C Programming Introduction

week 1: Setting up environment

Lecturer : Do Quoc Huy
Dept of Computer Science
Hanoi University of Technology

For HEDSPI Project

Introduction

- C Programming practice in UNIX (LINUX) environment
- Methods to write and execute simple programs in C language
- Basic grammar
- Usage of functions in standard libraries.

Course's topics

1st	Programming environment introduction, code editor
2nd	Introduction to C programming language
3rd	Standard output introduction
4th	Variables, constant, Standard input
5th	Expressions
6th	Branches
7th	Loops
8th	Loops
9th	Functions
10th	Arrays
11th	Pointers
12th	Arrays and pointers
13th	Strings
14th	Structures
15th	Final Exam

3

Some Rules to be Followed

- Attendance is mandatory.
- Regular assignments should be done fully in the lab class.
- If you face any problems catching up, draw the attention of one of the teachers.

4

Environment and tools

- Operating System: Linux Fedora 8.
- Programming language: C
- Compiler: gcc
- Editor : emacs
- Window manager: KDE / Gnome

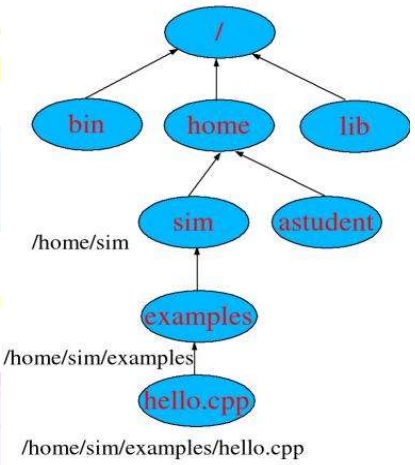
5

Linux login

- You have already your account and password
- Use them to open a working session, then setting up your directory, editor and compiler.

6

Linux file system



- Structured like an upside-down tree.
- Directories / sub-directories: Special files used for grouping. The Root directory is /
- Each user has a home directory: ~ or home/userid

7

Important Directories and Files

- The root - **/**

  /root – Home directory for root

  /boot – static files of the boot loader

  /bin – files needed to boot the system

  /sbin – /usr/sbin
  system admin. utilities

  /dev – device files

  /etc – admin. and configuration files

8

Open a command window

- Click on Terminal icon (or press Alt-F2: type xterm or konsole)
- Then you can use Linux commands.
- You may create other windows from the first one by typing xterm &

9

Some Linux Commands

- ls: Lists the directory contents.
- pwd: Show current working directory.
- cd: Change working directory.
- mkdir : Make directories.
- cp : Copy files and directories.
- cat: view the content of a file.
- mv : Move / rename files.
- man: Display on-line manual pages.
- which: print the directory contain the command.

```
which gcc
```

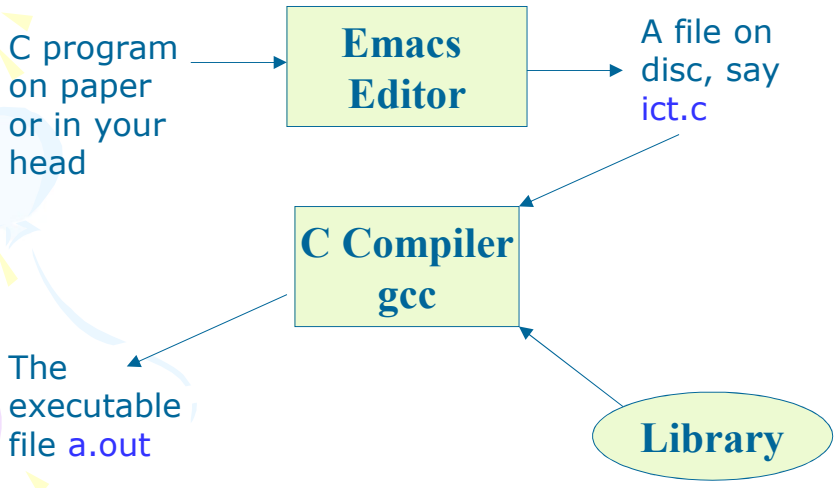
10

Exercise

- Go to your home directory
- Create a directory named Cprogramming
- Then a subdirectory of Cprogramming: week1
- In this session, your files will be stored in this directory.
- And in the ~/Cprogramming/week2 for the next session, and so on.
- Organize well your files in each week during this course.

11

Steps in Running a Program



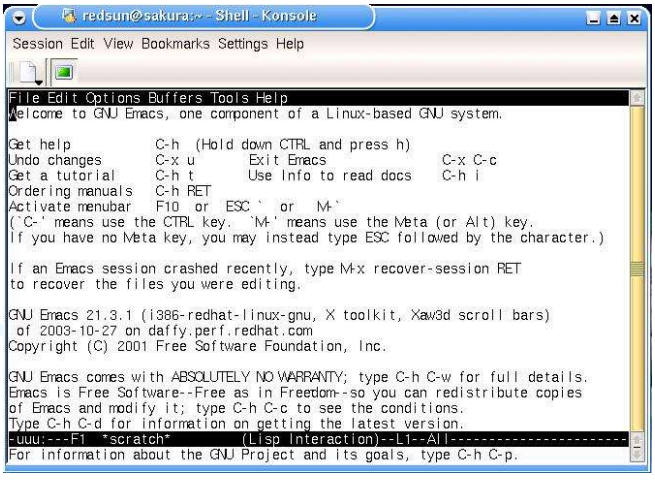
12

Start the emacs Editor

- Select a window and enter the command emacs & or emacs –nw
- To use **Emacs** to edit a file, type:
  emacs filename
- An emacs window is created. You can select the font size. You can now type in a program.
- To close the emacs window
  - Select menu Files of emacs
  - Select exit emacs

13

GUI of Emacs



14

GUI of Emacs

- The display in **Emacs** is divided into 3 basic areas.
  - The top area is called the text window. The text window takes up most of the screen, and is where the document being edited appears.
  - Below the text window, there is a single mode line (in reverse type). The mode line gives information about the document, and about the **Emacs** session.
  - The bottom line of the **Emacs** display is called the minibuffer. The minibuffer holds space for commands that you give to **Emacs**, and displays status information.

15

Emacs Commands

- **Emacs** uses **Control** and **Escape** (or **Alt**) characters to distinguish editor commands from text to be inserted in the buffer.
  - ***Control-x*** means to hold down the control key, and type the letter ***x***.

    (You don't need to capitalize the ***x***, or any other control character)
  - ***[ESCAPE] x*** means to press the escape key down, release it, and then type ***x***.
  - Abreviation: C-x for Ctrl-X and M-x means Meta-x

16

Emacs commands for a file

- Find and open a file
  - ***C-x C-f*** file_name
  - You can use TAB key to view the list of file in current directory
  - When you tape a character, all files whose name start with this character will be displayed.
- Save a file as you are working on it, type:
  - ***C-x C-s***
- Exit **emacs**: ***C-x C-c***

17

Moving Around

- The arrow keys on the keyboard work for moving around one line or one character at a time.
- Some navigation commands:
  - Move to the Top of the file: ***M-<***
  - Move to the End of the file: ***M->***
  - Next screen (page down): ***C-v***
  - Previous screen (page up): ***M-v***
  - Start of the current line: ***C-a***
  - End of the current line: ***C-e***
  - Forward one word: ***M-f***
  - Backward one word: ***M-b***

18

Type Text

- Once you move the cursor to the location in the file where you want to do some editing, you can just start typing - just like in an ordinary word processor.
- The delete key should work to remove characters and inserted text will push existing text over.

19

Cut, Copy, and Paste

- You can delete or move blocks of text.
  - First move the cursor to the beginning (or end) of the block of text.
  - Then set a mark with: ***C-spacebar***
  - Now move to the other end of the block of text and **Delete** or **Copy** the block:
    - Delete: ***C-w***
    - Copy: ***M-w***
  - To **Paste** a copied block, move to the new location and insert with : ***C-y***

20

Another userful commands

- C-g: keyboard-quit (stop a command which is taking too long)
- C-x 1 One window (i.e., show only one window)
- C-x 2 Splits the screen into two windows
- C-x o Move the cursor to the bottom window.
- C-x b Switch to buffer
- C-s search a string

21

Exercise 1.2 : Emacs Configuration

- In the Emacs command line, find and open ~/.emacs
- Add the following line to configure Emacs as you want (use the command as much as possible).
- Set font

```
(global-font-lock-mode 1 t)
```

- Set time and Date

```
(setq display-time-day-and-date t)
```

22

Exercise: Emacs Configuration

- Set working mode for C coding

```
(defun linux-c-mode ()
"C mode with adjusted defaults for use
with the Linux kernel."
(interactive)
(c-mode)
(c-set-style "K&R")
(setq tab-width 8)
(setq indent-tabs-mode t)
(setq c-basic-offset 8))
```

- Save the change, and restart emacs

23

Exercise 1.3: Edit your first program

- Use emacs to open a new file name hello.c in your ~/Cprogramming/week1
- Enter the following line:

```
/* Your name – your class */
/* This is my first program in C */

#include <stdio.h>

main()
{
   printf("Welcome to C Programming Introduction.\n");
}
```

- Save file.

24

Exercise 1.4 Creating simple algorithm

- Write an algorithm for choosing clothes to wear for different activities involving different weather conditions (e.g., going to the beach when it is hot, skiing in the snow, etc.). The algorithm should make it clear how the choice of clothes depends on the weather and the activity, and should be able to cope with a range of weather conditions.
- Hint: Use selection.

25

Exercise 1.5 Creating simple algorithm

- Suppose that you have been given a $100 music store gift voucher. Write an algorithm for buying some CDs with the voucher.
- Hint: Use selection and iteration.

26