CS354: Machine Organization and Programming

Lecture 1
Wednesday the September 2nd 2015

Section 2
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Logical Machine Organization

Physically How do they look today?
A Modern CPU

Physically How do they look today?
DRAM
Physically How do they look today? Motherboard

Simple hello world Program

- What is C? A High Level Language
- What is Assembly?
- What is Machine Code?

Simple hello world Program in the C Programming Language

```c
#include <stdio.h>      // Preprocessor directive
int main(int argc, char* argv[]){    // Execution starts with main
    printf("Hello CS354 Students! Welcome to the first class !\n");
    return 0;    // Return code for main tells whether program executed successfully or not
}
```

Compilation Process Overview

![Compilation Process Diagram](image)
```c
#include <stdio.h>
int main(int argc, char* argv[]){
  printf("Hello CS354 Students! Welcome to the first class!\n");
  return 0;
}
```

What Happens when you execute it? At a high level...

Shell program reads the command 
“./helloworld.o” character by character first into register and then into memory

Once I hit enter key, shell program loads “helloworld” program from hard disk into memory and executes it
Shell loads helloworld program into memory from disk

What Happens when you execute it? At a high level…

While executing, hello world program transfers the string
“Hello CS534 Students! Welcome to the first class!”
to the display device.

Processors do this in a really really fast loop:
- load instruction,
- execute it

helloworld displays welcome message to the display device

See you in Next Lecture

- See you in Next Lecture
- Try to read the reading materials before class
- Read the Chapter 1 in Textbook 1: Computer System: A programmer’s perspective if you have not already done so.
- Try to read Assignment 0 and start early! Don’t procrastinate!