HW2

1. Use DeMorgan's theorem to remove the complement outside the braces:
   (a) (x(yz'+y'z)'+wy(y'+x'z))',
   (b) (x+y)'+z'(x'+z)',

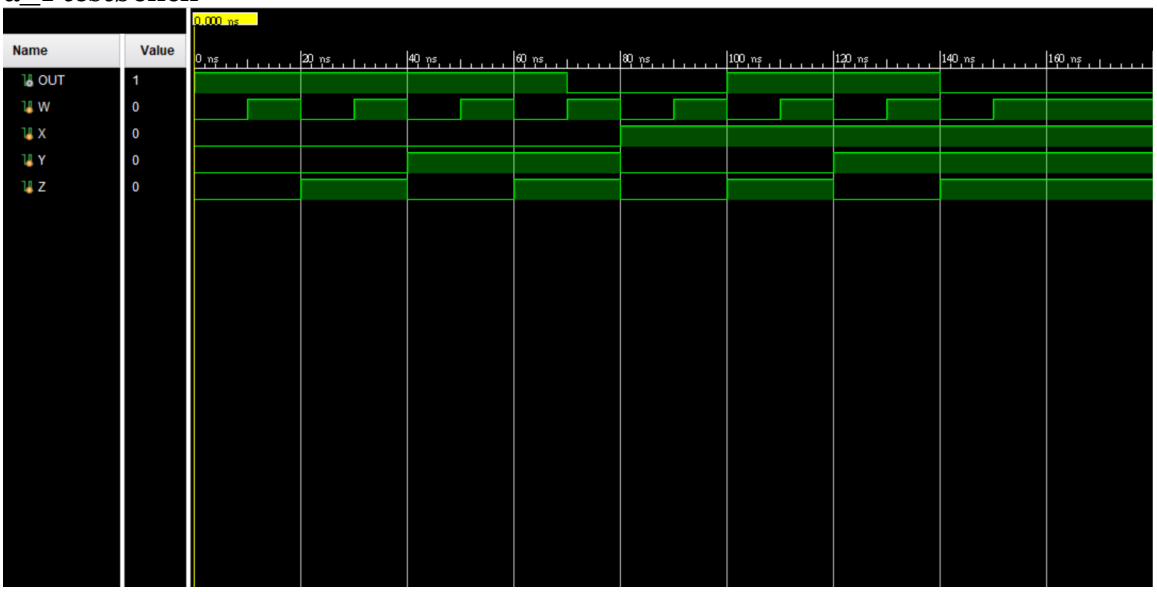
For each problem, use Verilog to simulate the two logic functions before and after brace removal for function verification.

(a) (x(yz'+y'z)'+wy(y'+x'z))'
=[x(yz'+y'z)']'[wy(y'+x'z)]'
=[x'+(yz'+y'z)][w'+y'+(y'+x'z)']
=[x'+yz'+y'z][w'+y'+xy+yz']
=x'w'+x'y'+x'yz'+yz'w'+xyz'+yz'+w'y'z+y'z
=x'w'+x'y'+yz'+y'z

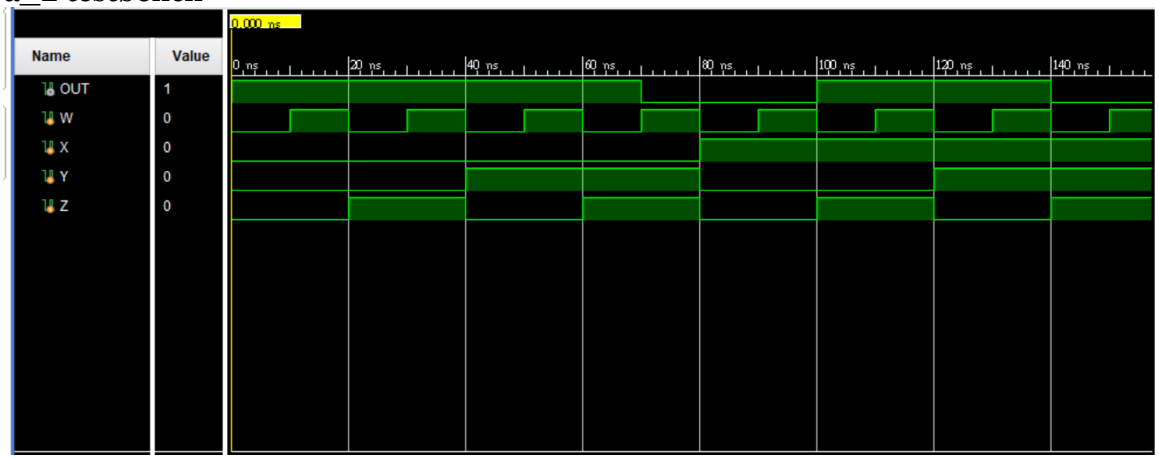
(a).Truth Table

x	y	z	w	output
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	0
1	1	1	1	0

a_1 testbench



a_2 testbench

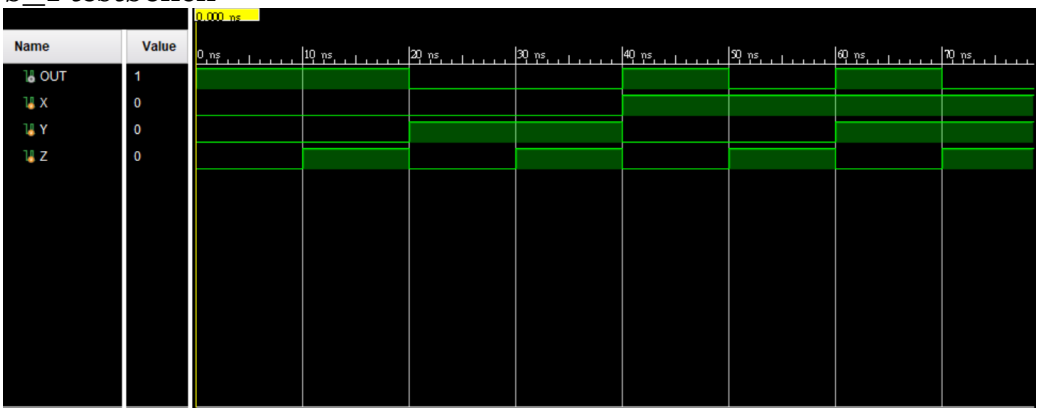


(b) (x+y)'+z'(x'+z)'
=x'y'+xz'

(b) Truth Table

x	y	z	output
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

b_1 testbench



b_2 testbench