

Introduction to Computer Science and Media Computation, part 1

Lecture 1

What Is Computer Science About?

- "Recipes" - *how*
- Data Structures
 - "Ingredients" - measurements
 - Data Types: integers, floating point numbers, characters/Strings, Boolean
 - Quantities (databases)
- Procedures → programming
- Algorithms
 - Algorithms != programs
 - Specific steps (English)

Computers and the Binary Numbering System

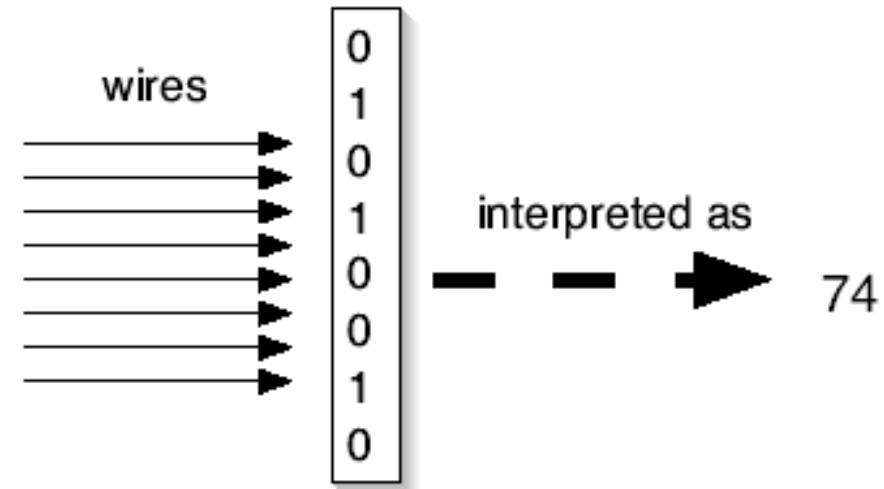
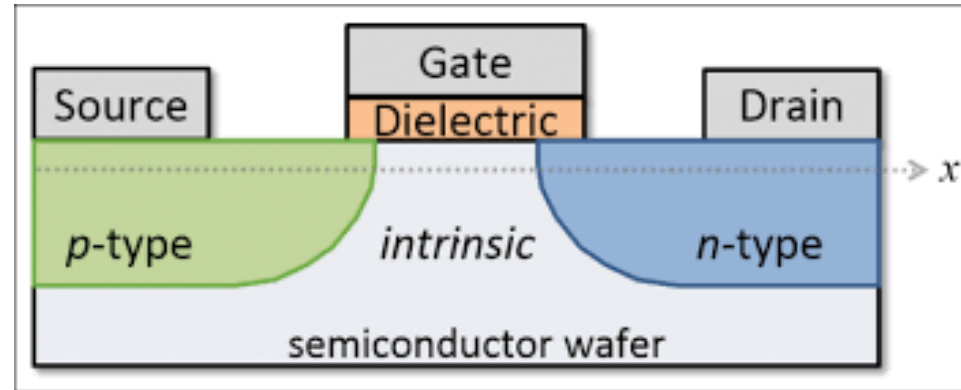
- Source → Gate → Drain
 - Open or Closed

- Binary: ones and zeros

- On or Off
- True or False
- Yes or No
- 1 or 0

- How big is *information*?

- 16 GB thumb drive == 128,000,000,000 (128 billion "on/off" switches)



Programming Languages, continued

The 9 Most In-Demand Programming Languages

1. SQL
2. Java
3. JavaScript
4. C#
5. C++
6. Python
7. PHP
8. Ruby on Rails
9. iOS/Swift

Machine language

00000000 11000011 00010000

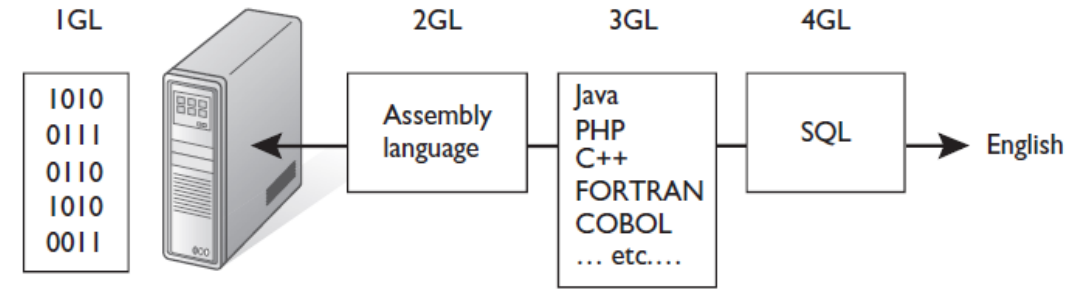
- Instructions
- Data

Assembly language

```
S1      B      FWD
FWD     EQU    *
BKWD    EQU    *
S2      B      BKWD
```

- Easier
- More portable

Compromises: machine vs human



Python/Jython

```
def hello():  
    print "Hello World"
```

Java

```
class HelloWorld {  
    static public void main( String args[] ) {  
        System.out.println( "Hello World!" );  
    }  
}
```

C++

```
#include <iostream.h>  
  
main() {  
    cout << "Hello World!" << endl;  
    return 0;  
}
```

Scheme

```
(define helloworld  
  (lambda ()  
    (display "Hello World")  
    (newline)))
```

JavaScript, ActionScript

Ruby, Python

Java, C#, VB.NET

Objective C

C++

C

Assembly Language

Machine Code

CPU

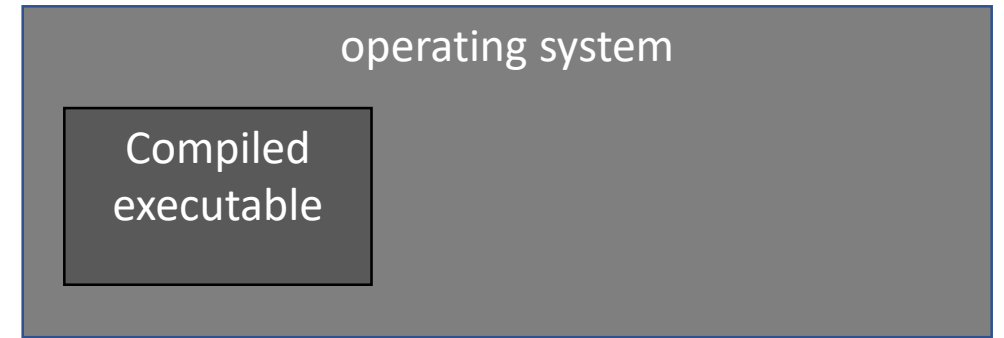
High Level Languages

Low Level Languages



Scripting Languages

- JavaScript, ActionScript, VBScript, PHP, Python, others
- Example: JavaScript (language), inside:
 - Web browser (interpreter), inside:
 - Operating system, inside:
 - Platform (machine code, CPU)



Full-featured Languages

- C++, Java, Objective-C, others



- Compiled code, optimized for the Platform (machine code, CPU)