



Quiz 3 – FALL 2024

Course Title:	Computer Organization & Architecture	Course Code:	CPE 343	Credit Hours:	4(3,1)
Course Instructor:	Dr. Muhammad Naeem Awais	Program Name:	BS Computer Engineering		
Semester:	Batch: FA22	Section:	B	Time:	10 minutes
Date:	10 th December, 2024	Maximum Marks:	10		
Student's Name:		Registration Number:			

Question 1: [CLO4-PLO3-C3] [10 Marks]

In a 5-stage pipelined MIPS architecture with branch decision in the 4th stage, *discover* different hazards found in the given sequence of code and propose solutions to eliminate these hazards:

1. LW \$s1, 5(\$s4)
2. LW \$s2, 5(\$s4)
3. AND \$s3, \$s1, \$s2
4. OR \$s4, \$s2, \$s3
5. SUB \$t4, \$s1, \$s6
6. AND \$s7, \$s4, \$s5
7. BEQ \$t0, \$t1, 12
8. SW \$s7, 7(\$s1)
9. ...
10. ...

Fill the table.

Instruction Number	Hazard Type	Resource/Register Name	Hazard Source Instruction	Hazard Affected Instruction	Proposed Solution
3	RAW, RAW	\$s1, \$s2	1, 2	3	Data forward (DF) & Delay
4	RAW	\$s2, \$s3	2, 3	4	Register renaming
6	RAW	\$s4	4	6	DF & Delay
8	Control		7	8, 9, 10	Move the setup to hazard control handling in 4 th stage
8	RAW	\$s7	6	8	DF & Delay
8	WAR	\$s1	3, 5	8	Register renaming
8	WAW	\$s1	1	8	"
5	RAW	\$s1	1	5	Data forward (DF) & Delay