

Computer Systems Org

Recitation 010

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Today

- Hands-on
 - Unix/Linux commands
 - Git
 - Makefile
 - C programs
- In the sample repo, create a branch with today's date
- Checkout into that branch
- Coding: create C files, makefile
- Execution: compile and execute them
- Commit and Push

Exercise...

- Create a dummy repo on GitHub
- Clone it onto your system
- Coding: create C files, makefile
- Execution: compile and execute them
- Commit and Push
- Gdb

Basic Unix/Linux commands

- **man** - manual
- ls - list
- cd - change dir
- pwd - current dir
- mkdir - make an empty dir
- cp - copy
- mv - move
- rm - remove
- echo - write arguments to the standard output
- cat - output content of a file
- wc - word count
- grep - pattern matching
- touch - create a file

- Google/ man
- <https://github.com/jlevy/the-art-of-command-line>

Git

- Git config
 - <https://stackoverflow.com/questions/35942754/how-to-save-username-and-password-in-git-gitextension>
 - `git config -- global credential.helper store`
 - `git pull`
- Git commands
 - `git clone <url>`
 - `git status`
 - `git add`
 - `git commit -m "<your message>"`
 - `git push origin <branch>`
 - `git pull origin <branch>`

Makefile

A good Makefile:

```
myprogram: main.o util.o
    gcc main.o util.o -o myprogram
main.o: main.c
    gcc -c main.c -o main.o
util.o: util.c
    gcc -c util.c -o util.o
clean:
    rm -f main.o util.o myprogram
```

- Make supports pattern matching with the %
 - %.c means all .c files
- Make has “automatic variables”
 - The meaning of variables within a rule is contextual
 - \$@ is the name of the rule
 - \$^ is the list of dependencies
- Example:

```
%.o: %.c
    gcc -c $^ -o $@
```

C basics

- Basic Data types
 - integer - signed, unsigned
 - char, string (char*)
 - float, double
 - struct, class
- Functions
- Conditions
- Loops
 - for
 - while
- Pointers
- Data structures
 - Array (of int, char, etc)
 - Stack (FILO/ LCFS)
 - Queue (FIFO/ FCFS)
 - Tree (Binary...)
 - Heap

Debugging with gdb

- Manual: <https://sourceware.org/gdb/current/onlinedocs/gdb.pdf>
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