D. Lab Activities

Part 1

Simulating logic circuit, construct truth table and timing diagram with Deeds.

Given Boolean expression as follow:

$$Y = AB + BC + AC$$

1. Convert the non-standard Boolean expression into standard form.

$Y = AB + BC + AC$

ABx → 110, 111

xBC → 011, 111

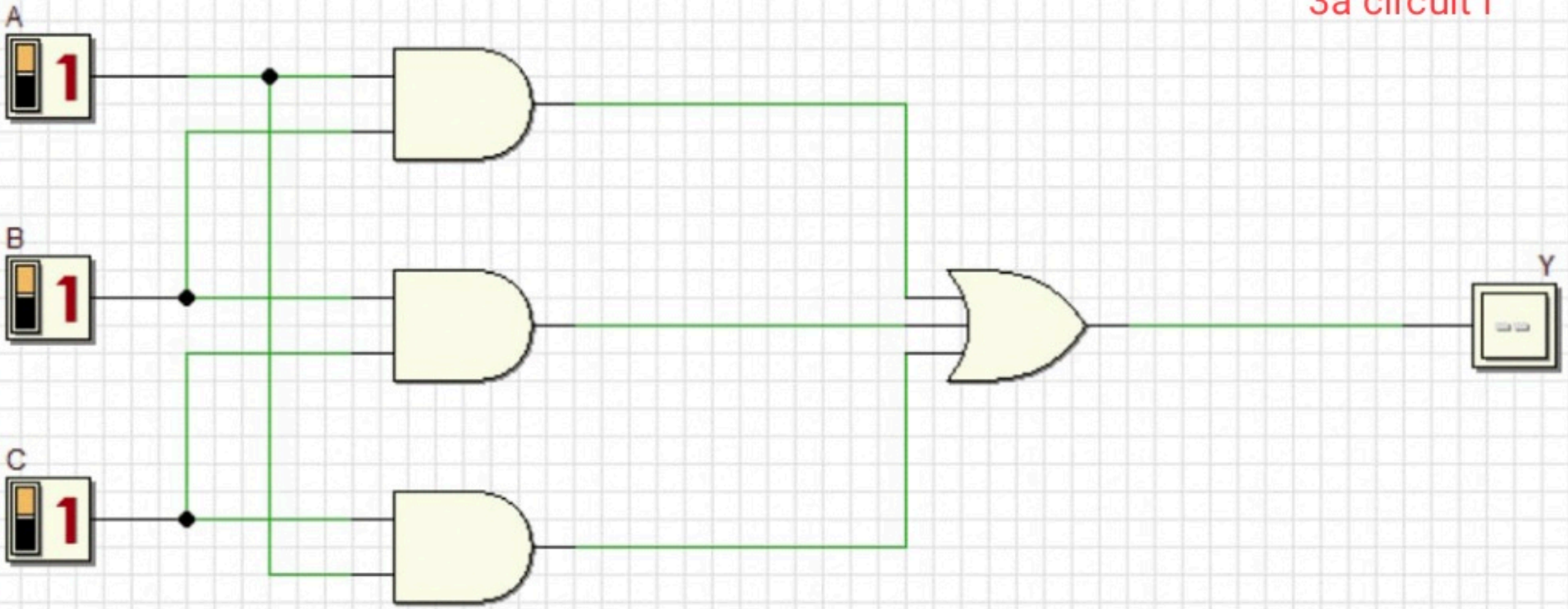
AxC → 101, 111

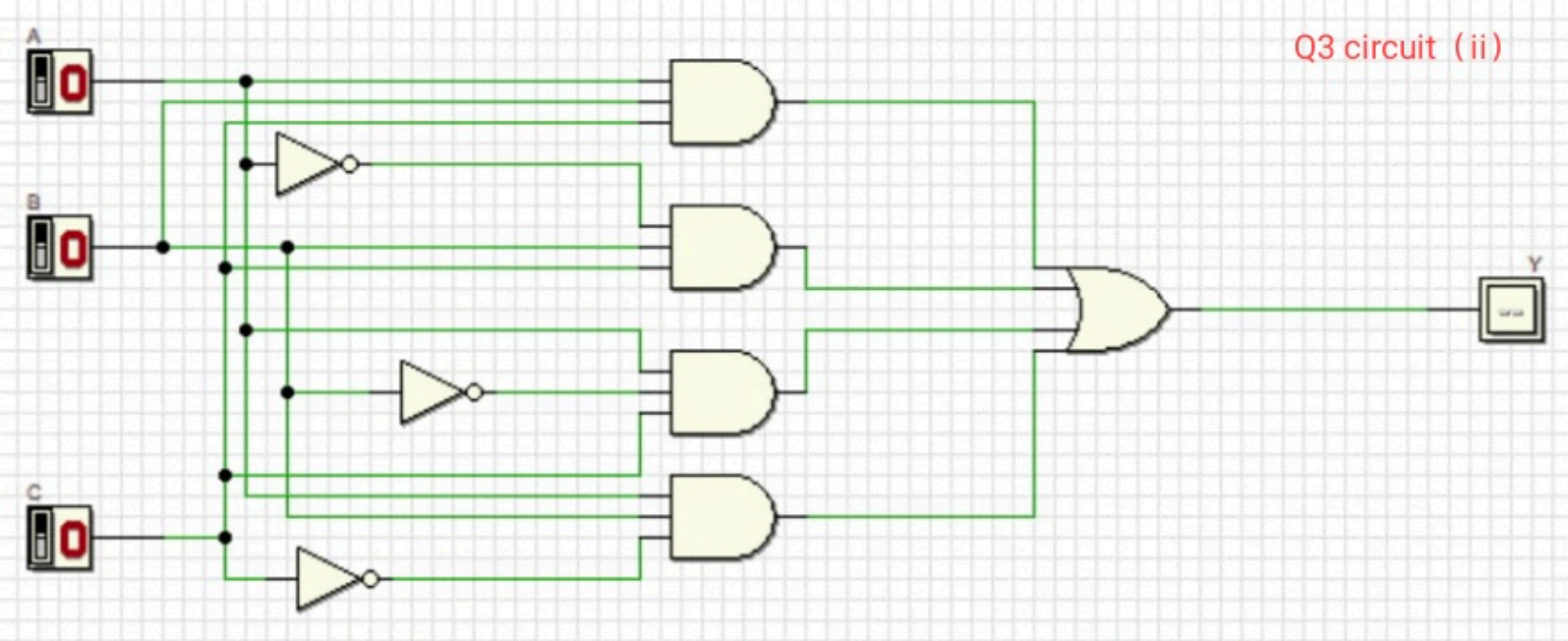
$Y = AB\bar{C} + ABC + \bar{A}BC + A\bar{B}C$

2. Based on standard form expression, complete the following truth table.

INPUT			OUTPUT
A	B	C	Y
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

3a circuit i




Q3 circuit（ii）
A
B
C
Y

4. Simulate these two circuits in step (3) and complete their truth table.

Compare the simulation result for these two truth tables. What is your conclusion?

Circuit (i)

INPUT			OUTPUT
A	B	C	Y
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

Circuit (ii)

INPUT			OUTPUT
A	B	C	Y
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

Conclusion:

The output of both circuit i) and circuit (ii) ~~###~~ is the same. As although standard form expression contain all variables, it is actually same with non-standard form. Conclude, nonstandard form and standard form expression will produce same output.

5. Simulate output of circuit (ii) with Timing Diagram. Illustrate some examples of different inputs and output.

Deeds-DcS - Simulation Timing Diagram

Q5 timing diagram