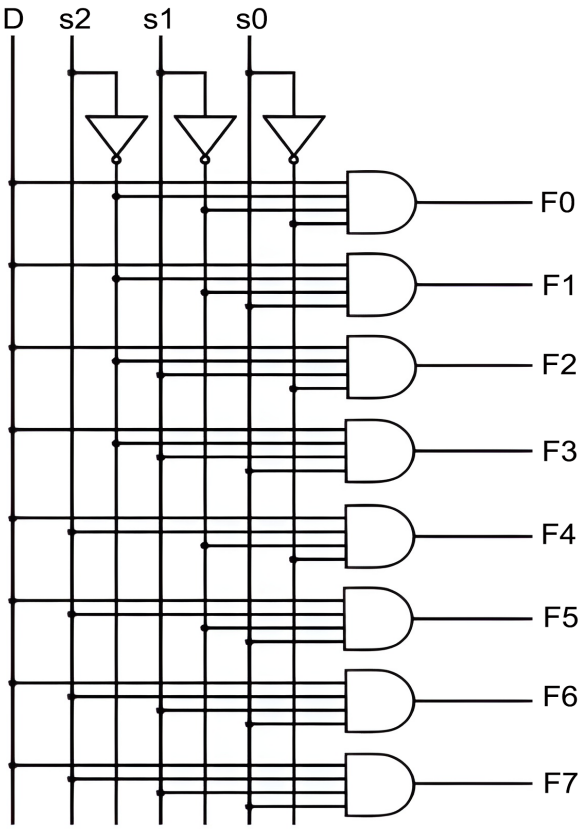
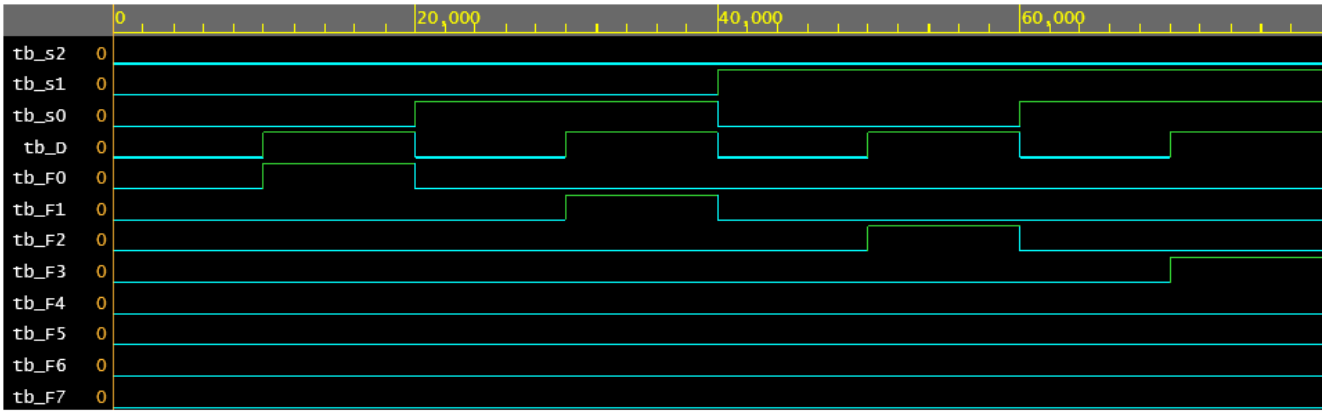
1 to 8 Demultiplexer

s2	s1	s0	D	F0	F1	F2	F3	F4	F5	F6	F7
0	0	0	0|1	**D**	0	0	0	0	0	0	0
0	0	1	0|1	0	**D**	0	0	0	0	0	0
0	1	0	0|1	0	0	**D**	0	0	0	0	0
0	1	1	0|1	0	0	0	**D**	0	0	0	0
1	0	0	0|1	0	0	0	0	**D**	0	0	0
1	0	1	0|1	0	0	0	0	0	**D**	0	0
1	1	0	0|1	0	0	0	0	0	0	**D**	0
1	1	1	0|1	0	0	0	0	0	0	0	**D**

A 1x8 demultiplexer consists of one enable input (D), three input lines (s2, s1, s0) and eight outputs AND (F0 - F7) consisting of four inputs . The values of F0 - F7 always have a value equal to the input of D (depending on the values of inputs s2,s1,s0). By comparing the simulation results with the truth table we see that you achieve the desired result. In all 3 circuits the simulation results are as follows.



Run Time: 160ns
- 0ns to 80ns:



For instance:

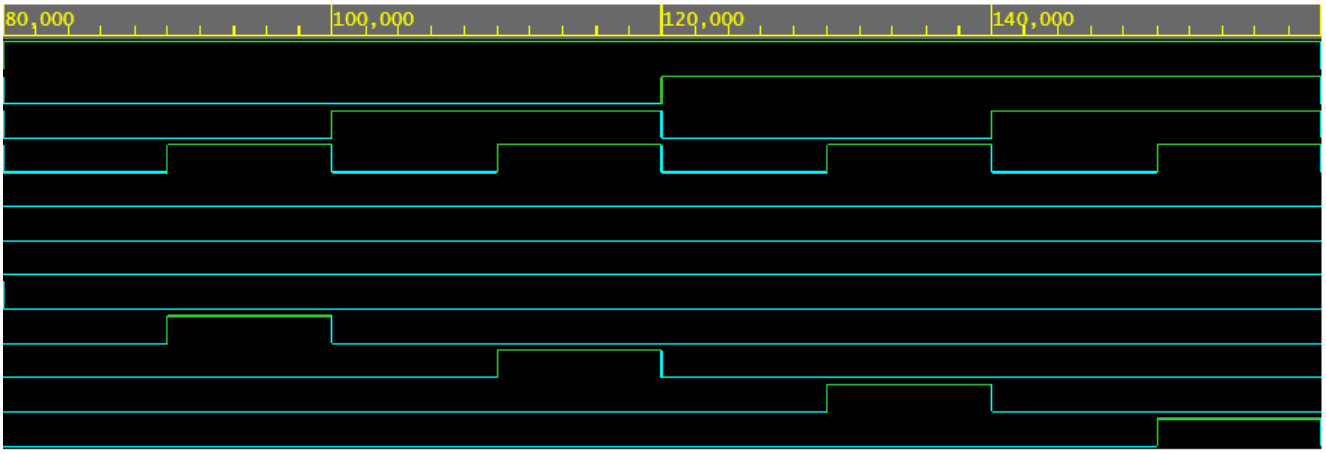
For the value of output F1:

- **20ns:** s2 = 0, s1 = 0, s0 = 1, **D = 0**, (001| 0)
  F0 = 0, **F1 = 0**, F2 = 0, F3 = 0, F4 =0, F5 = 0, F6 = 0, F7 =0
- **30ns**: s2 = 0, s1 = 0, s0 = 1, **D = 1**, (001| 1)
  F0 = 0, **F1 = 1**, F2 = 0, F3 = 0, F4 =0, F5 = 0, F6 = 0, F7 =0

For the value of output F3:

- **60ns:** s2 = 0, s1 =1, s0 = 1, **D = 0**, (011| 0)
  F0 = 0, F1 = 0, F2 = 0, **F3 = 0**, F4 =0, F5 = 0, F6 = 0, F7 =0
- **70ns:** s2 = 0, s1 = 1, s0 = 1, **D = 1**, (011| 1)
  F0 = 0, F1 = 0, F2 = 0, **F3 = 0**, F4 =1, F5 = 0, F6 = 0, F7 =0

- 80ns to 160ns:



For instance:

For the value of output F4:

- **80ns:** s2 = 1, s1 = 0, s0 = 1, **D = 0**, (100| 0)
  F0 = 0, F1 = 0, F2 = 0, F3 = 0, **F4 =0**, F5 = 0, F6 = 0, F7 =0
- **90ns:** s2 = 1, s1 = 0, s0 = 1, **D = 1**, (100| 1)
  F0 = 0, F1 = 1, F2 = 0, F3 = 0, **F4 =0**, F5 = 0, F6 = 0, F7 =0

For the value of output F7:

- **140ns:** s2 = 1, s1 =1, s1 = 1, **D = 0**, (111| 0)
  F0 = 0, F1 = 0, F2 = 0, F3 = 0, F4 =0, F5 = 0, F6 = 0, **F7 =0**
- **150ns:** s2 = 1, s1 = 1, s1 = 1, **D = 1**, (111| 1)
  F0 = 0, F1 = 0, F2 = 0, F3 = 0, F4 =1, F5 = 0, F6 = 0, **F7 =1**