Introduction to C and Unix

CS537 Section 304

by

Kevin Bao, Cheng Su

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Overview

1. 5 projects
2. Use C
3. Vedios are useful
4. Start early
5. Mind your code quality

What is a pointer

1. For now, treat the memory as a giant array
2. Pointer is like an index
3. How can we know the size of the data?

Man

1. man man
2. An interface to the on-line reference manuals
3. We will mainly use man 2 and man 3

Open your terminal

1. Linux: Ctrl-Alt-T
2. Mac OS: Cmd-Space, search “terminal”
3. Windows: Get a computer with 1 or 2

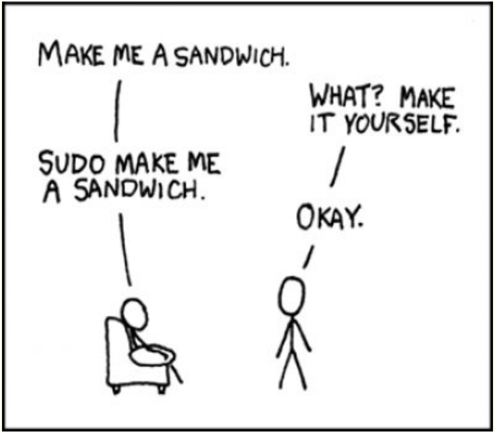
Download our github repo

https://github.com/c21/UWOS

```
$ git clone https://github.com/c21/UWOS.git
$ cd UWOS/1-intro/demo/c
$ ls
pointer0.c  pointer1.c  pointer2.c ...
$ cat pointer0.c
```

Shell: a servant

You write command, shell runs it for you.



A philosophical shell

Who am I ...

```
$ whoami
chengsu

$ date
Sat Sep  3 20:57:13 CDT 2016

$ pwd
/home/chengsu
```

SSH

Login to a remote computer.

```
$ ssh remote_username@remote_host
$ run-any-command-on-remote-computer
$ logout
```

- Options: -X, etc.
  - open a game in /usr/games
- No hassle of password?
  - ssh keys
  - sshpass

Try SSH yourself

Open a sudoku game on lab's computer

```
$ ssh -X your-cs-name@emperor-01.cs.wisc.edu
$ cd /usr/games/
$ ls
$ ./gnome-sudoku
$ logout
```

GCC

GNU Compiler Collection.

1. ***preprocessing*** (C code)
2. compilation (assembly code)
3. assembly (binary code)
4. linking (executable binary code)

Try preprocessing yourself

Preprocess test.c

```
$ cd ~/UWOS/1-intro/demo/unix
$ ls
Makefile  test.c  test.h
$ cat test.h
$ cat test.c
$ gcc -E test.c >prep_test.c
$ cat prep_test.c
```

Make

Recipe to cook (build) programs.

```
target: prerequisite1 prerequisite2 ...
    command1
    command2
    ...
```

- Efficiency (compare timestamps of *target* and *prereqs*)
  - make ; make
- Other usage (not serious)
  - workflow control:
    `http://widgetsandshit.com/teddziuba/2011/02/stupid-unix-tricks-workflow-control-with-gnu-make.html`

Vi: text editor

- Basic usage
  - write code: i (insert mode)
  - write command: <Esc> (command mode)
  - go to a line: :12 (go to 12th line)
  - copy a line: yy
  - paste a line: p
  - search a word: /dog (search word: dog)
  - undo: u
- How to learn Vi/Vim
  - vimtutor
  - `http://www.openvim.com`
  - even a game to play: `http://vim-adventures.com`
- Configure Vi
  - dotfile: .vimrc (set indentation to 2 space)

Suggested Readings

- C
  - The C Programming Language (Chapter 5, 8.7)
  - Expert C Programming: Deep C Secrets (Chapter 1)
- Unix (Basic)
  - Survival guide for Unix newbies
  - Settling into Unix
  - The Unix Programming Environment (Chapter 1)
- GCC, GDB and Make
  - CS537 Lab Tutorial
- Our Material
  - `https://github.com/c21/UWOS`