Learning Guide Unit 6

Reading Assignment

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

- How does computer architecture influence the performance and capabilities of a computer system?
- How do various CPU designs impact the overall performance of a computer?
- What is Instruction Set Architecture (ISA), and how does it relate to CPU design?

Textbook:

---

1. Both, D. (2020, July 23). *The central processing unit (CPU): Its components and functionality*. RedHat.

- This article explores the central processing unit (CPU), its historical significance, components, and operation. It clarifies the term "CPU in the modern context and discusses key CPU components like the ALU, cache, and control unit.
- The article outlines the CPU's instruction cycle and strategies for enhancing performance. It also touches on multitasking and multiple CPUs. Overall, it provides a concise yet informative overview of CPU architecture and functionality.

2. Computer Hope. (2019, June 30). *Machine language*.

- In this article, you will learn about machine language, the core binary code that computers use for interpretation. Machine language i the sole language comprehensible by computers and varies across operating systems. It acts as the bridge between human-readable programming languages and computer execution.

3. Cook, M. (2015, April 15). *Z80 interrupts*. Z80 Journal.

- This article explains how the Z80 microprocessor supports three interrupts modes.

4. Shanthi, A.P. (2018). Computer architecture: Introduction. In Parthasarathi, R. (Ed.), *Computer architecture*. Inflibnet Centre. https://www.cs.umd.edu/~meesh/411/CA-online/index.html licensed under CC BY 4.0.

- Read Chapter 1: Computer Architecture
  - Computer Architecture: Introduction
  - Instruction Set Architecture
  - Performance Metrics
  - Summarizing Performance, Amdahl's law and Benchmarks
  - Fixed Point Arithmetic Unit I
  - Fixed Point Arithmetic Unit II
  - Floating Point Arithmetic Unit
  - Execution of a Complete Instruction – Datapath Implementation
  - Execution of a Complete Instruction – Control Flow
- The chapter titled "Computer Architecture" covers a wide range of topics related to computer systems and their performance. It begi with an introduction to computer architecture, providing an overview of the fundamental concepts. The chapter then delves into Instruction Set Architecture, which defines how instructions are executed by the CPU.
- The chapter further discusses the execution of a complete instruction, emphasizing DataPath implementation and control flow within CPU. These topics collectively provide a comprehensive understanding of computer architecture and its various components that influence system performance and operation.

Videos:

---

1. Futurology - an optimistic future. (2017, December 7). *How a CPU works | The CPU explained* [Video]. YouTube.

- The video titled "How a CPU works | The CPU explained" offers a clear and concise explanation of the inner workings of a centr processing unit (CPU). It provides an insightful visual journey into the CPU's core components and their functions.

2. Kuzechie, A. (2020, June 8). *Programming Z80 microprocessor* [Video]. YouTube

- In this video, you'll dive into the fascinating world of programming the Z80 microprocessor. The Z80, renowned for its role in early personal computers and embedded systems, offers a unique set of challenges and opportunities for developers.