



Operating System

Module-5 Notes

by pyqfort.com

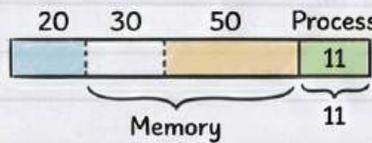


Contents Covered:

- Intro to Memory Management

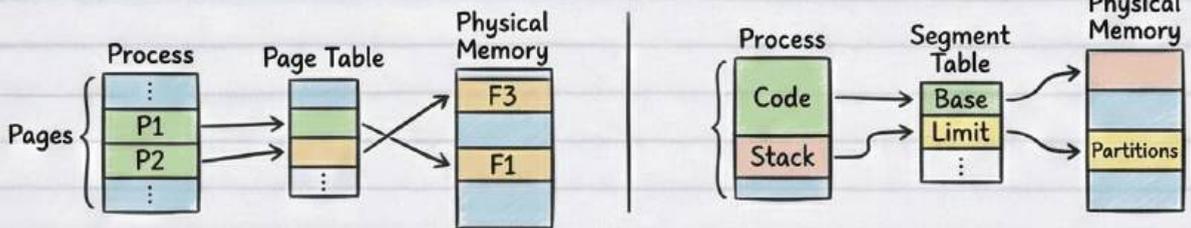


- Memory Allocation

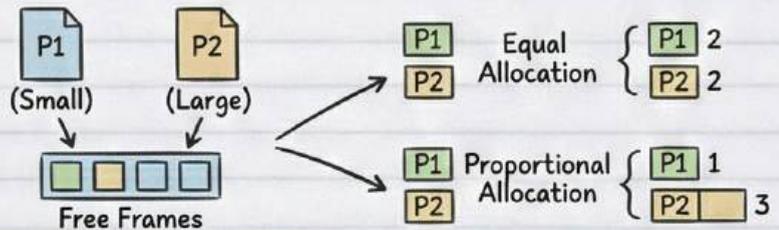


Algorithm	Hole Selected	Comment
First Fit	30	First sufficient
Best Fit	20	Smallest sufficient
Worst Fit	50	Largest sufficient

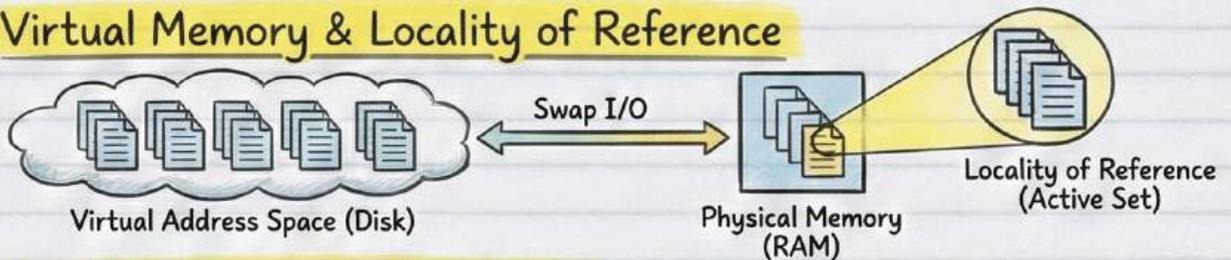
- Paging and Segmentation



- Page Allocation



- Virtual Memory & Locality of Reference



- Page Replacement Algorithms



7 0 1 2 0 3 ...

	FIFO	OPT	LRU	
	1	2	1	✓ Fault
	6	4	6	✓ Fault
	7	7	7	
	2	2	2	
	Replace Oldest Arrived	Replace Farthest Future Use	Replace Least Recently Used	

Introduction to the course

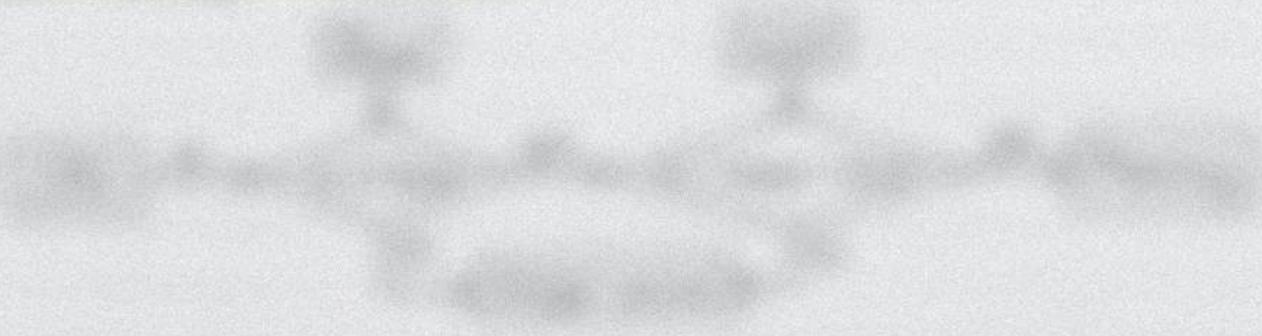
What is this course about?

The course covers the following topics: **Introduction to the course**, **Mathematical induction**, **Recursion**, **Combinatorics**, **Graphs**, **Algorithms**, **Complexity**, **Dynamic programming**, **NP-completeness**, **Approximation algorithms**, **Randomized algorithms**, **Amortized analysis**, **Advanced topics**.

Prerequisites: Discrete Mathematics, Linear Algebra, Probability, and some programming experience.

Learning Objectives: By the end of the course, you should be able to: **Apply mathematical induction** to prove the correctness of algorithms and properties of data structures. **Analyze the complexity** of algorithms and data structures. **Design algorithms** for a wide range of problems. **Understand the complexity** of algorithms and data structures. **Design approximation algorithms** for NP-hard problems. **Design randomized algorithms** for a wide range of problems. **Analyze the complexity** of randomized algorithms. **Design amortized analysis** for a wide range of problems.

Course structure



Prerequisites

The course requires a solid foundation in **Discrete Mathematics**, **Linear Algebra**, **Probability**, and some programming experience.



Course materials

The course materials include: **Lecture notes**, **Textbook**, **Assignments**, **Exercises**, **Projects**, **Quizzes**, **Exams**, **Final exam**.

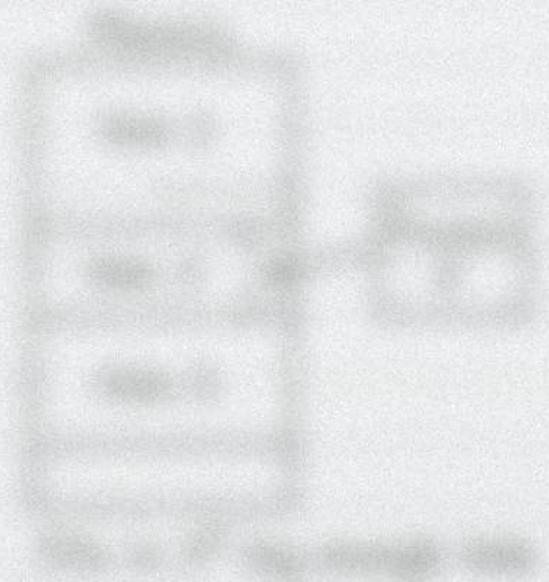
Handwritten Title

Handwritten text at the top of the page, possibly a subtitle or introductory sentence.

Section Header 1

Handwritten text block under the first section header.

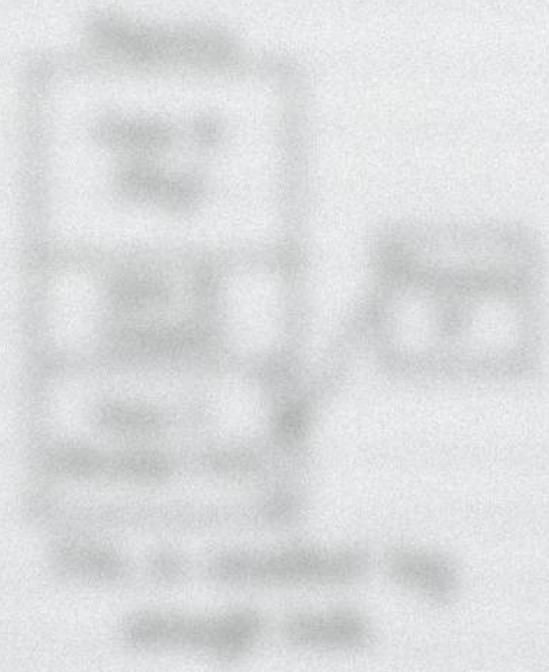
Handwritten text block under the first section header.



Section Header 2

Handwritten text block under the second section header.

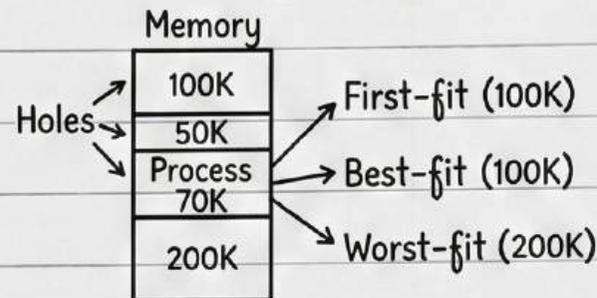
Handwritten text block under the second section header.



Contiguous Memory Allocation

These techniques are algorithms that satisfy the memory requirement of a process from the list of available free holes. They are known as **partition selection algorithms**.

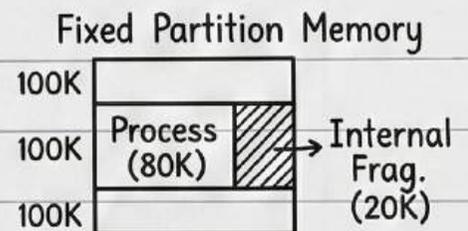
- There are primarily three types: **first-fit**, **best-fit**, and **worst-fit**.



Fixed and Variable Partition

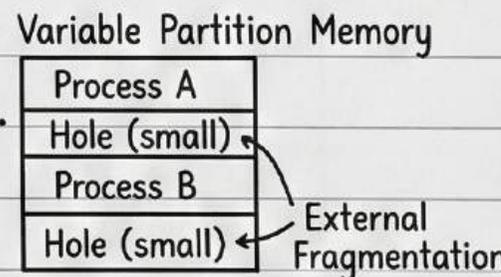
- **Fixed Partitioning**: Memory is partitioned at the time of **system generation**. Partition size is fixed & cannot be changed.

- It suffers from both internal and external fragmentation.



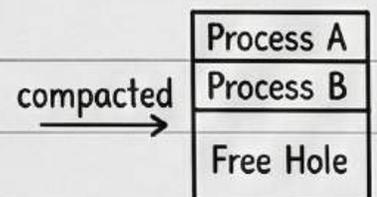
- **Variable Partitioning**: Number and size of partitions are created at **run-time** by the OS. A free memory partition is a **hole**.

- It suffers from external fragmentation.



Compaction

Compaction method is used to reduce memory wastage in variable partitioning.

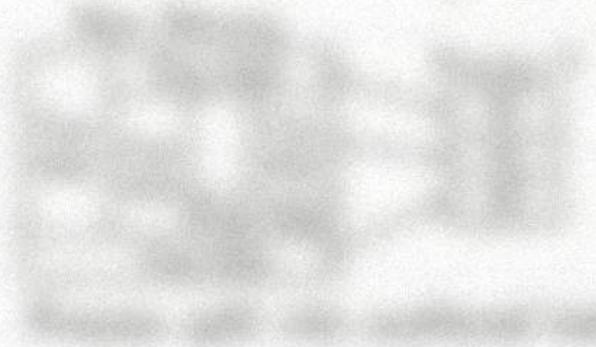


Introduction to the History of the World

The history of the world is a complex and multifaceted subject that encompasses a wide range of events, cultures, and societies. It is a study of the human experience over time, from the earliest civilizations to the modern world. This course will explore the major events and trends that have shaped the world as we know it today.

1800	1850	1900	1950	2000
1850	1900	1950	2000	2050
1900	1950	2000	2050	2100
1950	2000	2050	2100	2150

The course will cover the major events and trends that have shaped the world as we know it today. It will explore the rise of the modern world, the impact of the Industrial Revolution, and the challenges of the 21st century. The course will also examine the role of the United States in the world and the impact of globalization.



The course will cover the major events and trends that have shaped the world as we know it today. It will explore the rise of the modern world, the impact of the Industrial Revolution, and the challenges of the 21st century. The course will also examine the role of the United States in the world and the impact of globalization.



Conclusion and Future Outlook



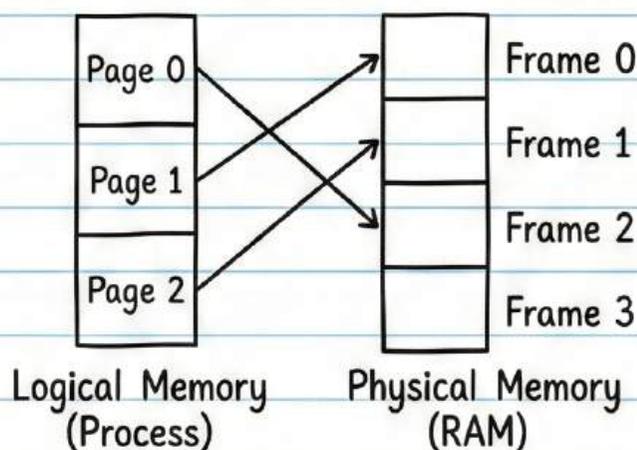
Paging and Segmentation

1. Paging

Paging is a **non-contiguous** allocation method where physical memory is divided into fixed-size blocks called **frames**.

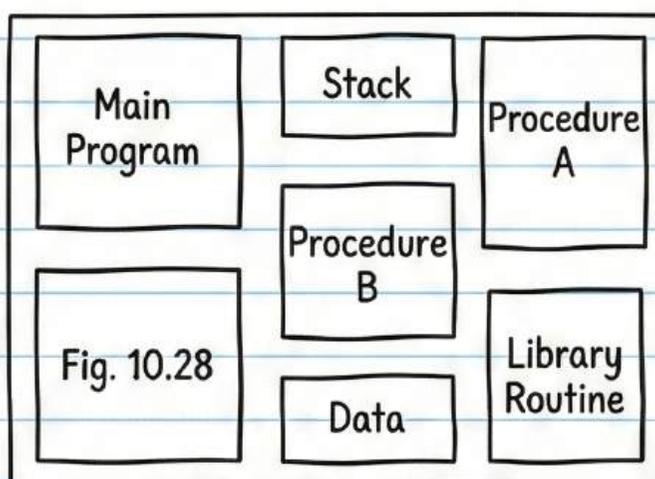
The logical memory of a process is also divided into blocks of the **same size** called **pages**.

This eliminates **external fragmentation**.



2. Segmentation

Segmentation is a **memory management technique** where a **logical address space** is divided into **variable-sized segments**. These segments represent logical parts of a program like main program, stack, procedures, etc.



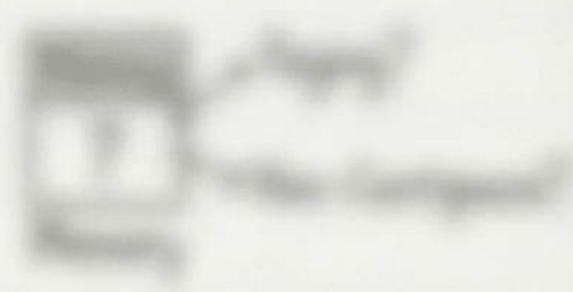
Logical Address Space

Key Difference

- **Pages** are **physical** divisions of **equal** size.
- **Segments** are **logical** divisions of **variable** size.

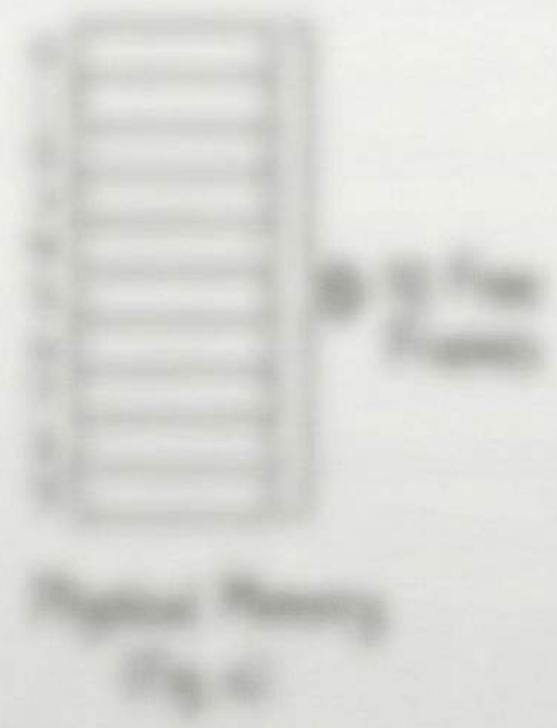
Example of Operation: Initial Flow Frame Setup

To understand the **copy control** and the benefits of a **multiplexed output**, see each of an example.



Initially, the physical memory consists of a set of **frames**. In our example they all have an

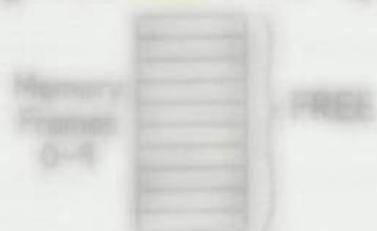
initial value in the **copy control**



These frames are numbered from **000** and are ready for allocation.

Initial Contiguous Page Allocation (An Example)

Let's consider a physical memory with 10 free frames (0 to 9) and four processes: **P1** (3 pages), **P2** (4 pages), **P3** (2 pages), and **P4** (5 pages).



Initially, **P1** is allocated the first three contiguous frames (0, 1, 2). Then **P2** gets the next four (3, 4, 5, 6), and **P3** gets the next two (7, 8).



Now, only one frame (9) is free. **P4** needs 5 frames and cannot be allocated.



Later, **P2** finishes and releases its frames (3, 4, 5, 6). Now there are 5 free frames (3, 4, 5, 6, 9). These are allocated to **P4**.



THE SCIENCE OF LEARNING

THE SCIENCE OF LEARNING IS THE STUDY OF HOW WE LEARN. IT IS A FIELD THAT BRINGS TOGETHER PSYCHOLOGY, EDUCATION, AND COGNITIVE SCIENCE.

THE SCIENCE OF LEARNING IS THE STUDY OF HOW WE LEARN. IT IS A FIELD THAT BRINGS TOGETHER PSYCHOLOGY, EDUCATION, AND COGNITIVE SCIENCE.



THE SCIENCE OF LEARNING IS THE STUDY OF HOW WE LEARN. IT IS A FIELD THAT BRINGS TOGETHER PSYCHOLOGY, EDUCATION, AND COGNITIVE SCIENCE.

THE SCIENCE OF LEARNING IS THE STUDY OF HOW WE LEARN. IT IS A FIELD THAT BRINGS TOGETHER PSYCHOLOGY, EDUCATION, AND COGNITIVE SCIENCE.



THE HISTORY OF THE UNITED STATES

The United States was founded by the first of many waves of immigrants.



The first wave of immigrants came from Europe.

The second wave of immigrants came from Ireland and Germany.



The third wave of immigrants came from Italy and Poland.



The fourth wave of immigrants came from China and Japan.

THE HISTORY OF THE UNITED STATES

The first part of the book deals with the early years of the nation, from the time of the first settlers to the end of the American Revolution. It covers the period from 1607 to 1789.

The second part of the book deals with the years from 1789 to 1861. It covers the period from the beginning of the American Republic to the start of the Civil War.

The third part of the book deals with the years from 1861 to 1914. It covers the period from the start of the Civil War to the beginning of World War I.

The fourth part of the book deals with the years from 1914 to the present. It covers the period from the start of World War I to the present day.

Handwritten Title

The first part of the **document** is **introduction** and the second part is **conclusion** and the third part is **summary**.

Handwritten text with **highlighted** words.

Handwritten Section Header

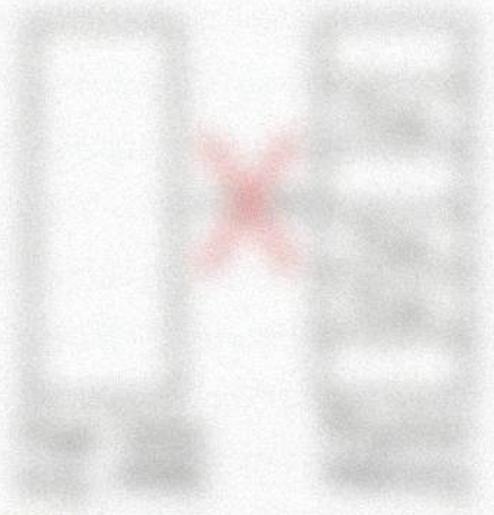


QUESTION 1

QUESTION 1

QUESTION 1: A company is considering two investment opportunities. The first investment requires an initial outlay of \$100,000 and is expected to generate cash flows of \$30,000 per year for 5 years. The second investment requires an initial outlay of \$150,000 and is expected to generate cash flows of \$40,000 per year for 5 years. The company's cost of capital is 10%.

QUESTION 2: A company is considering two investment opportunities. The first investment requires an initial outlay of \$100,000 and is expected to generate cash flows of \$30,000 per year for 5 years. The second investment requires an initial outlay of \$150,000 and is expected to generate cash flows of \$40,000 per year for 5 years. The company's cost of capital is 10%.



QUESTION 2

QUESTION 2: A company is considering two investment opportunities. The first investment requires an initial outlay of \$100,000 and is expected to generate cash flows of \$30,000 per year for 5 years. The second investment requires an initial outlay of \$150,000 and is expected to generate cash flows of \$40,000 per year for 5 years. The company's cost of capital is 10%.

- QUESTION 3: A company is considering two investment opportunities. The first investment requires an initial outlay of \$100,000 and is expected to generate cash flows of \$30,000 per year for 5 years. The second investment requires an initial outlay of \$150,000 and is expected to generate cash flows of \$40,000 per year for 5 years. The company's cost of capital is 10%.
- QUESTION 4: A company is considering two investment opportunities. The first investment requires an initial outlay of \$100,000 and is expected to generate cash flows of \$30,000 per year for 5 years. The second investment requires an initial outlay of \$150,000 and is expected to generate cash flows of \$40,000 per year for 5 years. The company's cost of capital is 10%.



Introduction to the Study of the History of the World

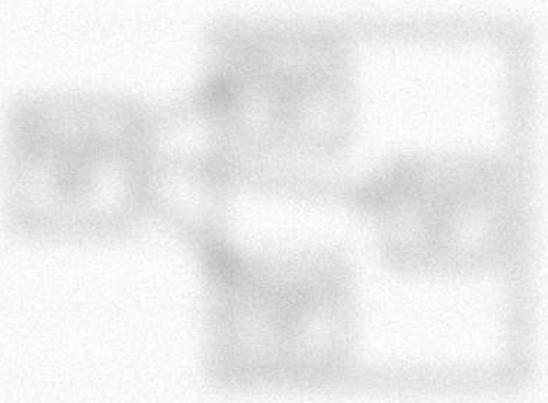
1. The World as a Whole

The world is a complex and diverse system of interconnected societies, cultures, and environments. The study of world history seeks to understand the patterns and processes that have shaped the human experience across time and space.



2. The Role of the Individual

Individual actions and decisions have played a significant role in shaping the course of world history. From the rise of empires to the fall of civilizations, the choices of leaders and the actions of ordinary people have left their mark on the world.



3. The Impact of Technology

Technology has been a driving force in the development of human civilization, from the invention of the wheel to the digital revolution. It has shaped the way we live, work, and interact with one another.

4. The Future of the World



The future of the world is uncertain, but it is clear that the challenges we face today will shape the world of tomorrow. We must work together to address these challenges and create a better future for all.

Introduction to the Study of the History of the World

What is the History of the World?

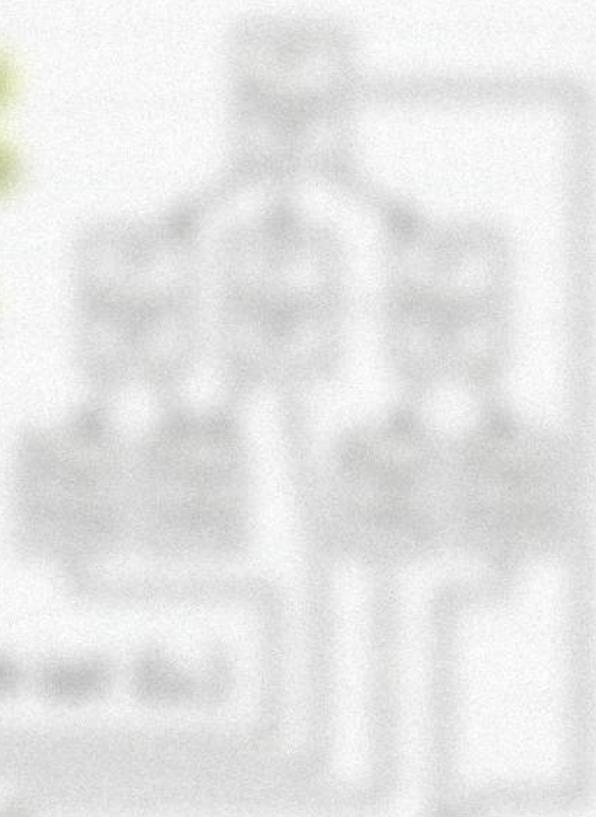
The history of the world is the study of the past events and processes that have shaped the world as we know it today. It is a discipline that seeks to understand the human experience across time and space, from the earliest civilizations to the present day.



Why Study the History of the World?

Studying the history of the world helps us to understand the roots of our culture, politics, and society. It provides a context for the events and processes that have shaped the world as we know it today.

It also helps us to understand the human experience across time and space, from the earliest civilizations to the present day. By studying the history of the world, we can gain a deeper understanding of our place in the world and the challenges we face today.



How to Study the History of the World

Topic	Source	Author	Year
World History	World History	World History	World History
World History	World History	World History	World History
World History	World History	World History	World History

Studying the history of the world is a challenging but rewarding task. It requires a deep understanding of the human experience across time and space, from the earliest civilizations to the present day. By studying the history of the world, we can gain a deeper understanding of our place in the world and the challenges we face today.

CONCEPTS OF THE CONCEPT

The first concept is that of **CONCEPTS** and **CONCEPTS**

The second concept is that of **CONCEPTS** and **CONCEPTS**

The third concept is that of **CONCEPTS** and **CONCEPTS**

The fourth concept is that of **CONCEPTS** and **CONCEPTS**

The fifth concept is that of **CONCEPTS** and **CONCEPTS**

CONCEPTS AND CONCEPTS

The sixth concept is that of **CONCEPTS** and **CONCEPTS**

The seventh concept is that of **CONCEPTS** and **CONCEPTS**

The eighth concept is that of **CONCEPTS** and **CONCEPTS**

CONCEPTS AND CONCEPTS

Introduction to the course

The course is designed to provide a comprehensive overview of the field. It covers the fundamental concepts and theories that underpin the discipline. The main objectives of the course are to:

- 1. Establish a solid foundation in the core principles.
- 2. Develop critical thinking and problem-solving skills.
- 3. Encourage independent research and analysis.

The course is structured into several modules, each focusing on a specific area of the subject. The modules are designed to build upon each other, ensuring a logical progression of learning. The first module introduces the basic concepts, while the subsequent modules delve into more advanced topics.

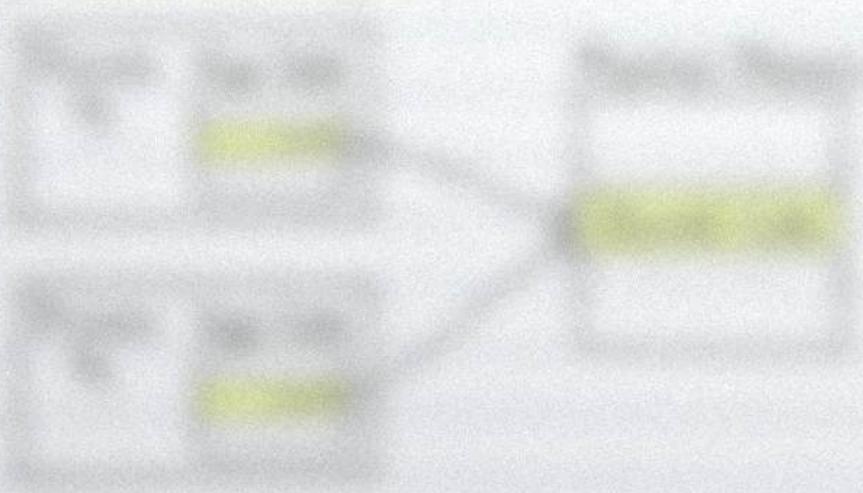


Course Objectives

By the end of the course, students should be able to:

- 1. Identify and explain the key concepts and theories.
- 2. Apply the knowledge to solve complex problems.
- 3. Conduct independent research and present findings.

The course is taught through a combination of lectures, seminars, and practical exercises. The lecturers are experts in their respective fields and will provide valuable insights and guidance. The seminars and practical exercises are designed to reinforce the theoretical knowledge and develop practical skills.



Introduction to the course

The course is designed to provide a comprehensive overview of the subject matter. It covers the following topics:

The course is divided into several modules, each focusing on a specific aspect of the subject. The modules are:

Module 1

The first module introduces the basic concepts and terminology of the subject. It covers the following topics:

The second module discusses the theoretical foundations of the subject. It covers the following topics:

The third module explores the practical applications of the subject. It covers the following topics:

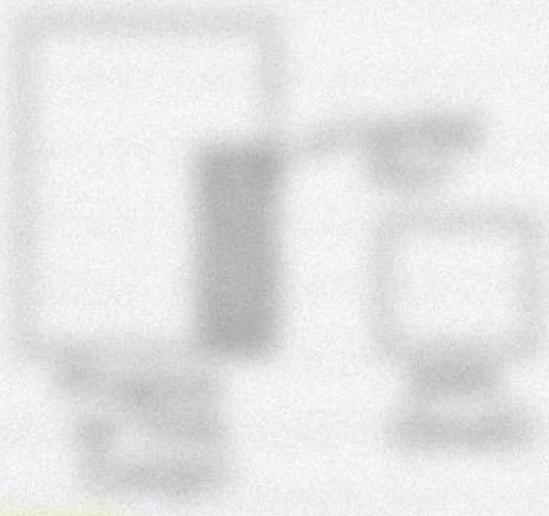
The fourth module examines the current research and developments in the field. It covers the following topics:

The fifth module provides a summary of the course and offers suggestions for further reading. It covers the following topics:



THE HISTORY OF THE UNITED STATES

The first part of the book covers the period from the early 17th century to the American Revolution. It discusses the settlement of the eastern seaboard, the growth of the plantation economy, and the struggle for independence.



The second part of the book covers the period from the American Revolution to the Civil War. It discusses the growth of the nation, the expansion of slavery, and the struggle for equality.

The third part of the book covers the period from the Civil War to the present. It discusses the Reconstruction era, the rise of the industrial revolution, and the struggle for civil rights.



THE AMERICAN WEST

The American West was a region of great importance in the history of the United States. It was a land of opportunity and adventure, where men sought their fortune and built a new way of life.



The American West was a land of great opportunity and adventure. It was a place where men sought their fortune and built a new way of life. The West was a land of great beauty and great challenges, and it played a vital role in the history of the United States.

Handwritten Title

Section 1

Text describing the first concept or process, including various terms and definitions.



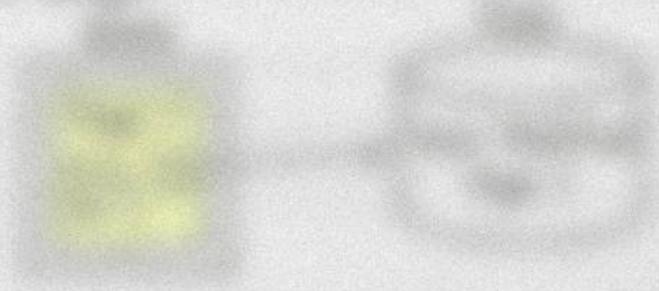
Section 2

Text describing the second concept or process, including various terms and definitions.

Detailed handwritten notes for the second section, including sub-points and examples.

Section 3

Text describing the third concept or process, including various terms and definitions.



Introduction to the History of the World

The history of the world is a complex and multifaceted subject that encompasses a wide range of events, cultures, and societies. It is a study of the human experience over time, from the earliest civilizations to the present day. The history of the world is a story of human progress, struggle, and achievement.

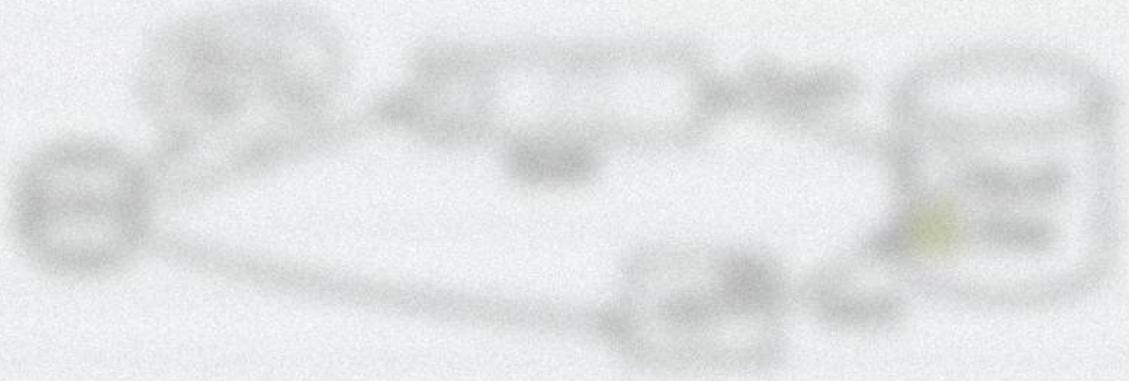
The history of the world is a story of human progress, struggle, and achievement. It is a study of the human experience over time, from the earliest civilizations to the present day.

The history of the world is a story of human progress, struggle, and achievement. It is a study of the human experience over time, from the earliest civilizations to the present day.



The history of the world is a story of human progress, struggle, and achievement. It is a study of the human experience over time, from the earliest civilizations to the present day.

The history of the world is a story of human progress, struggle, and achievement. It is a study of the human experience over time, from the earliest civilizations to the present day.



1. Introduction to the course

The course is designed to provide a comprehensive overview of the subject matter. It covers the following topics:



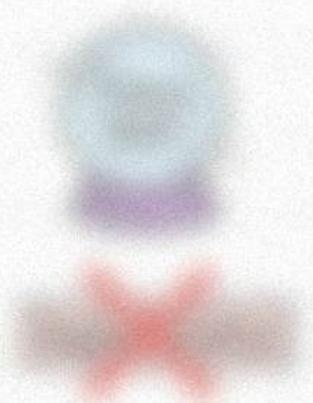
2. Course Objectives

- 1. To understand the basic principles of the subject.
- 2. To apply the concepts learned in practical situations.
- 3. To develop critical thinking and problem-solving skills.
- 4. To gain a deep understanding of the underlying mechanisms.



3. Course Structure

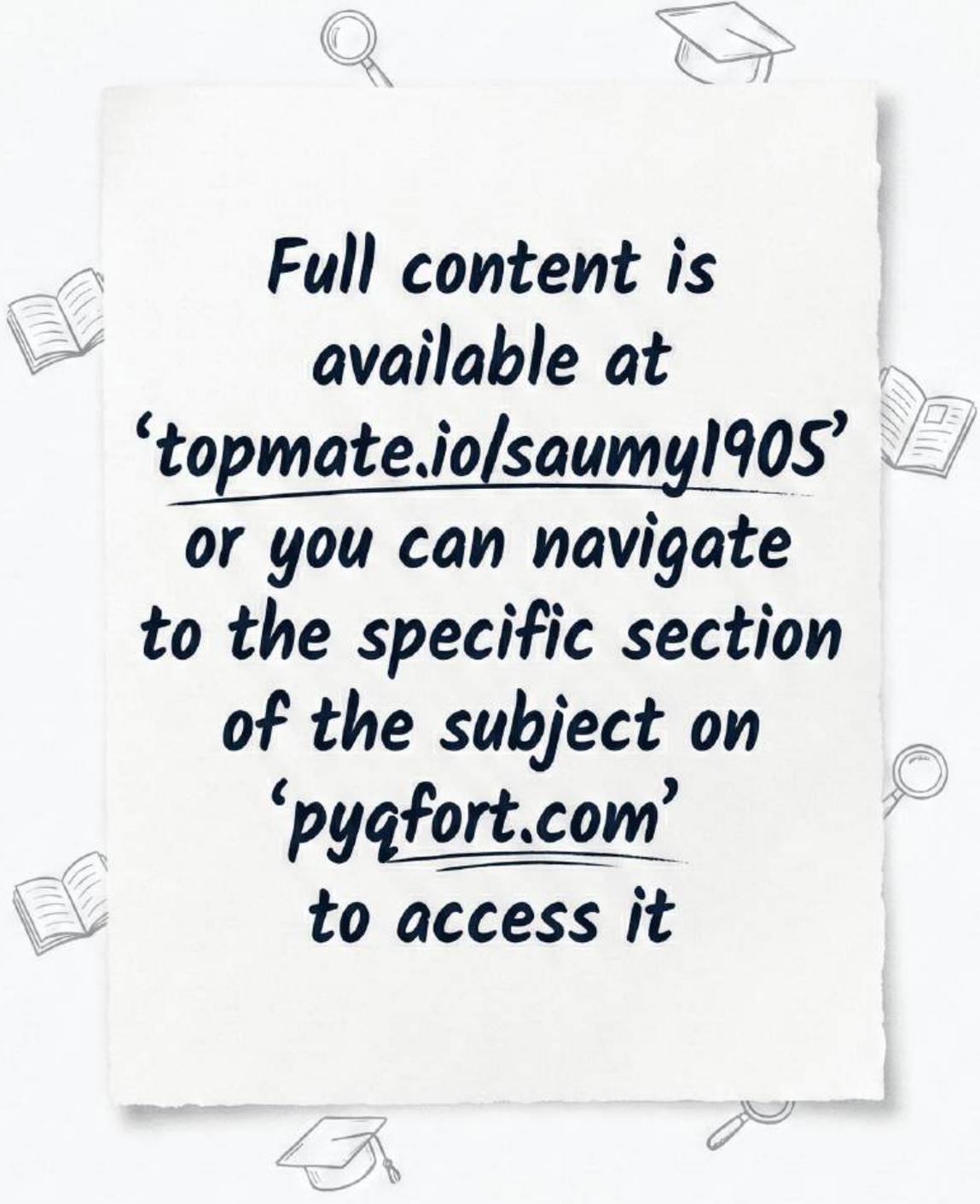
- 1. The course is divided into several modules.
- 2. Each module covers a specific aspect of the subject.
- 3. The modules are designed to build upon each other.
- 4. The final module provides a summary and outlook.



4. Course Materials

- 1. Textbooks and reference materials are provided.
- 2. Lecture notes and slides are available online.
- 3. Practical exercises and assignments are included.
- 4. Additional resources are recommended for further study.





Full content is
available at
'topmate.io/saumy1905'
or you can navigate
to the specific section
of the subject on
'pyqfort.com'
to access it