United International University (UIU)
Dept of CSE
CSE 313 : Computer Architecture
(Summer 2020) Section B
CT-1, Set-A (For odd IDs)

Full Marks: 20 Time: 30 min (+5 min for submission)

Answer all the questions. Show **detailed calculation steps**.
Your answer script must contain your name and ID.

1. A compiler designer is trying to decide between two code sequences for a particular computer. The hardware designers have supplied the following facts: 5 x 3 =15

	CPI for each Instruction Class		
	Arithmetic Instr	Memory Instr	Control Instr
CPI	3	4	2

For a particular high-level language statement, the compiler writer is considering two code sequences that require the following instruction counts:

	Number of Instruction for each class		
	Arithmetic Instr	Memory Instr	Control Instr
Algorithm 1	5	3	7
Algorithm 2	6	4	6

For each algorithm-

i) What is the CPI?
ii) What is the CPU time if the clock cycle time of the PC is 2×10^{-9} s?
iii) How much CPU time is spent on the **memory instructions** only?

Solution:

	Algorithm1	Algorithm2
CPI	(5x3+4x3+2x7)/(5+3+7) = 41/15	(6x3+4x4+6x2)/(6+4+6)=23/8
CPU Time	41x(2x10^-9) s = 8.2x10^-8 s	46 x (2x10^-9) s = 9.2x10^-8 s
Mem Time	3x4x(2x10^-9) s = 2.4 x 10 ^ -8 s	4x4x(2x10^-9) s = 3.2 x 10^-8 s

2. Explain the idea of 'performance via pipelining' with real life example. Your answer should not have more than two sentences. 05

Sample Answer: Pipeline means breaking down a task into smaller subtasks and assigning subtasks to different parties. An example of performance via pipelining can be Food-ordering apps with Home Delivery feature where the company can focus on producing the food and delegate the delivery subtask to a courier services.