Lab 4. Combinational Logic Design

1) Build a non-prime-number detector circuit. (100 pts)

a. First, complete the truth table below. If the integer $A_3A_2A_1A_0$ is a prime number, the output O should be 0. Otherwise, O should be 1. Note that 1 is not a prime number.

b. Use a K-map to optimize the function O.

c. Build a circuit in Vivado and show results on simulation part.

2) Files to submit;

A. K-map picture (you can take your notebook picture)

B. Block design picture

C. Simulation result picture. In this part show each 16 possibilities for input combinations with an order which is given in truth table.

Table 1. Truth table.

A_3	A_2	A_1	A_0	O
0	0	0	0	1
0	0	0	1	1
0	0	1	0	
0	0	1	1	
0	1	0	0	
0	1	0	1	
0	1	1	0	
0	1	1	1	
1	0	0	0	
1	0	0	1	
1	0	1	0	
1	0	1	1	
1	1	0	0	
1	1	0	1	
1	1	1	0	
1	1	1	1	