BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination: Quiz - 4 | Semester: Spring 2025
Duration: 25minutes | Full Marks: 15

CSE 340: Computer Architecture

Name:	ID:	Section:

1. Consider the code sequence given below.

LD X_{21}, 40(X_{22})
ADD X_{25}, X_{22}, X_{20}
SD X_{22}, 16(X_{21})
SUB X_{23}, X_{21}, X_{20}
LD X_{23}, 32(X_{22})

a. How many data hazards are there in the given code sequence? [2]
b. Apply only stall + forwarding to overcome the data hazards. [5]
c. Calculate the total clock cycles and average CPI required after applying the method. [3]

2. The following table shows the different stages involved in executing instructions and the corresponding durations for each stage:

stages	Instruction Fetch	Register Read	ALU Op	Memory Access	Register Write
Duration	50ps	10ps	30ps	20ps	10ps

Given the above durations, determine the total time required to complete each of the following instructions:

	Instructions	Time to complete each instruction
i.	ADD X_{21}, X_{22}, X_{23}	
iv	ADDi X_{21}, X_{22}, 5	
v.	LD X_{21}, 22(X_{20})	
vi.	SD X_5, 22(X_{23})	
vii	BEQ X_6, X_8, End	

Suppose the above instructions are being run in a **single cycle datapath**.

a. **Determine** the clock period of this system? [1]

Answer:

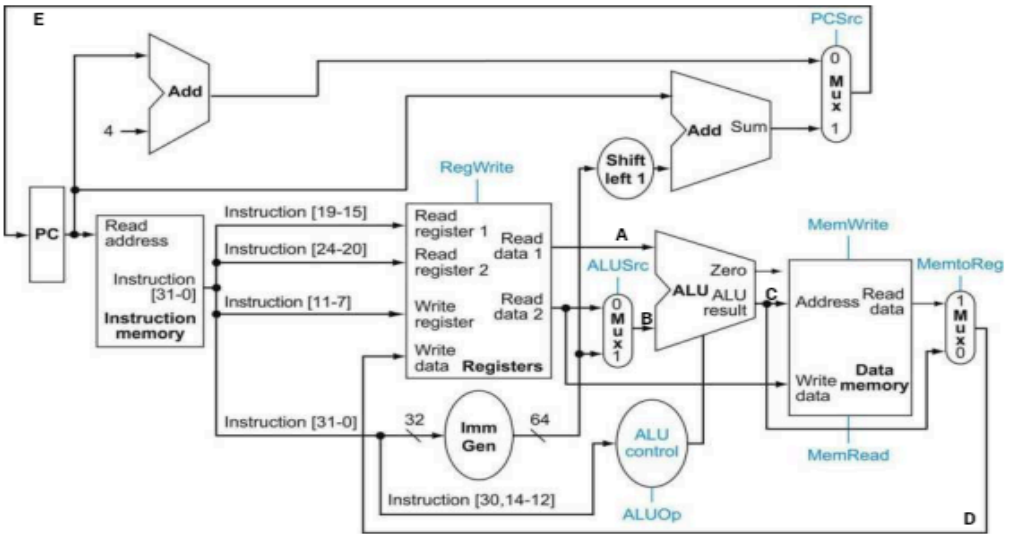
b. **Calculate** the number of clock cycles needed to execute this instruction set. [2]

Answer:

b. What would be the total time to run this instruction sequence? [2]

Answer:

Surprise Quiz 4



Study the above RISC-V Datapath thoroughly. Assume, that initially PC = 0x60A, X_1 = 0x776, X_2 = 0x477, X_3 = 0x666, X_4 = 0x999.

Determine the values of A, B, C, D, and E in **hex** for the following instructions executed sequentially. If the value does not matter, write it as X (don't care)

	Instructions	A	B	C	D	E
i.	And X_1, X_2, X_3					
ii.	Sd X_1, 102(X_2)					

Conditions: You must do the necessary calculations on your script and write only the final answer in the question paper. Each box carries 0.5 marks.