

# Operating Systems 1

## Lecture 3



Lecturer

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# Directory Structure

- In Linux systems each file or a directory has a path which starts with /.
- Common directories include:
  - /var variable files.
  - /home user home directories.
  - /root root user's home directory.
  - /bin essential user command binaries.
  - /sbin system binaries, need root access.
  - /media mount points for removable media.
  - /boot static boot loader files.

# Terminal

- The terminal is a program which can be used to interact with the system's shell.
- Many types of shells including: Bash,sh,csh,....
- The shell allows you to enter commands to be executed by the operating system.
- You can open the terminal using Ctrl+Alt+T.
- When it is open you can see the command prompt at the left side of the terminal's screen.

# Terminal

- `mohsen@mohsen-X540LA:~$`
- This is an example of a command prompt.
  - `mohsen`: The user name of the current user.
  - `mohsen-X540LA`: This is the host's name.
  - `~` The current directory (`~` means the home directory).
  - `$` This indicates a normal user, in case of root it is `#`.
- You can execute commands by typing them on the prompt and pressing Enter.
- You can use up and down arrow to navigate history.

# Basic Commands

- pwd: This command is used to print the current directory.
- cd: This command is used to change the current directory.
- ls: This command is used to print the contents of the current directory.
- man: This command is very useful, it can be used to view manual pages of other commands.
- mkdir: This command is used to create a directory.
- touch: This command is used to create a file.

# Basic Commands

- `cp`: This command is used to copy files and directories.
- `mv`: This command is used to move files and directories.
- `cal`: This command is used to display the calendar on the terminal.
- `whoami`: This command is used to print the name of the current user.
- `date`: This command is used to display the date.
- `clear`: This command is used to clear the terminal window.
- `cat`: Print the contents of a file.

# How to run commands?

- Commands can be executed by typing their name and pressing Enter, e.g.: ls.
- Some commands need arguments to be executed, e.g.:  
mkdir dir1
- Some commands accept options, e.g.: ls -l.
- The cp command needs two arguments, the first one is the name of the source file and the second one is the name of the destination. cp file1 file2
- To copy directories use -r option.



# How to run commands?

- The commands to be executed can be either shell builtins or binary files.
- You can use `type -a` command to get the commands type.
- `type -a cd`: `cd` is a shell builtin
- `type -a mkdir`: `mkdir` is `/bin/mkdir`.
- The terminal uses the environment variable `PATH` to search for binary files.
- You can print the value of `PATH` using `echo $PATH`.

# Environment Variables

- Environment variables are named value pairs that can be used to change how commands and processes are executed.
- To view all environment variables use `env` command.
- Some of them include: `USER` (the name of current user), `SHELL` (the path to current shell), `HOME` (The path to current users home dir)....
- To view the value of a variable use `echo $VARIABLE`.
- To change the value of a variable use `export VAR=VAL`.

# Shell redirection and pipes

- Some times we need to store the output of a command in a file, to do this we can use the `>` operator.
- `ls > files`, this command saves the names of directories and files in current directories to a file called files.
- We can use `>>` operator to append data to a file and not over write it.
- We can pass the output of one command as an input to another command.
- `date | cat > f1`. How does this command work?

# Exercise

- Use appropriate commands to do the following tasks:
  - Go to your home directory.
  - Create a directory called dir1.
  - Enter dir1
  - Create a file called f1
  - Write "hello world" to f1
  - Print the contents of f1
  - Print the calendar to a file called f2.
  - Add the date to the file f2.
  - Print the value of SHELL environment variable.



**THE END**