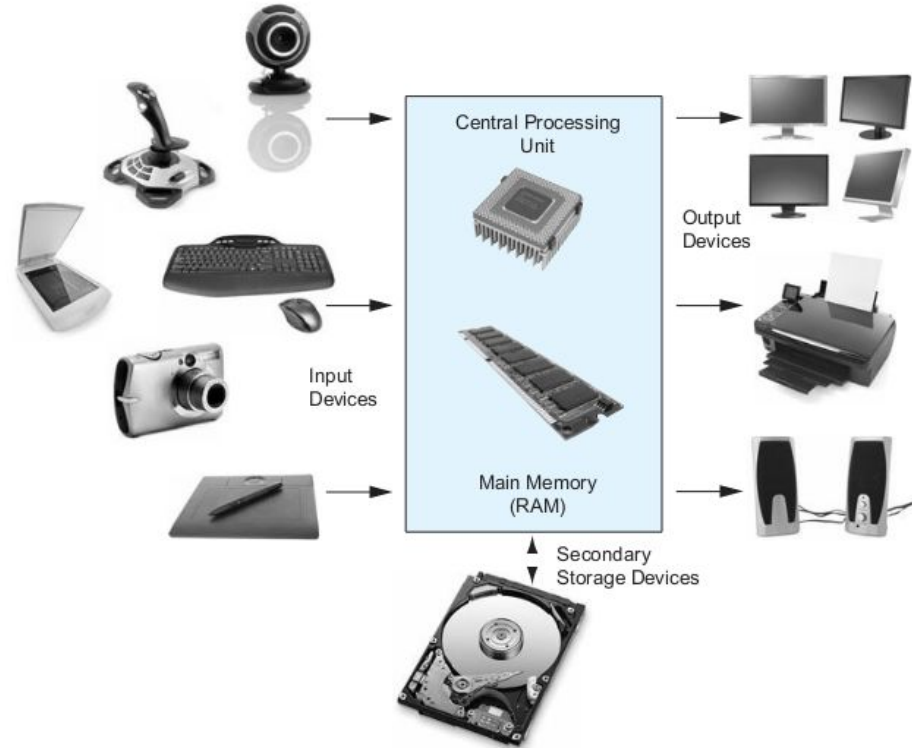


Introduction to Computer Programming

Fall 2019

Computers

- Computer - General purpose machine that can be programmed to perform a variety of tasks
- Program - Set of instructions a computer follows to perform a specific task



Hardware vs Software

- Hardware
 - Physical devices or components a computer is made of (so, RAM, CPU, etc)
- Software
 - Programs that tell the hardware what to do
 - System Software
 - Operating systems, file compression, etc
 - Application Software
 - Internet browsers, messaging services, etc

Programming Languages

- Low Level Languages
 - Machine code (binary)
 - Assembled
- High Level Languages
 - Compiled
 - Interpreted

Assembly language
program

```
mov eax, 2
add eax, 2
mov Y, eax
and so forth...
```



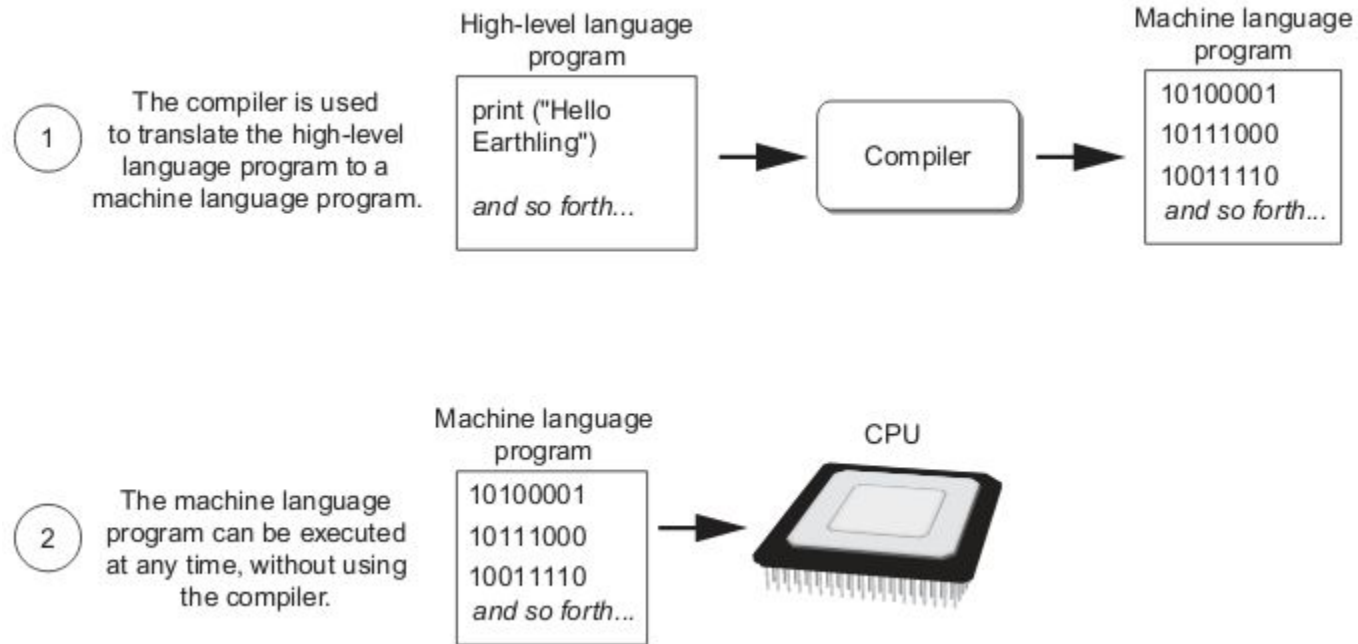
Assembler



Machine language
program

```
10100001
10111000
10011110
and so forth...
```

Compiled Languages



Examples compiled languages would be C/C++ and Rust

Compiled - Benefits and Drawbacks

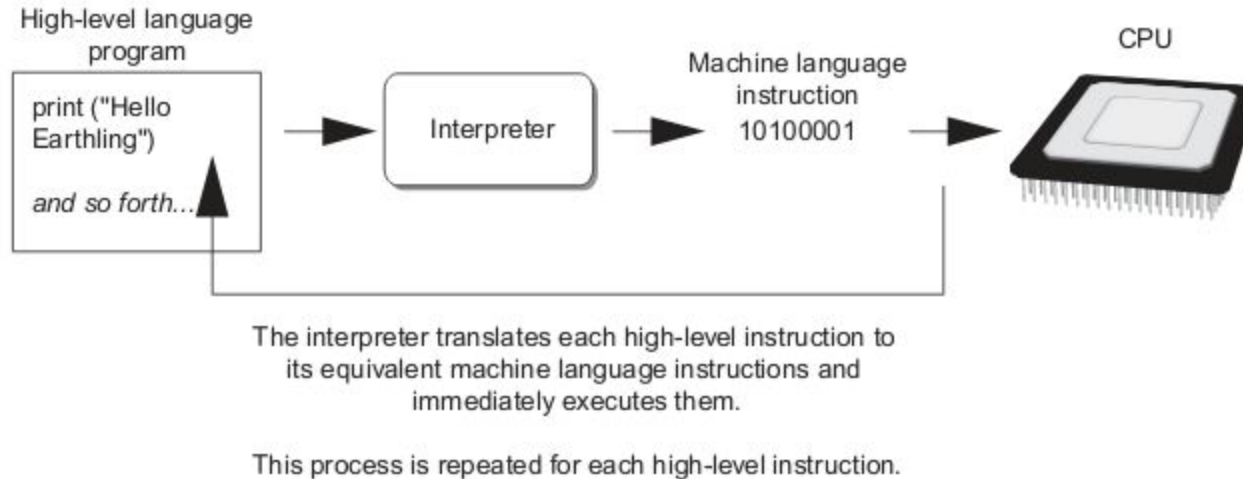
Benefits

- Faster to run/execute the finished program
 - Especially apparent for larger programs
- Provides companies privacy for proprietary/ closed-source projects
 - Can't view what the compiled code looks like
- Executables contain everything to run the code outside of external libraries

Drawbacks

- Slow to develop and test
 - Make edits, compile, and run
- Can be a bit heavy for small, simple programs
- More platform specific

Interpreted Languages



Examples interpreted languages would be Python, PHP, and Perl

Interpreted - Benefits and Drawbacks

Benefits

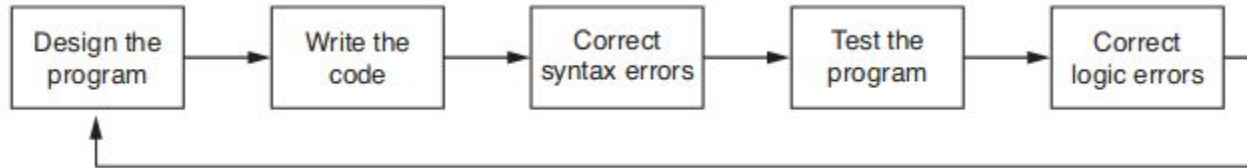
- Fast to develop
 - Making edits, testing, and running
- Good for small, quick programs
- Cross platformability
 - Runs on many types of machines (macOS, Windows, etc)
- Dynamic typing

Drawbacks

- Slow to execute
 - Becomes more apparent the larger the program
- Susceptible to code injection attacks
- Easy to reverse engineer

Production Lifecycle

- Designing
 - Pseudo-code
 - Flowcharts
- Testing
 - Unit testing
 - System testing
- Error Checking
 - Logical errors
 - Syntax errors



Development

- Text editors
 - Command-line execution
 - Can use external debugging programs
- IDE (Integrated Development Environment)
 - Executes programs within application
 - Often contains internal debugger
 - Contains built in libraries for that language



NetBeans



python

