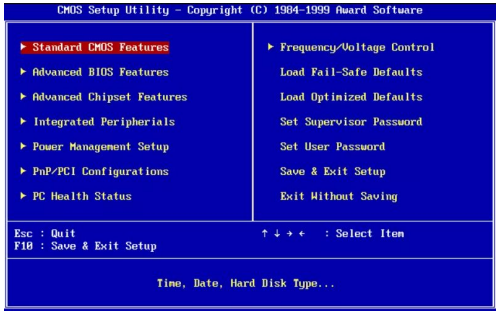
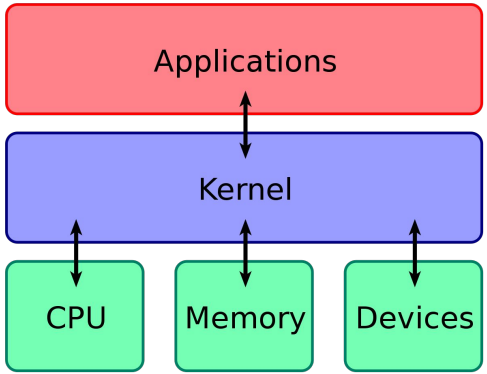
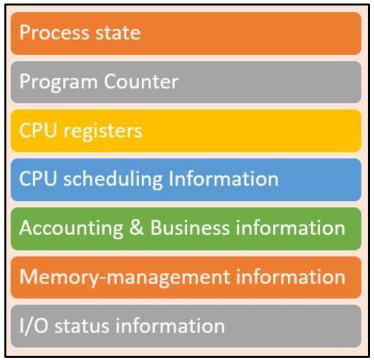
How Computers Work: Software

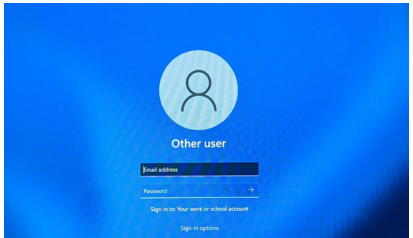
Turning on a Computer

Hit Power Button → BIOS/UEFI and POST (by Chipset) → Load Kernel → Start up other OS processes → Start up and display GUI

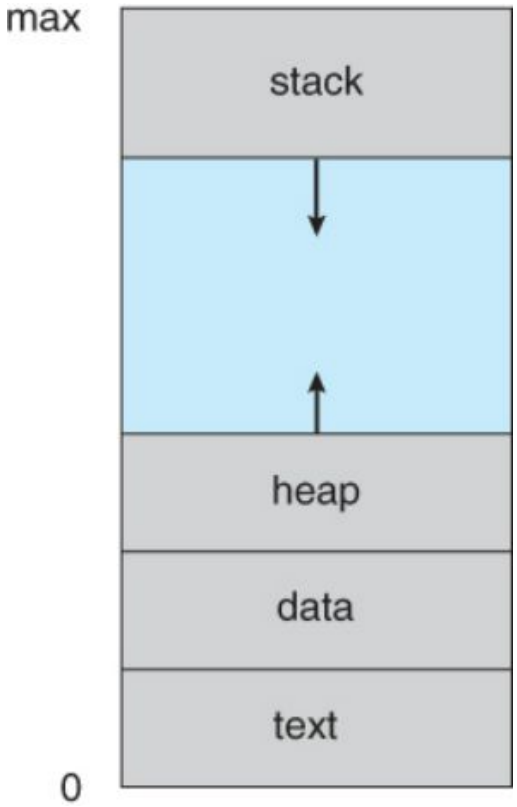




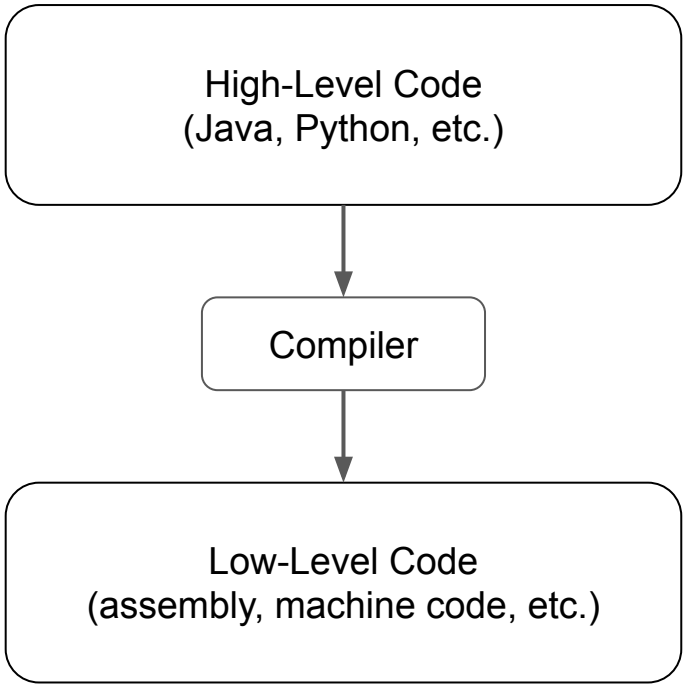




Program to Process



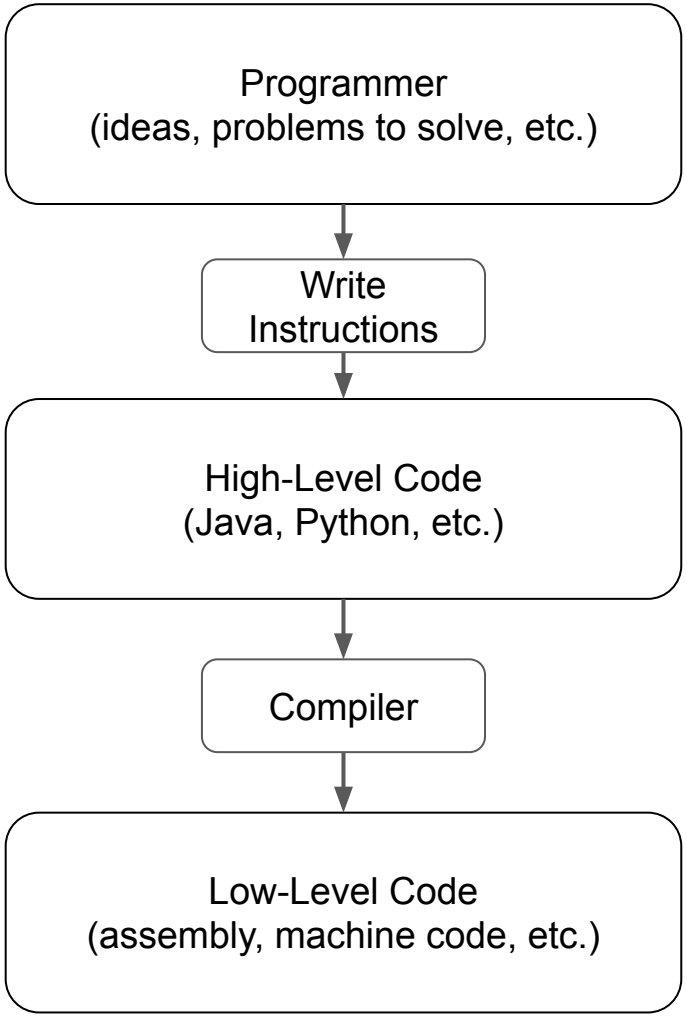
Programing Languages



- Easy for humans to write
- A “standardized” language
- Usually hides memory addressing and management
- Abstracted, high-level instructions

- Understandable by CPU (very difficult for humans)
- Different for may kinds of hardware
- No abstraction, explicit step-by-step instructions

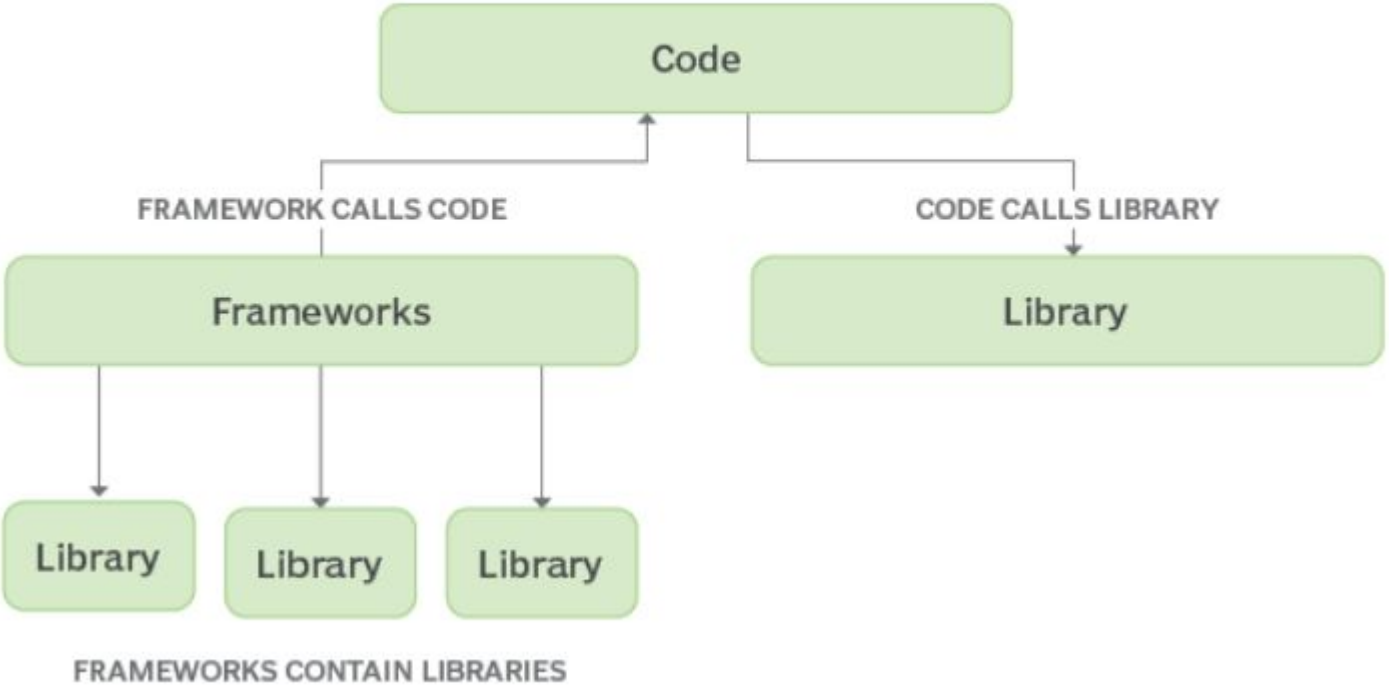
Is C low or high-level?


Programmer
(ideas, problems to solve, etc.)
Write
Instructions
High-Level Code
(Java, Python, etc.)
Compiler
Low-Level Code
(assembly, machine code, etc.)

Programmer Tools

- Libraries
  - (java.util, java.lang.Math, pytorch, etc.)
- Frameworks
  - (tensorflow, Google Maps, etc.)
- Application Programming Interface (API)
  - how you access and interact with libraries, frameworks, etc.
  - (System.out.println(), Scanner.nextInt(), GPSTracker.getLocation(), etc.)

Libraries vs. frameworks

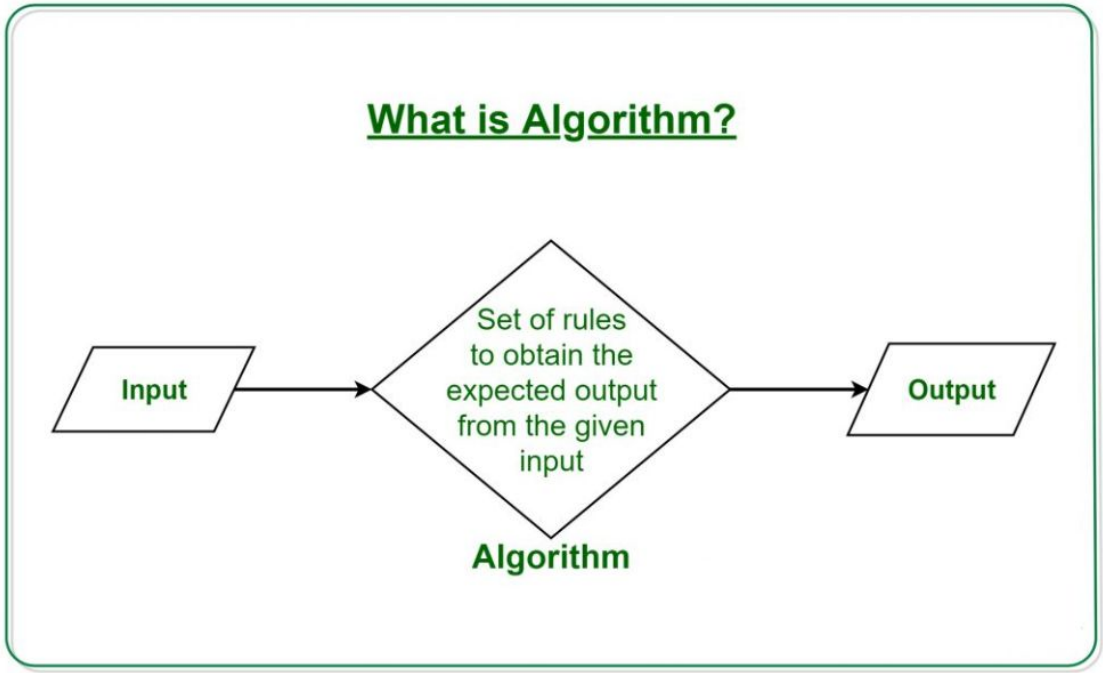


Programmer Tools

- Plug-ins
  - Extra features not part of an original package of code (library, framework, tool, etc.)
- Software Development Kits (SDK)
  - Package of libraries and other programming tools such as compilers, debuggers, etc.
  - An SDK is usually language-specific
- Integrated Development Environment (IDE)
  - A tool (usually in the form of a text editor) that provides many supporting features for writing/creating code such as: debugging, detailed warning and error messages, syntax and spell checking, autocomplete, autocorrect, etc.

Algorithms

- Computational Thinking



“In-Class” Assignment

- Download “LightBot: Code Hour” or “Rodocodo”
  - App Store (“Rodocodo: Code Hour”): https://apps.apple.com/us/app/rodocodo-code-hour/id1597648605
  - Google Play (“Rodocodo: Code Hour”): https://play.google.com/store/apps/details?id=com.rodocodo.game&hl=en_US&gl=US&pli=1

- Please complete the first 8 levels and as many of the other levels as you can/want. Please submit to Blackboard the highest level you were able to complete and the list of instructions you used to complete that level; alternatively, you can take a screenshot of the final level you completed (with the instructions showing) and upload that.