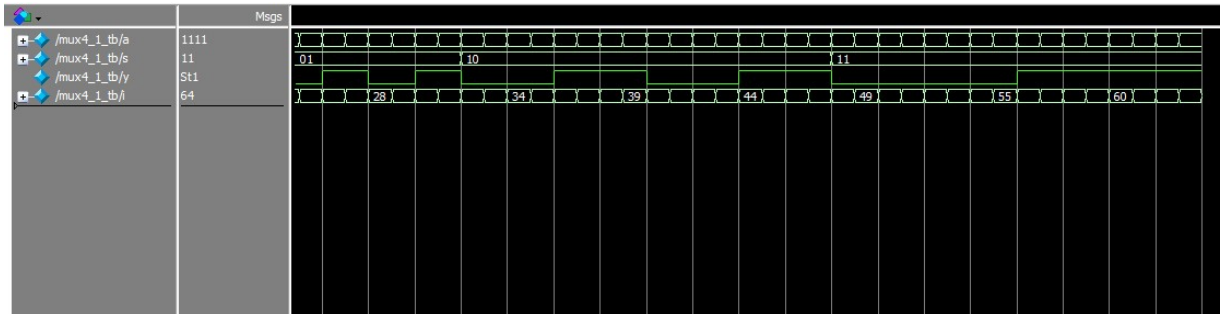
LAB 3 – Raja Aadhithan

Design – 4x1 mux using behavioral:

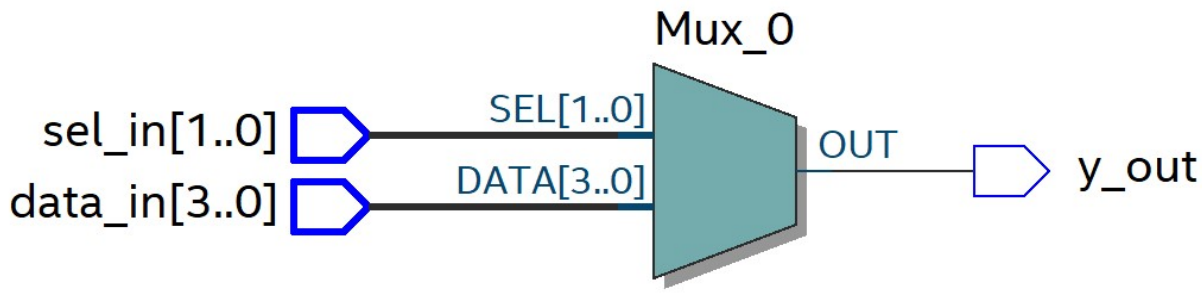
Wave:



Output:

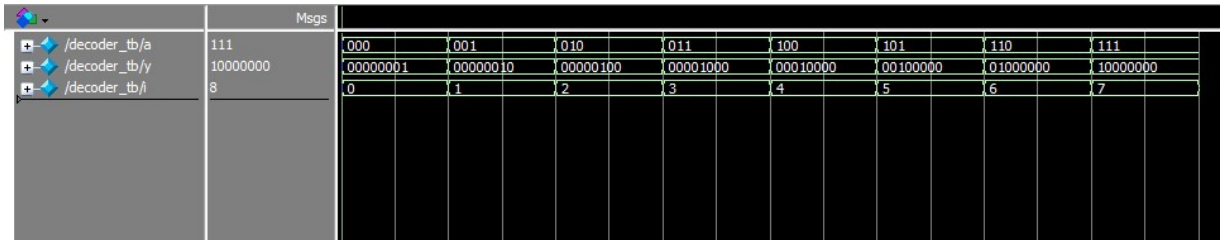
```
add wave -position insertpoint sim:/mux4_1_tb/*
VSIM 4> run -all
# @time    0: select line: 00, data: 0000, output: 0
# @time   10: select line: 00, data: 0001, output: 1
# @time   20: select line: 00, data: 0010, output: 0
# @time   30: select line: 00, data: 0011, output: 1
# @time   40: select line: 00, data: 0100, output: 0
# @time   50: select line: 00, data: 0101, output: 1
# @time   60: select line: 00, data: 0110, output: 0
# @time   70: select line: 00, data: 0111, output: 1
# @time   80: select line: 00, data: 1000, output: 0
# @time   90: select line: 00, data: 1001, output: 1
# @time  100: select line: 00, data: 1010, output: 0
# @time  110: select line: 00, data: 1011, output: 1
# @time  120: select line: 00, data: 1100, output: 0
# @time  130: select line: 00, data: 1101, output: 1
# @time  140: select line: 00, data: 1110, output: 0
# @time  150: select line: 00, data: 1111, output: 1
# @time  160: select line: 01, data: 0000, output: 0
# @time  170: select line: 01, data: 0001, output: 0
# @time  180: select line: 01, data: 0010, output: 1
# @time  190: select line: 01, data: 0011, output: 1
# @time  200: select line: 01, data: 0100, output: 0
# @time  210: select line: 01, data: 0101, output: 0
# @time  220: select line: 01, data: 0110, output: 1
# @time  230: select line: 01, data: 0111, output: 1
# @time  240: select line: 01, data: 1000, output: 0
# @time  250: select line: 01, data: 1001, output: 0
# @time  260: select line: 01, data: 1010, output: 1
# @time  270: select line: 01, data: 1011, output: 1
# @time  280: select line: 01, data: 1100, output: 0
# @time  290: select line: 01, data: 1101, output: 0
# @time  300: select line: 01, data: 1110, output: 1
# @time  310: select line: 01, data: 1111, output: 1
# @time  320: select line: 10, data: 0000, output: 0
# @time  330: select line: 10, data: 0001, output: 0
# @time  340: select line: 10, data: 0010, output: 0
# @time  350: select line: 10, data: 0011, output: 0
# @time  360: select line: 10, data: 0100, output: 1
# @time  370: select line: 10, data: 0101, output: 1
# @time  380: select line: 10, data: 0110, output: 1
# @time  390: select line: 10, data: 0111, output: 1
# @time  400: select line: 10, data: 1000, output: 0
# @time  410: select line: 10, data: 1001, output: 0
# @time  420: select line: 10, data: 1010, output: 0
# @time  430: select line: 10, data: 1011, output: 0
# @time  440: select line: 10, data: 1100, output: 1
# @time  450: select line: 10, data: 1101, output: 1
# @time  460: select line: 10, data: 1110, output: 1
# @time  470: select line: 10, data: 1111, output: 1
# @time  480: select line: 11, data: 0000, output: 0
# @time  490: select line: 11, data: 0001, output: 0
# @time  500: select line: 11, data: 0010, output: 0
# @time  510: select line: 11, data: 0011, output: 0
# @time  520: select line: 11, data: 0100, output: 0
# @time  530: select line: 11, data: 0101, output: 0
# @time  540: select line: 11, data: 0110, output: 0
# @time  550: select line: 11, data: 0111, output: 0
# @time  560: select line: 11, data: 1000, output: 1
# @time  570: select line: 11, data: 1001, output: 1
# @time  580: select line: 11, data: 1010, output: 1
# @time  590: select line: 11, data: 1011, output: 1
# @time  600: select line: 11, data: 1100, output: 1
# @time  610: select line: 11, data: 1101, output: 1
# @time  620: select line: 11, data: 1110, output: 1
# @time  630: select line: 11, data: 1111, output: 1
# ** Note: $finish    : C:/Users/Aadhithan/Documents/
#    Time: 640 ps  Iteration: 0  Instance: /mux4_1_tb
# 1
```

RTL:



Design: 3:8 Decoder:

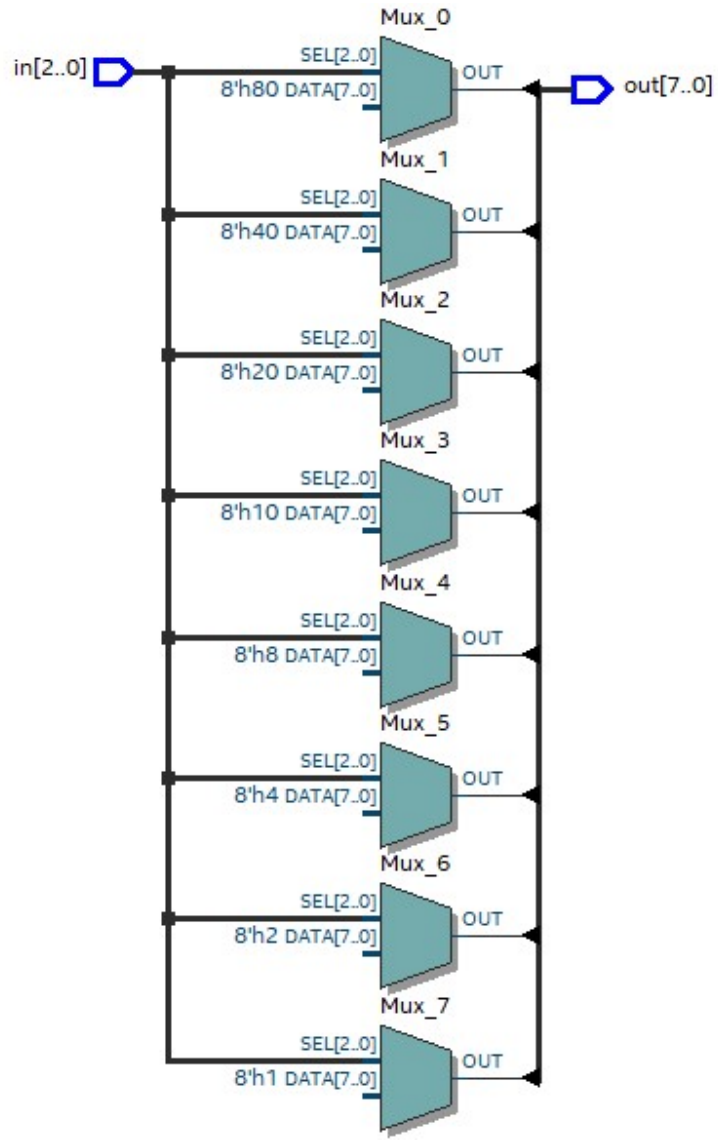
Wave



Output :

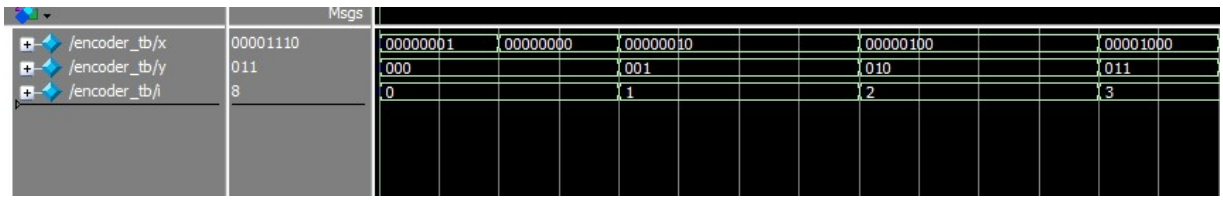
```
/SIM 9> run -all
# @time:  0ps - input is 000 , output is 00000001
# @time: 10ps - input is 001 , output is 00000010
# @time: 20ps - input is 010 , output is 00000100
# @time: 30ps - input is 011 , output is 00001000
# @time: 40ps - input is 100 , output is 00010000
# @time: 50ps - input is 101 , output is 00100000
# @time: 60ps - input is 110 , output is 01000000
# @time: 70ps - input is 111 , output is 10000000
# ** Note: $finish    : C:/Users/Aadhithan/Documents/V
#    Time: 80 ps  Iteration: 0  Instance: /decoder_tb
# 1
```

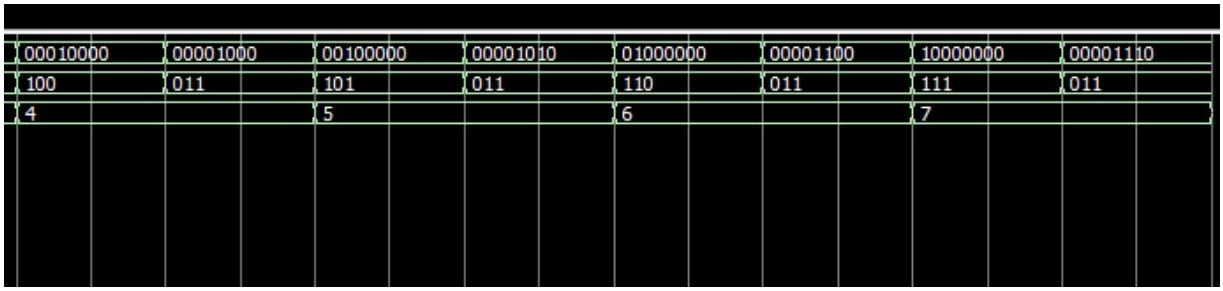
RTL:



Design: 8:3 priority encoder:

Wave:





Output:

```
VSIM 13> run -all
# @ time:   0ps the input is 00000001 output is 000
# @ time:  10ps the input is 00000000 output is 000
# @ time:  20ps the input is 00000010 output is 001
# @ time:  40ps the input is 00000100 output is 010
# @ time:  60ps the input is 00001000 output is 011
# @ time:  70ps the input is 00000110 output is 010
# @ time:  80ps the input is 00010000 output is 100
# @ time:  90ps the input is 00001000 output is 011
# @ time: 100ps the input is 00100000 output is 101
# @ time: 110ps the input is 00001010 output is 011
# @ time: 120ps the input is 01000000 output is 110
# @ time: 130ps the input is 00001100 output is 011
# @ time: 140ps the input is 10000000 output is 111
# @ time: 150ps the input is 00001110 output is 011
# ** Note: $finish    : C:/Users/Aadhithan/Documents/Ve
#    Time: 160 ps  Iteration: 0  Instance: /encoder_tb
```

RTL :