


National University of Computer and Emerging Sciences, Lahore Campus

	Course Name:	Computer Architecture	Course Code:	EE204
	Program:	BS(Computer Science)	Semester:	Fall 2019
	Duration:	30 Minutes	Total Marks:	20
	Paper Date:	04-11-2019	Weight	~3
	Exam Type:	Quiz 3d	Page(s):	2

Student : Name: _____ **Roll No.** _____
Section: _____

Question 1a [6]

What is the Execution hazard in reference to forwarding? Write pseudo-code to detect it!

Question 1b [4]

What are control hazard? How prediction helps in control hazard?

Question 2 [10]

Consider the following program that will be executed on a **2-issue Superscalar MIPS** architecture with **Static Branch Prediction (BACKWARD TAKEN)**

Consider the following specification for our pipelined processor:

- Five stages MIPS pipeline with **three execution units 2 adders and 1 divider**. Adder takes 1 cycle in execution and divider takes 3 cycles.
- **Forwarding is implemented**
- Computation of PC and TARGET ADDRESS for branch & jump instructions anticipated in the **ID stage**

L1: ld R3, 50 (R4)
 subi R3, R3, 4
 ld R2, 150 (R4)
 subi R2, R2, 8
 div R5, R2, R3
 st R5, 250 (R4)
 addi R4, R4, 4
 bne R4, R7, L1

In-order issue and out-of-order execution and completion rules are applied. For each cycle, show which instructions is at which stage by filling the following table. You don't need to write complete instructions. Just write the instruction numbers from the code above.

Cycle No.	IF	ID	EX			MEM	WB
			+/-	+/-	/		
1							
2							
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