

APM 153 LECTURE ONE. Algorithms, Programs and Programming Languages

Algorithm

- (1) An algorithm is a method or procedure for solving a problem in math or logic. Another way of saying it is that **an algorithm is a method of computation.**
- (2) The word is derived from the name of an ancient, Arabic mathematician (Muhammed ibn-Musa **al-Khawrizmi** 780-850 AD.)
- (3) An algorithm describes **a series of steps** to solve a problem. In this respect an algorithm is something like a **recipe.**
- (4) Look at the following series of steps from the back of a box of brownie mix. What is wrong with the series?
 - A. Pour contents of package containing brownie mix into bowl of electric mixer.
 - B. Spread chocolate icing on brownies.
 - C. Heat package of chocolate icing in microwave on low setting for 30 seconds.
 - D. Remove brownies from oven and cool in pan for at least one hour.
 - E. Add two eggs and a cup of milk and beat on medium speed for two minutes.
 - F. Bake for 40 minutes or until a toothpick inserted into brownies comes out clean.
 - G. Preheat Oven to 350 degrees
 - H. Pour batter into greased 9” pan and place on middle rack of oven.
- (5) What should the correct order be? _____
- (6) For an algorithm to work correctly, each step must be done in the **proper order.**

Summary: An algorithm is a method of computation that consists of an ordered series of steps to solve a problem in math or logic.

Programs and Programming Languages

(7) In order to use your algorithm you must either perform all the calculations yourself or **convert your algorithm into a program** that can be run on a computer or a calculator.

(8) A program is a **series of statements or commands** telling a computer to perform different tasks.

(9) Computer programs are written in special languages which the computer can understand.

(10) There are many different computer languages including FORTRAN, C, C++, Python, Ada, Java, Assembly Language, BASIC, COBOL PASCAL, Visual Basic, PERL, and on and on.

(11) Each language has its own **syntax and grammar**. Just like in English or any other spoken language syntax and grammar are the formal rules you must follow if you want to be understood.

(12) When you write a program in a programming language you are writing commands that tell the computer how to perform your algorithm.

(13) Algorithms however, are **independent** of the programming language being used. What this means is that whether we are writing a program for a computer, or using a pocket calculator, or doing all the calculations by hand, **the algorithm is the same**.

ASSIGNMENT

(1) Buy your textbook and read chapters 1 and 2 by next Monday

(2) Get a 3-ring binder and put this handout in it!

(3) Buy a USB thumbdrive and learn how to use it.

(4) Come to class on Friday on time with your textbook and 3-ring binder.