

# 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

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.