CMSC 216
Introduction to Computer Systems

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Dr. Ilchul Yoon • Spring 2020 • University of Maryland
http://cs.umd.edu/class/spring2020/cmsc216/

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Table of Contents

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1 Notes

This is a compilation of my notes for CMSC216 as a TA for the Spring 2020 offering of the course at the University of Maryland. All content covered in these notes was created by Dr. Ilchul Yoon and Dr. A.U. Shankar at the University of Maryland, and these are simply my transcriptions of the content provided in lecture and lab, along with my additional insight from the course compiled in a LaTeXdocument.

The notes template in use is Alex Reustle's template, which can be found on his github at the following location: `https://github.com/Areustle/CMSC351SP2016FLN`

Please send errors to `apraveen@cs.umd.edu`

2 Introduction to CMSC216

CMSC216 is where you learn how a computer works on a much lower level than you've experienced before. There are 3 main components that the course will explore.

Overview

- **UNIX** Threads, processes, and pipes as the building blocks of much bigger applications. We will be working with the UNIX operating system on the development environment at `grace.umd.edu`
- **C** is a high-performance language that works at a much lower level than Java. Things like memory management and advanced data structures are left up to the user. We'll cover concepts like memory management, pointers, and system calls.
- **Assembly** is even lower-level than C, and studying it will reveal how processors process instructions, store data, and maintain a stack and a heap. It's the lowest level you'll go in this class. For this semester's 216, you will be using MIPS assembly.

Debugging

Debugging is accomplished using two main tools: **Valgrind** for memory related issues, and **gdb** for general debugging. Both of these tools are very powerful if used correctly, and are explained as the semester progresses.
For more information, check out this link provided in the course slides:

`The Essentials of Debugging`

3 A Main Section (Template)

Here are some cool notes that will no doubt be very helpful to students.

Here is some cool code in Maryland colors!

```
int main() {
  int x = 1;
  int y = 2;
  printf("hello world");
  return x + y;
}
```

A Subsection

A subheading's text