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## COSC 211 Lab 7 Written

① a) 4.9.1:

Instruction 2 is dependent on  $r1$  in the first instruction. Instruction 2 cannot be written till  $r1$  has been written. The dependency type is read-after-write.

Instruction 3 is dependent on  $r1$  in the first instruction and  $r2$  in the second instruction. The dependency type is read-after-write.

b) 4.9.2:

The hazards are  $r1$  in instruction 2 waiting for instruction 1 to write, and  $r2$  in instruction 3 waiting for instruction 2 to write. to eliminate hazards...

or  $r1, r2, r3$

nop

nop

or  $r2, r1, r4$

nop

nop

or  $r1, r1, r2$