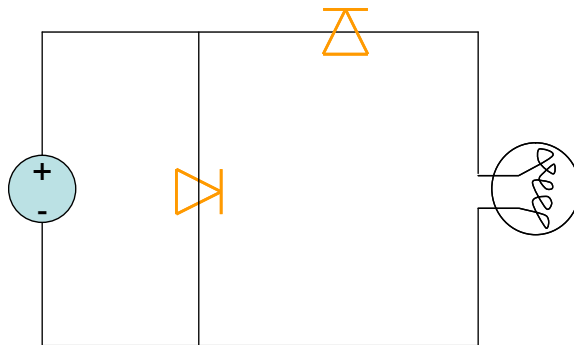# CSCI 120 Introduction to Computation
# Homework 2
Due 03/05/09

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PART 1: Turn me on!

(a) Place the two diodes in such a way that the light bulb will be ON. Remember that electrons, like everything in nature, prefer to go through the easy path and, therefore, will avoid the light bulb, whenever possible.
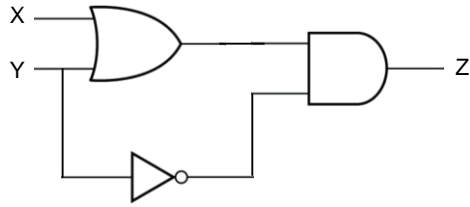

(b) Repeat (a) for the following diagram. There are many possible solutions in this case, because any closed path from the source to the lamp will work.
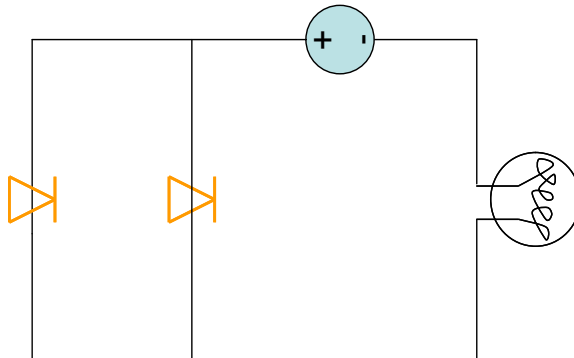
PART 2: Playing with Boolean gates
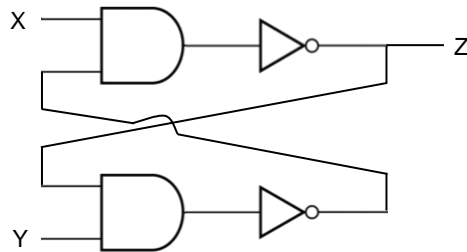(a) Fill up the truth table for the following logical circuit.

X	Y	Z

(b) Can you come up with a circuit with the same behavior but with less number of gates ?

PART 3: Flip-flop
Consider the following circuit:

Assume that both of the inputs X and Y in the circuit above are 1.

(a) Describe what would happen if X were temporarily changed to 0.

(b) Describe what would happen if Y were temporarily changed to 0.

PART 4: Storage space
(a) Suppose a picture is represented on a computer screen by a rectangular array containing 1024 columns and 768 rows of pixels (tiny dots). If eight bits are required to encode the color and intensity of each pixel, what is the size of memory needed to hold the entire picture?

(b) Identify two advantages that main memory has over magnetic disk storage.

(c) Identify two advantages that magnetic disk storage has over main memory.

(d) Suppose that only 50 GB of your personal computer's 120 GB hard disk drive is empty. Would it be reasonable to use CDs to store all the material you have on the drive as a backup? What about DVDs?

(e) What is the average access time for a hard drive disk spinning at 60 revolutions per second with a seek time of 10 milliseconds?

PART 5: Research
Do some online research to answer the following questions to the best you can:

(a) What technologies enable the optical matrial in DVD-RW and DVD+RW to be re-written? What is the difference between DVD-RW and DVD+RW?

(b) What is BluRay?