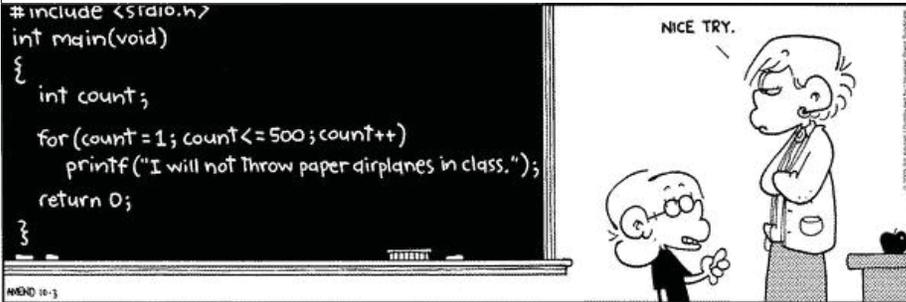


Introduction to Programming

Chapter 1



CMPT 125 / 128
(C) Brian Fraser

Topics

- 1) How does a program we write actually run on the computer?

Computing Science

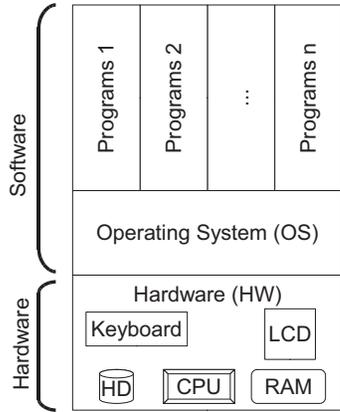
- Computing Science is the science of...
 - It is not just programming.



Algorithms

- Algorithm:
 -
 - Ex: Parking in visitors lot at SFU.
- Algorithms (and computers) do...
 - Must fully specify an algorithm.
 - Handle all errors:
Computers have no common sense.
 - We will design & implement many algorithms.

Computer System Hierarchy

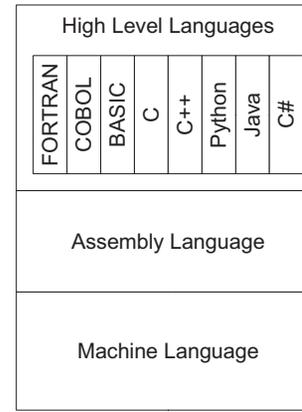


- Programs:**
- Accept input.
 - Perform algorithm(s).
 - Generate output.

- OS provides:**
- - Coordinates multiple programs.

- HW follows machine-level instructions:**
- Read a value from memory
 - Add 2 values inside CPU
 - Write value back to memory

Language Hierarchy



- High Level Languages:**
- - One high-level statement = many machine-level instructions.
 - Ex: total = cost * 1.12 + 2;

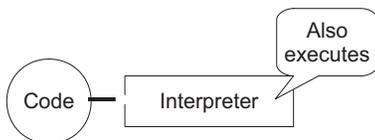
- Assembly Language:**
- Human readable abbreviations.
 - Ex: mov 0x50, 0xA5;

- Machine Language:**
- Numbers read by the machine.
 - Ex: 0x1525 A5B2

Interpret vs Compile

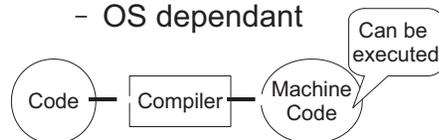
Interpreter

-
- Advantage: Flexible
- Drawback: Inefficient

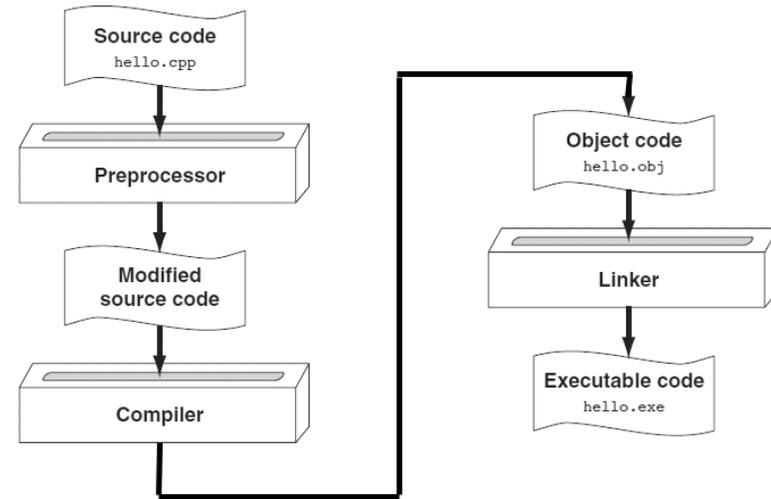


Compiler

-
- Advantage: Efficient
- Drawbacks:
 - Machine dependant
 - OS dependant



Compiling Process



Review

- How does a program actually run on the computer?
 - 1) What are two examples of abstraction?
 - a) It can run on different types of machines.
 - b) It often runs faster.
 - c) It's faster to write the program.
 - 2) What is an advantage of a compiled language?
 - a) It can run on different types of machines.
 - b) It often runs faster.
 - c) It's faster to write the program.
 - 3) C++ is...
 - a) an interpreted language.
 - b) a compiled language.

Summary

- Algorithm: step-by-step process for solving a problem.
- Abstraction:
 - Programs are run by an OS on hardware.
 - C++ is a high level language with human readable commands.
- Language Types:
 - Interpreter: Statements executed directly.
Ex: Python, Perl
 - Compiler: Translated to machine code, then executed.
Ex: C, C++