



RUTGERS
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OF NEW JERSEY

Computer Architecture (CS-211)

Recitation 1

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TA Information

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please use [CS-211] as prefix in your Email Subject!

Section 10 Recitation: Wed 9:00 AM - 9:55 AM (SEC-118)

My office hour: haven't been assigned yet

Topics

- How to use iLab machines
- Useful Linux Commands
- How to write and compile C programs

* Some materials are collected and compiled from previous year's CS 211 lectures and TAs

How to use iLab Machine

Follow the link to open your account

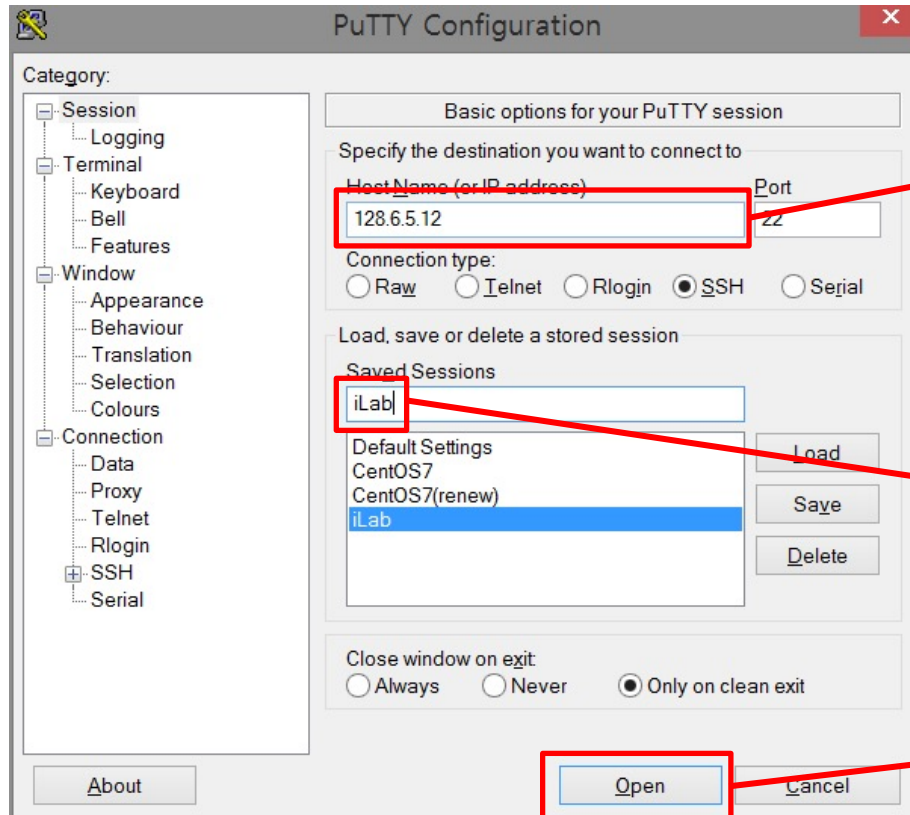
- <http://www.cs.rutgers.edu/resources/systems/ilab/>

To get connected with iLab machines

- Download and install X2GO client for GUI
- Download and install Putty/WinSCP on Windows
- Use Terminal/Command Line application on Linux
 - `$ ssh netid@address`
 - eg. `ssh NetID@iLab3.cs.rutgers.edu`

You can also download and install MobaXterm on Windows for as command line application.

How to use iLab Machine (Windows - Putty)



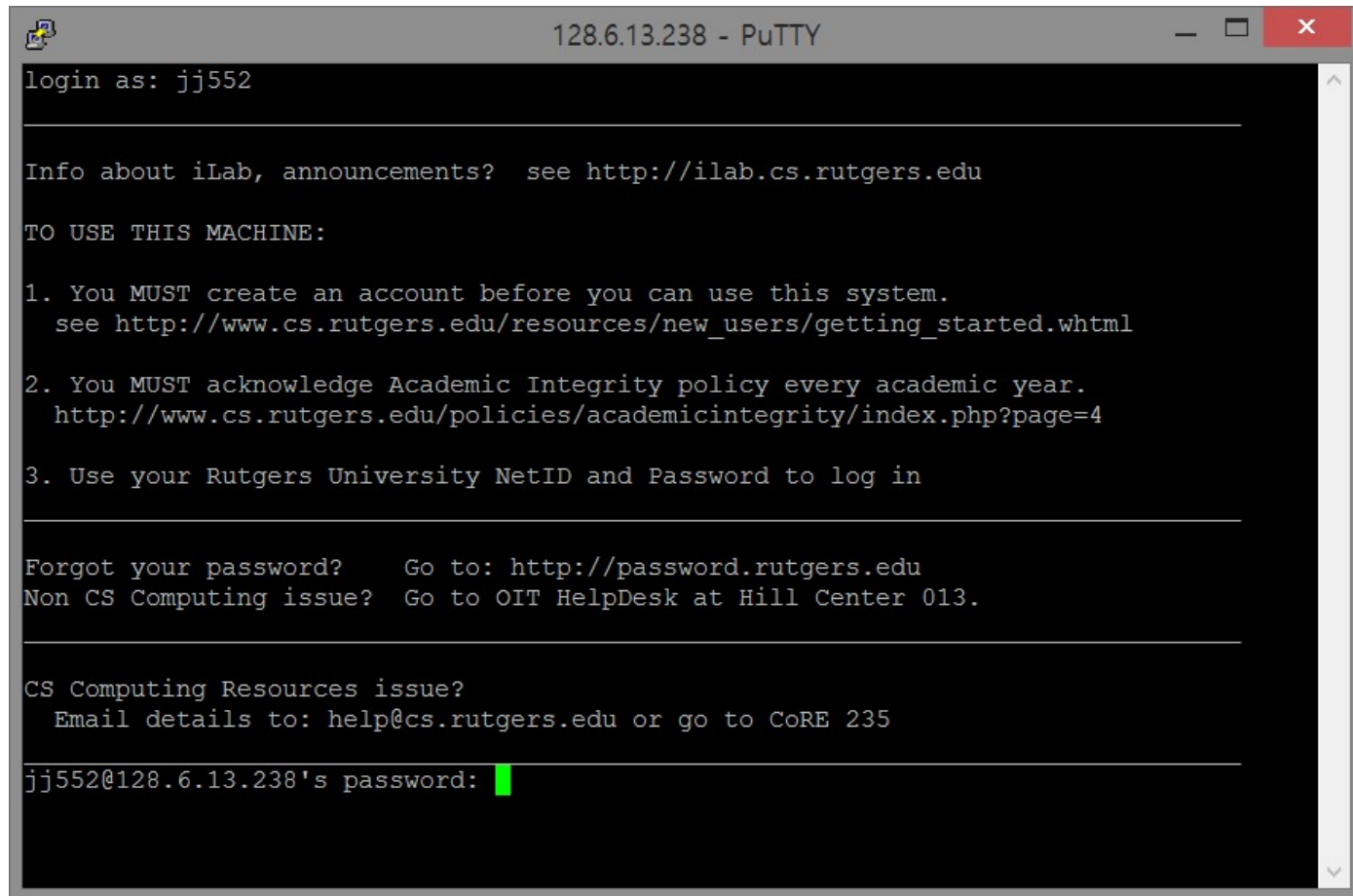
Put the IP address of the machine in iLab (the IP address may be different as it is shown) or iLab machine name

Save the session

Connect iLab Machine

How to use iLab Machine (Windows - Putty)

- Login with your netID



```
128.6.13.238 - PuTTY
login as: jj552

Info about iLab, announcements?  see http://ilab.cs.rutgers.edu

TO USE THIS MACHINE:

1. You MUST create an account before you can use this system.
   see http://www.cs.rutgers.edu/resources/new_users/getting_started.whml

2. You MUST acknowledge Academic Integrity policy every academic year.
   http://www.cs.rutgers.edu/policies/academicintegrity/index.php?page=4

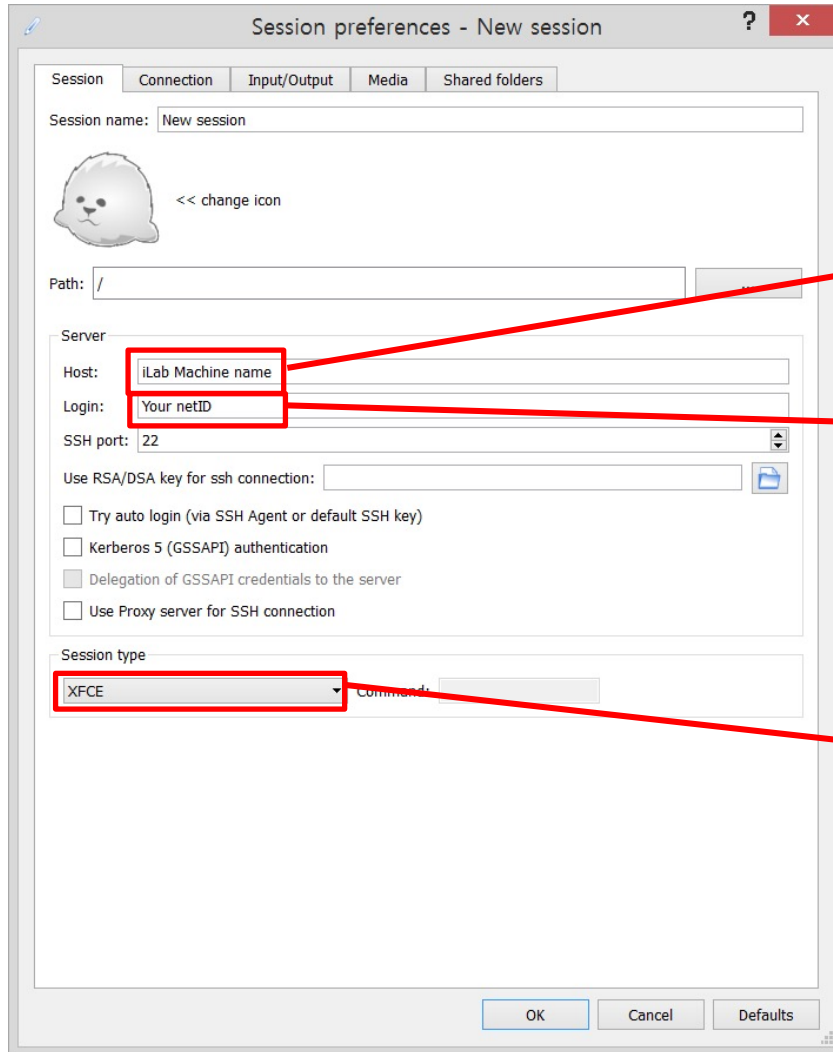
3. Use your Rutgers University NetID and Password to log in

Forgot your password?    Go to: http://password.rutgers.edu
Non CS Computing issue?  Go to OIT HelpDesk at Hill Center 013.

CS Computing Resources issue?
  Email details to: help@cs.rutgers.edu or go to CoRE 235

jj552@128.6.13.238's password: █
```

How to use iLab Machine with GUI (Using X2go)



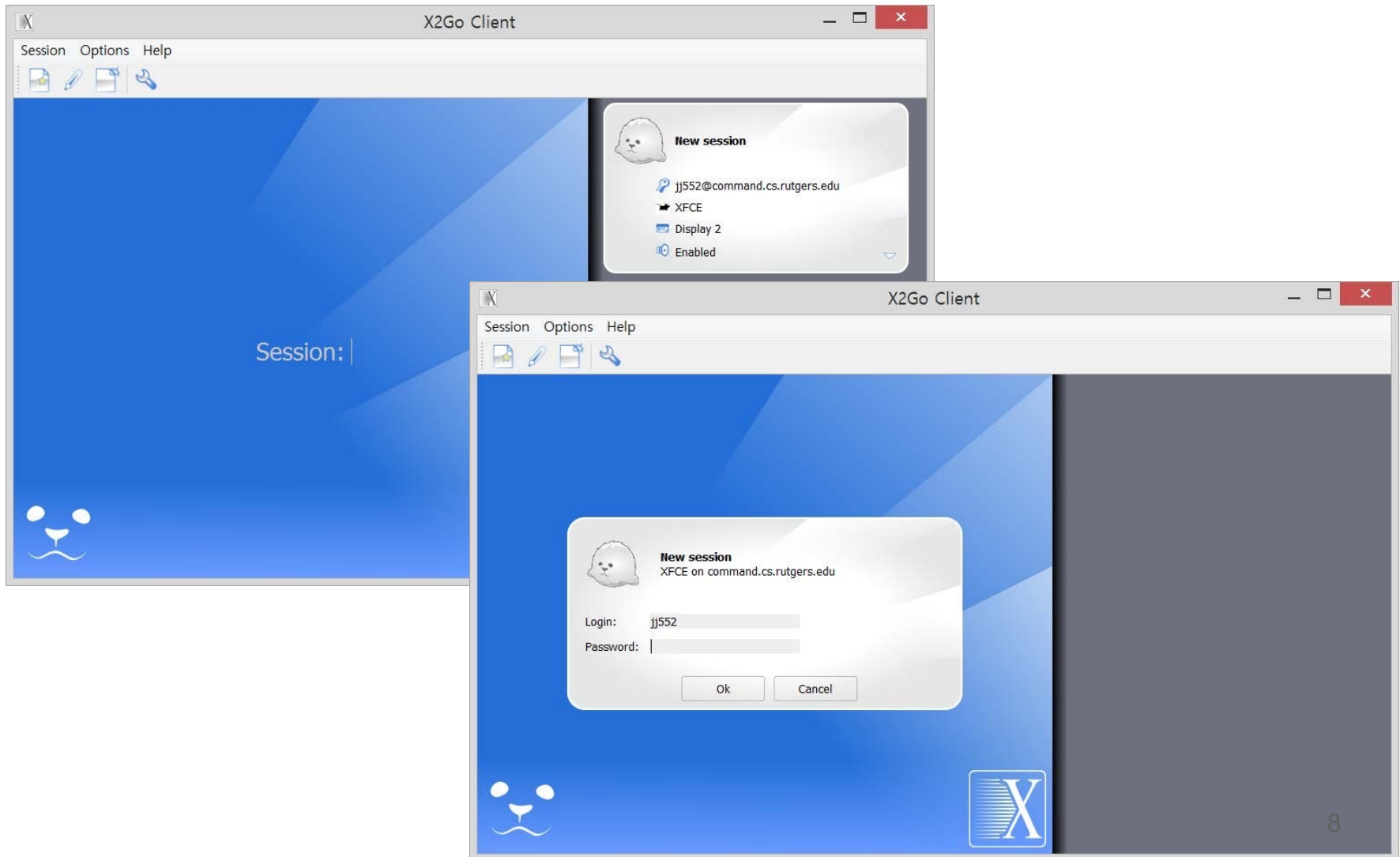
Put any iLab machine name from
<https://report.cs.rutgers.edu/nagiosnotes/iLab-machines.html>

Your netID

Select one of XFCE, MATE, KDE

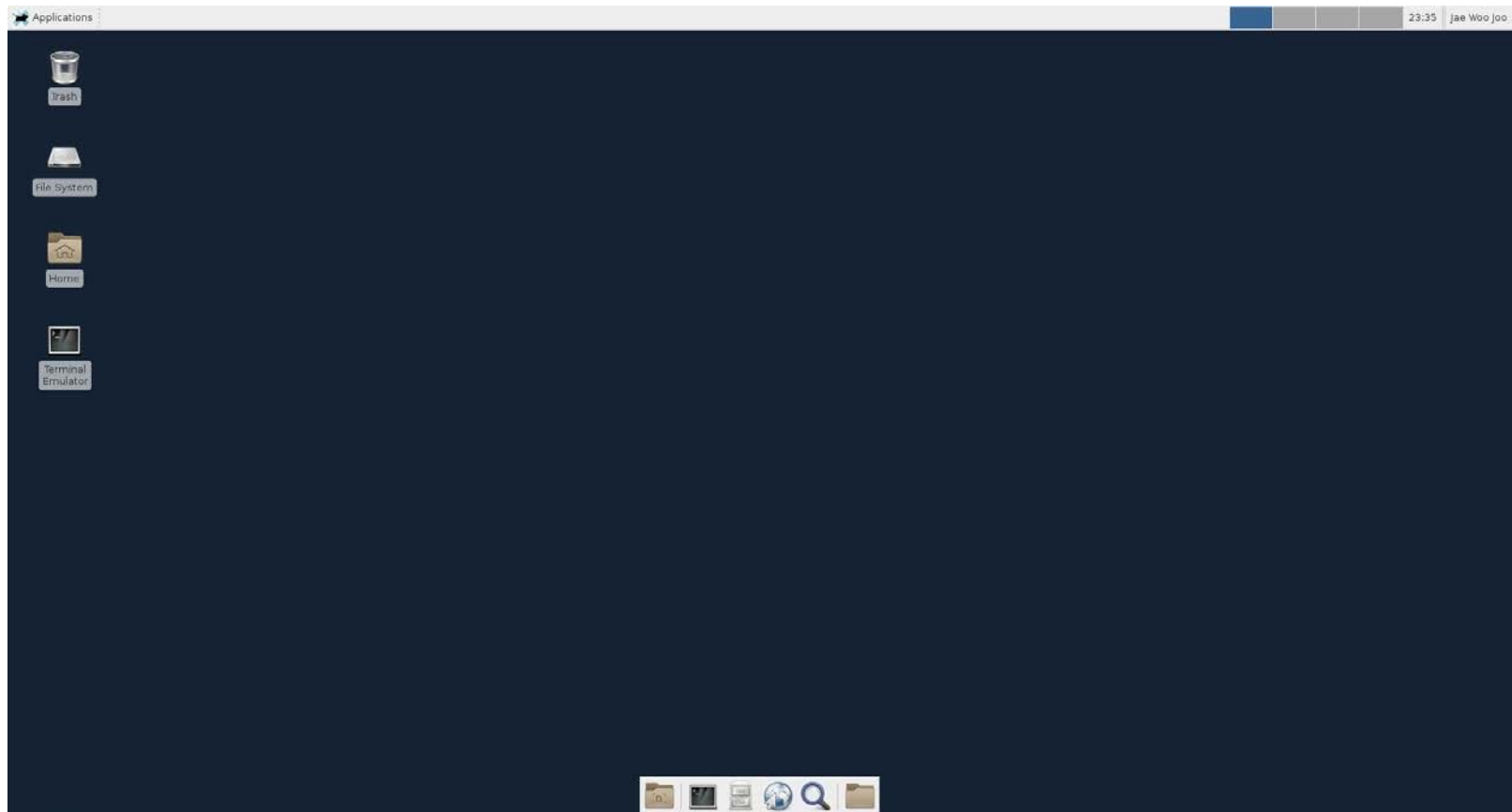
GUI = Graphical User Interface

How to use iLab Machine with GUI(Using X2go)



How to use iLab Machine with GUI(Using X2go)

- You are connected to iLab machine



Basic Linux Commands 1

Check out this: <http://linuxcommand.org/index.php>

- **ssh**: login to any machines remotely
- **pwd**: show current location
- **cd**: change directory (eg. \$cd Documents, or \$ cd ..)
- **ls**: list all contents (check <http://www.rapidtables.com/code/linux/ls.htm>)
- **locate**: show location of a file (eg. \$locate test.txt)
- **grep**: search texts in files (e.g. \$ grep "cs 211" *.txt)
- **version**: show version (eg. \$ java -version)
- **cat**: print contents on screen (ex. \$ cat test.txt)
- **touch**: create a file (eg. \$ touch test.txt)

Basic Linux Commands 2

- **cp**: copy file (eg. `$ cp source.txt destination.txt`)
- **mkdir**: make directory (eg. `$ mkdir myfolder`)
- **rm**: remove file (eg. `$ rm test.txt`)
- **mv**: rename file (eg. `$ mv oldname.txt newname.txt`)

Common Editor

- Atom (flashy)
- Vim (learning curve)
- Nano (simple)
- Eclipse
- VS code ...
- Whatever is convenient for you...

Basic commands in Vi / Vim

Switch between Edit and Command mode

- Open file `$ vi myfile.txt`
- Hit `i` to insert text
- `Esc` to switches back to command mode

Basic operations (in command mode)

- **w** : will save (write) the file
- **q** : will exit the editor
- **q!** : forces to quit a file containing unsaved changes
- **wq** : will save and exit

Moving Files to/from server

- **Filezilla**

(windows):

<https://filezilla-project.org/download.php?platform=win64>

(mac):

<https://filezilla-project.org/download.php?platform=osx>

Or....Through linux using scp (more tedious):

- **scp**: transfer file from local to server machine and vice versa

Example:

(\$ scp source destination)

- Local computer to iLab:

```
$scp -r local-folder/ matan@null.cs.rutgers.edu:~/
```

- iLab to Local (execute command from local machine):

```
$ scp -r matan@null.cs.rutgers.edu:~/remote-folder/ /home/matan/
```

Sample C Program

```
#include <stdio.h>
int main() {
    int integer;
    float num;
    char str[100];

    printf("Enter an integer: ");
    scanf("%d", &integer);

    printf("Enter a floating number: ");
    scanf("%f", &num);

    printf("Enter a string: ");
    scanf("%s", str);

    printf("Integer %d \nFloat %f \nString %s \n",
integer, num, str);

    return 0;
}
```

Result

Enter an integer: 211
Enter a floating number: 4.5
Enter a string: Hello world!

Output

Integer 211
Float 4.5
String Hello World!

Makefile

- Makefiles are a simple way to organize compilation Why we need makefile:

Do you want to type 'gcc -Werror -Wall ...'

Or would you rather type 'make'

A complete reference for writing 'makefile' from a basic one to very advanced one

here: <http://www.gnu.org/software/make/manual/make.html>

How to compile C in Linux

- GCC
 - GNU Compiler Collection
 - gcc is a compiler that can compile C, C++, JAVA, FORTRAN, ...
 - Most widely used for compiling program
 - We use gcc to compile C in Linux
 - Create a .c file (eg. `$ touch hello.c`)
 - Open the file with gedit/vim/nano
 - Compile your code `$ gcc -Wall -Werror -fsanitize=address hello.c -o hello`
 - Run your code `$./hello`
- Werror: Make all warnings to errors
-Wall: Show all warnings
-Fsanitize=address: a fast memory error detector
-o: outfile

Q&A

Thank you!