ECE 270 Solutions – Homework 1

1.
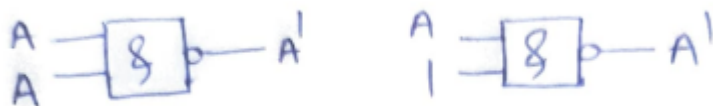
A	B	C	D	E
0	0	0	0	0
0	0	1	0	1
0	1	0	1	1
0	1	1	1	1
1	0	0	0	0
1	0	1	0	1
1	1	0	0	0
1	1	1	0	1

2. Let the inputs be A, B

A	B	A'	B'	A' * B'	(A' * B') '	A + B
0	0	1	1	1	0	0
0	1	1	0	0	1	1
1	0	0	1	0	1	1
1	1	0	0	0	1	1

We see that **A + B = (A' * B') '**. Hence OR gate can be implemented using AND and NOT gates.
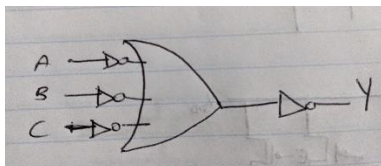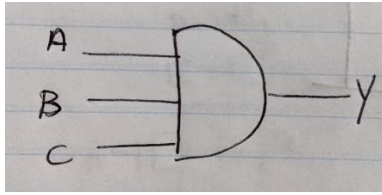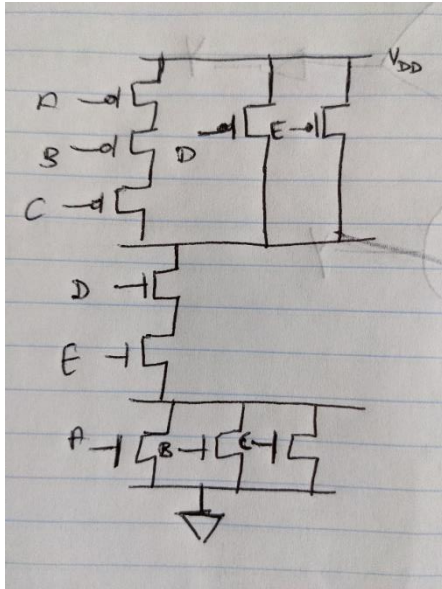
3. Two ways

4.

10 X
00 y
10 f₁ t_{pd}
11 Z
10 f₂ t_{pd}
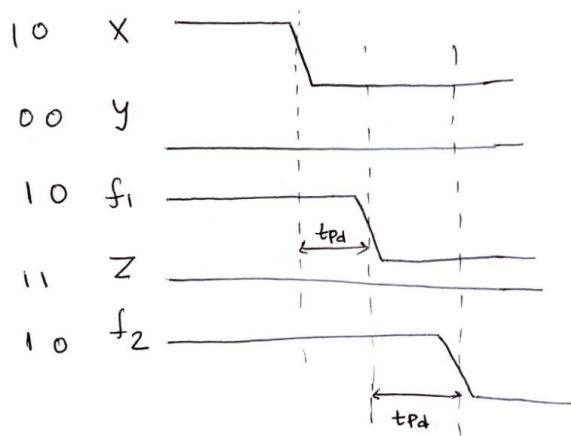
5.
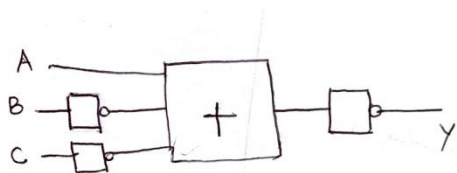
6.

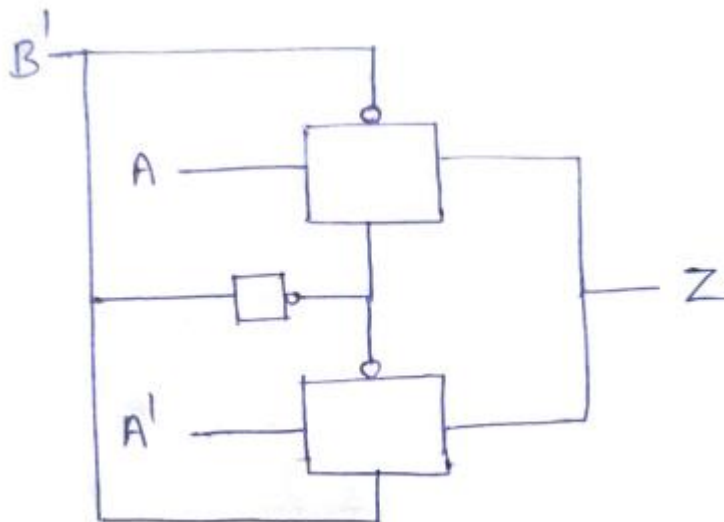| A	B	C	A′	B′	C′	A′ + B′ + C′	(A′ + B′ +C′)′	A * B * C
0	0	0	1	1	1	1	0	0
0	0	1	1	1	0	1	0	0
0	1	0	1	0	1	1	0	0
0	1	1	1	0	0	1	0	0
1	0	0	0	1	1	1	0	0
1	0	1	0	1	0	1	0	0
1	1	0	0	0	1	1	0	0
1	1	1	0	0	0	0	1	1

7.

8. Because of their programmability, they are almost always larger and slower than a customized chip would be for the same application, and they usually have a higher cost per chip.

9. Let A, B are inputs. Z be the output.

10. C