EdX 6.00x Notes

# Lecture 1:

* What is the difference between an Algorithm and a Program?
  + An algorithm is a conceptual idea, a program is a concrete instantiation of an algorithm.
* True or False? A computational mode of thinking means that everything can be viewed as a math problem involving numbers and formulas.
  + True.
* True or False? Computer Science is the study how to build efficient machines that run programs.
  + True
* The two things every computer can do are:
  + Perform calculations.
  + Remember the results.
* Declarative knowledge:
  + Facts or a statement of truth.
* Imperative knowledge:
  + It is how to kinds of knowledge, or methods or recipes for finding something.
* Fixed Program Computer:
  + Designed to do only a specific calculation.
* Stored Program Computer:
  + A machine that can both store and manipulate sequences of instructions.
* Turing Complete:
  + Using just 6 primitives it's possible to compute anything that's computable.
  + Anything you compute in 1 programming language you can compute in any other programming language.
* If a computer can abstract methods it can…
  + Take a description, a sequence of code that is written, and use it to create a new primitive, thereby adding to the set of primitives that the system can use.
* A program counter…
  + Points the computer to the next instruction to execute in the program.
* What does it mean when we say that "the computer walks through the sequence executing some computation"?
  + The computer executes the instructions mostly in a linear sequence, except sometimes jumping to a different place in the sequence.
* Each programming language provides…
  + A set of primitive operations.
  + Mechanisms for combining privates to form more complex, but legal, expressions.
  + Mechanisms for deducing meanings or values associated with computations or expressions.
* Syntax:
  + Determines whether a string is legal.
* Static Semantics:
  + Determines whether a (*syntactically valid*) string have a meaning.
* Formal Semantics:
  + The meaning associated with a syntactically correct string of symbols that does not have any static semantic errors
* Interpreted Languages:
  + Interpreter will walk through executing entire program.
  + Python is an interpreted language.