CSE 351

Introduction & Course Tools
Why take 351?

• Aside from it being a CSE requirement...
• The labs are fun
• You learn how computers work!
• Introduction to the C language, as well as x86_64 assembly
Working Environment

You have three options

• Install the [CSE Home VM](#) (Recommended)
• If you have a CS account, you can use the lab machines (or [remote into attu](#))
• You can use your own personal computer running a Linux distribution (i.e. Ubuntu)
Course Tools

• Text editor
• GNU Compiler Collection (GCC)
• GNU Project Debugger (GDB)
• You can find all of these installed on the CSE Home VM
Text Editors

• This is a personal preference
• Try several, choose the one you like and get fast
• Command-line
  – Nano
  – Vim
  – Emacs
• Graphical
  – Gedit
  – Emacs
GCC

- This is a command-line utility that compiles your C files
- To create an executable program in C, there are two phases:
  - Compiling
  - Linking
- Compile: `gcc -Wall -std=gnu99 -c main.c`
  - This produces an object file: `main.o`
- Link: `gcc main.o -o test`
  - This produces an executable program file: `test`
GCC

• For this class, you will only be writing simple programs, so you can easily combine the compiling & linking phases

• Compile & Link:
  gcc -Wall -std=gnu99 main.c -o test

• This accomplishes the same thing as before in just one command
Hello World

#include <stdio.h>

int main(int argc, char *argv[]) {
    printf("Hello World!\n");
}

Try it on your own

• If you have a laptop with you, download the following file: HelloWorld.c from the course website

• Compiling the program:
gcc HelloWorld.c -o hello

• Running the program:
  ./hello
About `printf()`

• Used for printing to the console
• You can’t just concatenate strings with variables like you can in Java
• Insert placeholders to print out variables
  – The placeholder depends on the type of the variable
  – “%d”, signed int
  – “%u”, unsigned int
  – “%f”, float
  – “%s”, string
  – “%x”, hexadecimal int
  – “%p”, pointer
Printf() Examples

```c
printf("I am %d years old", 20)
• Prints “I am 20 years old”
printf("My name is %s", "Alfian")
• Prints “My name is Alfian”
printf("%d in hex is %x", 2827, 2827)
• Prints “2827 in hex is 0xb0b”
```
Another Example

• Download the file: calculator.c from the course website

• Again, navigate to the file, compile it, and run it
  – Example usage: “./calculator 4 5 +”
Linux man Pages

• When you don’t know how to use a particular shell command, you have several options
• One option is this site: http://google.com
• Another option is using the `man` command: `man 3 printf`
  – This will give a detailed description of `printf()`
Lab 0 Introduction

• If you haven’t already downloaded it, go ahead and download Lab 0

• Open the arrays.c file in an editor and we will go through it as time permits