25/3/21 HPCA - Short Test

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LD/ST - 2 cycles / 7 cycles
ADD/SUB - 3 cycles
MUL - 8 cycles
BRANCH - 4 cycles

ROB Table

| ROB | Type | Dest | Value | Done | Commit |
|---|---|---|---|---|---|
| ROB1 | LD | R0 | 3 | 1 | 1 |
| ROB2 | MUL | R1 | 0 | 1 | 1 |
| ROB3 | ADD | R2 | 1 | 1 | 1 |
| ROB4 | SUB | R4 | 3 | 1 | 1 |
| ROB5 | MUL | R2 | 1 | 1 | 1 |
| ROB6 | ST | R4 | – | 1 | 1 |
| ROB7 | BNE | ∅ | – | 1 | 1 |
| ROB8 | LD | R0 | | | |
| ROB9 | F | | | | |
| ROB 10 | | | | | |
| ROB 11 | | | | | |
| ROB 12 | | | | | |

Instrn.

| No. | Instrn | Issue | Exec | Wrtb | Commit |
|---|---|---|---|---|---|
| 1 | LD R0 3(R2) | 1/8 | 2 | 9 | 10 |
| 2 | MUL R1 R0 R2 | 2/9 | 10 | 18 | 19 |
| 3 | ADD R2 R1 R3 | 3/20 | 19 | 22 | 23 |
| 4 | SUB R4 R0 R1 | 4/ | 19 | 22 | 24 |
| 5 | MUL R2 R2 R3 | 5/ | 23 | 31 | 32 |
| 6 | ST R4 3(R2) | 6 | 32 | 34 | 35 |
| 7 | BNE R4 R2 loop | 7 | 23 | X | 36 |

LSQ

| LS | Address | value | Commit |
|---|---|---|---|
| LD | 3 | | |
| ST | ROB 5 × 3 | | |
| LD | 3 + ROB5 | | |
| | | | |

Reg File

| | |
|---|---|
| $R_0$ | 2 |
| $R_1$ | 0 |
| $R_2$ | 0 |
| $R_3$ | 1 |
| $R_4$ | |

RAT

| | |
|---|---|
| $R_0$ | ~~ROB1~~ |
| $R_1$ | ~~ROB2~~ |
| $R_2$ | ~~ROB3~~ ROB5 |
| $R_3$ | |
| $R_4$ | |

| | Busy | $V_j$ | $V_k$ | $Q_j$ | $Q_k$ | Dst Tag |
|---|---|---|---|---|---|---|
| MUL1 | ✓ | 3 | 0 | ~~ROB1~~ | | ROB2 |
| MUL2 | ✓ | | 1 | ROB3 | | ROB5 |
| ADD1 | ✓ | 0 | 1 | ~~ROB3~~ | | ~~ROB3~~ |
| ADD2 | ✓ | 3 | | ~~ROB1~~ | ~~ROB2~~ | ROB4 |