The Shell

A look at :

- Introduction
- ICE Breaker
- UI - in depth
- GUI & CLI
- What is the shell
- Shell navigation


Danny Thompson @DThompsonDev · Feb 3
The biggest skill you can have as a developer is searching online for info to help solve a problem.
Do you have an error?
Search the error message.
Don't spend countless hours on it but try. Work on your Googling skills! It is intimidating but it will make you better.
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Tip


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I believe it's the confidence that comes after putting in the work. You are confident in your skills and this radiates to everyone around you.
1
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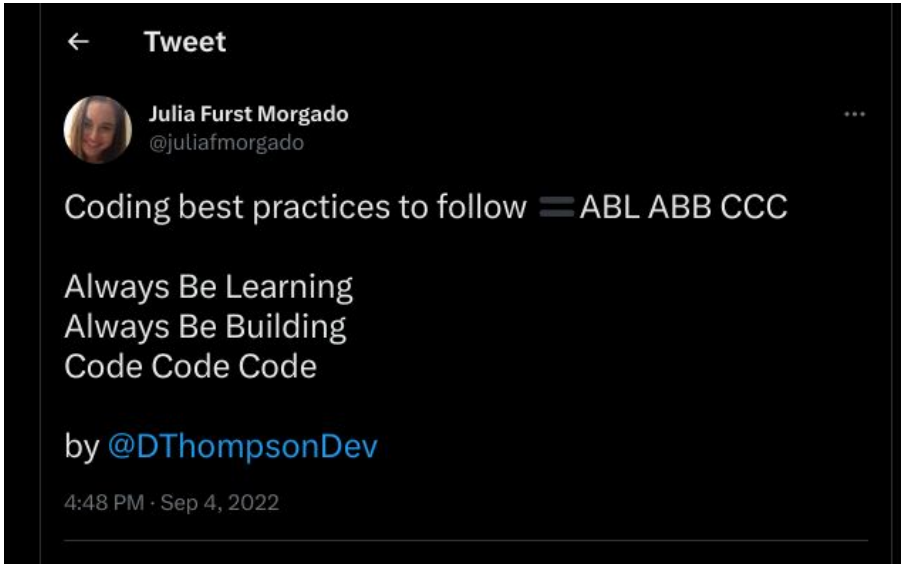
Tip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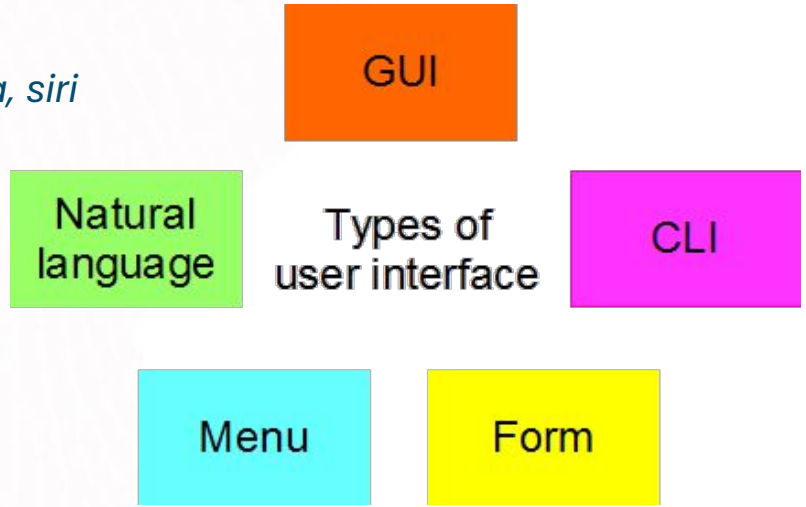
UI

User Interface

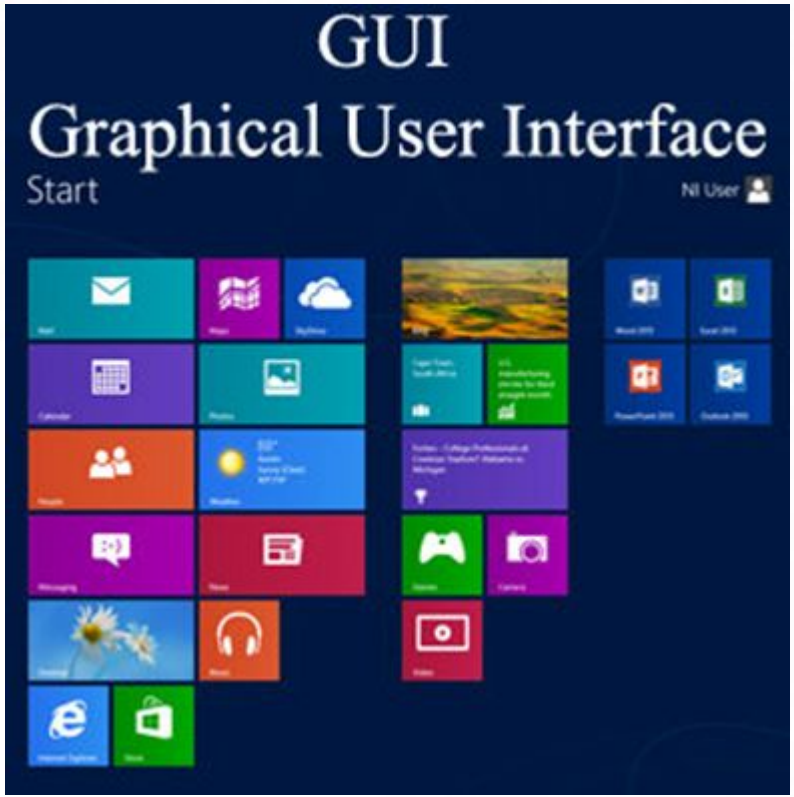
- Communication between a user and a computer is two-way.
- One of the jobs of the operating system is to provide a '*user interface*', so that a human can communicate with the hardware that makes up a computer.
- A user will give data and instructions to a computer and a computer will give information back to a user. The way that a computer and a user communicate is known as the **interface.**

Types of User Interfaces

1. **GUI** - *windows*
2. **CLI** - *unix*
3. Form-based interfaces - *hospital form*
4. Menu-based interfaces- *ATM*
5. Natural language interfaces - *alexa, siri*



1. Graphical User Interface



Interfaces that are graphical in nature are known either as *Graphical User Interfaces* (GUI) or **WIMP** interfaces (**W**indows, **I**cons, **M**enus and **P**ointer)

2. Command Line Interface

- A command line interface requires a user to type in commands from a list of allowable commands.
- This type of interface can take a long time to learn and is not intuitive.
- For inexperienced users it can be a frustrating type of interface whilst for experienced users it can be **very powerful**. This is because command line interfaces provide commands that **can get a user very close to the workings of the components of a computer system**. There are commands that can manipulate the hardware and software in a computer system in a way that simply cannot be done using a GUI.
- Indeed, there are tasks where you have to use a command line interface to carry them out. **UNIX** and **DOS** are good examples of CLI OS.

What is a shell and why you should care

- A shell is a computer program that presents a CLI which allows you to control your computer using commands entered with a *keyboard* instead of controlling graphical user interfaces (GUIs) with a mouse/keyboard/touchscreen combination.
- The shell makes your work **less boring,** you can automate those repetitive tasks and leave you free to do more exciting things.
- The shell makes your work l**ess error-prone.** Your computer can do the same thing a thousand times with no mistakes.
- The shell makes your work **more reproducible** since it keeps a history of your work.
- etc

Hello Shell,

Could you please ask Kernel to create a directory in **/root/Documents** for me, call it **my_dir**. Then inside it create a script called **my_script.sh** and type **#!/bin/bash** inside it.

Thank you in advance.

-Beta

How to access the shell

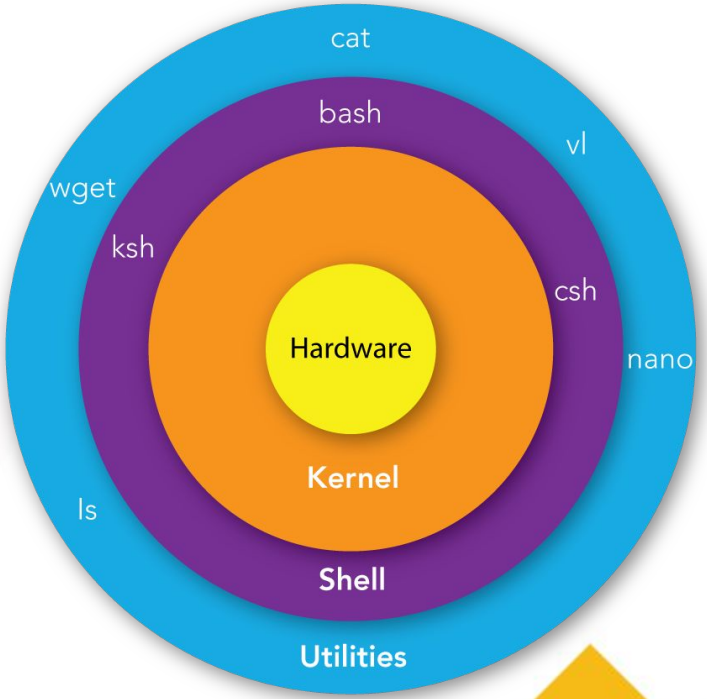
- On a Mac or Linux machine, you can access a shell through a program called **“Terminal”**, which is already available on your computer.
- ***The Terminal is a window into which we will type commands.***
- If you’re using Windows, you’ll need to download a separate program to access the shell e.g git bash, WSL, cmder

What is the alx-SE sandbox

- Sandbox is a remotely isolated virtual machine that is configured to run ubuntu version 20.04 CLI to enable you to access a terminal to work on the projects.
- Your sandbox is your playground.

The anatomy of the Shell

- The innermost core of the Linux OS is ***the kernel***.
- The outermost shell of the Linux OS is ***Shell***.
- The kernel acts as a window for the software programs to *recognize* and *run* on the hardware components.
- While the Shell **receives** the commands directly from the user and **sends** it to the kernel for **processing** and in turn, **returns** back the response to the user.
- It wraps inside of the OS and protects it from any external damage directly. Hence, the name **Shell**.

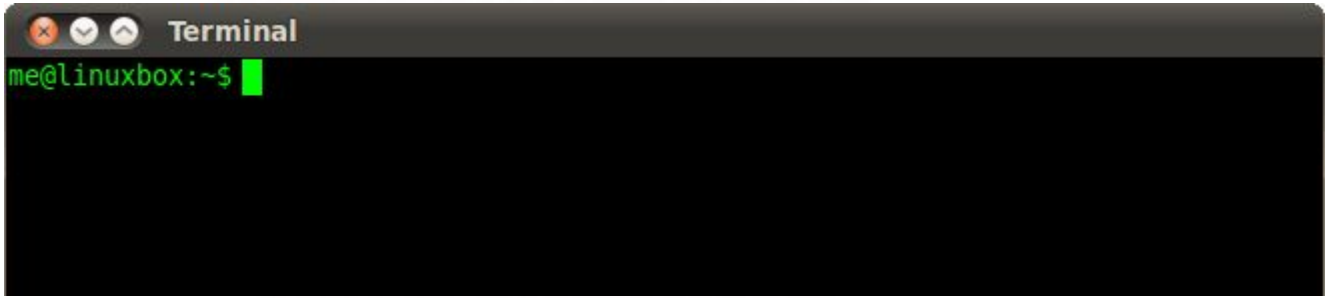


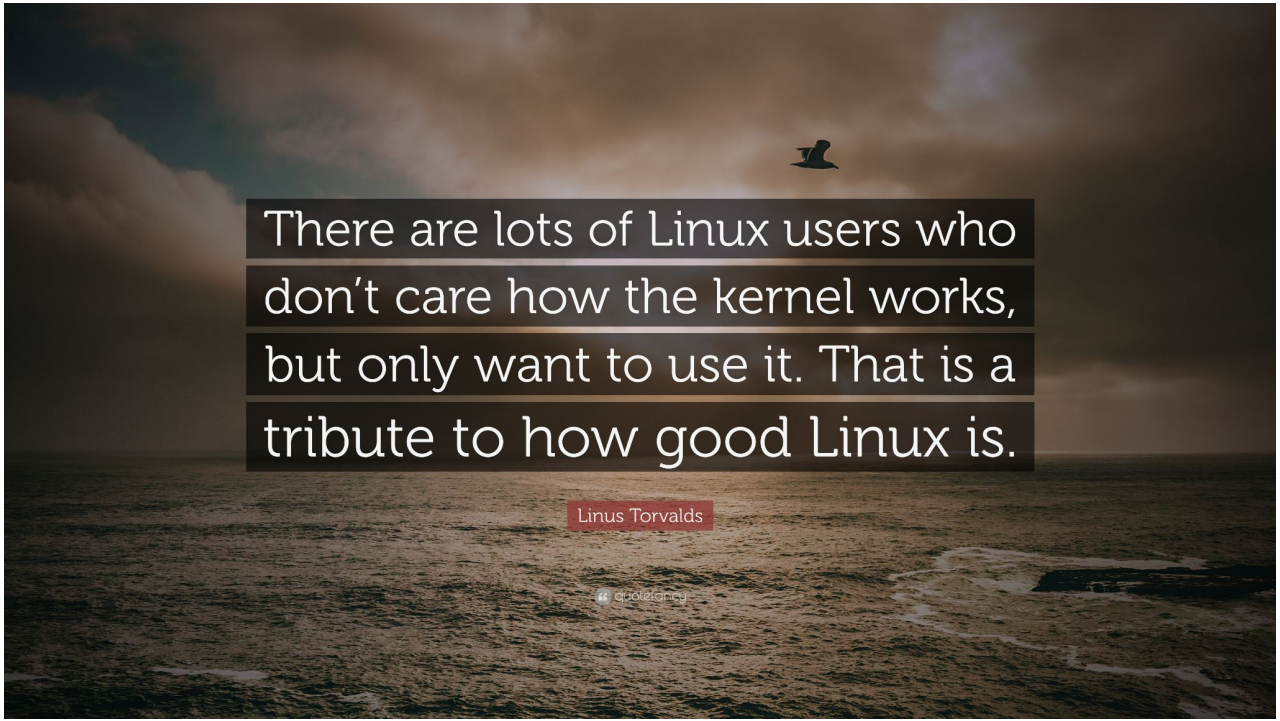
Main types of Shell

1. **Bourne Shell** (sh) - the first kind of shell programmed by Stephen R. Bourne in AT&T Bell Labs in the mid-1970s. Also known as the **primary Unix Shell**. E.g ksh, bash, sh
2. **C Shell** (csh) - the UNIX enhancement written by Bill Joy

Shell Prompt

- The prompt, "**$**", is called the command prompt, which is displayed by the Shell. *This command prompt is the interface, on which you can write and execute your commands and programs.*
- The command prompt reads the first word and interprets the command. The Shell reads the command only once you press "**Enter**".

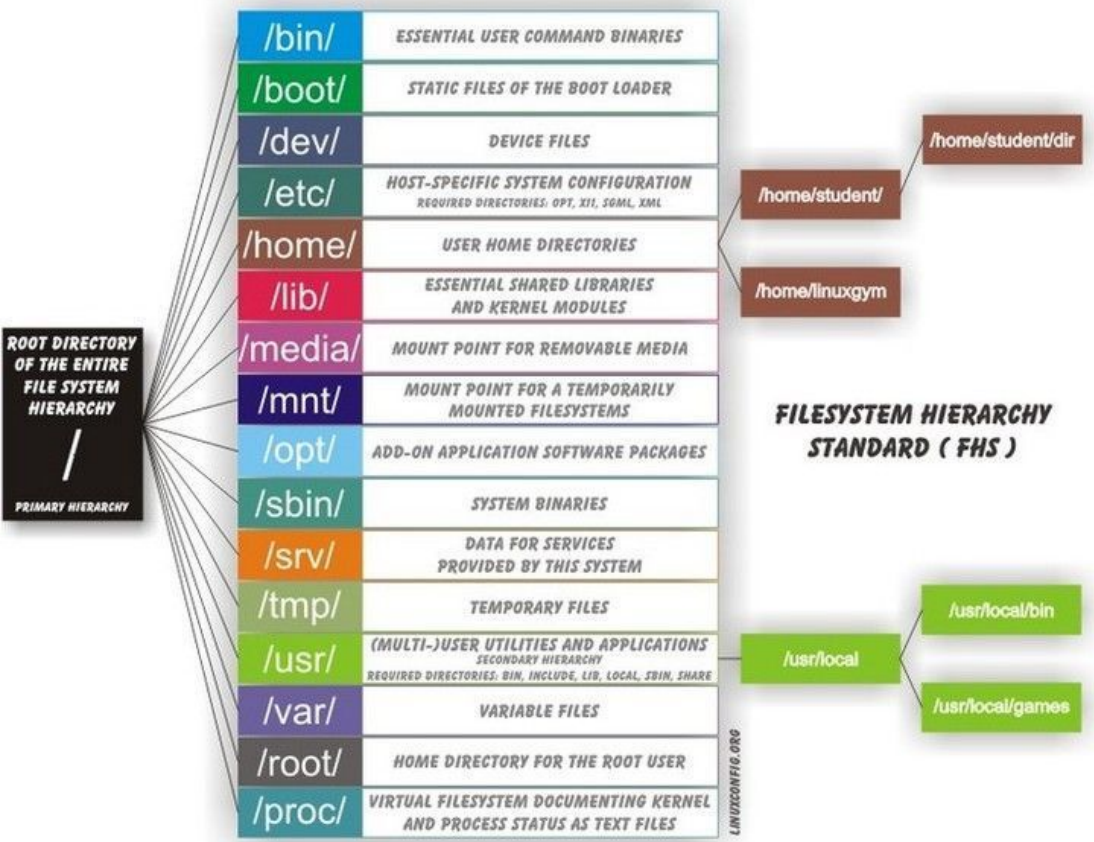




Linus Torvalds, (born December 28, 1969, Helsinki, Finland), Finnish computer scientist who was the principal force behind the development of the Linux operating system.

Navigating the linux file system

Navigating the file system



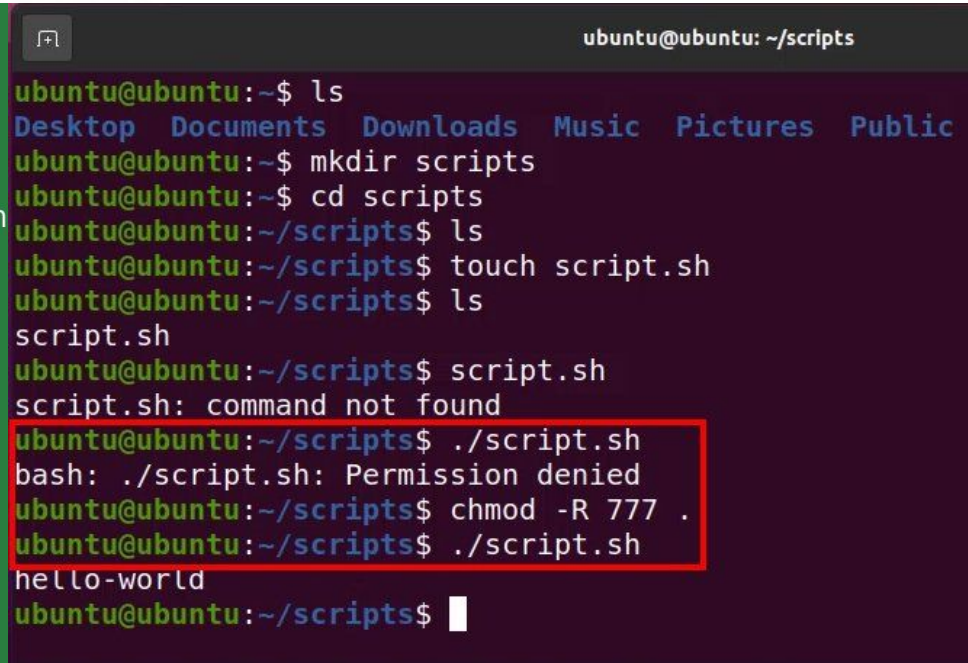
- The part of the operating system that manages files and directories is called the **file system**.
- It organizes our data into files, which hold information, and directories (also called “folders”), which hold files or other directories.

Shell Commands

- Shell commands are particular to the shell (tcsh, in this case).
- Unix commands are common to all Unix systems, though options vary a bit.
- Special characters may apply to Unix in general, or be particular to a shell.

Talking to the computer kernel directly

A shell command is one that is processed internally by the shell. There is no corresponding executable program.



Shell Scripting

Shell Scripting

- A shell script is a text file that contains a sequence of commands for a UNIX-based operating system.
- It is called a shell script because it combines a sequence of commands, that would otherwise have to be typed into the keyboard one at a time, into a single script.
- To create a script you need to use a text editor (vim, vi, emacs) to write your commands in ASCII text.

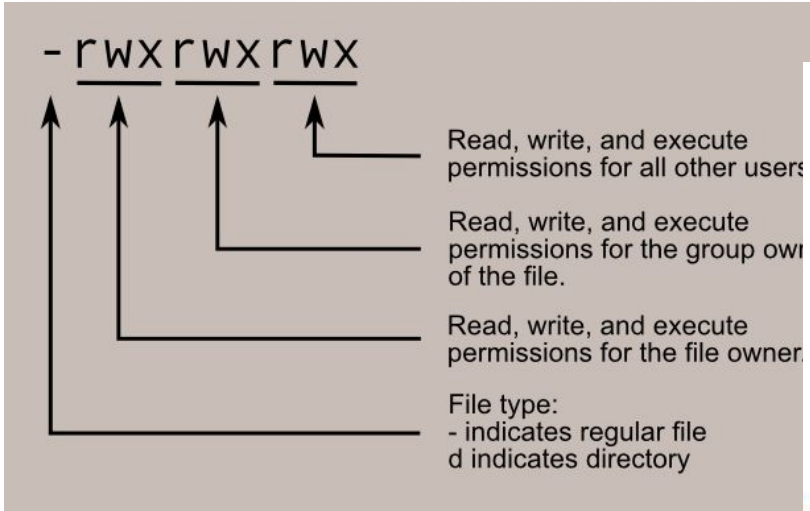
Writing a shell script

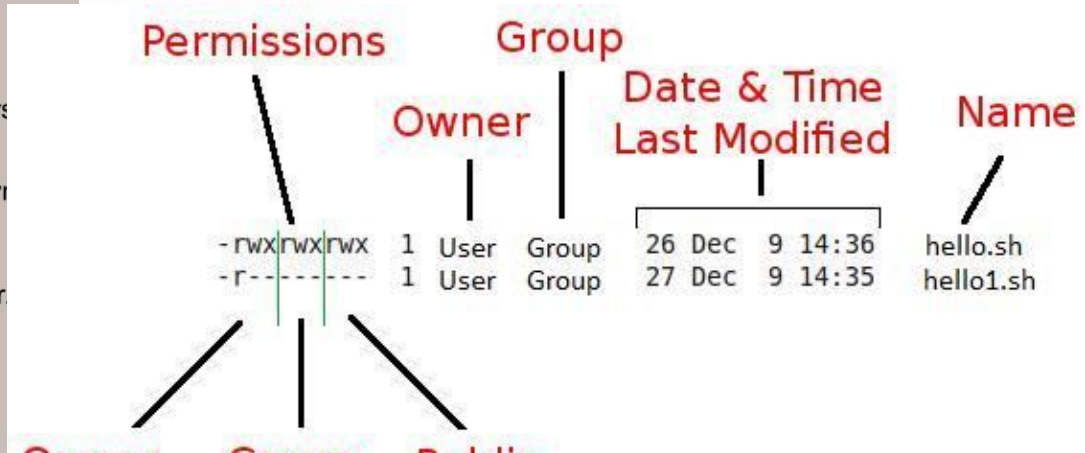
```
#!/bin/bash
# My first script
echo “special text!”
```

- **#!** (Shebang) - The first line of the script dictates the program will be used to interpret the script. In the example above /bin/bash has been used (but you can also use *Perl, aw, tcl, Python and Tk* instead)
- **comment** – The comment basically explains to the programmer viewing the text what the script is for (the # tells bash to ignore what appears after it.)
- **echo** command – Prints out the argument.

Writing a shell script

- **Granting permission to Shell script** - Each shell script must have the execute permission
- **Executing shell scripts** - specify the path to the script file to run it





Why you need shell scripts

There are many reasons to go through the process of writing your own scripts, and the number one reason is convenience. With shell scripts, you can create your own commands and save time entering commands on a case-by-case basis. You can effectively automate multiple commands. Without scripts, you'd have to run these manually yourself each and every time.

Resources

1. Understanding what the shell is
2. User Interfaces in detail
3. All about the Shells
4. Linux commands handbook
5. Linux commands cheat sheet
6. Linux terminal starter guide
7. Getting started with Shell Scripting
8. Linux is amazing
9. Shell Scripts are awesome
10. Shell scripting crash course

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