Pipeline Assignment – CSCI 4335

Refer to this video for help <https://www.youtube.com/watch?v=8NPzLBSBzPI> (only for your enjoyment)

You have learned three types of Hazards and the data hazard is further divided into WAR, RAW, and RAR. Further we talked about stalls (noOp), forwarding, placing an unrelated instruction between dependent instructions, and flushing the pipeline to solve these hazards. Complete the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Code | Hazard | Registers affected | How to handle the Hazard | In case of forwarding place arrows where it can be forwarded |
| Add $t0,$t1,$t2 | So long as t1 and t2 have the correct data type suitable for addition there are no hazards. | T0 is changed to the sum of t1 and t2. | Again no hazard yet. | Does not apply. |
| Sub $t3,$t0,$t1 | Read after write. | T3,T0 | Forwarding. | As of 2:36 PM 11/19/22 cannot figure out how. |
| Or $t4,$t0,$t2 | Read after write. | T4,T0 | Forwarding. | ^ |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Code | Hazard | Registers affected | How to handle Hazard | In case of forwarding place arrows |
| Lw $t2, 60($t1) | So far I do not see a hazard. | T2,T1 | n/a | n/a |
| Lw $t1,40($t2) | So far I do not see a hazard. | T1,T2 | n/a | n/a |
| Add $t1,$t1,$t2 | Write after read | T1 | Place as many nop as necessary. |  |
| Sw $t1,20($t2) | Write after write | T1 | Place as many nop as necessary. |  |
|  |  |  |  |  |

Please not load word and store word instructions use memory calculated by adding contents of the register indicated with the number given. Just to let you know that CPU is involved in calculating the memory location.

Please do some review of your textbook and research before filling these out. May not be as easy as you think.