

Learning Guide Unit 5

Reading Assignment

As you read through the resources and watch the videos, consider the following:

- Why is it essential to comprehend the concept of memory types and hierarchies in digital systems, and how do these hierarchies impact data storage, retrieval, and system performance?
- Describe the key characteristics and use cases of Read-Only Memory (ROM) and Random-Access Memory (RAM). What are the advantages and limitations of each memory type in various computing applications?
- Explore the world of Programmable Logic Devices (PLDs).
How do PLDs function, and what are their primary applications in digital design and control systems?
How do they differ from other types of integrated circuits in terms of flexibility and configurability?

Read:

1. Bandakkanavar, R. (2023, March 9). [Application and types of programmable logic devices](#). KrazyTech.

- In this article, we will explore the fascinating world of programmable logic devices (PLDs) and their diverse applications. PLDs represent a pivotal component in modern electronics, offering versatility and flexibility in designing digital systems. Our journey will commence with an introduction to programmable logic and its significance in contemporary technology.
- By the end of this article, you'll have gained a profound understanding of programmable logic devices, their types, and the wide array of applications where they shine. Whether you're an aspiring engineer or a seasoned technologist, this knowledge will empower you to harness the full potential of PLDs in your projects.

2. MacClanahan, P. (n.d.). [Memory hierarchy](#). LibreTexts.

https://eng.libretexts.org/Courses/Delta_College/Introduction_to_Operating_Systems licensed under CC BY-SA 4.0.

- The chapter discusses memory hierarchy in computer systems, emphasizing the role of cache memory as the fastest but limited in size. It introduces the concept of spatial and temporal locality in data access and explains cache levels (L1, L2, L3) in CPU architecture. Cache associativity types, eviction strategies, and cache addressing using tags, indexes, and offsets are also covered, offering insights into efficient memory management.

3. Shanthi, A.P. (2018). [Memory hierarchy design – basics](#). In Parthasarathi, R. (Ed.), *Computer architecture*. INFLIBNET CENTRE.

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- Read Chapter 21: [Memory Hierarchy Design – Basics](#)
 - Introduction
 - Different Types of Memory
 - Memory Optimizations
 - Memory Hierarchy terminology
- In this chapter, we will embark on a journey into the realm of memory hierarchy design, a fundamental aspect of modern computer systems. Memory hierarchy plays a pivotal role in determining the overall performance and efficiency of a computer. We'll commence our exploration with a comprehensive introduction to the significance and purpose of memory hierarchy.

Videos:

1. Curious cat. (2023, February 1). *RAM and ROM-what's the difference?* [Video]. YouTube.

- o This video explains the distinctions between RAM (Random Access Memory) and ROM (Read-Only Memory), highlighting their respective roles in computer systems.

2. Watkins, M. (2017, March 29). *Memory hierarchy introduction* [Video]. YouTube.

- o This video provides an introductory overview of memory hierarchy, explaining the fundamental concepts and challenges in memory systems.

