4 Lecture - CS501

Important Subjective

1. **What is ISA, and what is its role in processor design?**
   Answer: ISA stands for Instruction Set Architecture. It is a set of instructions and programming tools that define the functionality and operation of a processor. ISA specifies the instructions that a processor can execute, the registers it uses, the memory addressing modes it supports, and the format of its instructions.

   What are the different types of addressing modes used in instruction formats?
   Answer: The different types of addressing modes are register addressing, immediate addressing, direct addressing, and indirect addressing.

   What is an opcode, and what is its function in instruction formats?
   Answer: Opcode is a binary code used to represent a specific operation. It specifies the operation to be performed by the processor, such as addition, subtraction, or multiplication.

   What is RISC architecture, and what are its advantages over CISC architecture?
   Answer: RISC architecture stands for Reduced Instruction Set Computer. It is a type of processor design that emphasizes simplicity and speed of instruction execution. RISC processors have a small number of simple instructions that can be executed quickly. RISC architecture is more power-efficient than CISC architecture, and it is easier to design and manufacture.

   What is CISC architecture, and what are its advantages over RISC architecture?
   Answer: CISC architecture stands for Complex Instruction Set Computer. It is a type of processor design that emphasizes versatility and complexity of instruction execution. CISC processors can perform complex instructions in a single clock cycle, which makes them suitable for applications that require high computational power.

   What is direct addressing, and how is it different from indirect addressing?
   Answer: Direct addressing specifies the location of an operand in memory. It directly specifies the memory location of the operand. Indirect addressing, on the other hand, specifies the location of the memory address of the operand.

   What is register addressing, and how is it different from memory addressing?
   Answer: Register addressing specifies the operand as a register. It uses the registers present in the processor to store operands. Memory addressing, on the other hand, specifies the operand as a memory location. It uses the memory to store operands.

   What is the role of the program counter in instruction execution?
   Answer: The program counter is a register that holds the address of the next instruction to be executed. It increments after each instruction execution, thus allowing the processor to execute instructions in sequence.

   What is pipelining, and how does it affect instruction execution?
   Answer: Pipelining is a technique used to increase the efficiency of instruction execution. It

divides the execution of instructions into a sequence of stages, each of which is executed simultaneously. This reduces the time required to execute an instruction, and thus increases the overall processing speed.

What is the role of microcode in instruction execution?
Answer: Microcode is a low-level software that translates machine language instructions into microinstructions that can be executed by the processor. It enables the processor to execute complex instructions by breaking them down into simpler microinstructions.