Algorithms

Define Algorithm
**Algorithm Definition**

An algorithm is a list of steps to solve a problem (or complete a task?) written in "plain English". The algorithm’s steps should be written out and numbered in the order in which they are to be executed.

Algorithms should be as extensive as necessary to allow one (you?) to complete the task. Your algorithm is not only going to tell your program what to do, but how to do it.

**Example Algorithm --- Going Home**

Algorithm 1: Walking
1. Leave classroom
2. Turn right out of school building
3. Walk 1.2 miles
4. Turn right on street
5. Go to the 4th house

Algorithm 2: Take the Bus
1. Go to the bus area
2. Get in the right bus
3. Go to house
Example Algorithm --- Pick a number

Here’s a game we can play. Your goal is to choose a number between 1 and 1000. Each time you guess a "black box" will tell you one of three things:

- Your guess was too high,
- Your guess was too low or
- Your guess was correct

So, YOU are the "contestant" and your job is to find the magic number in <= 10 guesses.

1. Set guesses = 0
2. Set high = 1000
3. Set low = 1
4. Make Next_Guess equal to (high+low)/2 (ignore any fractional part of the division)
5. Add 1 to the current value of guesses
6. If guesses > 10 You Lose! (quit at this point)
7. Announce (to the black box) the value of Next_Guess
8. "Listen" to black box
9. If black box says "Too High", reset high to be Next_Guess -1 and return to step 4
10. If black box says "Too Low", reset low to be Next_Guess +1 and return to step 4
11. If black box says "Correct" You Win!
Your turn

Write an algorithm for the "black box".
Each "table" should turn in one solution by 10:20pm today!
Do This Individually

Here’s an algorithm. Follow the steps EXACTLY

0. Get a sheet of paper and a writing implement
1. Draw a diagonal line.
2. Draw another diagonal line connected to the top of the line drawn in step 1.
3. Draw a straight line from the point where the diagonal lines meet.
4. Draw a horizontal line over the straight line
5. At the bottom of the straight line, draw a curvy line.
6. Draw a diagonal line from the bottom of the first diagonal line to the straight line.
7. Draw a diagonal line from the bottom of the second diagonal to the straight line.
**Putting it all together**

1. Write an algorithm (for a problem we’ve not discussed).
   Do this individually.
2. Test it yourself
3. Get someone else to test it.
   How can you be sure that your algorithm will "work ok"?