

# Module 1

- Question 1 MIPS Design Principle 1 states that 'Simplicity favors regularity.' Which of the following is a direct application of this principle in the MIPS ISA?

 Completed Checked 1 time

 Correct! Well done.

- Having instructions of different lengths to save memory space.
- Maintaining a consistent instruction format with three operands for all arithmetic operations.
- Providing a unique instruction for every possible mathematical function.
- Using complex addressing modes to reduce the number of instructions.

Explanation:



Regularity in instruction format (like always having three operands) simplifies the hardware implementation and enables higher performance at lower cost.

- Question 2 MIPS uses 'Big Endian' byte addressing. Which statement correctly describes this layout?

 Completed Checked 1 time

 Correct! Well done.

- The least-significant byte is stored at the lowest address of a word.
- The most-significant byte is stored at the lowest address of a word.
- Only the first bit of every word is used for data.
- Data can only be stored in registers, never in main memory.

 Show Explanation

- Question 3 If register \$s3 contains the base address of an array A, and each word is 4 bytes, what is the correct MIPS instruction to load A[8] into register \$t0?

 Completed Checked 1 time

Question **4** Which register is hardwired to the constant value 0 and cannot be overwritten in MIPS?

 Completed Checked 1 time

 Correct! Well done.

- \$ra
- \$s0
- \$zero
- \$at

 Show Explanation

Question **5** What is the primary purpose of 'Sign Extension' in MIPS instructions like addi or lb?

 Completed Checked 1 time

 Correct! Well done.

- To convert a 32-bit number into a 16-bit number.
- To ensure that a smaller constant or value retains its numeric value when placed in a 32-bit register by replicating the sign bit.
- To change a positive number into a negative number automatically.
- To clear the most significant bits of a register to zero.

 Show Explanation

Question **6** In the MIPS R-format instruction, which field is used to extend the opcode and specify the exact arithmetic or logical operation (e.g., distinguishing add from sub)?

 Completed Checked 1 time

 Correct! Well done.

- rs (source register)
- rt (target register)
- funct (function code)
- shamt (shift amount)

Question **7** Which MIPS instruction is used to jump to a procedure and

Question **8** Which segment of the MIPS memory hierarchy is used to store automatic variables and return addresses for procedure calls?

Completed Checked 1 time

Correct! Well done.

Text

Static Data

Heap

Stack

Question **9** How does a MIPS processor calculate the target address for a Branch Equal (beq) instruction?

Completed Checked 1 time

Correct! Well done.

By using an absolute 32-bit address stored in the instruction.

By adding the constant zero to the value in the rs register.

By using PC-relative addressing ( $\text{Target} = \text{PC} + \text{offset} \times 4$ ).

By jumping to the address stored in the \$ra register.

Question **10** What is a 'Pseudoinstruction' in the context of MIPS assembly?

Completed Checked 1 time

Correct! Well done.

An instruction that the hardware executes directly without a clock cycle.

A high-level command recognized by the assembler that is translated into one or more actual machine instructions.

A comment in the code that the processor ignores.

An instruction used only in CISC architectures, not RISC.