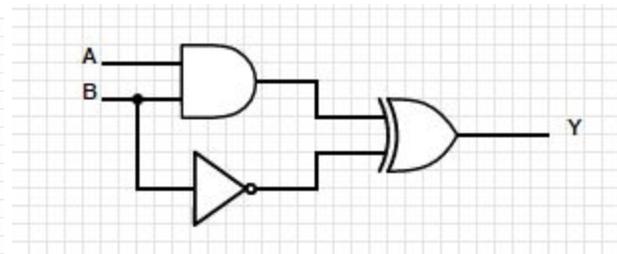
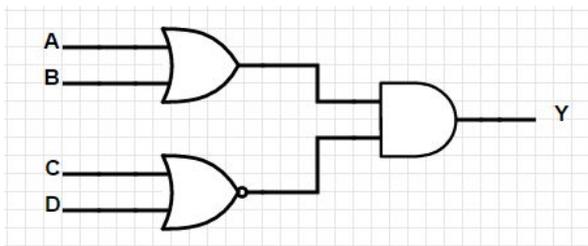
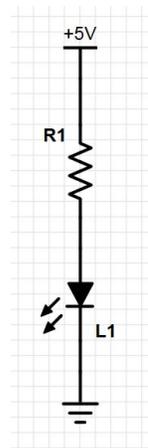


Digital Logic and Number Systems

Review Sheet

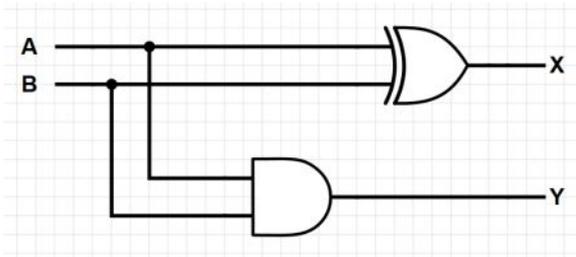
- For each of the following components, draw their schematic symbol, describe their function, and use the internet to find a common practical use for them in an electronic circuit.
 - Resistor
 - LED
 - Diode
 - Capacitor
 - Transistor
 - Battery / Voltage Source
- Draw a small diagram of a breadboard and describe how the rows and columns are connected underneath. How does this facilitate building circuits? What is a benefit of building circuits using a breadboard over other methods like using a circuit board, or simple soldering the correct connections to each component?
- Draw in the components and connecting wires on the diagram to show how this simple LED circuit could be wired on a breadboard.
- List the 6 basic logic gates that we studied, and for each:
 - Give the fundamental boolean equation/operation
 - Draw the schematic symbol
 - Complete a truth table describing the gate's function
- Create three of your own questions that require the use of ohm's law to solve. Solve each of them, showing your work.
- For each of the following sets of resistor colour bands, give the rated resistance of a resistor coloured with that pattern.
 - Red, Red, Red
 - Yellow, Purple, Brown
 - Orange, Orange, Black
 - Brown, Black, Green
- For the logic gate circuits shown here:



- Complete a truth table for the circuit

b. Give the equivalent boolean equation

8. For the logic gate circuit shown here, which is an example of a half adder circuit:



- Draw a diagram showing how the circuit could be wired on a breadboard using one AND gate IC and one XOR gate IC.
- Give a complete truth table describing what outputs would appear given every possible combination of inputs
- Identify which output is the sum output and which is the carry output.

9. Convert each of these UNSIGNED binary numbers to its equivalent decimal number.

- 0000010
- 0000101
- 00010001
- 00010101
- 00011011
- 00001110
- 00001011
- 00000110
- 00011111
- 00100110

10. Convert each decimal number to binary.

- 35
- 15
- 19
- 31
- 34
- 96
- 110
- 238
- 78
- 149

11. Convert each of the following hexadecimal numbers to decimal.

- 345
- AF56
- 78C1
- B0D5

12. Convert each of the following decimal numbers to hex.
 - a. 345
 - b. 32768
 - c. 255
 - d. 1289
13. Convert each UNSIGNED binary number to hex.
 - a. 01101111
 - b. 10111010
 - c. 011001101110
 - d. 100101010111
14. Convert each hex number to binary.
 - a. C9
 - b. 1F
 - c. A9
 - d. 76
15. Complete each of the binary addition practice problems on [this sheet](#).
16. Complete each of the binary subtraction problems on [this sheet](#) by first converting the bottom number to a negative number using the two's complement representation, then performing the equivalent addition problem.