Case 1: Tests for Function Units

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Instruction | IF | ID | EX | MEM | WB |
| Add r1, r2 | 1 | 2 | 3 | -- | 4 |
| Addi r3, 10 | 2 | 3 | 4 | -- | 5 |
| Addui r4, 20 | 3 | 4 | 5 | -- | 6 |
| Mult r5, r6 | 4 | 5 | 6 | -- | 7 |
| Put r1 | 5 | 6 | 7 | -- | 8 |
| Put r3 | 6 | 7 | 8 | -- | 9 |
| Put r4 | 7 | 8 | 9 | -- | 10 |
| Put r5 | 8 | 9 | 10 | -- | 11 |
| Halt | 9 | -- | -- | -- | -- |

Case 2: Tests for Load/Store Function

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Instruction | IF | ID | EX | MEM | WB |
| Sw r3, r4 | 1 | 2 | 3 | 4 | -- |
| Add r1, r2 | 2 | 3 | 4 | -- | 5 |
| Lw r5, r4 | 3 | 4 | 5 | 6 | 7 |
| Halt | 6 | -- | -- | -- | -- |

Case 3: Tests for Forwarding

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Instruction | IF | ID | EX | MEM | WB |
| Add r1, r2 | 1 | 2 | 3 | -- | 4 |
| Add r3, r1 | 2 | 3 | 4 | -- | 5 |
| Add r4, r2 | 3 | 4 | 5 | -- | 6 |
| Put r3 | 4 | 5 | 6 | -- | 7 |
| Halt | 5 | -- | -- | -- | -- |

Case 4: Test for Branch Function (Bubble Insertion)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Instruction | IF | ID | EX | MEM | WB |
| Add r1, r2 | 1 | 2 | 3 | -- | 4 |
| Bz r3, 3 | 2 | 3 | 4 |  | 5 |
| Add r1, r2 | -- | -- | -- | -- | -- |
| Add r3, r4 | 5 | 6 | 7 | -- | 8 |
| Add r1, r2 | 6 | 7 | 8 | -- | 9 |
| Add r5, r6 | 7 | 8 | 9 | -- | 10 |
| Put r3 | 8 | 9 | 10 | -- | 11 |
| Halt | 9 | -- | -- | -- | -- |