1-

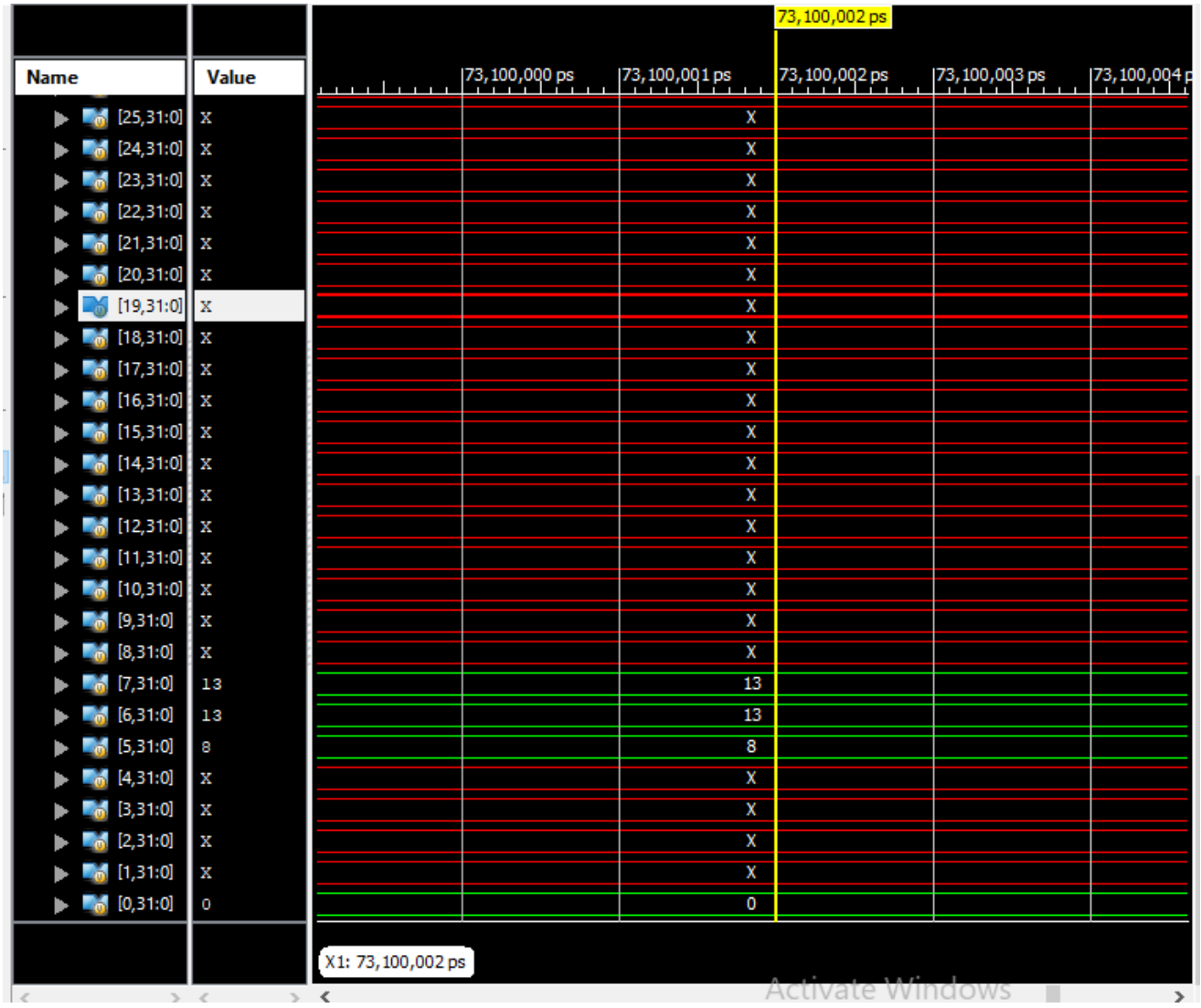
The folder “1-2” includes all the HDL sources for the pipelined RISC-V

2-

Code of Fibonacci for the pipelined RISC_V

You will find a written copy of it at folder (1-2) venus.txt

```
.text
main:   addi    t1, x0, 1
        add     t0, x0, x0
        addi     t3, x0,6
        nop
        nop
fib:    beq     t3, x0, finish
        nop
        nop
        add     t2, t1, t0
        mv      t0, t1
        nop
        mv      t1, t2
        addi    t3, t3, -1
        j       fib
        nop
        nop
finish: addi    a0, x0, 1
        addi    a1, t0, 0
        ecall # print integer ecall
        addi    a0, x0, 10
        ecall # terminate ecall
```


73,100,002 ps
Name
Value
73,100,000 ps
73,100,001 ps
73,100,002 ps
73,100,003 ps
73,100,004 p
[25,31:0] X
[24,31:0] X
[23,31:0] X
[22,31:0] X
[21,31:0] X
[20,31:0] X
[19,31:0] X
[18,31:0] X
[17,31:0] X
[16,31:0] X
[15,31:0] X
[14,31:0] X
[13,31:0] X
[12,31:0] X
[11,31:0] X
[10,31:0] X
[9,31:0] X
[8,31:0] X
[7,31:0] 13
[6,31:0] 13
[5,31:0] 8
[4,31:0] X
[3,31:0] X
[2,31:0] X
[1,31:0] X
[0,31:0] 0
X1: 73,100,002 ps
Activate Windows

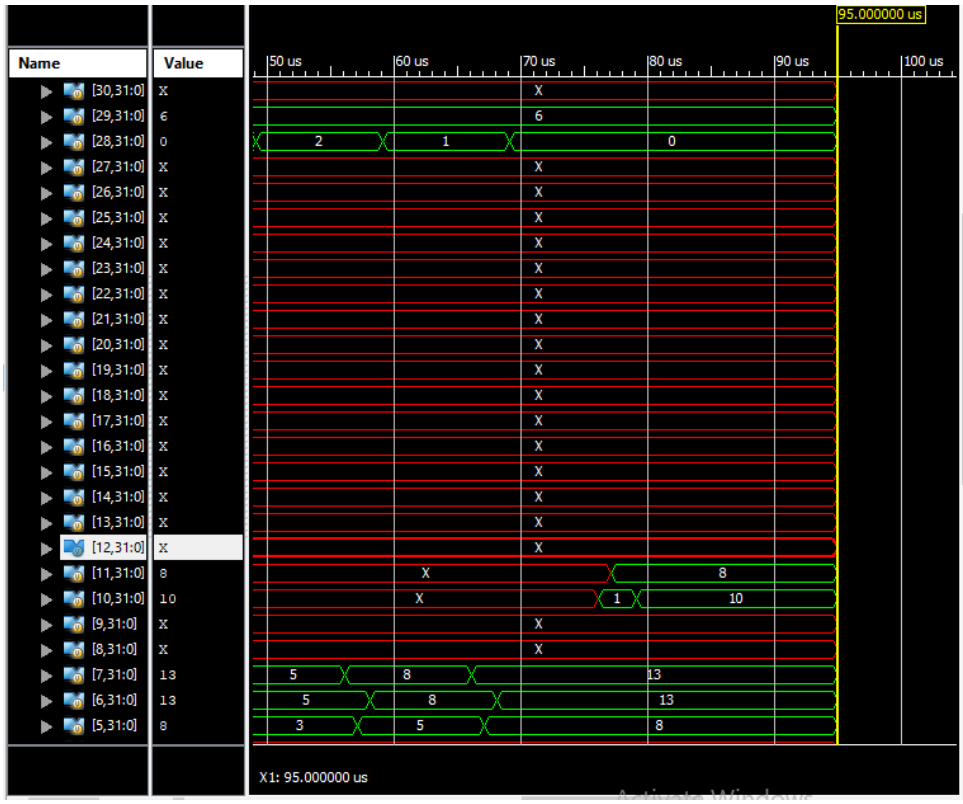
3-

You will find all the HDL sources in folder “3”

With the assembly code at venus.txt

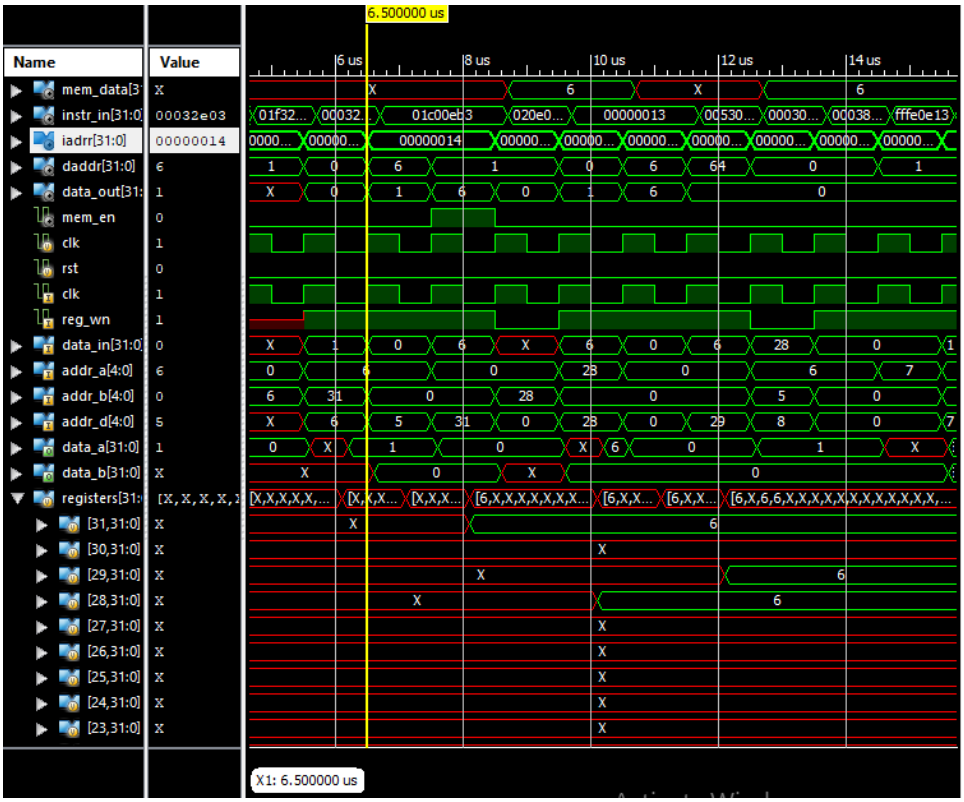
And machine code at prog.txt

Correct Result:



Stalling on the same instruction adress at (iaddr=0x14)

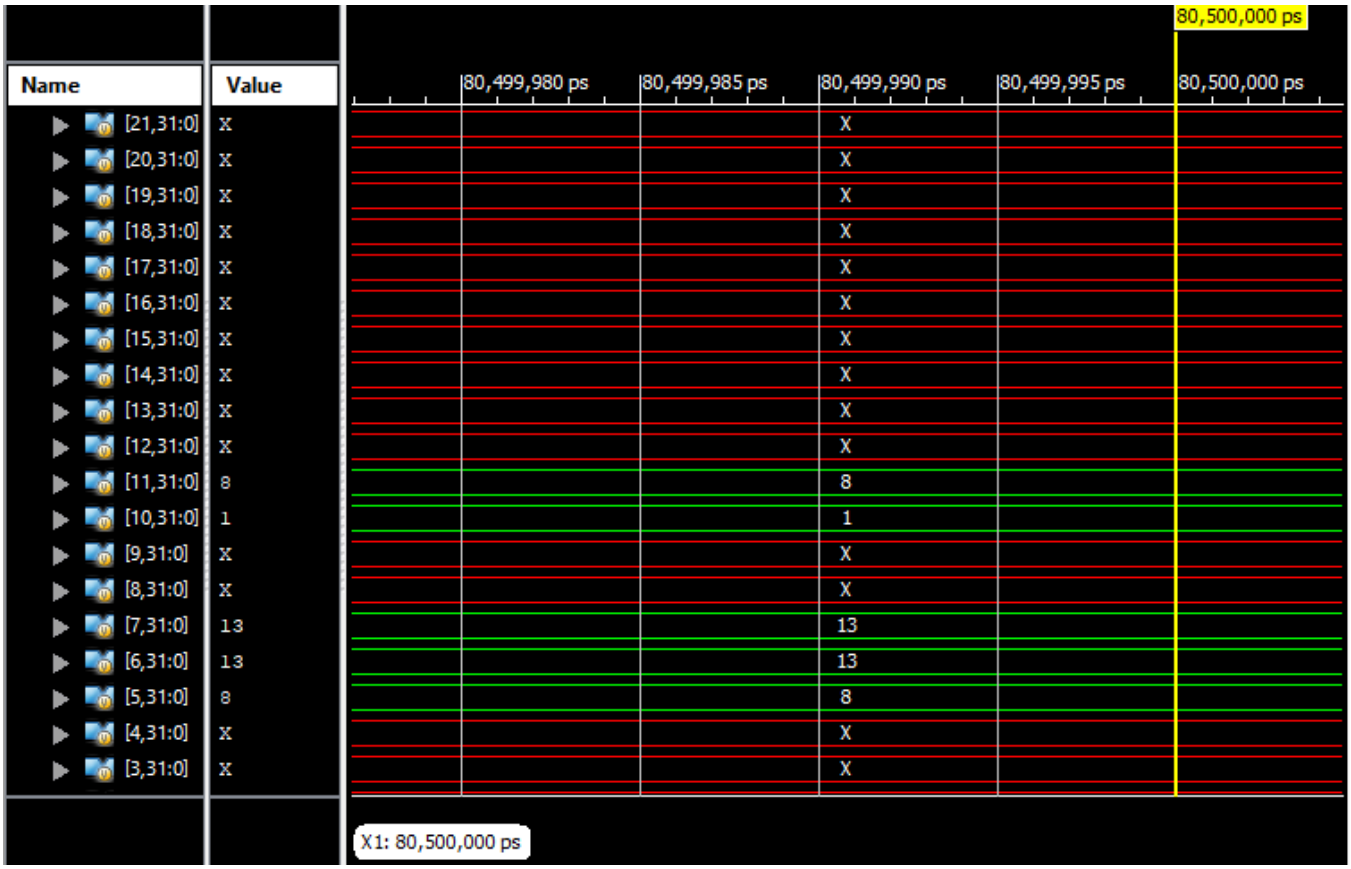
Insertring a nop by hardware instead of the first stalled instruction



Extra : solving the control hazards without need to expecting and without losing any cycle if the brunch doesn't occur

You will find the HDL sources in folder “extra”

```
.text
main:   addi    t1, x0, 1
        add     t0, x0, x0
        addi     t3, x0,6
fib:    beq     t3, x0, finish
        add     t2, t1, t0
        mv      t0, t1
        mv      t1, t2
        addi    t3, t3, -1
        j       fib
finish: addi    a0, x0, 1
        addi    a1, t0, 0
        ecall # print integer ecall
        addi    a0, x0, 10
        ecall # terminate ecall
```


Name
Value
80,499,980 ps
80,499,985 ps
80,499,990 ps
80,499,995 ps
80,500,000 ps
[21,31:0] X
[20,31:0] X
[19,31:0] X
[18,31:0] X
[17,31:0] X
[16,31:0] X
[15,31:0] X
[14,31:0] X
[13,31:0] X
[12,31:0] X
[11,31:0] 8
[10,31:0] 1
[9,31:0] X
[8,31:0] X
[7,31:0] 13
[6,31:0] 13
[5,31:0] 8
[4,31:0] X
[3,31:0] X
X1: 80,500,000 ps