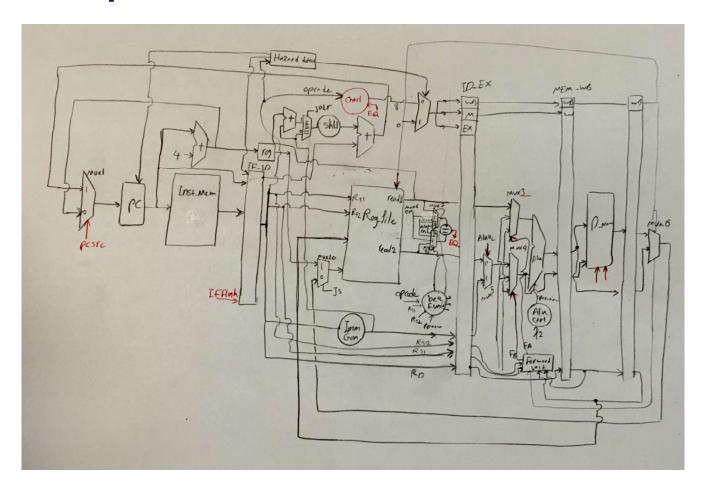
Data path:



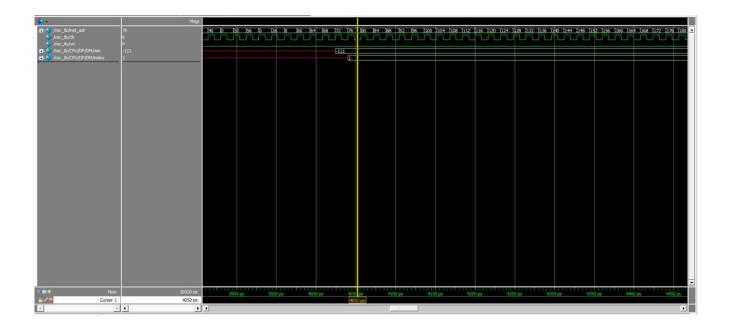
We tested this code that includes any kind of possible hazards:

```
add
                  R8, R0, R0 0
11
           addi
                  R10, R0, 20 4
11
           ld
                  R2, 1000 (R8) 8
11
                  R3, R0, R8
           add
// Loop:
                  R8, R10, END LOOP 16
           beq
                  R13, R8, R8
11
           add
                                   20
                                          11111
11
                  R13, R13, R13
                                    24
           add
                                          1111
                  R13, R13, R13
11
           add
                                    28
                  R7, 1000 (R13)
           ld
                                    32
                                            111
11
           slt
                  R11, R7, R2
                                    36
11
                  RO, R11, END IF
                                    40
                                          beq
                  R2, R0, R7
11
                                    44
           add
                                       111111
11
           add
                  R3, R0, R8
                                    48
                  R8, R8, 1
// END IF: addi
                                    52
                  LOOP
           J
                                    56
11
                                         //// (beq)
// END LOOP: sd, R2, 2000(R0)
                                    60
             sd, R3, 2004(R0)
                                    64
```

Simulations:

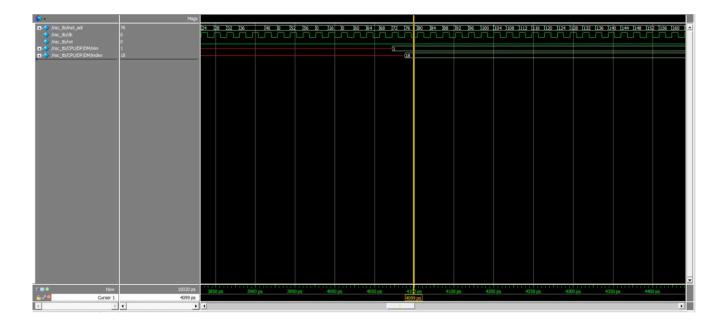


```
64'd8;
64'dll1; //1
64'dll; //2
64'd5;
          //4
//5
//6
64'd4:
64'd5;
                     Min = 0
64'd6;
          //7
64'd7;
64'd7;
                     Index = 9
          //9
//10
//11
64'd0;
64'd101;
64'dl1;
64'd12;
64'd13;
64'd5:
        //14
        //15
64'd14;
64'd14;
64'dll; //17
64'dll; //18
64'dl1; //19
```



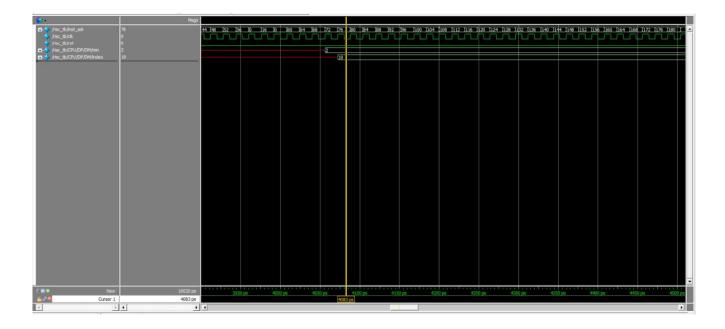
Min = -111 Index = 1

```
64'd8; //0
-64'dlll; //1
64'dl1; //2
64'd5;
        //3
       //4
//5
//6
64'd4;
64'd5;
64'd6;
       1/7
64'd7;
64'd7;
       //8
64'd3;
       1/9
64'd101; //10
64'dl1; //11
64'd12; //12
       //13
64'd13;
       //14
64'd5;
64'd14;
       //15
64'd14; //16
64'dl1;
       //17
64'dl1; //18
64'dl1; //19
```



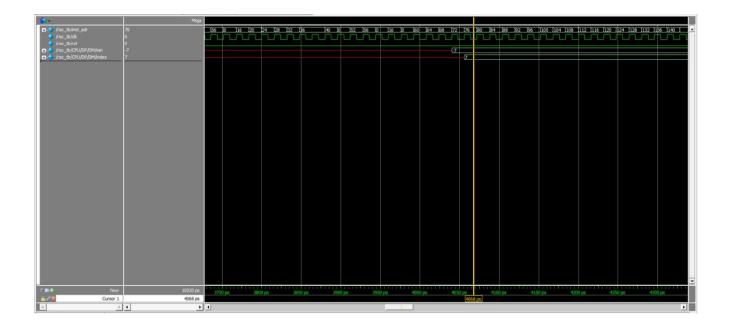
Min = 1 Index = 18

```
64'd8;
          //0
64'dll1; //1
64'dl1;
         1/2
64'd5;
         //3
64'd4;
         1/4
64'd5;
         1/5
64'd6;
         1/6
         1/7
64'd7;
         //8
64'd7;
64'd3;
         1/9
64'd101;
          //10
         //11
64'dl1;
64'd12;
         //12
64'd13;
        //13
64'd5;
        //14
64'd14;
         //15
64'd14;
        //16
64'dl1; //17
64'd1;
        //18
64'dll; //19
```



Min = 2 Index = 19

```
64'd8;
          110
         //1
64'd111;
64'dl1;
          1/2
64'd5;
         1/3
         1/4
64'd4;
64'd5;
         1/5
64'd6;
         1/6
64'd7;
         1/7
64'd7;
         1/8
64'd13;
         1/9
64'd101;
         //10
64'd11;
         //11
64'd12;
         //12
64'd13;
         //13
        //14
64'd5;
64'd14;
         //15
64'd14;
        //16
64'd11;
        //17
64'dl1; //18
64'd2; //19
```

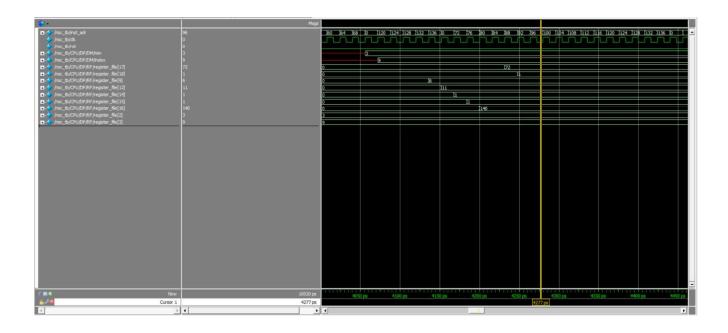


Min = -7 Index = 7

```
64'd8;
         1/0
64'dll1; //1
64'dl1;
         1/2
64'd5;
         1/3
64'd14;
         1/4
         1/5
64'd15;
64'd6;
         1/6
-64'd7;
         1/7
64'd5;
         //8
         1/9
64'd13;
64'd101; //10
64'dl1;
        //11
64'd12;
         //12
64'd13;
        //13
64'd115; //14
64'd14;
         //15
64'd14;
         //16
64'dl1; //17
64'dl1; //18
64'd10; //19
```

In order to check other instructions such as sll and slr and jalr and jal and ... we used this code:

```
11
               jal X1, TEST
                                      68
11
   RETURTN: sll R17, R3, R2
                                      72
11
               srl R18, R3, R2
                                      76
// TEST:
               sub R9, R3, R2
                                      120
11
               or R12, R3, R2
                                      124
11
               and R14, R3, R2
                                      128
11
               slti R15, R2, 20
                                      132
11
               jalr R16 RETURN(R2)
                                      136
```



The results are totally correct.