

CS501

Advance Computer Architecture

Important mcqs

Lec 1 - Introduction

1. **What is the primary purpose of an introduction?**

- A) To provide a summary of the main points
- B) To provide background information
- C) To introduce the topic
- D) All of the above

Answer: C

Which of the following should be included in an introduction?

- A) Personal opinions
- B) Detailed explanations of complex concepts
- C) Background information
- D) All of the above

Answer: C

What is the ideal length of an introduction?

- A) As long as possible
- B) A few sentences to a paragraph
- C) One page
- D) It depends on the type of writing

Answer: B

What should a thesis statement do?

- A) Introduce the topic
- B) Provide a summary of the main points
- C) Present the main argument or claim
- D) All of the above

Answer: C

Which of the following is not an effective way to grab the reader's attention in an introduction?

- A) Using a quotation
- B) Asking a question
- C) Providing a list of references
- D) Telling a story

Answer: C

What is the purpose of background information in an introduction?

- A) To provide context for the topic
- B) To introduce the main argument

- C) To provide evidence for the thesis statement
- D) All of the above

Answer: A

Which of the following is not a good way to end an introduction?

- A) Restate the thesis statement
- B) Provide a summary of the main points
- C) Introduce a new topic
- D) Ask a rhetorical question

Answer: C

What is the role of an introduction in a research paper?

- A) To summarize the research findings
- B) To provide a review of literature
- C) To explain the research methods and data analysis
- D) To introduce the research question and objectives

Answer: D

Which of the following is not an essential element of an introduction?

- A) A thesis statement
- B) Background information
- C) A conclusion
- D) A clear and concise statement of purpose

Answer: C

How should an introduction be structured?

- A) Background information, thesis statement, main points
- B) Main points, background information, thesis statement
- C) Thesis statement, background information, main points
- D) Main points, thesis statement, background information

Answer: C

Lec 2 - Instruction Set Architecture

1. What is Instruction Set Architecture (ISA)?

- a) A type of computer memory
- b) A set of instructions for hardware design
- c) A software application
- d) A programming language

Answer: b) A set of instructions for hardware design

Which component of a computer system is responsible for executing instructions?

- a) Hard disk drive
- b) Central Processing Unit (CPU)
- c) Random Access Memory (RAM)
- d) Graphics Processing Unit (GPU)

Answer: b) Central Processing Unit (CPU)

What does the term "instruction encoding" refer to in ISA?

- a) The process of translating machine code into assembly code
- b) The process of translating assembly code into machine code
- c) The process of defining the set of instructions available to a processor
- d) The process of mapping memory locations to register addresses

Answer: b) The process of translating assembly code into machine code

Which of the following is NOT a component of ISA?

- a) Registers
- b) I/O operations
- c) Compiler
- d) Memory organization

Answer: c) Compiler

What is the purpose of a register in ISA?

- a) To store instructions
- b) To store data
- c) To store program counter
- d) To store keyboard input

Answer: b) To store data

Which type of instruction sets can perform arithmetic operations directly on memory?

- a) Stack-based
- b) Register-based
- c) Complex Instruction Set Computing (CISC)
- d) Reduced Instruction Set Computing (RISC)

Answer: c) Complex Instruction Set Computing (CISC)

Which type of instruction sets have simpler instructions and fewer addressing modes?

- a) Stack-based
- b) Register-based
- c) Complex Instruction Set Computing (CISC)
- d) Reduced Instruction Set Computing (RISC)

Answer: d) Reduced Instruction Set Computing (RISC)

Which of the following is NOT a characteristic of a good ISA?

- a) Consistent instruction encoding

- b) Large number of addressing modes
- c) Orthogonality
- d) Simplicity

Answer: b) Large number of addressing modes

Which type of instruction sets rely on a last-in, first-out (LIFO) stack?

- a) Stack-based
- b) Register-based
- c) Complex Instruction Set Computing (CISC)
- d) Reduced Instruction Set Computing (RISC)

Answer: a) Stack-based

Which of the following components of ISA defines the set of instructions that a processor can execute?

- a) Instruction encoding
- b) Memory organization
- c) Registers
- d) I/O operations

Answer: a) Instruction encoding

Lec 3 - Introduction to SRC Processor

1. What does SRC Processor specialize in?

- a) Image processing
- b) Sample rate conversion
- c) Audio compression
- d) Video encoding

Answer: b) Sample rate conversion

What is the primary use of SRC Processor?

- a) Data encryption
- b) Image rendering
- c) Audio signal processing
- d) Video decoding

Answer: c) Audio signal processing

Which industry commonly uses SRC Processor?

- a) Automotive
- b) Construction
- c) Banking
- d) Audio/Video

Answer: d) Audio/Video

What kind of algorithms does SRC Processor use?

- a) Simple algorithms
- b) Complex algorithms
- c) Linear algorithms
- d) Non-linear algorithms

Answer: b) Complex algorithms

What is the purpose of sample rate conversion?

- a) To compress data
- b) To decompress data
- c) To convert data between different sample rates
- d) To convert data between different formats

Answer: c) To convert data between different sample rates

What is the advantage of SRC Processor in sample rate conversion?

- a) High distortion
- b) Low distortion
- c) High noise
- d) Low noise

Answer: b) Low distortion

Which type of devices use SRC Processor?

- a) Smartphones
- b) Laptops
- c) Audio interfaces
- d) All of the above

Answer: d) All of the above

How does SRC Processor achieve high-quality sample rate conversion?

- a) Using simple algorithms

- b) Using complex algorithms
- c) By adding noise to the signal
- d) By reducing the quality of the signal

Answer: b) Using complex algorithms

What is the benefit of SRC Processor's efficiency?

- a) Lower cost
- b) Higher cost
- c) Lower quality
- d) Higher quality

Answer: a) Lower cost

What does SRC stand for in SRC Processor?

- a) Sample Rate Converter
- b) System Resource Control
- c) Signal Reduction Circuit
- d) System Reference Clock

Answer: a) Sample Rate Converter

Lec 4 - ISA and Instruction Formats

1. What does ISA stand for?

- a) Integrated Software Architecture
- b) Instruction Set Architecture
- c) Interface System Architecture
- d) Interconnect System Architecture

Answer: b) Instruction Set Architecture

What is the purpose of ISA?

- a) To define the functionality and operation of a processor
- b) To define the architecture of a computer system
- c) To define the programming language used by a processor
- d) To define the operating system used by a computer

Answer: a) To define the functionality and operation of a processor

What are instruction formats?

- a) Binary code used to represent instructions in machine language
- b) Programming tools used to write instructions for a processor
- c) The architecture of a computer system
- d) The operating system used by a computer

Answer: a) Binary code used to represent instructions in machine language

What is an opcode?

- a) A type of instruction format
- b) A binary code used to represent a specific operation
- c) A programming tool used to write instructions
- d) The architecture of a computer system

Answer: b) A binary code used to represent a specific operation

Which of the following is an example of an operand?

- a) ADD
- b) 0x04
- c) MOV
- d) JMP

Answer: b) 0x04

What does RISC stand for?

- a) Reduced Instruction Set Computer
- b) Random Instruction Set Computer
- c) Relocatable Instruction Set Computer
- d) Robust Instruction Set Computer

Answer: a) Reduced Instruction Set Computer

Which of the following is an advantage of RISC architecture?

- a) It has a large number of complex instructions
- b) It can perform complex instructions in a single clock cycle
- c) It is more power-efficient than CISC architecture
- d) It is more versatile than CISC architecture

Answer: c) It is more power-efficient than CISC architecture

Which of the following is a characteristic of CISC architecture?

- a) It has a small number of simple instructions

- b) It can perform complex instructions in a single clock cycle
- c) It is more power-efficient than RISC architecture
- d) It is more versatile than RISC architecture

Answer: b) It can perform complex instructions in a single clock cycle

Which instruction format specifies the location of an operand in memory?

- a) Register addressing
- b) Immediate addressing
- c) Direct addressing
- d) Indirect addressing

Answer: c) Direct addressing

Which instruction format specifies an operand that is contained in the instruction itself?

- a) Register addressing
- b) Immediate addressing
- c) Direct addressing
- d) Indirect addressing

Answer: b) Immediate addressing

Lec 5 - Description of SRC in RTL

1. What is SRC?

- A. A computer architecture following the CISC approach
- B. A computer architecture following the RISC approach
- C. A programming language
- D. A data structure

Answer: B

What does RTL stand for?

- A. Register Transfer Logic
- B. Register Transfer Level
- C. Random Transmission Line
- D. Remote Transfer Language

Answer: B

What is the size of an SRC instruction word?

- A. 8 bits
- B. 16 bits
- C. 24 bits
- D. 32 bits

Answer: D

What is the purpose of the ALU in SRC?

- A. To handle communication between the processor and memory
- B. To store the operands and intermediate results during instruction execution
- C. To generate control signals for various components
- D. To perform arithmetic and logic operations on the operands

Answer: D

What is the role of the control unit in SRC?

- A. To handle communication between the processor and memory
- B. To store the operands and intermediate results during instruction execution
- C. To generate control signals for various components
- D. To perform arithmetic and logic operations on the operands

Answer: C

What does the memory interface do in SRC?

- A. Performs arithmetic and logic operations on the operands
- B. Stores the operands and intermediate results during instruction execution
- C. Generates control signals for various components
- D. Handles communication between the processor and memory

Answer: D

How are instructions encoded in SRC?

- A. Using a variable format
- B. Using a hybrid format
- C. Using a fixed format
- D. Using a floating-point format

Answer: C

What types of instructions are included in the SRC instruction set?

- A. Only arithmetic and logic operations

- B. Only data transfer and control flow instructions
- C. Basic operations such as arithmetic and logic operations, as well as data transfer and control flow instructions
- D. Only data transfer instructions

Answer: C

What is the goal of SRC architecture design?

- A. To have a complex and diverse instruction set
- B. To have a streamlined and simple instruction set
- C. To have a large number of complex hardware components
- D. To have a large number of software instructions

Answer: B

What is required to implement SRC in RTL?

- A. Understanding of the SRC architecture and the ability to design and implement the hardware components using RTL
- B. Understanding of a high-level programming language
- C. Understanding of data structures
- D. Understanding of compiler design

Answer: A

Lec 6 - RTL Using Digital Logic Circuits

1. What does RTL stand for in digital logic circuits?

- a) Reduced Timing Latency
- b) Register-Transfer Level
- c) Randomized Time Logic
- d) Real-Time Logic

Answer: b) Register-Transfer Level

Which type of logic circuits are used in RTL design?

- a) Combinational and sequential logic circuits
- b) Only combinational logic circuits
- c) Only sequential logic circuits
- d) None of the above

Answer: a) Combinational and sequential logic circuits

What is the purpose of RTL design?

- a) To enable efficient use of hardware resources
- b) To simplify digital system design
- c) To reduce power consumption
- d) All of the above

Answer: d) All of the above

Which of the following is an example of a digital system that uses RTL design?

- a) Graphics card
- b) Sound card
- c) Central Processing Unit (CPU)
- d) All of the above

Answer: c) Central Processing Unit (CPU)

Which level of abstraction does RTL represent in digital system design?

- a) Low-level abstraction
- b) High-level abstraction
- c) Intermediate-level abstraction
- d) None of the above

Answer: b) High-level abstraction

What is the flow of data represented between in RTL design?

- a) Registers
- b) Clock signals
- c) Power signals
- d) None of the above

Answer: a) Registers

What is the difference between combinational and sequential logic circuits?

- a) Combinational circuits have memory, whereas sequential circuits do not.
- b) Sequential circuits have memory, whereas combinational circuits do not.
- c) Both types of circuits have memory.
- d) Both types of circuits do not have memory.

Answer: b) Sequential circuits have memory, whereas combinational circuits do not.

Which digital system design methodology benefits from the use of RTL?

- a) Waterfall model

- b) Agile model
- c) Spiral model
- d) None of the above

Answer: b) Agile model

What is the advantage of using RTL in digital system design?

- a) Faster design process
- b) Higher level of abstraction
- c) Improved design verification and testing
- d) All of the above

Answer: d) All of the above

What is the primary use of RTL design in modern digital system design?

- a) To increase power consumption
- b) To simplify digital system design
- c) To enable efficient use of hardware resources
- d) None of the above

Answer: c) To enable efficient use of hardware resources

Lec 7 - Design Process for ISA of FALCON-A

1. What is the first step in the design process for the ISA of FALCON-A?

- a. Selecting the instruction set features
- b. Defining the application domain
- c. Designing the instruction format
- d. Identifying the target audience

Answer: b. Defining the application domain

What is the role of identifying the target audience in the design process for the ISA of FALCON-A?

- a. To ensure that the ISA is easy to use for all users
- b. To ensure that the ISA meets the performance requirements of the target audience
- c. To ensure that the ISA has a broad appeal to all users
- d. To ensure that the ISA is compatible with other processors in the market

Answer: b. To ensure that the ISA meets the performance requirements of the target audience

What is the goal of selecting the instruction set features in the design process for the ISA of FALCON-A?

- a. To include as many features as possible to increase performance
- b. To include only the necessary features to balance performance and simplicity
- c. To make the ISA more compatible with other processors in the market
- d. To make the ISA more appealing to a broad range of users

Answer: b. To include only the necessary features to balance performance and simplicity

What is the significance of designing the instruction format in the design process for the ISA of FALCON-A?

- a. It ensures that the ISA is easy to use for all users
- b. It ensures that the ISA meets the performance requirements of the target audience
- c. It ensures that the ISA is compatible with other processors in the market
- d. It determines how the processor interprets and executes instructions

Answer: d. It determines how the processor interprets and executes instructions

What is the primary goal of the design process for the ISA of FALCON-A?

- a. To maximize performance at all costs
- b. To balance performance and simplicity
- c. To create an ISA that is easy to use for all users
- d. To create an ISA that is compatible with other processors in the market

Answer: b. To balance performance and simplicity

What is the role of the application domain in the design process for the ISA of FALCON-A?

- a. To define the target audience for the processor
- b. To determine the features required in the ISA
- c. To identify the performance requirements of the target audience
- d. To ensure that the ISA meets the needs of the application domain

Answer: d. To ensure that the ISA meets the needs of the application domain

What is the significance of balancing performance and simplicity in the design process for the ISA of FALCON-A?

- a. It ensures that the processor is easy to use for all users

- b. It ensures that the processor meets the performance requirements of the target audience
- c. It ensures that the processor is compatible with other processors in the market
- d. It ensures that the processor is efficient and cost-effective

Answer: d. It ensures that the processor is efficient and cost-effective

What is the role of the target audience in the design process for the ISA of FALCON-A?

- a. To ensure that the processor meets the performance requirements of the target audience
- b. To ensure that the processor is easy to use for all users
- c. To identify the features required in the ISA
- d. To ensure that the processor is compatible with other processors in the market

Answer: a. To ensure that the processor meets the performance requirements of the target audience

What is the significance of including only the necessary instruction set features in the design process for the ISA of FALCON-A?

- a. It reduces the cost and complexity of the processor

Lec 8 - ISA of the FALCON-A

1. What is the Instruction Set Architecture (ISA) of the FALCON-A?

- a) 64-bit CISC architecture
- b) 16-bit RISC architecture
- c) 32-bit RISC architecture
- d) 8-bit CISC architecture

Answer: c) 32-bit RISC architecture

What is the benefit of a fixed-length instruction format in the FALCON-A ISA?

- a) Increased code density
- b) Faster instruction decoding and execution
- c) Better support for branching and looping
- d) All of the above

Answer: b) Faster instruction decoding and execution

What types of memory access instructions are supported by the FALCON-A ISA?

- a) Load and store only
- b) Load, store, and atomic operations
- c) Load, store, and jump instructions
- d) Branch, jump, and atomic operations

Answer: b) Load, store, and atomic operations

What types of arithmetic and logical instructions are supported by the FALCON-A ISA?

- a) Addition and subtraction only
- b) Addition, subtraction, multiplication, and division
- c) Bitwise operations only
- d) All of the above

Answer: d) All of the above

What is the primary advantage of the FALCON-A ISA for embedded systems?

- a) High performance
- b) Low power consumption
- c) Large code density
- d) Easy programming model

Answer: b) Low power consumption

What is the purpose of the power-saving modes in the FALCON-A ISA?

- a) To increase performance
- b) To reduce power consumption
- c) To improve code density
- d) To simplify programming

Answer: b) To reduce power consumption

How many bits are in the instruction format of the FALCON-A ISA?

- a) 8 bits
- b) 16 bits
- c) 32 bits
- d) 64 bits

Answer: c) 32 bits

What is the difference between RISC and CISC architectures?

- a) RISC has a smaller instruction set than CISC

- b) RISC has a fixed-length instruction format, while CISC has variable-length
- c) RISC supports fewer instructions than CISC
- d) RISC is designed for low-power applications, while CISC is designed for high-performance applications

Answer: b) RISC has a fixed-length instruction format, while CISC has variable-length

What is the benefit of a smaller instruction set in the FALCON-A ISA?

- a) Reduced power consumption
- b) Increased code density
- c) Improved performance
- d) All of the above

Answer: b) Increased code density

What type of devices are the FALCON-A ISA and architecture suitable for?

- a) High-performance servers
- b) Mobile and battery-powered devices
- c) Supercomputers
- d) Desktop computers

Answer: b) Mobile and battery-powered devices

Lec 9 - Description of FALCON-A and EAGLE using RTL

1. What is the primary use of FALCON-A and EAGLE processors?

- a. Gaming consoles
- b. AI and machine learning
- c. Smartphones
- d. Embedded systems

Answer: b

Which processor has a higher bit width, FALCON-A or EAGLE?

- a. FALCON-A
- b. EAGLE
- c. Both have the same bit width
- d. None of the above

Answer: a

What is the pipeline issue width of FALCON-A?

- a. 4
- b. 5
- c. 6
- d. 7

Answer: c

What is the pipeline issue width of EAGLE?

- a. 3
- b. 4
- c. 5
- d. 6

Answer: c

Which of the following is not a feature of FALCON-A and EAGLE processors?

- a. Dedicated hardware accelerators
- b. Advanced branch prediction
- c. Reduced Instruction Set Architecture (RISC)
- d. Cache management techniques

Answer: c

What type of instruction set architecture do FALCON-A and EAGLE processors support?

- a. Complex Instruction Set Architecture (CISA)
- b. Reduced Instruction Set Architecture (RISC)
- c. Both a and b
- d. None of the above

Answer: a

Which processor is better suited for multimedia processing?

- a. FALCON-A
- b. EAGLE
- c. Both are equally suited
- d. None of the above

Answer: a

Which processor has a higher number of issue stages?

- a. FALCON-A

- b. EAGLE
- c. Both have the same number of issue stages
- d. None of the above

Answer: a

What is the main advantage of FALCON-A and EAGLE processors?

- a. High power consumption
- b. Flexible design options
- c. Low performance
- d. Limited applications

Answer: b

Which of the following is not an application area of FALCON-A and EAGLE processors?

- a. AI and machine learning
- b. Gaming consoles
- c. Embedded systems
- d. Signal processing

Answer: b

Lec 10 - The FALCON-E and ISA Comparison

1. Which of the following is a custom design instruction set architecture developed by Qualcomm?

- a) ISA
- b) FALCON-E
- c) ARM
- d) x86

Answer: b) FALCON-E

What is the aim of FALCON-E architecture?

- a) To improve performance and energy efficiency for specific applications
- b) To provide compatibility across different processors
- c) To simplify the instruction set
- d) None of the above

Answer: a) To improve improve performance and energy efficiency for specific applications

Which of the following is a standardized instruction set architecture used by many processor manufacturers?

- a) FALCON-E
- b) ARM
- c) ISA
- d) x86

Answer: c) ISA

Which architecture provides compatibility across different processors?

- a) FALCON-E
- b) ARM
- c) ISA
- d) x86

Answer: c) ISA

Which of the following is true regarding FALCON-E architecture?

- a) It aims to simplify the instruction set
- b) It is a standardized instruction set architecture
- c) It provides compatibility across different processors
- d) It is developed by Intel

Answer: a) It aims to simplify the instruction set

What are the factors that need to be analyzed while comparing FALCON-E and ISA?

- a) Instruction set complexity
- b) Power consumption
- c) Compatibility with software
- d) All of the above

Answer: d) All of the above

Which architecture provides improved performance and energy efficiency for specific applications?

- a) FALCON-E
- b) ARM

- c) ISA
- d) x86

Answer: a) FALCON-E

Which architecture is used by many processor manufacturers to ensure compatibility?

- a) FALCON-E
- b) ARM
- c) ISA
- d) x86

Answer: c) ISA

Which architecture is most suitable for applications that require high performance and energy efficiency?

- a) FALCON-E
- b) ARM
- c) ISA
- d) x86

Answer: a) FALCON-E

Which architecture is most suitable for applications that require compatibility across different processors?

- a) FALCON-E
- b) ARM
- c) ISA
- d) x86

Answer: c) ISA

Lec 11 - CISC and RISC

1. What does CISC stand for?

- A) Complex Instruction Set Computing
- B) Computer Instruction Set Code
- C) Compact Instructional System Computing
- D) None of the above

Answer: A) Complex Instruction Set Computing

What is the primary difference between CISC and RISC processors?

- A) CISC processors have a smaller instruction set than RISC processors
- B) RISC processors have a more complex instruction set than CISC processors
- C) CISC processors have a larger and more complex instruction set than RISC processors
- D) None of the above

Answer: C) CISC processors have a larger and more complex instruction set than RISC processors

Which type of processor architecture is better suited for mobile devices?

- A) CISC
- B) RISC
- C) Both architectures are equally suited for mobile devices
- D) Neither architecture is suited for mobile devices

Answer: B) RISC

Which of the following is an example of a CISC processor?

- A) Intel 80386
- B) ARM Cortex-A53
- C) IBM PowerPC
- D) All of the above

Answer: A) Intel 80386

Which type of processor architecture is better suited for multimedia and gaming applications?

- A) CISC
- B) RISC
- C) Both architectures are equally suited for multimedia and gaming applications
- D) Neither architecture is suited for multimedia and gaming applications

Answer: A) CISC

Which type of processor architecture is known for its pipelining ability?

- A) CISC
- B) RISC
- C) Both architectures are equally known for their pipelining ability
- D) Neither architecture is known for its pipelining ability

Answer: B) RISC

Which type of processor architecture typically has a higher power consumption?

- A) CISC
- B) RISC
- C) Both architectures have the same power consumption

D) It depends on the specific processor model

Answer: A) CISC

Which type of processor architecture is more commonly used in embedded systems?

A) CISC

B) RISC

C) Both architectures are equally used in embedded systems

D) Neither architecture is used in embedded systems

Answer: B) RISC

Which type of processor architecture is known for its emphasis on load/store instructions?

A) CISC

B) RISC

C) Both architectures emphasize load/store instructions

D) Neither architecture emphasizes load/store instructions

Answer: B) RISC

Which of the following is an example of a RISC processor?

A) Intel Pentium

B) Motorola 68000

C) MIPS R4000

D) All of the above

Answer: C) MIPS R4000

Lec 12 - CPU Design

1. Which of the following is NOT an essential component of a CPU design?

- a) Architecture
- b) Instruction set
- c) Datapath
- d) Compiler

Answer: d) Compiler

Which technique is used to improve the performance of a CPU design by executing multiple instructions simultaneously?

- a) Pipelining
- b) Branch prediction
- c) Superscalar execution
- d) Cache memory

Answer: c) Superscalar execution

Which component of a CPU design is responsible for fetching instructions from memory?

- a) Datapath
- b) Control unit
- c) Arithmetic logic unit
- d) Register file

Answer: b) Control unit

Which of the following is a measure of the speed of a CPU design?

- a) Clock frequency
- b) Instruction set size
- c) Datapath width
- d) Control signal count

Answer: a) Clock frequency

Which technique is used to reduce the impact of branch instructions on the performance of a CPU design?

- a) Pipelining
- b) Superscalar execution
- c) Out-of-order execution
- d) Branch prediction

Answer: d) Branch prediction

Which component of a CPU design is responsible for performing arithmetic and logical operations?

- a) Datapath
- b) Control unit
- c) Arithmetic logic unit
- d) Register file

Answer: c) Arithmetic logic unit

Which type of memory is used to temporarily store data that the CPU needs to access frequently?

- a) Cache memory

- b) Virtual memory
- c) ROM
- d) RAM

Answer: a) Cache memory

Which of the following is a measure of the power consumption of a CPU design?

- a) Clock frequency
- b) Instruction set size
- c) Datapath width
- d) Power dissipation

Answer: d) Power dissipation

Which technique is used to improve the performance of a CPU design by reordering instructions to reduce pipeline stalls?

- a) Pipelining
- b) Superscalar execution
- c) Out-of-order execution
- d) Branch prediction

Answer: c) Out-of-order execution

Which component of a CPU design is responsible for temporarily storing data that the CPU needs to access?

- a) Datapath
- b) Control unit
- c) Arithmetic logic unit
- d) Register file

Answer: d) Register file

Lec 13 - Structural RTL Description of the FALCON-A

1. What is the FALCON-A?

- A) A programming language
- B) A microprocessor
- C) A memory hierarchy
- D) A control unit

Answer: B

What is Structural RTL Description?

- A) A programming language
- B) A hardware-level design language
- C) An operating system
- D) A database management system

Answer: B

What does the Structural RTL Description of the FALCON-A include?

- A) Description of the instruction set architecture
- B) Description of the caches
- C) Description of the main memory
- D) All of the above

Answer: D

What is the datapath of the FALCON-A?

- A) The memory hierarchy
- B) The control unit
- C) The registers and ALU
- D) The instruction set architecture

Answer: C

What is the control unit of the FALCON-A responsible for?

- A) Performing arithmetic and logical operations
- B) Controlling the flow of data
- C) Storing data and instructions
- D) None of the above

Answer: B

What is the memory hierarchy of the FALCON-A?

- A) The registers and ALU
- B) The control unit
- C) The caches, main memory, and other components
- D) The instruction set architecture

Answer: C

What is the purpose of using Structural RTL Description in CPU design?

- A) To describe the software programs that run on the CPU
- B) To test the CPU's behavior and functionality
- C) To create the physical layout of the CPU
- D) To manage the CPU's power consumption

Answer: B

Which of the following is not included in the Structural RTL Description of the FALCON-

A?

- A) Description of the datapath
- B) Description of the instruction set architecture
- C) Description of the input/output devices
- D) Description of the memory hierarchy

Answer: C

What is the benefit of using a Structural RTL Description in CPU design?

- A) It allows for the creation of simulation models
- B) It reduces the size of the CPU
- C) It increases the CPU's clock speed
- D) It improves the CPU's power consumption

Answer: A

What is the FALCON-A designed for?

- A) Low-performance computing applications
- B) High-performance computing applications
- C) Mobile devices
- D) None of the above

Answer: B

Lec 14 - External FALCON-A CPU

1. What is the clock speed of the External FALCON-A CPU?

- a) 1 GHz
- b) 2 GHz
- c) 3 GHz
- d) 4 GHz

Answer: b) 2 GHz

What is the power consumption of the External FALCON-A CPU?

- a) High
- b) Low
- c) Moderate
- d) Variable

Answer: b) Low

What is the primary application of the External FALCON-A CPU?

- a) Gaming
- b) Mobile devices
- c) Graphics rendering
- d) Data centers

Answer: d) Data centers

What is the main advantage of the External FALCON-A CPU?

- a) High clock speed
- b) Low power consumption
- c) Advanced graphics processing
- d) Low cost

Answer: b) Low power consumption

Which of the following is a feature of the External FALCON-A CPU?

- a) Advanced power management
- b) High cost
- c) Low clock speed
- d) Inefficient processing

Answer: a) Advanced power management

Which type of devices is the External FALCON-A CPU suitable for?

- a) Low-power devices
- b) High-performance devices
- c) Mid-range devices
- d) All of the above

Answer: b) High-performance devices

What is the architecture of the External FALCON-A CPU?

- a) ARM
- b) x86
- c) MIPS
- d) PowerPC

Answer: a) ARM

Which company manufactures the External FALCON-A CPU?

- a) AMD

- b) Intel
- c) Qualcomm
- d) ARM Holdings

Answer: d) ARM Holdings

Which of the following is a competitor of the External FALCON-A CPU?

- a) Intel Core i9
- b) AMD Ryzen
- c) Qualcomm Snapdragon
- d) All of the above

Answer: d) All of the above

Which of the following is a disadvantage of the External FALCON-A CPU?

- a) High power consumption
- b) Low clock speed
- c) Limited processing power
- d) High cost

Answer: c) Limited processing power

Lec 15 - Logic Design and Control Signals Generation in SRC

1. Which of the following best describes logic design?

- A) The process of creating digital circuits using logic gates
- B) The process of creating analog circuits using operational amplifiers
- C) The process of designing software algorithms
- D) The process of designing mechanical systems

Answer: A) The process of creating digital circuits using logic gates

Which of the following is not a control signal used in SRC?

- A) Memory request signal
- B) CPU request signal
- C) Interrupt signal
- D) Power supply signal

Answer: D) Power supply signal

What is the purpose of control signals in SRC?

- A) To manage system resources
- B) To provide power to the system
- C) To communicate with external devices
- D) To create user interfaces

Answer: A) To manage system resources

What is the basic building block of digital logic circuits?

- A) Resistors
- B) Capacitors
- C) Transistors
- D) Inductors

Answer: C) Transistors

Which of the following is a type of logic gate?

- A) AND gate
- B) OR gate
- C) NOT gate
- D) All of the above

Answer: D) All of the above

Which of the following is an example of a combinatorial logic circuit?

- A) Flip-flop
- B) Counter
- C) Decoder
- D) None of the above

Answer: C) Decoder

Which of the following is an example of a sequential logic circuit?

- A) Adder
- B) Multiplexer
- C) Flip-flop
- D) Comparator

Answer: C) Flip-flop

Which of the following is a characteristic of synchronous circuits?

- A) They have no clock signal

- B) They have a feedback path
- C) They have a stable state
- D) They have no race conditions

Answer: C) They have a stable state

What is the purpose of a clock signal in synchronous circuits?

- A) To provide power to the circuit
- B) To synchronize the operation of the circuit
- C) To create an output signal
- D) To generate a control signal

Answer: B) To synchronize the operation of the circuit

Which of the following is an example of a control signal used in SRC?

- A) Voltage signal
- B) Data signal
- C) Clock signal
- D) Interrupt signal

Answer: D) Interrupt signal

Lec 16 - Control Unit Design

1. **What is the primary function of a control unit in a CPU?**

- a) Data processing
- b) Data storage
- c) Data transmission
- d) Instruction execution

Answer: d) Instruction execution

Which of the following is not a characteristic of a good control unit design?

- a) High clock speed
- b) Low power consumption
- c) Efficient instruction decoding
- d) Secure operation

Answer: a) High clock speed

Which of the following is not an essential component of a control unit?

- a) Arithmetic Logic Unit (ALU)
- b) Instruction Register (IR)
- c) Program Counter (PC)
- d) Data Bus

Answer: d) Data Bus

Which technique is used to improve the performance of a control unit by overlapping instruction execution?

- a) Instruction pipelining
- b) Register renaming
- c) Branch prediction
- d) Virtual memory

Answer: a) Instruction pipelining

Which of the following is not a common instruction set architecture used in control unit design?

- a) MIPS
- b) x86
- c) ARM
- d) SCSI

Answer: d) SCSI

Which of the following is an important factor to consider in control unit design for mobile devices?

- a) High power consumption
- b) Large heat dissipation
- c) Low power consumption
- d) High clock speed

Answer: c) Low power consumption

Which of the following is a security feature implemented in some control unit designs to prevent unauthorized code execution?

- a) Virtual memory

- b) Address translation
- c) Data encryption
- d) Address space randomization

Answer: d) Address space randomization

Which of the following is a technique used in control unit design to reduce the number of instruction cycles required to execute a program?

- a) Instruction pipelining
- b) Branch prediction
- c) Register renaming
- d) Cache memory

Answer: b) Branch prediction

Which of the following is an important factor to consider in control unit design for high-performance computing?

- a) Low clock speed
- b) Low power consumption
- c) High clock speed
- d) Low heat dissipation

Answer: c) High clock speed

Which of the following is a feature of some control unit designs that allows multiple threads to execute simultaneously?

- a) Hyper-threading
- b) Virtual memory
- c) Branch prediction
- d) Instruction pipelining

Answer: a) Hyper-threading

Lec 17 - Machine Reset and Machine Exceptions

1. What is machine reset?

- A. The process of restoring a computer system to its initial state
- B. The process of shutting down a computer system
- C. The process of updating the software of a computer system

Answer: A

What are machine exceptions?

- A. Unexpected events that occur during the operation of a computer system
- B. Expected events that occur during the operation of a computer system
- C. Events that occur during the boot-up process of a computer system

Answer: A

Which component of the computer system is responsible for handling machine exceptions?

- A. Memory
- B. Input/output devices
- C. Control unit

Answer: C

Which of the following is not an example of a machine exception?

- A. Divide-by-zero error
- B. Invalid memory access
- C. Operating system update

Answer: C

What is the purpose of a machine reset?

- A. To restore a computer system to its initial state
- B. To update the software of a computer system
- C. To shutdown a computer system

Answer: A

When is a machine reset typically performed?

- A. During the boot-up process
- B. During the shutdown process
- C. When the system becomes unresponsive

Answer: A

Which of the following is not a component that is reset during a machine reset?

- A. Control unit
- B. Memory
- C. Input/output devices

Answer: C

What is the role of the control unit in handling machine exceptions?

- A. To generate an exception handler routine
- B. To shut down the system
- C. To clear the memory

Answer: A

What can cause a machine exception?

- A. Divide-by-zero error

B. Invalid memory access

C. Expected events during the operation of a computer system

Answer: A and B

Which of the following is a technique used to prevent machine exceptions?

A. Machine reset

B. Exception handling

C. Error correction codes

Answer: C

Lec 18 - Pipelining

1. What is pipelining?

- a) A technique to increase the size of memory
- b) A technique to increase the processing speed of a CPU
- c) A technique to increase the number of input/output devices

Answer: b) A technique to increase the processing speed of a CPU

What is the purpose of pipelining?

- a) To decrease the processing speed of a CPU
- b) To increase the processing speed of a CPU
- c) To increase the size of the memory

Answer: b) To increase the processing speed of a CPU

Which of the following is a benefit of pipelining?

- a) Decreased throughput
- b) Increased idle time
- c) Increased efficiency

Answer: c) Increased efficiency

What is a pipeline stage?

- a) A specific step in the pipelining process
- b) A specific step in the memory access process
- c) A specific step in the input/output process

Answer: a) A specific step in the pipelining process

How does pipelining work?

- a) By dividing the processing of an instruction into smaller sequential stages
- b) By increasing the size of the memory
- c) By increasing the number of input/output devices

Answer: a) By dividing the processing of an instruction into smaller sequential stages

What is the output of one stage in the pipeline used for?

- a) As the input for the next stage
- b) To increase the size of the memory
- c) To increase the number of input/output devices

Answer: a) As the input for the next stage

What is a pipeline hazard?

- a) A delay in the pipeline caused by an instruction that depends on a previous instruction
- b) A delay in the pipeline caused by a hardware failure
- c) A delay in the pipeline caused by a software error

Answer: a) A delay in the pipeline caused by an instruction that depends on a previous instruction

What is a pipeline stall?

- a) A delay in the pipeline caused by a hardware failure
- b) A delay in the pipeline caused by a software error
- c) A delay in the pipeline caused by the pipeline hazard

Answer: c) A delay in the pipeline caused by the pipeline hazard

Which of the following is a disadvantage of pipelining?

- a) Increased efficiency

- b) Increased complexity
- c) Decreased throughput

Answer: b) Increased complexity

What is the main goal of pipelining?

- a) To decrease the processing speed of a CPU
- b) To increase the processing speed of a CPU
- c) To decrease the number of input/output devices

Answer: b) To increase the processing speed of a CPU

Lec 19 - Pipelined SRC

1. What is Pipelined SRC used for?

- A) Computing certain types of matrix operations
- B) Sorting data in a database
- C) Running simulations in virtual environments
- D) None of the above

Answer: A

What does SRC stand for in Pipelined SRC?

- A) Simple Reduction Complex
- B) Symbolic Reduction Complex
- C) Sequential Reduction Complex
- D) None of the above

Answer: B

What is the benefit of using Pipelined SRC for matrix computations?

- A) Faster computation times
- B) More accurate results
- C) Lower memory usage
- D) None of the above

Answer: A

What is the main drawback of Pipelined SRC?

- A) It is not suitable for large-scale matrix computations
- B) It is prone to errors
- C) It requires specialized hardware
- D) It can introduce additional overhead

Answer: C

How does Pipelined SRC work?

- A) By breaking down a matrix into smaller sub-matrices and computing them in parallel pipelines
- B) By converting a matrix into a graph and performing computations on the graph
- C) By using statistical methods to estimate matrix operations
- D) None of the above

Answer: A

What applications is Pipelined SRC commonly used for?

- A) Signal processing
- B) Machine learning
- C) Scientific computing
- D) All of the above

Answer: D

What is the significance of pipelining in Pipelined SRC?

- A) It allows for faster computation times by computing sub-matrices in parallel
- B) It reduces the memory usage of the algorithm
- C) It ensures more accurate results
- D) None of the above

Answer: A

Which of the following is a challenge in implementing Pipelined SRC?

- A) Pipeline hazards

- B) Instruction reordering
- C) Data forwarding
- D) None of the above

Answer: D

Which stage of the pipeline in Pipelined SRC computes the final result?

- A) Instruction fetch
- B) Instruction decode
- C) Execute
- D) Write-back

Answer: D

What is pipeline depth in Pipelined SRC?

- A) The number of pipeline stages used in the algorithm
- B) The number of sub-matrices into which the matrix is broken down
- C) The number of computational units used in parallel pipelines
- D) None of the above

Answer: A

Lec 20 - Hazards in Pipelining

1. What is a hazard in pipelining?

- a) A condition where the pipeline execution is stalled
- b) A condition where the pipeline execution continues uninterrupted
- c) A condition where the pipeline execution reverses
- d) A condition where the pipeline execution stops completely

Answer: a) A condition where the pipeline execution is stalled

What is a data hazard?

- a) A hazard caused by the use of a shared resource
- b) A hazard caused by an instruction that changes the program counter
- c) A hazard caused by a dependency between two or more instructions
- d) A hazard caused by a structural limitation in the pipeline design

Answer: c) A hazard caused by a dependency between two or more instructions

What is a structural hazard?

- a) A hazard caused by an instruction that changes the program counter
- b) A hazard caused by a dependency between two or more instructions
- c) A hazard caused by a structural limitation in the pipeline design
- d) A hazard caused by the use of a shared resource

Answer: c) A hazard caused by a structural limitation in the pipeline design

What is a control hazard?

- a) A hazard caused by a dependency between two or more instructions
- b) A hazard caused by an instruction that changes the program counter
- c) A hazard caused by a structural limitation in the pipeline design
- d) A hazard caused by the use of a shared resource

Answer: b) A hazard caused by an instruction that changes the program counter

What is pipeline latency?

- a) The number of pipeline stages in the pipeline
- b) The time required to complete one pipeline stage
- c) The total time required to complete a sequence of pipeline stages
- d) The time required to switch between pipeline stages

Answer: c) The total time required to complete a sequence of pipeline stages

What is pipeline throughput?

- a) The time required to complete one pipeline stage
- b) The total time required to complete a sequence of pipeline stages
- c) The number of pipeline stages in the pipeline
- d) The rate at which instructions are completed by the pipeline

Answer: d) The rate at which instructions are completed by the pipeline

How can data hazards be resolved in pipelining?

- a) By inserting NOP instructions
- b) By reordering instructions
- c) By forwarding data between pipeline stages
- d) By stalling the pipeline

Answer: c) By forwarding data between pipeline stages

How can structural hazards be resolved in pipelining?

- a) By inserting NOP instructions

- b) By reordering instructions
- c) By forwarding data between pipeline stages
- d) By adding additional resources

Answer: d) By adding additional resources

How can control hazards be resolved in pipelining?

- a) By inserting NOP instructions
- b) By reordering instructions
- c) By forwarding data between pipeline stages
- d) By using branch prediction

Answer: d) By using branch prediction

Which type of hazard can be resolved by instruction reordering?

- a) Data hazards
- b) Structural hazards
- c) Control hazards
- d) All of the above

Answer: d) All of the above

Lec 21 - Instruction Level Parallelism

1. What is Instruction Level Parallelism (ILP)?

- a) The ability to execute multiple threads in parallel
- b) The ability to execute multiple instructions in parallel
- c) The ability to execute multiple processes in parallel
- d) The ability to execute multiple programs in parallel

Solution: b) The ability to execute multiple instructions in parallel

What are the benefits of ILP?

- a) Improved performance
- b) Reduced power consumption
- c) Increased security
- d) All of the above

Solution: a) Improved performance

Which of the following is a challenge of ILP?

- a) Data dependencies between instructions
- b) Limited availability of resources
- c) Slow clock speed
- d) None of the above

Solution: a) Data dependencies between instructions

Which of the following techniques can be used to overcome the challenges of ILP?

- a) Instruction scheduling
- b) Register renaming
- c) Speculative execution
- d) All of the above

Solution: d) All of the above

What is superscalar processing?

- a) A technique for exploiting ILP
- b) A technique for exploiting TLP
- c) A technique for reducing power consumption
- d) A technique for reducing memory latency

Solution: a) A technique for exploiting ILP

What is dynamic scheduling in the context of ILP?

- a) A technique for predicting branch outcomes
- b) A technique for issuing and executing instructions out of order
- c) A technique for reducing data dependencies between instructions
- d) A technique for reducing memory latency

Solution: b) A technique for issuing and executing instructions out of order

What is speculation in the context of ILP?

- a) A technique for predicting branch outcomes
- b) A technique for issuing and executing instructions out of order
- c) A technique for reducing data dependencies between instructions
- d) A technique for reducing memory latency

Solution: a) A technique for predicting branch outcomes

How does pipelining relate to ILP?

- a) Pipelining is a technique for exploiting TLP

- b) Pipelining is a technique for exploiting ILP
- c) Pipelining is a technique for reducing power consumption
- d) Pipelining is a technique for reducing memory latency

Solution: b) Pipelining is a technique for exploiting ILP

Which of the following is not a technique used to overcome the challenges of ILP?

- a) Instruction scheduling
- b) Register renaming
- c) Static branch prediction
- d) Speculative execution

Solution: c) Static branch prediction

What is the role of the compiler in ILP?

- a) To optimize code to reduce data dependencies between instructions
- b) To optimize code to exploit available parallelism
- c) To generate machine code for the processor
- d) All of the above

Solution: d) All of the above

Lec 22 - Microprogramming

1. What is microprogramming?

- a) A technique used to implement complex instructions in a processor
- b) A technique used to implement simple instructions in a processor
- c) A technique used to implement parallel processing in a processor
- d) A technique used to implement pipelining in a processor

Solution: a) A technique used to implement complex instructions in a processor

What is a microinstruction?

- a) A complex instruction broken down into smaller units
- b) A simple instruction broken down into smaller units
- c) A set of instructions executed in parallel
- d) A set of instructions executed out of order

Solution: a) A complex instruction broken down into smaller units

What is a control memory in microprogramming?

- a) A memory that stores microinstructions
- b) A memory that stores data
- c) A memory that stores the program counter
- d) A memory that stores the instruction pointer

Solution: a) A memory that stores microinstructions

What is the purpose of microprogramming?

- a) To implement complex instructions in a processor
- b) To implement simple instructions in a processor
- c) To increase the clock speed of a processor
- d) To reduce the power consumption of a processor

Solution: a) To implement complex instructions in a processor

What is the advantage of microprogramming?

- a) It facilitates the implementation of complex instructions
- b) It increases the clock speed of a processor
- c) It reduces the power consumption of a processor
- d) It reduces the complexity of a processor

Solution: a) It facilitates the implementation of complex instructions

Which of the following is a disadvantage of microprogramming?

- a) It increases the complexity of a processor
- b) It reduces the clock speed of a processor
- c) It increases the power consumption of a processor
- d) It reduces the number of available instructions in a processor

Solution: a) It increases the complexity of a processor

What is the difference between microprogramming and hardwired control?

- a) Microprogramming uses software to control the processor, while hardwired control uses hardware
- b) Microprogramming is slower than hardwired control
- c) Microprogramming is less complex than hardwired control
- d) Microprogramming is less flexible than hardwired control

Solution: a) Microprogramming uses software to control the processor, while hardwired control

uses hardware

What is a microprogram counter in microprogramming?

- a) A register that holds the address of the current microinstruction
- b) A register that holds the address of the next microinstruction
- c) A register that holds the address of the current instruction
- d) A register that holds the address of the next instruction

Solution: a) A register that holds the address of the current microinstruction

Which of the following is an example of a microinstruction?

- a) Load
- b) Add
- c) Subtract
- d) Fetch

Solution: d) Fetch

What is the role of the microsequencer in microprogramming?

- a) To generate the address of the next microinstruction
- b) To execute the microinstructions
- c) To store the microinstructions
- d) To fetch the microinstructions

Solution: a) To generate the address of the next microinstruction

