

Assignment 1: Computer Organization and Architecture (COA)

Question 1:

Explain the concept of von Neumann architecture. Discuss the key components of a von Neumann architecture and their functions. Provide examples of real-world computing systems that follow the von Neumann architecture.

Question 2:

Compare and contrast the Harvard architecture and von Neumann architecture. Discuss their similarities, differences, and advantages. Give examples of scenarios where each architecture would be suitable.

Question 3:

Explain the concept of pipelining in computer architecture. Discuss the benefits and challenges of pipelining. Provide an example of a pipelined instruction execution process and describe how it improves performance.

Question 4:

Discuss the difference between RISC (Reduced Instruction Set Computer) and CISC (Complex Instruction Set Computer) architectures. Compare their design principles, instruction sets, and trade-offs. Give examples of processors or instruction sets that fall under each category.

Question 5:

Explain the memory hierarchy in computer architecture. Discuss the different levels of memory hierarchy (registers, cache, main memory, secondary storage) and their respective characteristics, such as speed, capacity, and cost. Describe the purpose of each level and how they work together to optimize memory access.