Introduction

DMS 102: Programming Digital Media

Lecture 1

Professor Kostin

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- Morey Hall, room 313
- Office Hours:
  - **Virtual Office Hours** for technical help: [Slack](), **#help** channel; Mondays and Thursdays, 9:30 to 10:30 AM
  - **Regular Office Hours** for *non-technical help:* Morey 313; Tuesdays and Wednesdays at 9:30 to 10:30 AM.
  - **Private Office Hours:** email to [robert.kostin@rochester.edu]()

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
7 AM					
8					
9	**Virtual Office Hours** via Slack	**Office Hours** Morey 313	**Office Hours** Morey 313	**Virtual Office Hours** via Slack	
10					
11	**CSC170 lab 1** Gavett 208	**CSC170: Intro to Web Development** Goergen 101	**CSC170 lab 1** Gavett 208	**CSC170: Intro to Web Development** Goergen 101	
12 PM	**CSC170 lab 2** Gavett 208		**CSC170 lab 2** Gavett 208		
1					
2		**DMS102: Programming Digital Media** Gavett 208		**DMS102: Programming Digital Media** Gavett 208	
3	**CSC174: Advanced Front-end Web Development** Gavett 208	**CSC170 lab 3** Gavett 208	**CSC174: Advanced Front-end Web Development** Gavett 208	**CSC170 lab 3** Gavett 208	
4					
5					

Programming Fundamentals

Computer basics and a short history of computers

Programming Languages

Programming Languages

- JavaScript, ActionScript
- Ruby, Python
- Java, C#, VB.NET
- Objective-C
- C++
- C
- Assembly Language

What Programmers Know

- Loops
- Conditions
- Variables
- Functions
- Classes and Objects (OOP)

Sets of Instructions the Computer Will Follow

- Zeros and ones

- Complexity → More complexity (programs running programs)

- "Driving instructions" - assume: you already know how to drive

- "Display a JPG on my computer" or "Change this pixel to that color"

- A programming "language"
  - syntax - a set of rules
  - dialects
  - Statements:

    ```
    BASIC:        LET Balance = 500
    AppleScript:  set balance to 500
    Java:         balance = 500;
    COBOL:        MOVE 500 TO BALANCE
    ```

- "Depth" - *n* generation languages (1GL, 2GL, 3GL, 4GL, 5GL)

Programming Languages

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

Bouwkamp, A. (2018, February 07). The 9 Most In-Demand Programming Languages of 2016.
Retrieved from https://www.codingdojo.com/blog/9-most-in-demand-programming-languages-of-2016/

Compromises: machine vs human

1GL		2GL	3GL	4GL	
1010 0111 0110 1010 0011		Assembly language	Java PHP C++ FORTRAN COBOL … etc.…	SQL	English

JavaScript, ActionScript
Ruby, Python
Java, C#, VB.NET

High Level Languages

Objective C

C++

C

Low Level Languages

Assembly Language

Machine Code

CPU
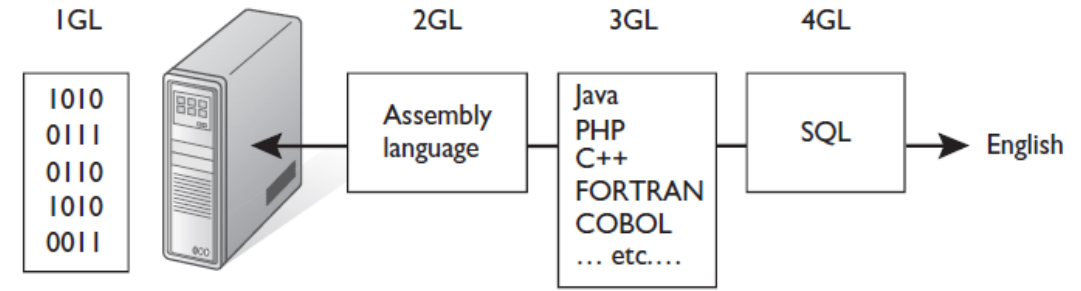
Programming

Need to know:
- How to write the instructions - "source code"
- How to convert source code → machine code - "interpret", "compile"
- How to run the machine code - "execute"

Choices
- Where and when
- Capabilities
- Skills

Writing Source Code

- Code editor → plain text files
  - functions**.js**
  - image-processor**.py**
  - form-processor**.php**
- Sublime Text v3 www.sublimetext.com
  - Same: Mac and Windows
  - Installed: University Computers
- JES (Jython Environment for Students) github.com/gatech-csl/jes/releases
  - Integrated Development Environment (IDE)
  - Same: Mac and Windows
  - Installed: University Computers
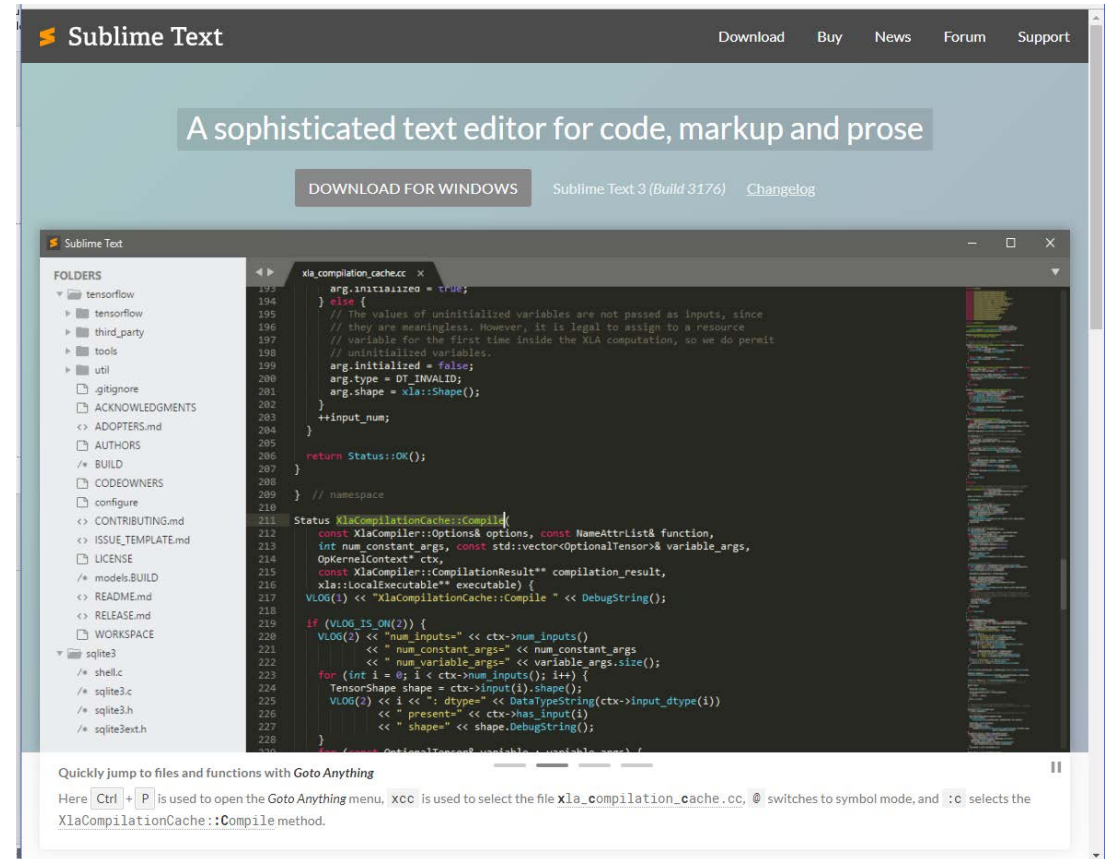
Interpreted and Compiled Languages

Compiled

1. Source code
2. Run compiler; create the executable
3. Distribute and run the executable

Interpreted

1. Source code
2. Distribute
3. Interpret

Ready to run, but not portable

Optimized; runs faster

Private source code (proprietary)

Cross-platform (portable)

Simpler/faster to write source

Runs slower

Open source only

Third option: hybrid

- Both compiled and Interpreted
- Intermediate Language, a.k.a. Byte Code
- Just In Time (JIT) compilation

Compiled
- C
- C++
- Objective-C

Interpreted
- PHP
- JavaScript

Hybrid
- Java
- C#
- .NET
- Python

For next time:

1. Install JES on your own laptop

    Installation files:
    https://github.com/gatech-csl/jes/releases

    …or use the lab computers

2. Download the **mediasources** folder - 27 MB of stuff; keep it handy all semester

3. Read: Chapter 2, pages 18 - 39

4. Do Assignment 1: Pick and Show
    - Instructions linked from: **docs.dms102.org** (NOT in the book!)
    - Upload files → Blackboard, in DMS 102 course, in the *Assignment Turn-in* area