Quiz 2

BCS-7

Spring 2020

Note:

1. The doc file should contain title page as well as the required tables

1. Consider the following code running on a single-issue dynamically scheduled processor with speculation (i.e. reorder buffer)

fmul.d F4,F2,F0 ;

fld F2,0(x1) ;

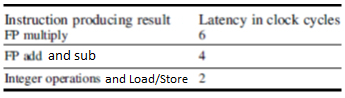
fld F6,0(x2) ;

fadd.d F6,F2,F6

fsd F6,0(x2) ;

fsub.d F4,F4,F6 ;

Table below gives the latency of the instructions. Assume branch prediction scheme is ‘branch no taken'. Do not show branch instruction in any table because it is integer unit instruction, but include it in cycle calculation



Completely fill the Instruction cycle detail table given below when all instructions are committed

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | Complete/ Write to reorder |  |
|  |  |  |  |  |  |
|  |  | issue | exe start | exe end | commit |
|  | |  |  |  |  |  |
|  | |  |  |  |  |  |
|  | |  |  |  |  |  |
|  | |  |  |  |  |  |
|  | |  |  |  |  |  |
|  | |  |  |  |  |  |

Also give the Reorder buffer, Reservation station and FP register status tables when the fsub.d F4,F4,F6 instruction is just issued.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Reorder Buffer | | | | | |
| Entry | Busy | Instruction | State | Destination | Value |
| 1 | No |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |
| 5 |  |  |  |  |  |
| 6 |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Reservation Station | | | | | | | |
| Name | Busy | op | Vj | Vk | Qj | Qk | Dest | A |
| Load1 |  |  |  |  |  |  |  |  |
| Load2 |  |  |  |  |  |  |  |  |
| Add1 |  |  |  |  |  |  |  |  |
| Add2 |  |  |  |  |  |  |  |  |
| Add3 |  |  |  |  |  |  |  |  |
| Mult1 |  |  |  |  |  |  |  |  |
| Std |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Register Status | | | | | | | | | |
| Field | F0 | F2 | F4 | F6 | F8 | F10 | F12 | ..... | F30 |
| Busy |  |  |  |  |  |  |  |  |  |
| Qi |  |  |  |  |  |  |  |  |  |