


# National University of Computer and Emerging Sciences, Lahore Campus

	Course Name:	Advance Computer Architecture	Course Code:	EE502
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	Exam Type:	Quiz 1b	Page(s):	2

**Student : Name:** \_\_\_\_\_ **Roll No.** \_\_\_\_\_  
**Section:** \_\_\_\_\_

## Question 1a [5]

```
load    R4, 100(R3)
and     R3, R4, R1
add     R2, R4, R3
store   R2, 100(R3)
sub     R4, R3, R2
```

Find all types of hazards in above code. If there is a hazard between two instructions 1 and 2, write 1 & 2 in front of that hazard below:

WAR:

RAW:

WAW:

## Question 1b [5]

How many stalls will be required for the correct execution of above code? Rewrite the above code after insertion of stalls!

## Question 2 [10]

Consider three different processors P1, P2, and P3 with following specifications

Processor	Clock rate	No. of Instructions	Execution Time
P1	1.5 GHz	$15 \times 10^9$	8 s
P2	2 GHz	$20 \times 10^9$	10s
P3	3 GHz	$30 \times 10^9$	9 s

(a) Find the average CPI for processor P1.

(b) Find the clock rate for P2 that reduces its execution time to that of P3.

(c) Find the number of instructions for P3 that reduces its execution time to that of P2.