Unix Workshop 2011

What is Unix

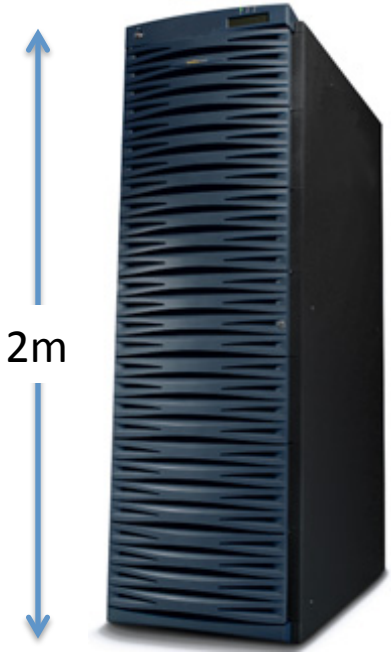
- Multitasking, multiuser operating system
- Often the OS of choice for large servers, large clusters
  - 64% of web servers run some type of Unix
  - 96% of Top500 supercomputers run Unix
    - Of which 95% of them are Linux

Unix Around You

- You're probably familiar with these:
  - Linux
  - Solaris
  - Mac OS X (roots from FreeBSD and NetBSD)
- And these websites:

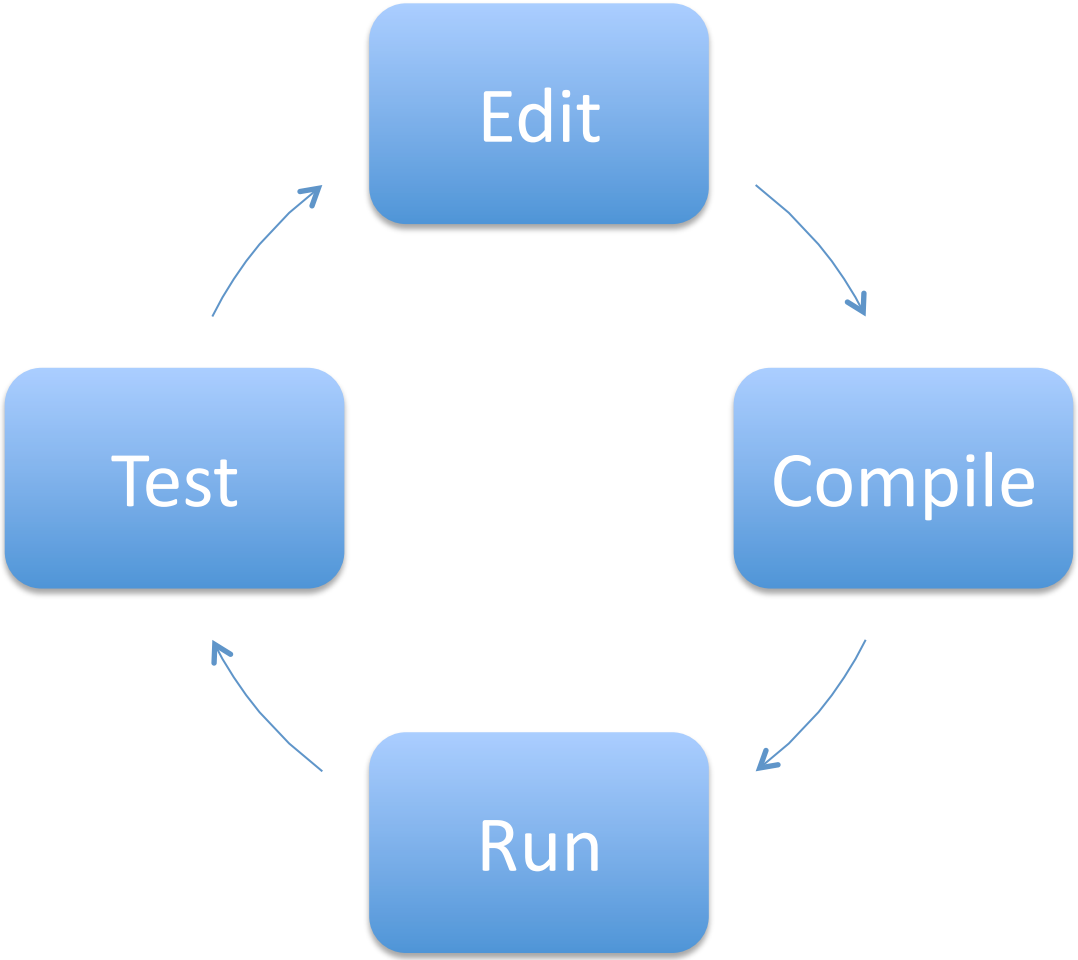
What is SunFire?

In 2001: Full-sized rack



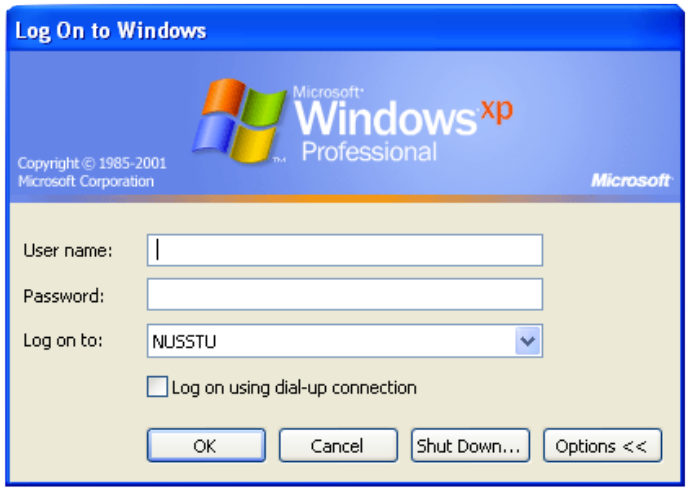
Today: A solaris zone in a blade of a chassis quarter-size of a rack!

Programming Workflow



Activity: Login to NUSNET

- Press Ctrl-Alt-Delete
- Type in your NUSNET user name, password, and select the NUSSTU domain
- Click the OK button

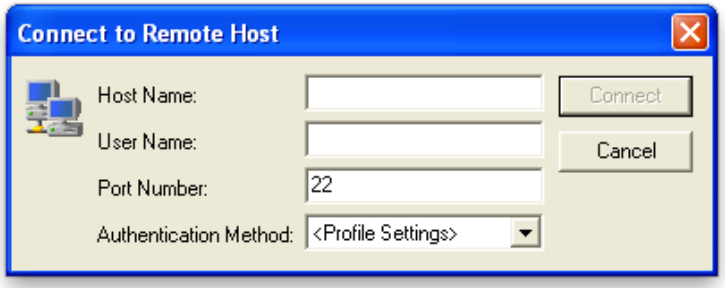


Activity: Creating your Unix Account

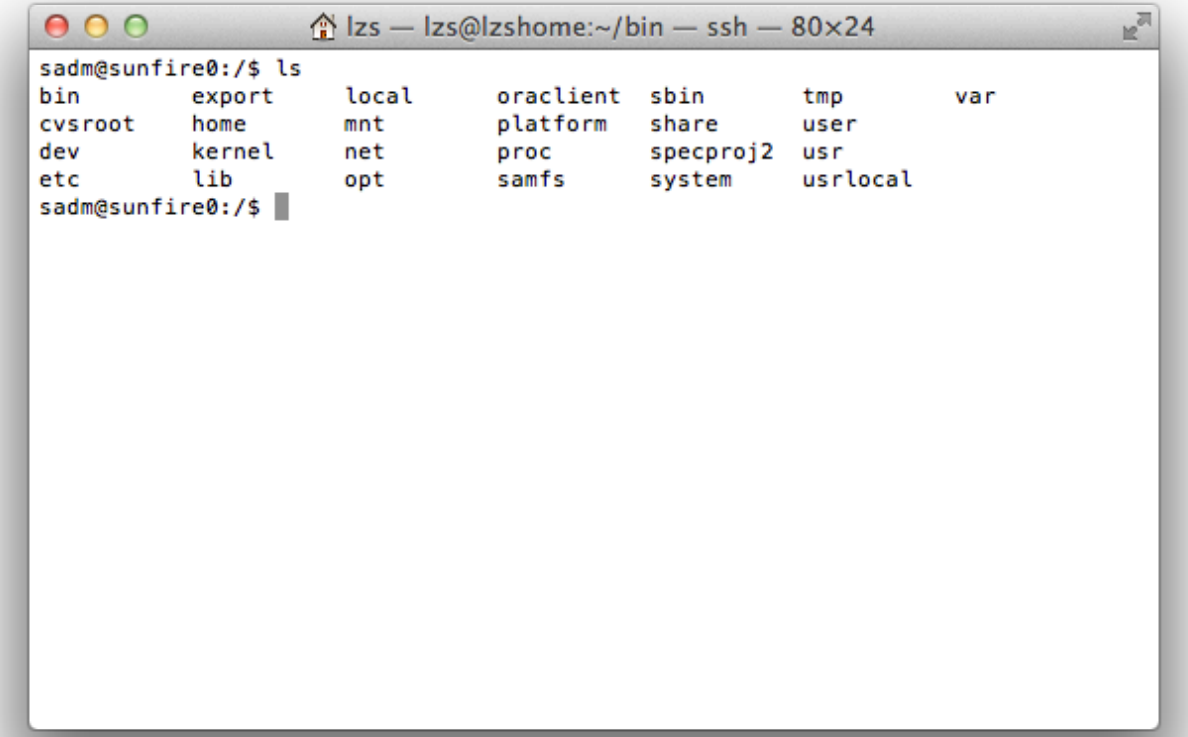
- https://mysoc.nus.edu.sg/~newacct
- Login using your NUSNET user name and password

On Activity: Connecting to SunFire

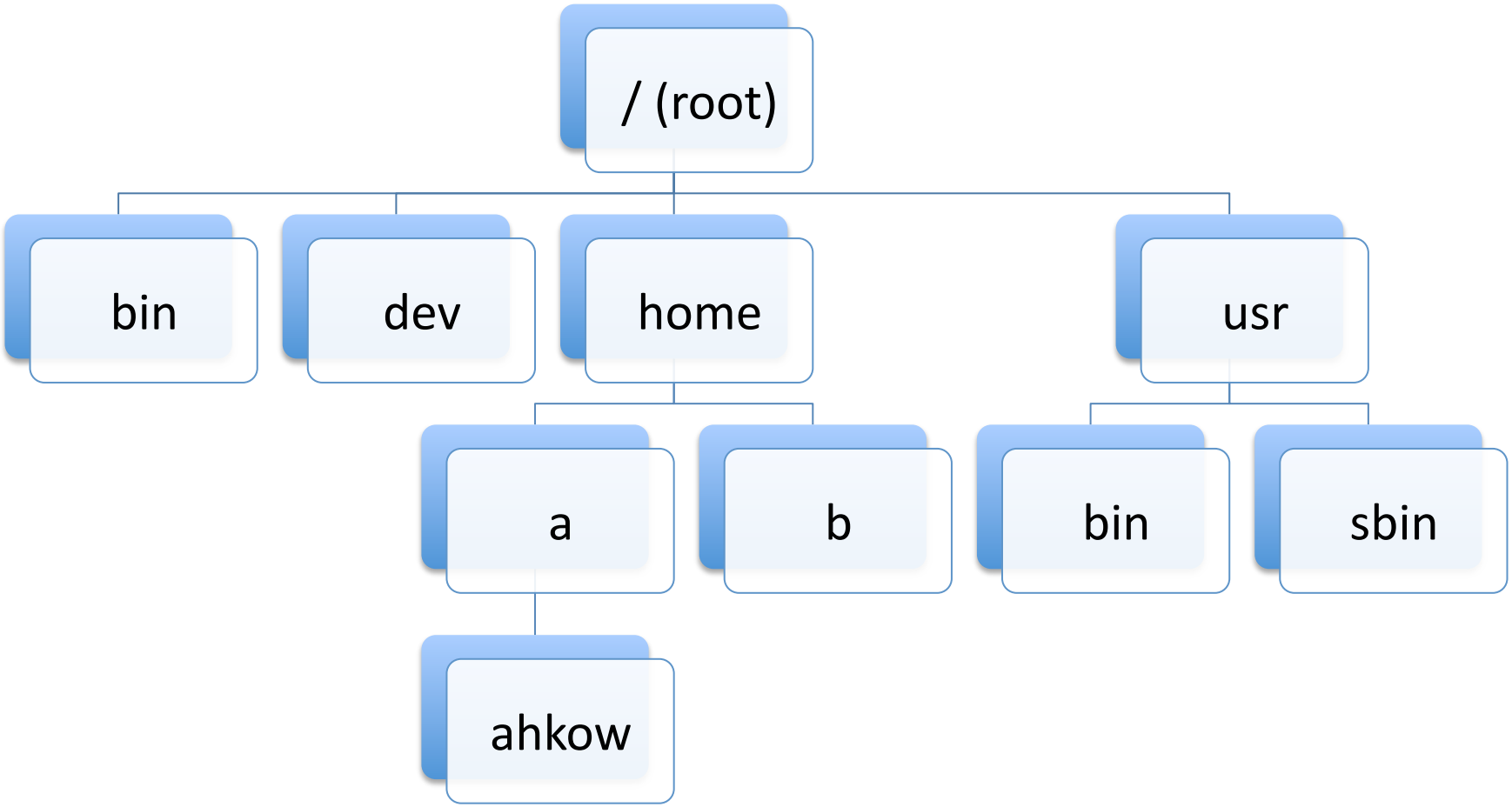
1. From the desktop, launch the SSH Secure Shell Client application
2. Click on Quick Connect
   Host Name: sunfire.comp.nus.edu.sg
   User Name: Your SoC user name
3. Click on Connect
4. Click on “Yes” at the Host identification dialog
5. Enter your SoC password in the password dialog



Command Line Interface



Unix Directory Tree



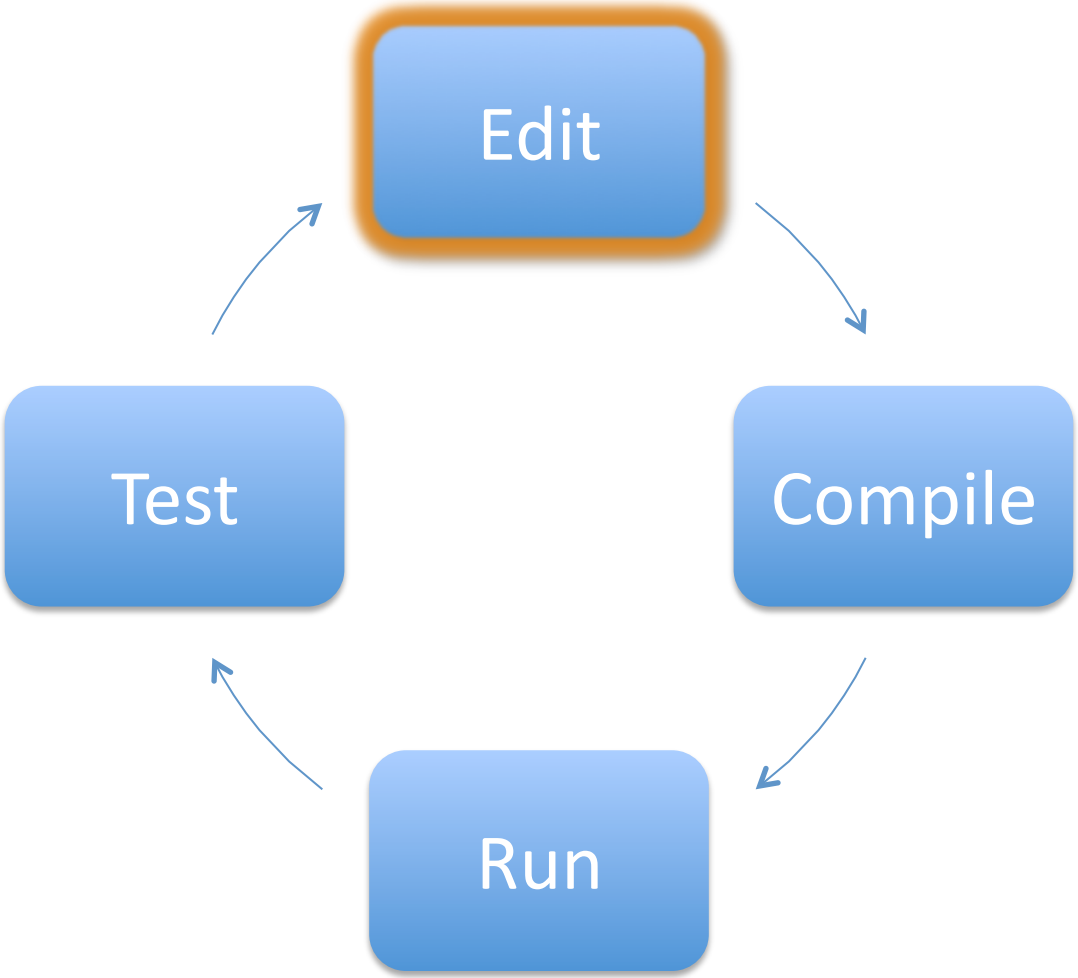
Parts of a Command

$ program argument1 argument2 …

Activity: Working with Files and Directories

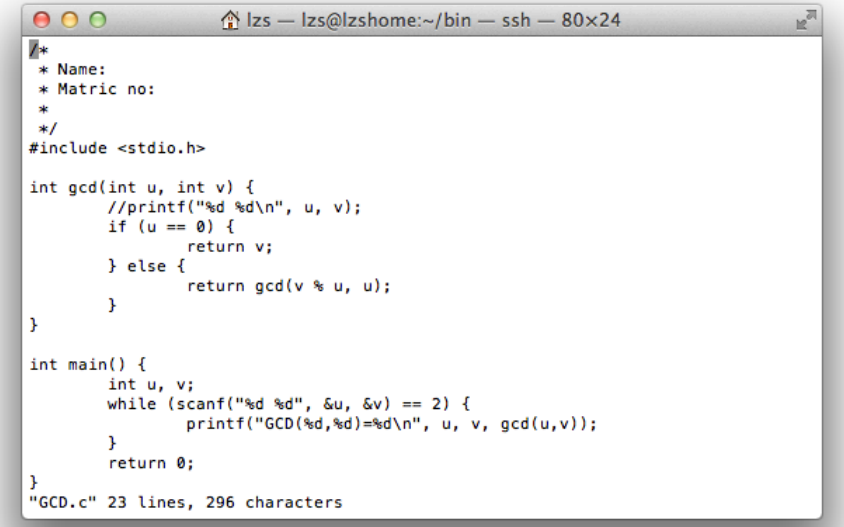
1. After login, you are in your home directory, e.g. /home/l/laizs
2. Check your current working directory:
   $ pwd
3. Show files in your current directory:
   $ ls
4. Create a new directory:
   $ mkdir UNIXWorkshopFiles
5. Switch to the new directory:
   $ cd UNIXWorkshopFiles
6. Check your current working directory again: pwd

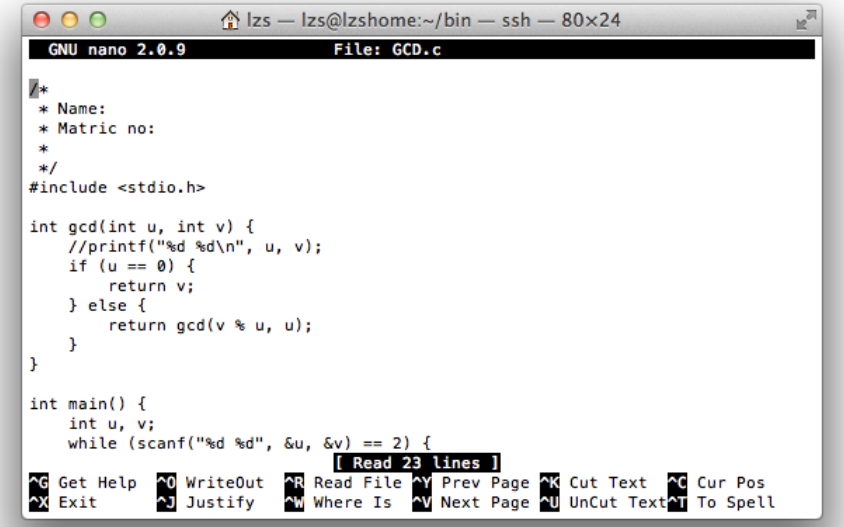
Edit



Text Files

- Program source code is stored in text files.
- A good text editor will dramatically improve your productivity.

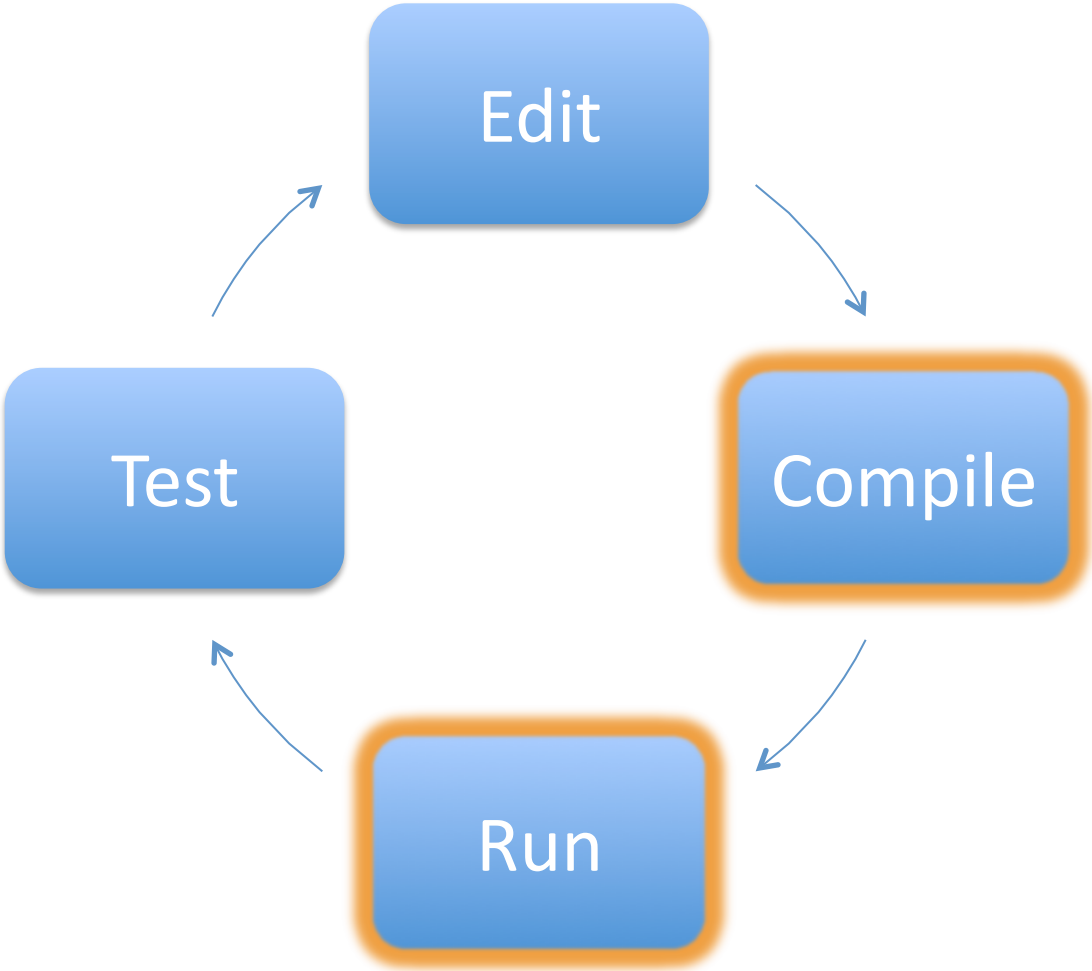




Activity: Text Editing with Nano

1. Download the sample GCD.c program from the UWS website using wget
   $ wget http://download.comp.nus.edu.sg/GCD.c
2. Edit the file using the editor nano
   $ nano GCD.c
3. Type in your name and matric number as indicated in the file.
4. Save the file and exit nano by pressing Ctrl-X
5. Check the contents of the file using the cat command:
   $ cat GCD.c

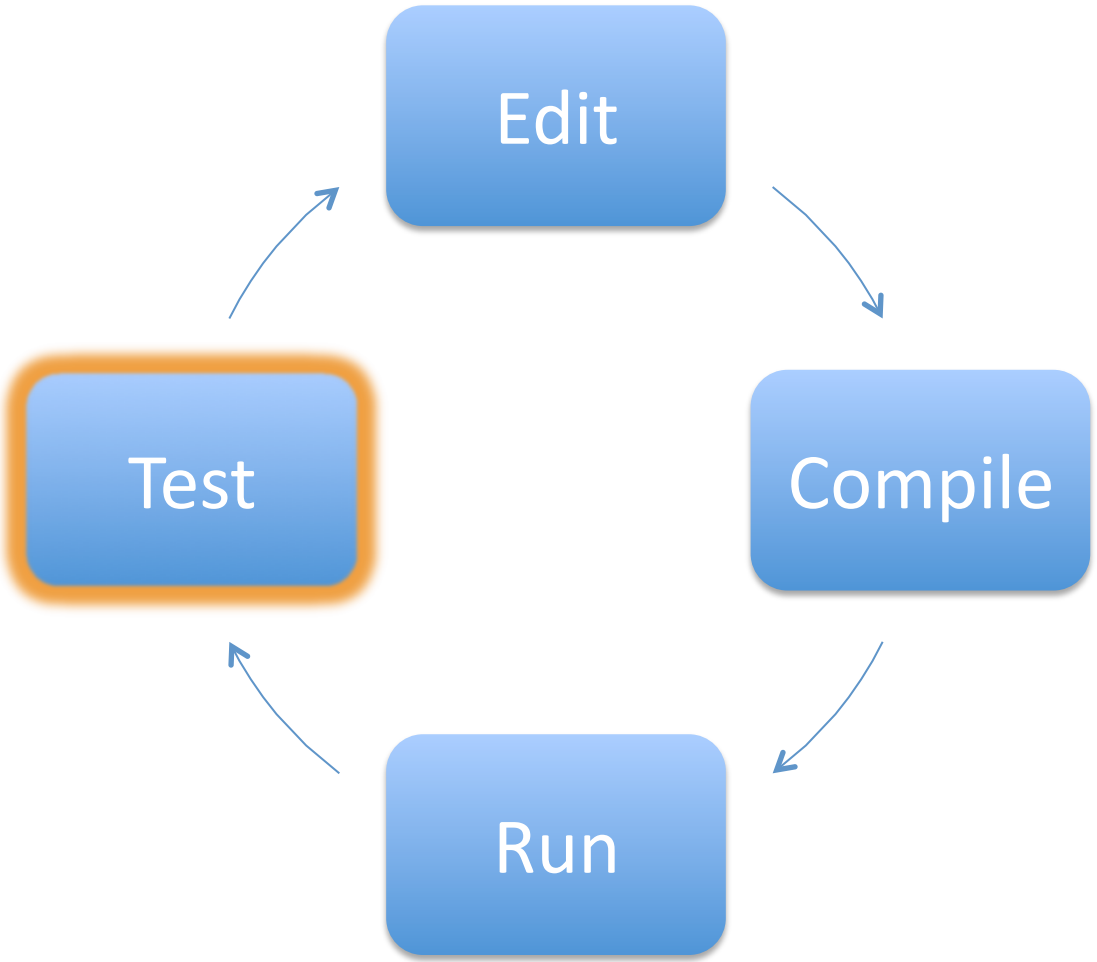
Compile and Run



Activity: Compiling and Running

1. C programs are compiled using the gcc compiler
   $ gcc GCD.c
2. To run a program, you must add ./ in front of its name; the default name used by gcc is a.out
3. Run the GCD program
   $ ./a.out
4. Type in a pair of integers followed by the Enter key, for example:
   58 24
5. Repeat step 4 as many times as you like
6. To force the program to end, press Ctrl-C

Test



Testing – Blackbox Testing

Testing in Unix

```
$ program < input > output
```

Activity: Creating the Input

1. Instead of typing the input by hand as in the previous activity, we create an input file using nano
   $ nano input
2. Type in pairs of integers, one pair per line, e.g.:
   3 10
   15 25
   200 420
3. Save and exit nano

Activity: Creating the Correct Output

1. Create a file for the correct output
   $ nano answer
2. Type in the correct GCD for each pair of integers in the input
   GCD(3,10)=1
   GCD(15,25)=5
   GCD(200,420)=20
3. Save and exit nano.
4. Run the GCD program on the test case.
   ./a.out < input > output

Activity: Find the Bugs

- Open output in nano and verify if it matches the correct answer.
  $ nano output
- If they differ, you've found the bug!
  Else try again with different input/answer files
- Hint: manually checking whether two files are identical is boring, try using the diff command:
  $ diff answer output

SMS Word Count

For example, given the following text file:

U wan 2 haf lunch i'm in da canteen now.

Haf u found him? I feel so stupid da v cam was working.

Where r we meeting?

I went to ur hon lab but no one is there

The desired output is:

.

.

.

1 we

1 went

1 Where

1 working.

2 da

2 I

Activity: sort and uniq

- Two Unix commands useful to this task:

sort

Input:
dog
bat
log
cat

Output:
bat
cat
dog
log

uniq

Input:
dog
dog
cat
cat
dog
cat
cat

Output:
dog
cat
dog
cat

SMS Word Count

1. Download the file containing sms messages using wget:
   $ wget http://download.comp.nus.edu.sg/SMSwords.txt
2. Sort the file:
   $ sort SMSwords.txt
3. Sort and remove duplicates:
   $ sort SMSwords.txt | uniq
4. We need to use a particular option of uniq which counts the number of duplicates; learn about it from uniq's manual page:
   $ man uniq
5. Sort and count words:
   $ sort SMSwords.txt | uniq -???
6. Sort by the frequency, so that more frequent words appear later:
   $ sort SMSwords.txt | uniq -??? | sort –n

Acitivity: Logging Out

```
$ logout
```

Useful Websites

- KiTTY, SSH client for Windows: http://www.9bis.net/kitty/
- Cygwin, UNIX-like environment for Windows: http://www.cygwin.com/
- Description of computing facilities in SoC: http://docs.comp.nus.edu.sg/cf
- MySoC, intranet portal: https://mysoc.nus.edu.sg

Q&A