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UGE1197 – Programming in Python

Exercise 1: Study of basic Linux commands

A. Definitions and Examples:

1. **Hardware:**

Hardware refers to the physical and electronic parts of the computer such as the CPU, the monitor, the keyboard, computer data storage, the graphics card, speakers and the motherboard.

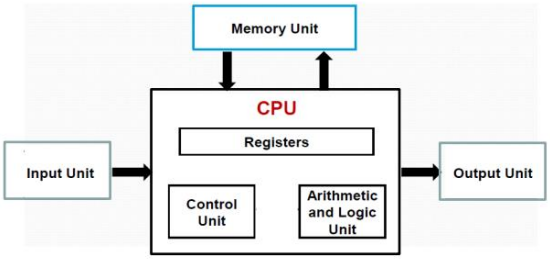
2. **Software:**

Software is a collection of computer instructions that direct the operation of a computer. It can be one of two types – System software and Application software.

3. **Computer Architecture diagram:**

The architecture of a computer consists of:

- A Memory Unit (MU), which stores both data and instructions.
  - Main memory or primary memory stores data, instructions, intermediate results and output temporarily.
  - Secondary memory stores data, programs and output permanently.
- A Central Processing Unit (CPU), which controls coordinates and supervises the operations of a computer. It includes:
  - An Arithmetic and Logic Unit (ALU), capable of operating on binary data.
  - A Control Unit (CU), which interprets the instructions in the memory and causes them to be executed.
  - Registers, which are memory cells built into the CPU that contain specific data needed by the CPU. They are used to quickly accept, store and transfer data and instructions that are being used immediately by the CPU. They are controlled directly by the compiler that sends information for the CPU to process.
- Input and Output (I/O) equipment operated by the Control Unit.
  - Input unit accepts data from the user. Devices – keyboard, trackball, touchpad.
  - Output unit provides processed data to the user. Devices – monitor, printer, speakers.



4. **Operating System:**

An operating system (OS) is a system software that manages computer hardware, software resources, and provides common services for computer programs.

5. **Examples of OS:**
   - Microsoft Windows
   - MacOS
   - Linux
   - Unix
   - ChromeOS
   - Android
   - IOS

   The above are some examples of Operating Systems.

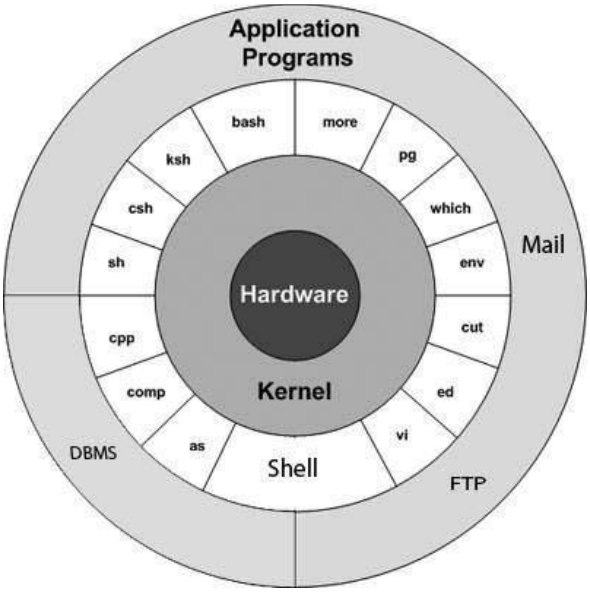
6. **About Linux – developers and language in which Linux was written:**

   Linux was developed by Linus Torvalds. Linux is written in C and Assembly language.

7. **Unix Architecture diagram and its components:**

   The important divisions in the components of a UNIX operating system architecture:

   - Kernel – interacts with the machine's hardware
   - Shell – interacts with the user
   - Application programs



8. **Text editor – use and examples:**

   A text editor is any word processing program that can be used to type and edit text. Some text editors are small and simple, while others offer broad and complex functions.

   Some examples of text editors are MS Word, Notepad, WordPad, SimpleText, TextEdit, Sublime Text and Atom.

9. **Examples of programming languages:**

   Some of the popular programming languages are:

- C
- C++
- Java
- Python
- PHP
- Visual Basic
- SQL
- R
- Go

10. **Compiler vs Interpreter with examples:**

To convert source code into machine code, either a compiler or an interpreter is used.

Compiler	Interpreter
• Scans the entire program and translates it as a whole into machine code. • Compilers take a large amount of time to analyse the source code. However, the overall execution time is comparatively faster. • Generates intermediate object code, hence requires more memory. • Ex: Programming languages like C, C++, Java use compilers.	• Translates the program one statement at a time. • Interpreters take less time to analyse the source code. However, the overall execution time is comparatively slower. • No intermediate object code is generated, hence is memory efficient. • Ex: Programming languages like JavaScript, Python, Ruby use interpreters.

B. Basic Linux Commands:

1. System related commands:

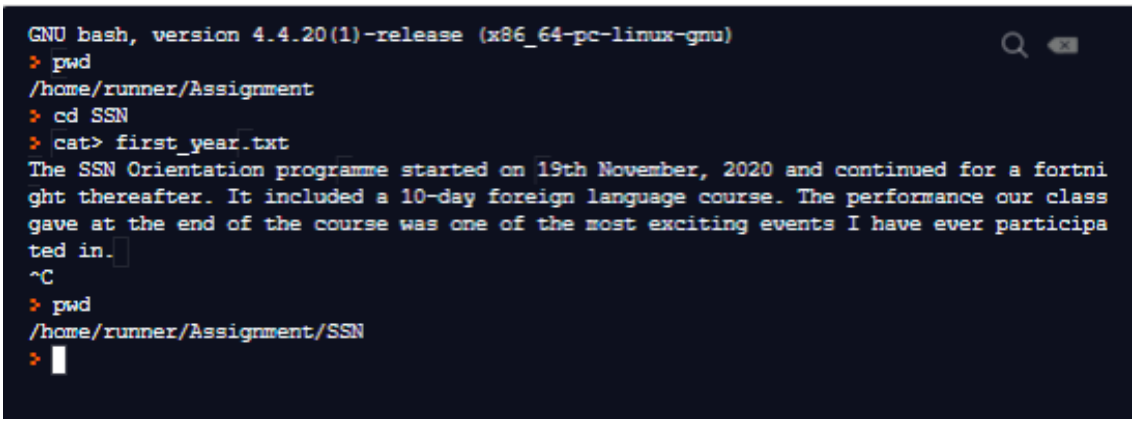
- **whoami:** displays the name of the current user in the terminal window
- **pwd:** prints the name of the present working directory in the terminal window
- **date:** displays the current date in the terminal window
- **man:** displays the user manual pages for a command in the terminal window
- **echo:** prints a string of text as is to the terminal window
- **cal:** displays the calendar in the terminal window
- **bc:** opens a binary calculator in the terminal window

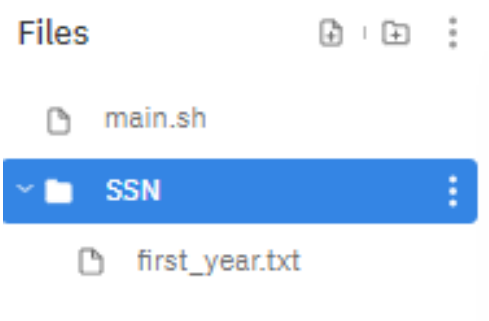
2. File and directory commands:

- **ls:** to list the files and directories in the current directory
- **ls –l:** to list the files and directories in the current directory with details
- **cd:** to change the current directory
- **cd ..:** to change to the parent directory
- **mkdir:** to make a new directory in the file system
- **cat:** (short for concatenate) lists the contents of files to the terminal window
- **cp:** to copy files and directories from directory to directory
- **mv:** to move files and directories from directory to directory
- **chmod:** sets the file permission flags on a file or directory
- **wc:** to count the lines, words and characters in a file
- **find:** to search for files and directories

C. **Working on Directories:**

1.





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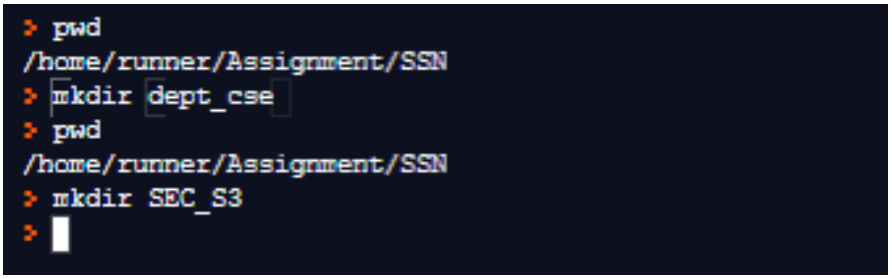
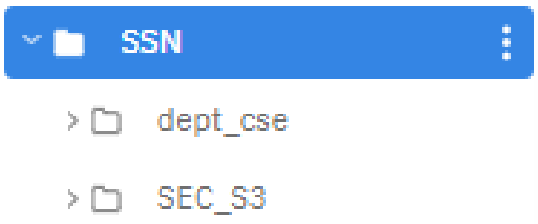
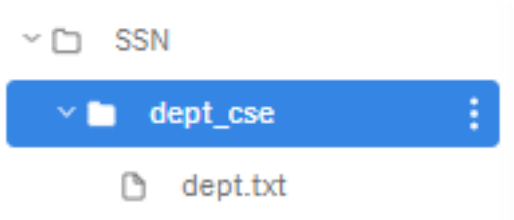




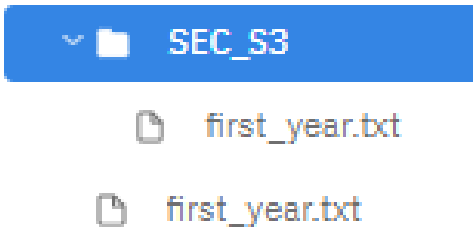
3.

```
> cd dept_cse
> cat> dept.txt
My department is Computer Science and Engineering. I chose it because I love computer s
cience, especially programming. I can't wait to get to campus to enjoy the CSE departme
nt and attend classes along with the other CSE students. I'm sure I'll enjoy learning h
ere.
^C
> pwd
/home/runner/Assignment/SSN/dept_cse
>
```



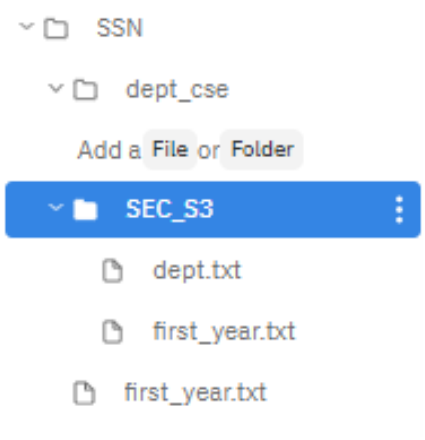
4.

```
> pwd
/home/runner/Assignment
S3cp /home/runner/Assignment/SSN/first_year.txt /home/runner/Assignment/SSN/SEC_
>
```



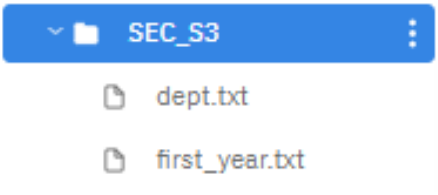
5.

```
> pwd
/home/runner/Assignment
> cd SSN
> cd dept_cse
> cat dept.txt
My department is Computer Science and Engineering. I chose it because I love computer s
cience, especially programming. I can't wait to get to campus to enjoy the CSE departme
nt and attend classes along with the other CSE students. I'm sure I'll enjoy learning h
ere.
EC_S3/home/runner/Assignment/SSN/dept_cse/dept.txt /home/runner/Assignment/SSN/S
>
```



6.

```
> cd SEC_S3
> ls
dept.txt  first_year.txt
>
```



7.

```
> cd ..
> pwd
/home/runner/Assignment/SSN
> ls
dept_cse  first_year.txt  SEC_S3
>
```