



ENCS2380- Computer Organization and Microprocessor

Dr. Ayman Hroub

Quiz #1

October 13, 2021

Student Name: .....

Student ID: .....

Quiz Time: 15 minutes

Question #1 (5 Points): Choose the correct answer (multiple choice):

1. <b>B</b>	2. <b>A</b>	3. <b>D</b>	4. <b>A</b>	5. <b>B</b>
-------------	-------------	-------------	-------------	-------------

1. One of the following is not an architectural attribute of the processor

- A. Addressing Modes     B. **Memory Technology**     C. Instructions' Formats     D. I/O Mechanisms

2. The smallest addressable unit of data in memory is:

- A. **Byte**     B. Bit     C. Word     D. Half Word

3. The instruction execution stage in which the instruction is interpreted

- A. Execute     B. Memory Access     C. Fetch     D. **Decode**

4. The addressing mode in which the operand's address is one of the instruction's fields:

- A. **Direct**     B. Indirect     C. Register Indirect     D. Immediate

5. In the processor design, the organization is decided before the processor's architecture is fixed

- A. True     B. **False**

**Question #2 (5 Points):** A program is run on a 1 MHz processor. The following table shows the instruction mix of this program, and the CPI of each instruction type. Answer the questions below and show your solution steps clearly.

Instruction Type	Instruction Count	Cycles per Instruction
Arithmetic and Logic	4000	1
Data Transfer	3000	2
Control Instructions	1000	2
Floating Point	2000	2

- Calculate the effective CPI of this program on this processor (3 Points)
- Calculate the execution time of this program on this processor (2 Points)

**Good Luck!**

**a.**

Good Luck!

$$CPI = \sum_{i=1}^n \left( CPI_i \times \frac{\text{Instruction Count } i}{\text{Total instruction count}} \right)$$

total instruction count =  $4000 + 3000 + 1000 + 2000$   
 $= 10000$

$$CPI = 1 \times 0.4 + 2 \times 0.3 + 2 \times 0.1 + 2 \times 0.2$$

$$= 0.4 + 0.6 + 0.2 + 0.4 = 1.6$$

**b.** CPU time = Instruction count  $\times$  CPI  $\times$  clock period

$$= 10000 \times 1.6 \times \frac{1}{10^6} = 0.016 \text{ s}$$

$$= 16 \text{ ms}$$