Introduction

DMS 102: Programming Digital Media

Lecture 1

Professor Kostin

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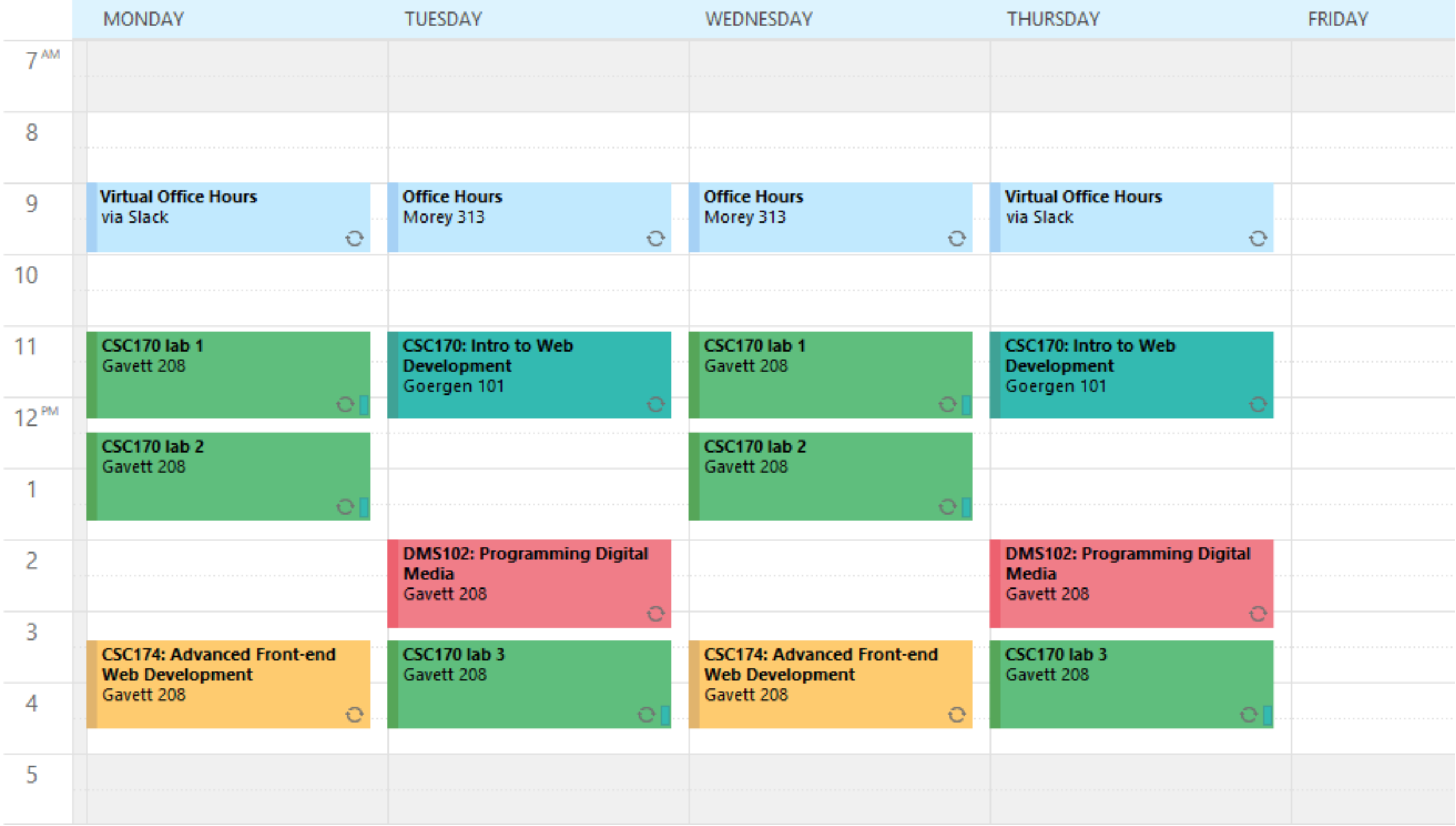
- Morey Hall, room 313
- Office Hours:
  - **Virtual Office Hours** for technical help: Slack, **#help** channel; Mondays and Thursdays, 9:00 to 10:00 AM
  - **Regular Office Hours** for *non-technical help:* Morey 313; Tuesdays and Wednesdays at 9:00 to 10:00 AM.
  - **Private Office Hours:** email to robert.kostin@rochester.edu


MONDAY
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Virtual Office Hours
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CSC170 lab 1
Gavett 208
CSC170: Intro to Web Development
Goergen 101
CSC170 lab 1
Gavett 208
CSC170: Intro to Web Development
Goergen 101
CSC170 lab 2
Gavett 208
CSC170 lab 2
Gavett 208
DMS102: Programming Digital Media
Gavett 208
DMS102: Programming Digital Media
Gavett 208
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

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

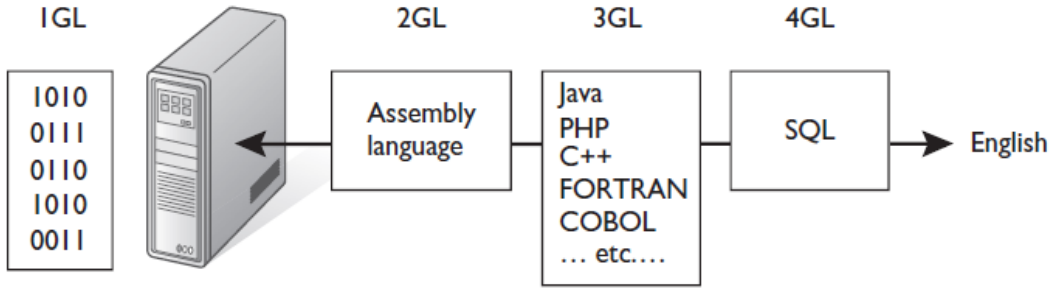
Assembly language

```
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



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:

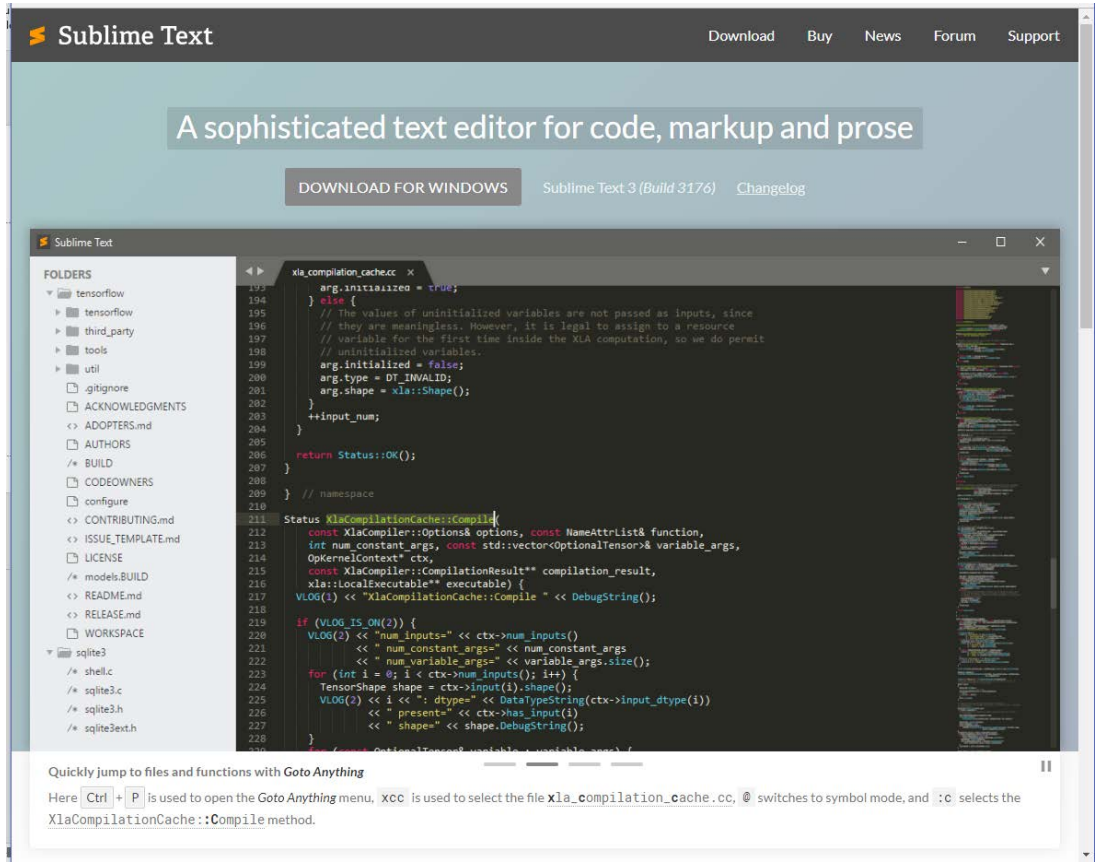
- How to write the instructions - "source code"
- How to convert source code → machine code - "interpret", "compile"
- How to run the machine code - "execute"

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