Linux

Agenda

- Introduction
- Linux FileSystem Hierarchy
- Linux FileSystem Commands
- VIM Editor
- C Prgramming - (Hello World)

Introduction

- Syllabus
    - Embedded C Programming - C Language
    - Data Structures and Algorithms
    - Advanced Micro Controller - ARM Cortex M3, Protocols, Peripheral programming
    - Embedded Operating System - ARM Cortex A, Operating System Concepts, Linux Programming
    - Embedded Linux Device Driver - Driver Programming (Linux)
    - Real Time Operating System - FreeRTOS, Task programming
    - Internet of Things - Networking, IoT Protocols, NodeMCU(ESP8266), BBB
    - Project
    - Aptitude and Effective Communication
- Evaluations
    - Theroy Exam : 40 Marks, MCQs (CCEE)
    - Lab Exam : 40 Marks, Last day of module, One Program
    - Internal Exam : 20 Marks, Ongoing Evaluation, Assignments, Case studies, Interviews, Hackthons, Quiz

Disk/partition naming conventions

- Windows:
    - Disks are named as disk0, disk1, ...
    - partitions are named as drives i.e. C:, D:, E:, ...
- Linux:
    - Disks are named as /dev/sda, /dev/sdb, /dev/sdc, etc.
    - Partitions per disk are named as
        - sda partitions: sda1, sda2, sda3, ...
        - sdb partitions: sdb1, ...

Linux File Structure

- Linux follows “/” (root) file system.
- “/” is a starting point of Linux file system.
- All your data is stored in this partition.
- / contains boot, bin, sbin, etc, root, home, dev, proc, mnt, media, opt

- In Linux everything is a file.
- Mainly there are two types of files in Linux
    - File
    - Directory (Folder)
- Linux Directories
    - boot - files related to booting
        - vmlinuz - kernel Image
        - grub - boot loader
        - config - kernel configuration
        - initrd/initramfs - initail root file system
    - bin - user commands in binary format
    - sbin - all admin/system commands in binary format
    - etc - configuration files
    - root - home directory of root user
    - home - it contains sub directories for each user with its name
        - devendra -> /home/devendra
        - sunbeam -> /home/sunbeam
        - osboxes -> /home/osboxes
    - dev - it contains all device related files
    - lib - shared program libraries required by kernel
    - mnt - it is temporary mount point
    - media - it is mount point for media eg cdrom
    - opt - stores optional files of large softwares
    - proc - virtual file system - it contains information about system or processes
    - sys - entries of each block devices, subdirectories for each physical bus type supported, every device class registered with the kernel, global device hierarchy of all devices
    - tmp - temporary files that may be lost on system shutdown
    - usr - read only directory that stores small programs and files accessible to all users

Path

- It is a unique location of any file in the file system.
- It is represented by character strings with few delimiters (“/”, “\”, “:”)
- Types of path
    - There are two types of paths in linux
    - Absolute path
        - Path which starts with “/” is called as absolute path.
        - E.g. /home/devendra/MyData/Demos/demo01.sh
    - Relative path
        - Path with respect to current directory is called as relative path
        - E.g. MyData/Assignments/assign02.pdf

Types of files

- Regular file (-)
- Directory file (d)
- Link file (l)
- Socket file (s)
- Pipe file (p)
- Character Special file (c)
- Block Special file (b)

VI Editor

- sudo apt-get install vim
- VI editor works in two modes
  - command mode
  - insert mode
- press i - to go into insert mode
- press Esc - to go into command node
- VI editor commands:
  - w - write/save into file
  - q - quit vi editor

Linux Commands

```
ls
ls /
ls /home/
ls /home/sunbeam/
pwd
mkdir sept2023
cd sept2023
mkdir ECP
cd ECP
pwd
mkdir DSA IoT RTOS
mkdir -p dir1/dir2/dir3
rmdir IoT
touch file1.txt
ls -s
ls -s -h
man ls
ls -l
ls /dev/ -l
groups
cat > file2.txt
cat file2.txt
cat >> file2.txt
vim demo.c
gcc demo.c
./a.out
```