|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cycle** | **reset** | **pc** | **instr** | **branch** | **srca** | **srcb** | **aluout** | **zero** | **pcsrc** | **writedata** | **memwrite** | **read data** |
| 1 | 1 | 00 | addi $2,$0,5  (0x20020005) | 0 | 0 | 5 | 5 | 0 | 0 | 0 | 0 | x |
| 2 | 0 | 04 | addi $3,$0,12  (0x2003000c) | 0 | 0 | c | c | 0 | 0 | 0 | 0 | x |
| 3 | 0 | 08 | addi $7,$3,-9  (0x2067fff7) | 0 | c | -9 | 3 | 0 | 0 | 0 | 0 | x |
| 4 | 0 | 0C | or $4, $7, $2  (0x00e22025) | 0 | 3 | 5 | 7 | 0 | 0 | 0 | 0 | x |
| 5 | 0 | 10 | and $5, $3, $4  (0x00642824) | 0 | 12 | 7 | 2 | 0 | 0 | 0 | 0 | x |
| 6 | 0 | 14 | add $5, $5, $4  (0x00a42820) | 0 | 2 | 7 | 9 | 0 | 0 | 0 | 0 | x |
| 7 | 0 | 18 | beq $5, $7, end  (0x10a7000a) | 1 | 3 | 9 | -6 | 0 | 0 | 0 | 0 | x |
| 8 | 0 | 1C | slt $4, $3, $4  (0x0064202a) | 0 | 12 | 7 | 0 | 0 | 0 | 0 | 0 | x |
| 9 | 0 | 20 | beq$4,$0,around  (0x10800001) | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | x |
| 10 | 0 | 24 | addi $5, $0, 0  (0x20050000) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | x |
| 11 | 0 | 28 | slt $4, $7, $2  (0x00e2202a) | 0 | 3 | 5 | 1 | 0 | 0 | 0 | 0 | x |
| 12 | 0 | 2C | add $7, $4, $5  (0x00853820) | 0 | 1 | 2 | 3 | 0 | 0 | 0 | 0 | x |
| 13 | 0 | 30 | sub $7, $7, $2  (0x00e23822) | 0 | 3 | 5 | -2 | 0 | 0 | 0 | 0 | x |
| 14 | 0 | 34 | sw $7, 68($3)  (0xac670044) | 0 | 12 | 68 | 80 | 0 | 0 | -2 | 1 | x |
| 15 | 0 | 38 | lw $2, 80($0)  (0x8c020050) | 0 | 0 | 80 | 80 | 0 | 0 | 0 | 0 | -2 |
| 16 | 0 | 3C | j end  (0x08000011) | x | x | x | x | x | x | x | 0 | x |

Table 1. First sixteen cycles of executing mipstest.asm

# Extended functionality. Main Decoder:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Instruction** | **Op5:0** | **RegWrite** | **RegDst** | **AluSrc** | **Branch** | **MemWrite** | **MemtoReg** | **ALUOp1:0** | **Jump** | **BNE** | **ORI** |  |
| R-type | 000000 | 1 | 1 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 |  |
| lw | 100011 | 1 | 0 | 1 | 0 | 0 | 1 | 00 | 0 | 0 | 0 |  |
| sw | 101011 | 0 | X | 1 | 0 | 1 | X | 00 | 0 | 0 | 0 |  |
| beq | 000100 | 0 | X | 0 | 1 | 0 | X | 01 | 0 | 0 | 0 |  |
| addi | 001000 | 1 | 0 | 1 | 0 | 0 | 0 | 00 | 0 | 0 | 0 |  |
| j | 000010 | 0 | X | X | X | 0 | X | XX | 1 | 0 | 0 |  |
| ori | 001101 | 1 | 0 | 1 | 0 | 0 | 0 | 10 | 0 | 0 | 1 |  |
| bne | 000101 | 0 | X | 0 | 1 | 0 | X | 01 | 0 | 1 | 0 |  |

**Extended functionality. ALU Decoder:**

|  |  |
| --- | --- |
| **ALUOp1:0** | **Meaning** |
| 00 | Add |
| 01 | Subtract |
| 10 | Look at funct field |
| 11 |  |