

CS251, Spring 2022

Assignment 1: Question 4

Q4a) Give a truth table for the circuit:

X	Y	A	$\neg A$	B	C	D
0	0	0	1	0	0	0
0	1	1	0	0	1	1
1	0	1	0	0	1	1
1	1	1	0	0	1	1

Q4b) Give the boolean formula for D:

$$D = \overline{X}Y + X\overline{Y} + XY$$

Q4c) Simplify the following Boolean formula:

$$\begin{aligned} F &= XYZ + \overline{X}Z + XZ + YZ \\ &= Z(YZ + \overline{X} + X + Y) \text{ (Distributive Law)} \\ &= Z(YZ + 1 + Y) \text{ (Inverse Law)} \\ &= Z(1) \text{ (One Law)} \\ &= Z \end{aligned}$$