ARCHITECTURE IMPLEMENTATION

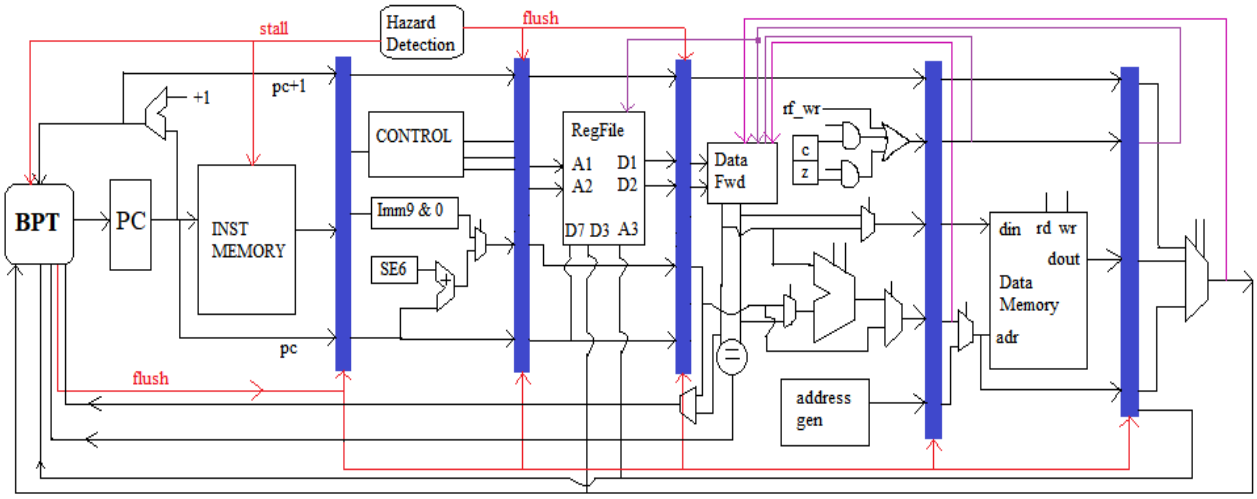

FIG 1. DATAPATH OF 16-BIT RISC PROCESSOR

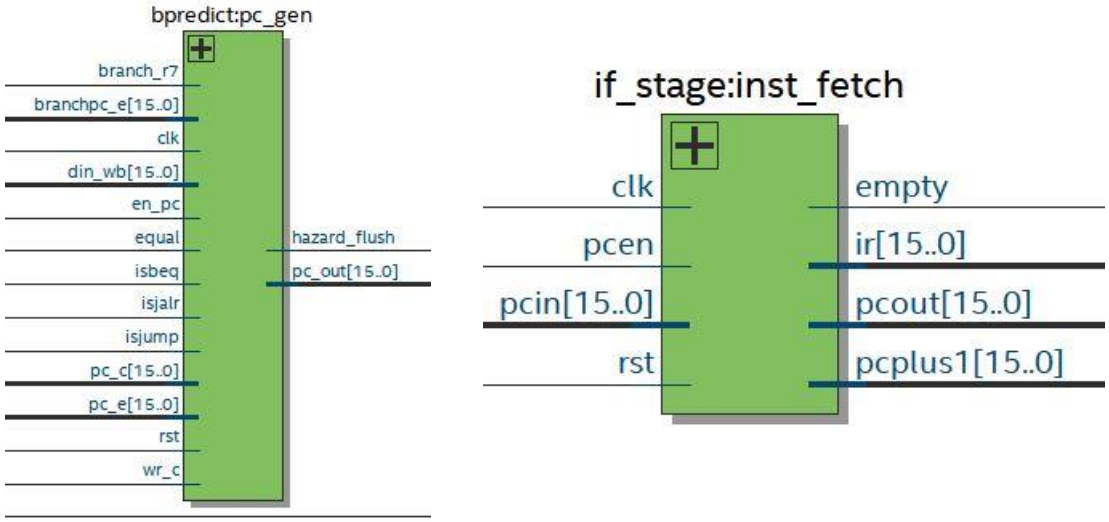

FIG 2. STAGE 1: BRANCH PREDICTION MODULE AND INSTRUCTION FETCH STAGE

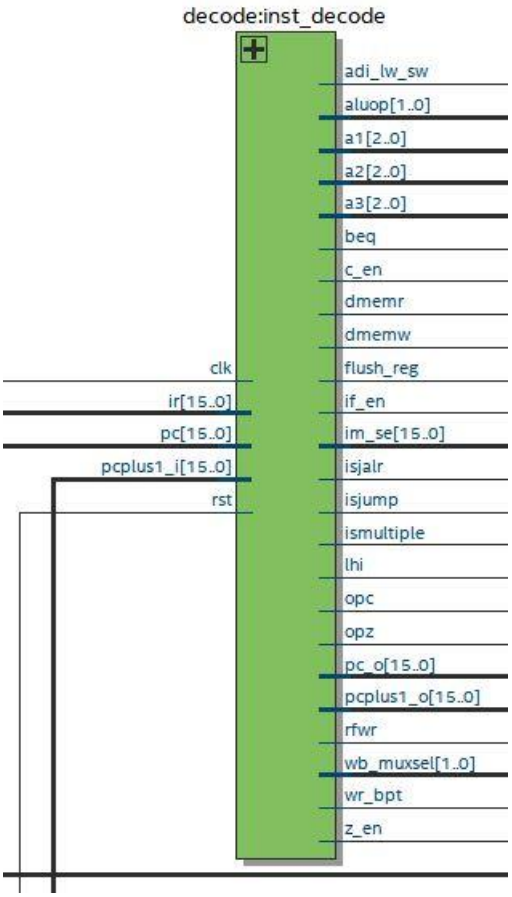

FIG 3. STAGE 2: CONTROL/DECODE STAGE

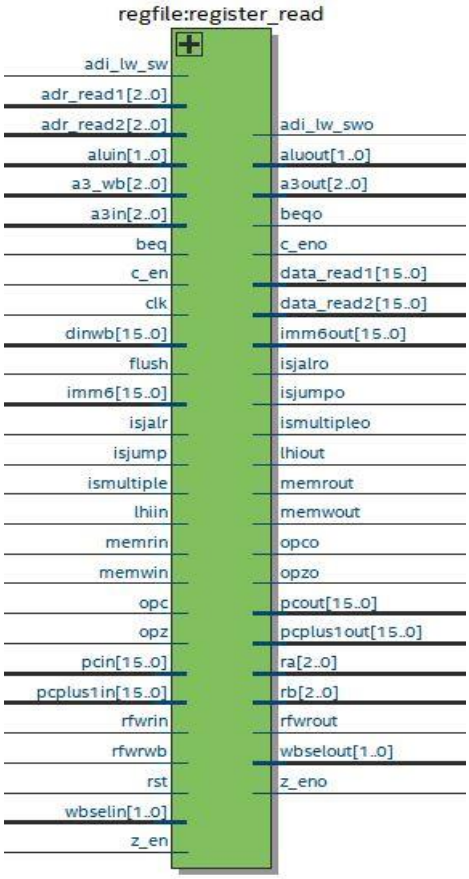

FIG 4. STAGE 3: REGISTER READ(OPERAND FETCH)

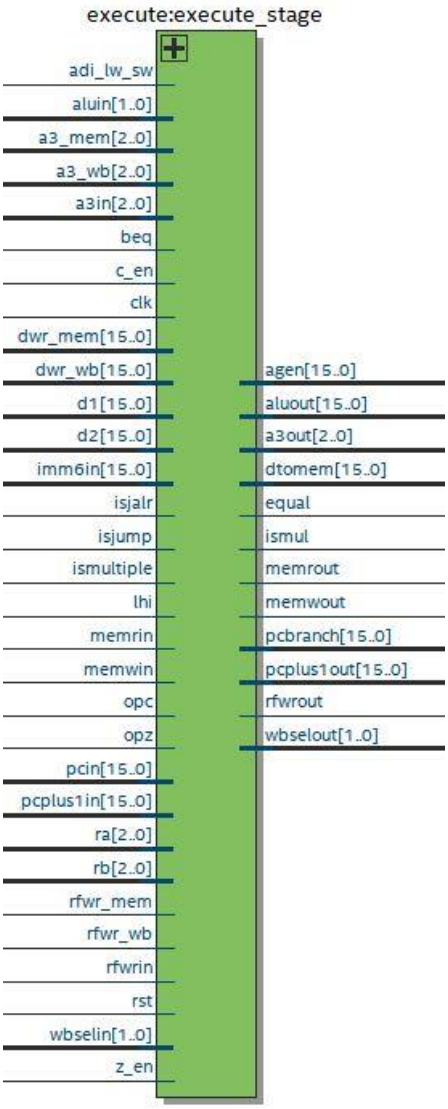

FIG 5. STAGE 4: EXECUTE MODULE

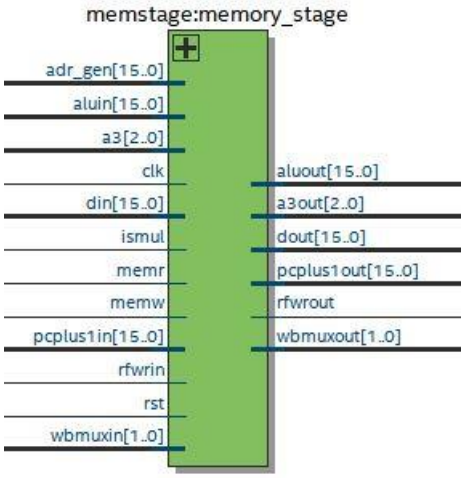

FIG 6. STAGE 5: DATA MEMORY READ

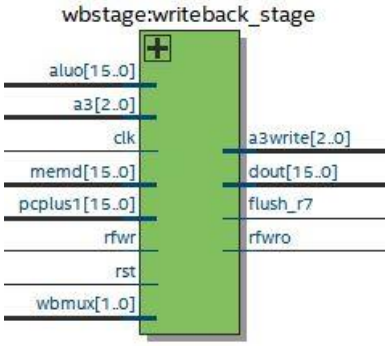

FIG 7. STAGE 6: WRITEBACK

FIG 8. SIMULATION WAVEFORMS FOR VARIOUS TEST CASES

FOLLOWING ARE THE CORRESPONDING TEST CASE FOR THE ABOVE FIGURES:

- 0 => "0011000000000001", --LHI R0 X0080
  1 => "0011001000000010", --LHI R1 X0100
  2 => "0011010000000100", --LHI R2 X0200
  3 => "0011011000001000", --LHI R3 X0400
  4 => "0011100000010000", --LHI R4 X0800
  5 => "0011101000100000", --LHI R5 X1000
  6 => "0011110001000000", --LHI R6 X2000

- 0 => "0011000000000001", --LHI R0 X0080
  1 => "1000001000100010", --JAL R1 X0020
  35 => "1100010011100000", --BEQ R2 R3 X0020

- 0 => "0101000010000000", --SW R0 R2+X00
  1 => "0000100101110000", --ADD R4 R5 R6
  2 => "0000001010011000", --ADD R1 R2 R3
  3 => "0000011110110010", --ADC R3 R6 R6
  4 => "0000001101110001", --ADZ R1 R5 R6
  5 => "0001100101000001", --ADI R4 R5 X01
  6 => "0100011010000000", --LW R3 R2+X00
  7 => "1100011100000000", --BEQ R3 R4 X00

- 0 => "0111000000111010", --SM R0 11111010
  1 => "0000100101110000", --ADD R4 R5 R6
  2 => "0000001010011000", --ADD R1 R2 R3

```
3 => "0000000110110010",      --ADC R3 R6 R6
4 => "0000001101110001",      --ADZ R1 R5 R6
5 => "0001100101000001",      --ADI R4 R5 X01
6 => "0100011010000000",      --LW R3 R2+X00
7 => "1100011100000000",      --BEQ R3 R4 X00
```

- ```
  x"3212",      --LHI
  x"3212",      --LHI
  x"3401",      --LHI
  x"029a",      --ADC
  x"5281",      --SW
  x"4881",      --LW
  x"0858",      --ADD
  x"8a05",      --JAL
  x"0000",      --ADD
  x"1234",      --ADI
  x"1234",      --ADI
  x"1234",      --ADI
  x"1d42",      --ADI
  x"7abf",      --SM
  x"7823",      --SM
  x"3001",      --LHI
  x"6a75",      --LM
  x"6c85",      --LM
  x"7a3a",      --SM
  x"c207",      --BEQ
  x"8af2",      --JAL
  x"3212",      --LHI
  ```
  ```