

## **Correction – Computer Architecture Exam**

### **L2 Computer Science**

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QCM – Correct Answers

Q1: RAM

Q2: Instructions and data can be fetched simultaneously

Q3: Unidirectional

Q4: The number of bits transmitted in parallel

Q5: Program Counter (PC)

Q6: Data must be fetched from main memory

Q7:  $2^{32}$

Q8: 400 MB/s

Q9: Overlapping the execution of multiple instructions

Q10: Readable Only – Writable by certain instructions

Q11: Relative

Q12: The memory address of the operand

Q13: 4

Q14: One operand

Q15: Microprocessor without Interlocked Pipeline Stages

## Solution: MIPS Assembly Programming

```
.data
array:      .space 40          # space for 10 integers (10 x 4 bytes)
prompt:     .asciiz "Enter an integer: "
resultMsg:  .asciiz "Number of even elements: "

.text

main:
    la $t0, array           # $t0 points to the start of the array
    li $t1, 10              # counter for 10 elements
    li $t2, 0               # even counter = 0

read_loop: (1Pts)
    beq $t1, $zero, count_loop

    # Print prompt
    li $v0, 4
    la $a0, prompt
    syscall

    # Read integer
    li $v0, 5
    syscall

    sw $v0, 0($t0)          # store integer in array
    addi $t0, $t0, 4        # move to next array position
    addi $t1, $t1, -1       # decrement counter
    j read_loop

count_loop: (3 Pts)

    la $t0, array           # reset pointer to start of array
    li $t1, 10              # reset counter

check_even:
    beq $t1, $zero, display_result

    lw $t3, 0($t0)          # load array element
    andi $t4, $t3, 1        # logical AND to check parity
    bne $t4, $zero, skip    # if odd, skip increment

    addi $t2, $t2, 1        # increment even counter

skip:
    addi $t0, $t0, 4        # next element
    addi $t1, $t1, -1
    j check_even
```

display\_result: (1Pts)

```
# Print result message
li $v0, 4
la $a0, resultMsg
syscall
```

```
# Print even count
li $v0, 1
move $a0, $t2
syscall
```

```
# Exit program
li $v0, 10
syscall
```