|  |  |  |
| --- | --- | --- |
| Original Instructions | Pipelined no Forwarding | Pipelined with Forwarding |
| lw $6, 10($7)  lw $8, 10($9)  lw $10, 10($11)  add $8, $7, $6 |  |  |
| lw $2, 8($5)  lw $5, 4($2)  add $2, $3, $9 |  |  |
| sw $4, 20($5)  lw $5, 20($7) |  |  |
| lw $5, 20($7)  sw $4, 20($5) |  |  |
| add $3, $6, $9  add $2, $4, $6  jr $3  sw $4, 50($8) |  |  |
| add $3, $2, $1  sub $4, $3, $2  and $6, $,2, $4  or $5,$2, $3 |  |  |
| add $3, $2, $1  sw $3, 20 ($5) |  |  |
| lw $3, 30($6)  lw $4, 40($6)  add $5, $3, $4 |  |  |
| lw $3, 20($6)  sw $6, 20($5)  add $7, $8, $9 |  |  |
| lw $3, 14($6)  sw $5, 40($3)  add $3, $7, $9 |  |  |
| sw $4, 20($3)  lw $5, 30($4) |  |  |
| sw $6, 30 ($5)  add $3, $5, $6  add $2, $3, $4  lw $2, 40($3) |  |  |

Please read and write 1 page of notes from Chapter 4 in the book!

What is a pipeline hazard?

What are the three types of hazards? Please give an example of each!