**Homework 3 Logic and Circuits 50 points**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. (4 pts) Fill in the truth table for an AND gate using 0’s and 1’s

|  |  |  |
| --- | --- | --- |
| Input A | Input B | Output Y |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

2. (4 pts) Fill in the truth table for an NAND gate using 0’s and 1’s

|  |  |  |
| --- | --- | --- |
| Input A | Input B | Output Y |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

3. (4pts) Fill in the truth table for an XOR gate using 0’s and 1’s

|  |  |  |
| --- | --- | --- |
| Input A | Input B | Output Y |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

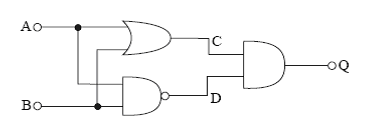
4. (2 pts each) Name the gate

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 

5. (8 pts) Complete the truth table for the following circuit. Use 0’s and 1’s:



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | Q |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

6. (2 pts each) Complete the following binary addition problems. Must show work (carrys)!

0000 1111 1010 1101 10101111

0000 0000 1111 1111 01110111

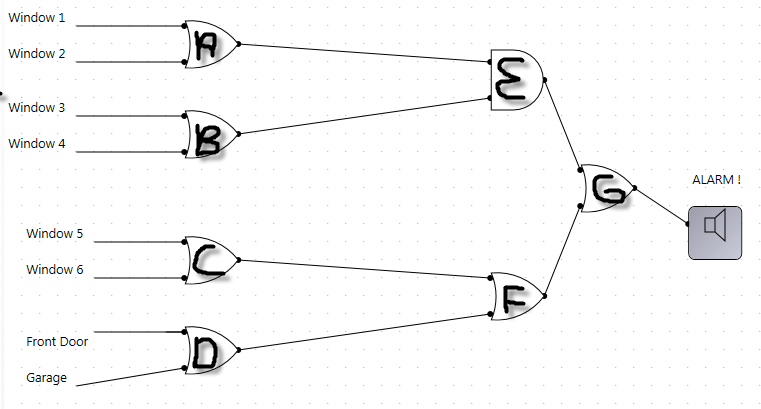
0000 1010 0110 1011 11111111

7. ( 6 pts) Draw a logic circuit with Input A and Input B and Output Y for the following logic rule.

NOT (A and B) OR (C AND D)

8. (8 pts) You have been called to investigate a home burglary. The home owner is mystified because he had a home security system installed and on Wednesday a burglar seemed to get into the house without the alarm going off. The home owner thinks maybe he forgot to turn the system on or maybe the system wasn’t working properly. Can you tell the homeowner what happened and how you would fix it.

Examine the diagram thinking 0 = window/door closed and 1 = window/door open and 1 would activate the alarm.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_