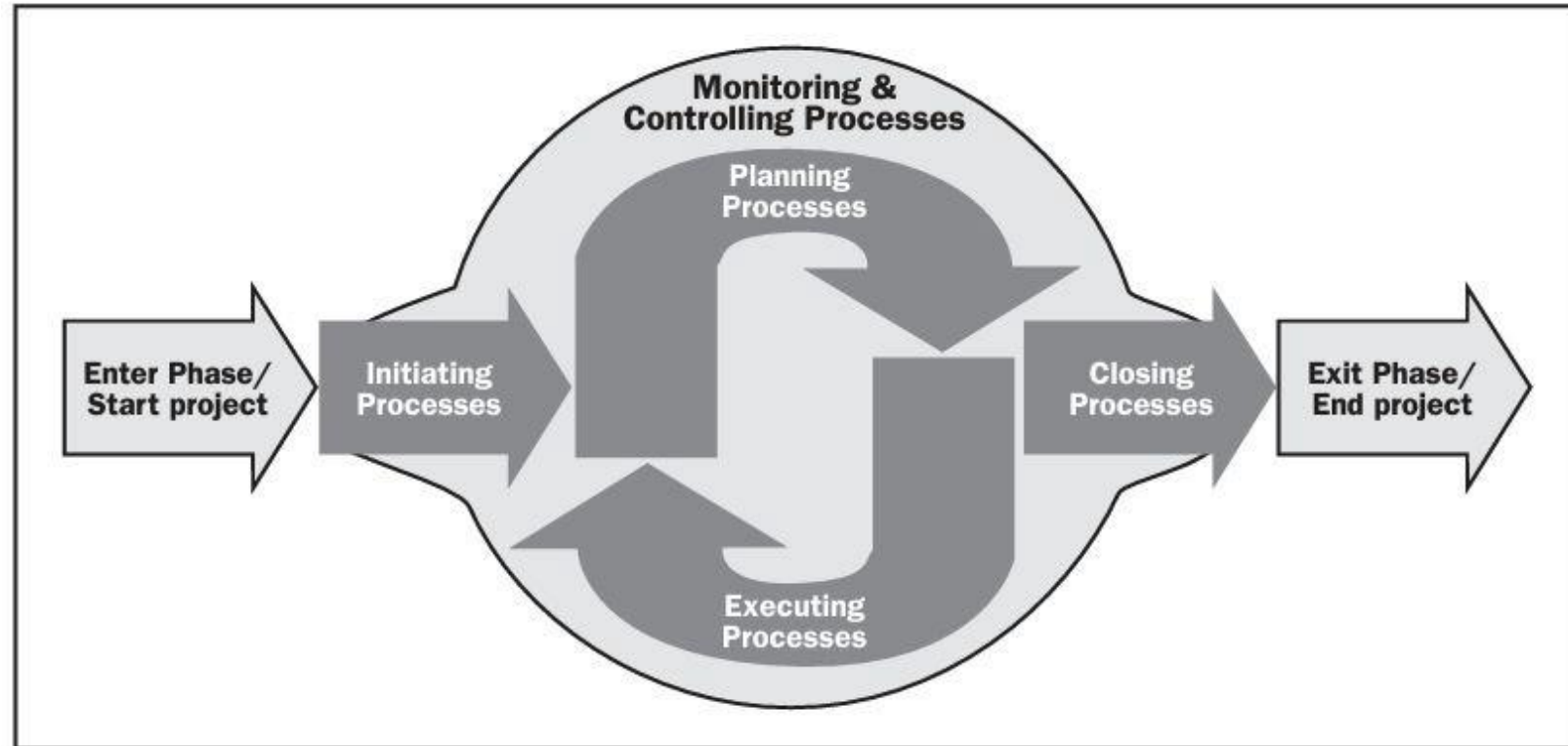
What is Project Management?

- **Definition:** Project management is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements. This application of knowledge requires the effective management of appropriate processes. (from PMBOK)



Project Management phases

1. Selection and Initiation
2. Planning
3. Execution
4. Monitoring & Controlling
5. Closing



Project Management Process,
Project Management Institute, 2001,
p.40

In this unit we will mainly focus on phrase 1, 2 ,4.

The 9 Knowledge Areas

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

Knowledge	Initiating	Planning	Execution	Monitoring & Control	Closing
1. Project Integration Management	1.1 Develop Project Charter	1.2 Develop Project Management Plan	1.3 Direct and Manage Project Execution	1.4 Monitor and Control Project Work 1.5 Perform Integrated Change Control	1.6 Close Project or Phase
2. Project Scope Management		2.1 Plan Scope Management 2.2 Collect Requirements 2.3 Define Scope 2.4 Create WBS		2.5 Verify Scope 2.6 Control Scope	
3. Project Schedule Management		3.1 Plan Schedule Management 3.2 Define Activities 3.3 Sequence Activities 3.4 Estimate Activity Resources 3.5 Estimate Activity Durations 3.6 Develop Schedule		3.7 Control Schedule	
4. Project Cost Management		4.1 Plan Costs Management 4.2 Estimate Costs 4.3 Determine Budget		4.4 Control Costs	
5. Project Quality Management		5.1 Plan Quality Management	5.2 Perform Quality Assurance	5.3 Perform Quality Control	
6. Project Resource Management		6.1 Plan Human Resource Plan	6.2 Acquire Project Team 6.3 Develop Project Team 6.4 Manage Project Team		
7. Project Communications Management		7.1 Plan Communications Management	7.2 Manage Communications	7.3 Control Communications	
8. Project Risk Management		8.1 Plan Risk Management 8.2 Identify Risks 8.3 Perform Qualitative Risk Analysis 8.4 Perform Quantitative Risk Analysis 8.5 Plan Risk Responses		8.6 Monitor and Control Risks	
9. Project Procurement Management		9.1 Plan Procurements Management	9.2 Conduct Procurements	9.3 Control Procurements	9.4 Close Procurements
10. Project Stakeholders Management	10.1 Identify Stakeholders	10.2 Plan Stakeholder Management	10.3 Management Stakeholder Engagement	10.4 Control Stakeholder Engagement	

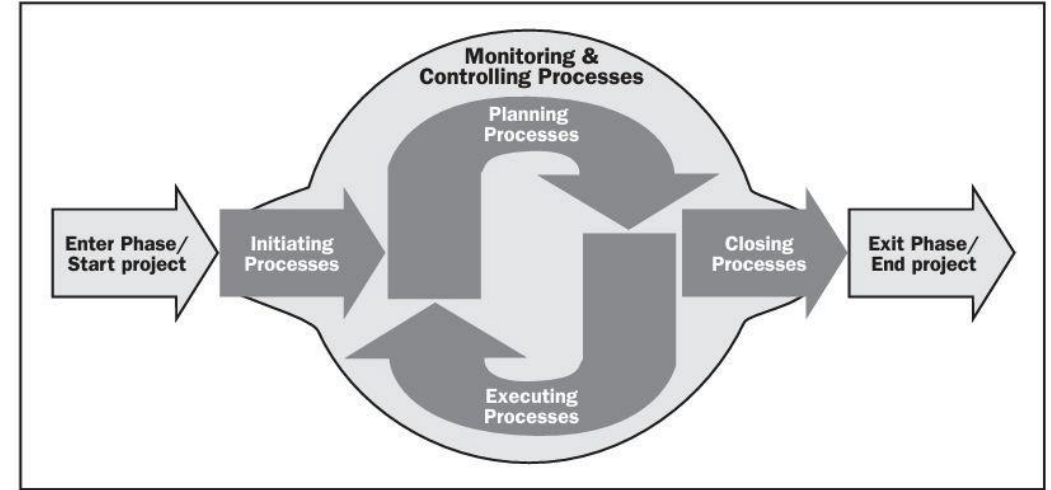
In total, there are 47 processes defined in the PMBOK

1: Initiation Processes

–Input:

- **Statement of Work (SOW):** Describes project deliverables; Sourced internally or from external customers; Includes business need, product scope, and strategic plan alignment.
- **Business Case:** Justifies project investment; Includes business need and cost-benefit analysis; created due to market demand, organizational need, customer request, technological advance, legal requirement, ecological impact, or social need; reviewed periodically.
- **Contract:** Required if the project is for an external customer.
- **Enterprise Environmental Factors:** Influences include governmental/industry standards, organizational infrastructure, and marketplace conditions.
- **Organizational Process Assets:** Influences include standard processes, templates, and historical information/lessons learned.

–Outcome: Project Charter.

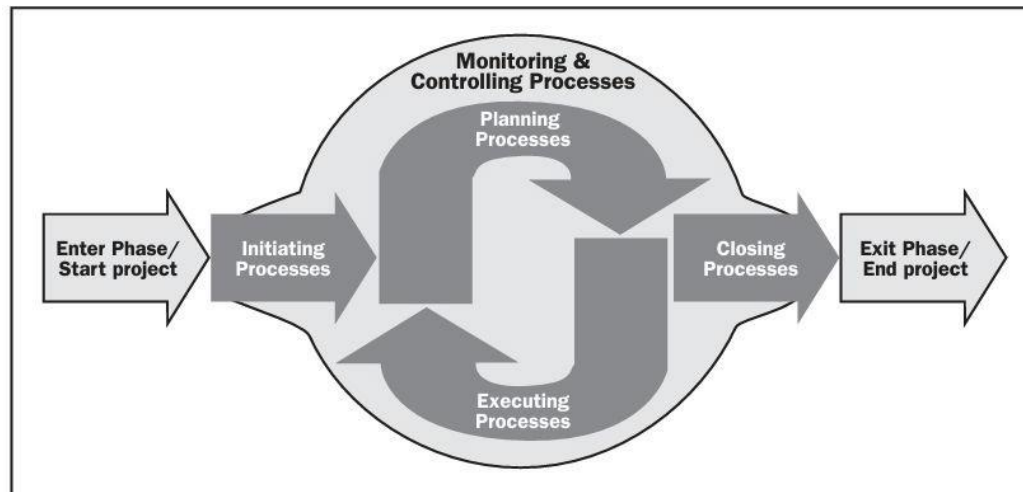


Project Management Process,
Project Management Institute, 2001,
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2: Planning

Planning is the only group that has activity in all 9 knowledge areas. Out of the 47 processes defined in the PMBOK, 24 are involved in the planning phase.

Those processes required to establish the scope of the project, refine the objectives, and define the course of action required to attain the objectives that the project was undertaken to achieve.

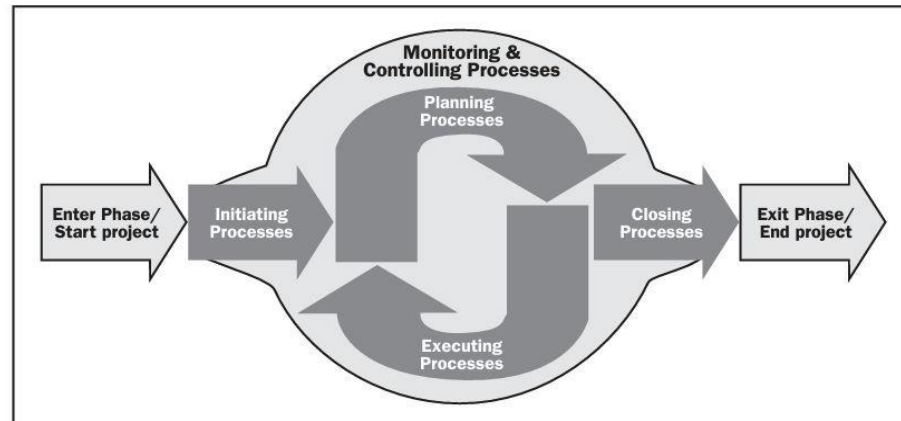


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3. Execution

Executing Process Group. Those processes performed to complete the work defined in the project management plan to satisfy the project specifications.



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 2001, p.40

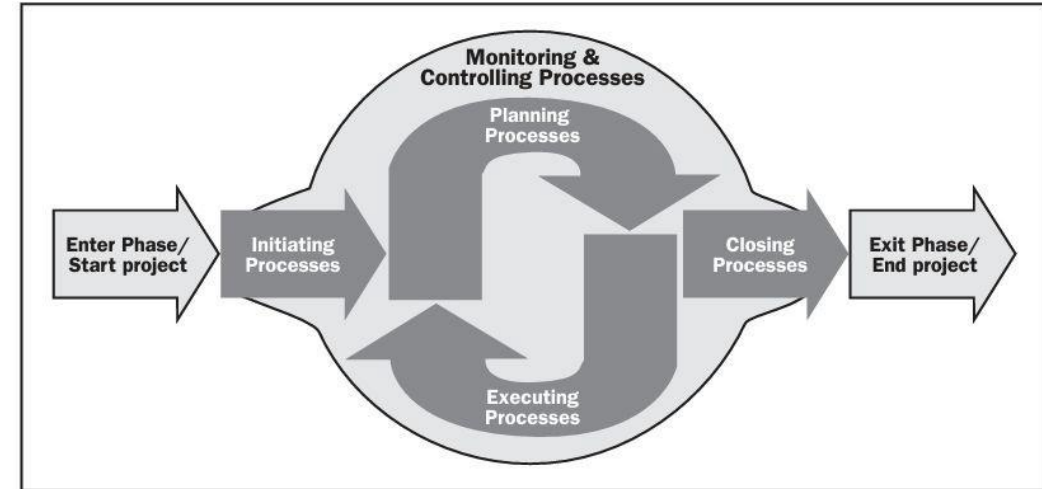
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4. Monitoring & Control

- Observing project execution and team performance regularly
- Identifying problems in a timely manner
- Taking corrective actions when necessary
- Monitoring Project variables against initial project plan

- Project Variables are:

- Cost
- Time
- Scope



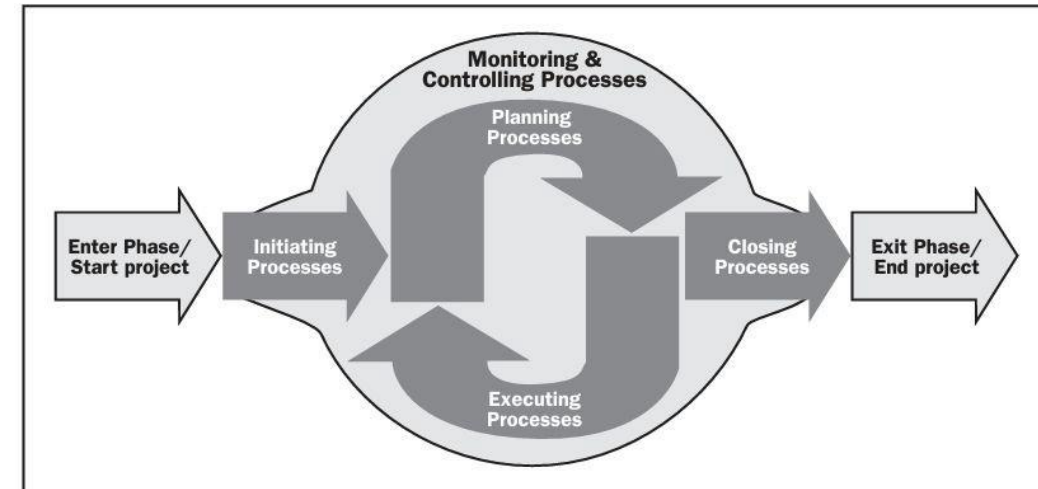
Project Management Process,
Project Management Institute, 2001,
p.40

5. Closing

Formal acceptance and ending of the project
Archiving administrative activities and other documentation

Two main phases
1. Contract Closure
2. Project closure

For Agile or iterative methodologies
we also close iterations.



Project Management Process,
Project Management Institute, 2001,
p.40



Thank You

