

Installation guide of virtual machine

Hasan Yiğit
mu.edu.tr

Virtual Environment

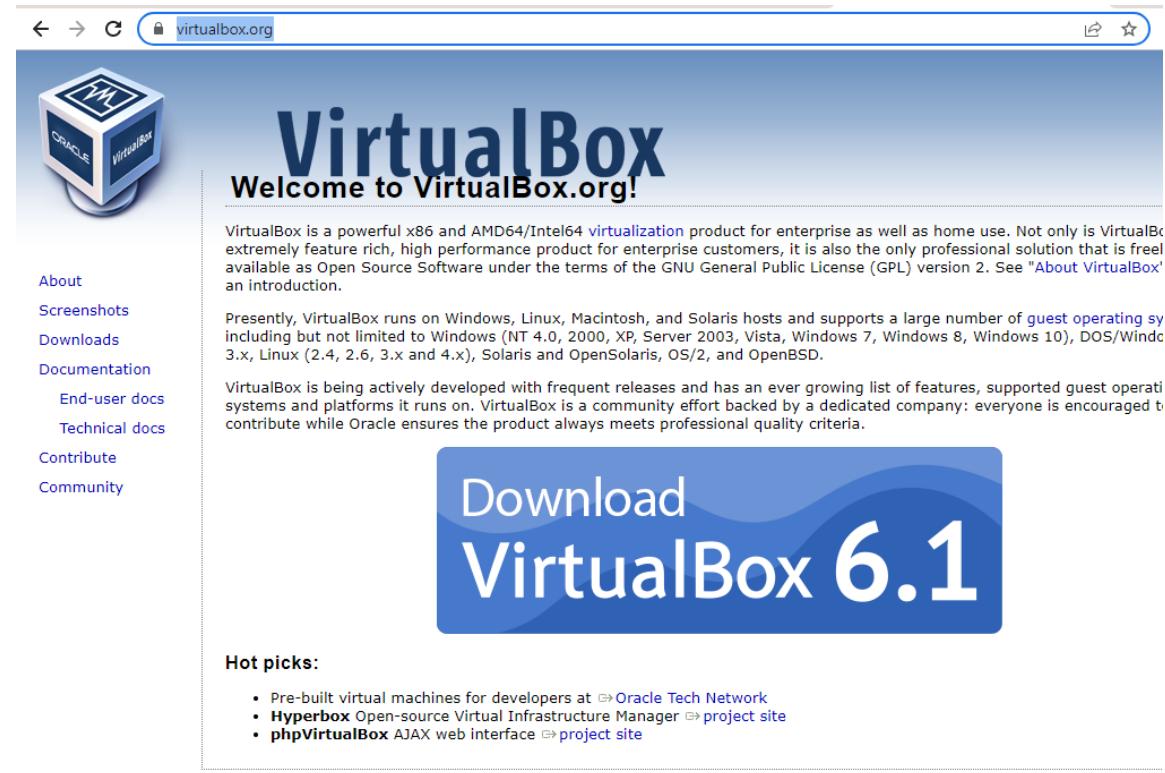
- A Virtual Environment is a simulated computer system. Using a Virtual Machine, you can mimic a standard PC and install an operating system as a whole to it without affecting the one installed on your computer. It's a great way to test and use Linux while still having Windows 10 as your primary OS.



Installing a Virtual Environment For Windows Systems

Step 1

- We're using VirtualBox in this instance, as it's one of the most accessible virtual environments to get to grips with. Enter www.virtualbox.org and click on 'Download VirtualBox.' This takes you to the main download page. Locate the correct host for your system: The Host is windows now, and click the link to begin downloading.



Step 2

- Next, while still at the VirtualBox download page, just click the correct download link.

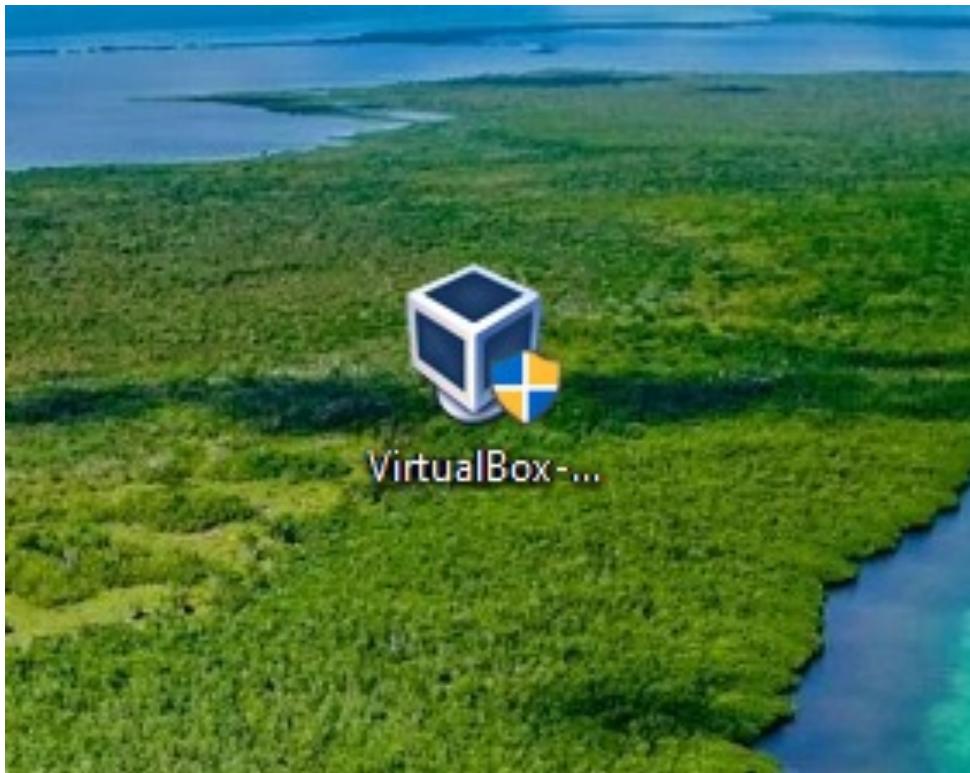
The screenshot shows a web browser window with the URL virtualbox.org/wiki/Downloads. On the left, there's a sidebar with links: 'VirtualBox', 'Documentation', 'Bugs', and 'Unity'. The main content area has a heading 'VirtualBox 6.1.38 platform packages'. Below it is a list of download links:

- [Windows hosts](#) ← (highlighted with a red arrow)
- [OS X hosts](#)
- [Linux distributions](#)
- [Solaris hosts](#)
- [Solaris 11 IPS hosts](#)

At the bottom, a note states: 'The binaries are released under the terms of the GPL'.

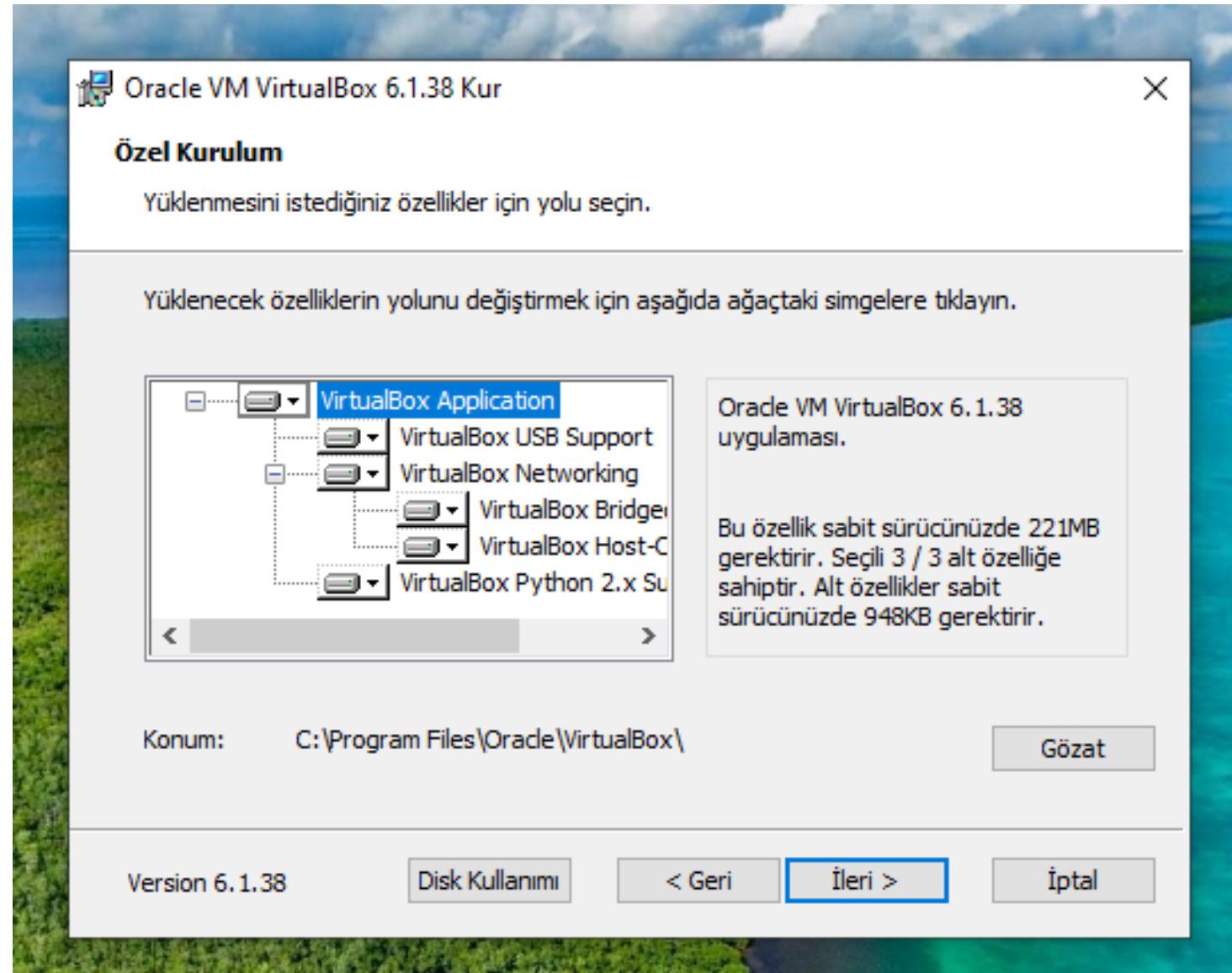
Step 3

- Within your host computer, locate the downloaded main VirtualBox application and double-click to begin the installation process. Click Next to continue when you are ready.



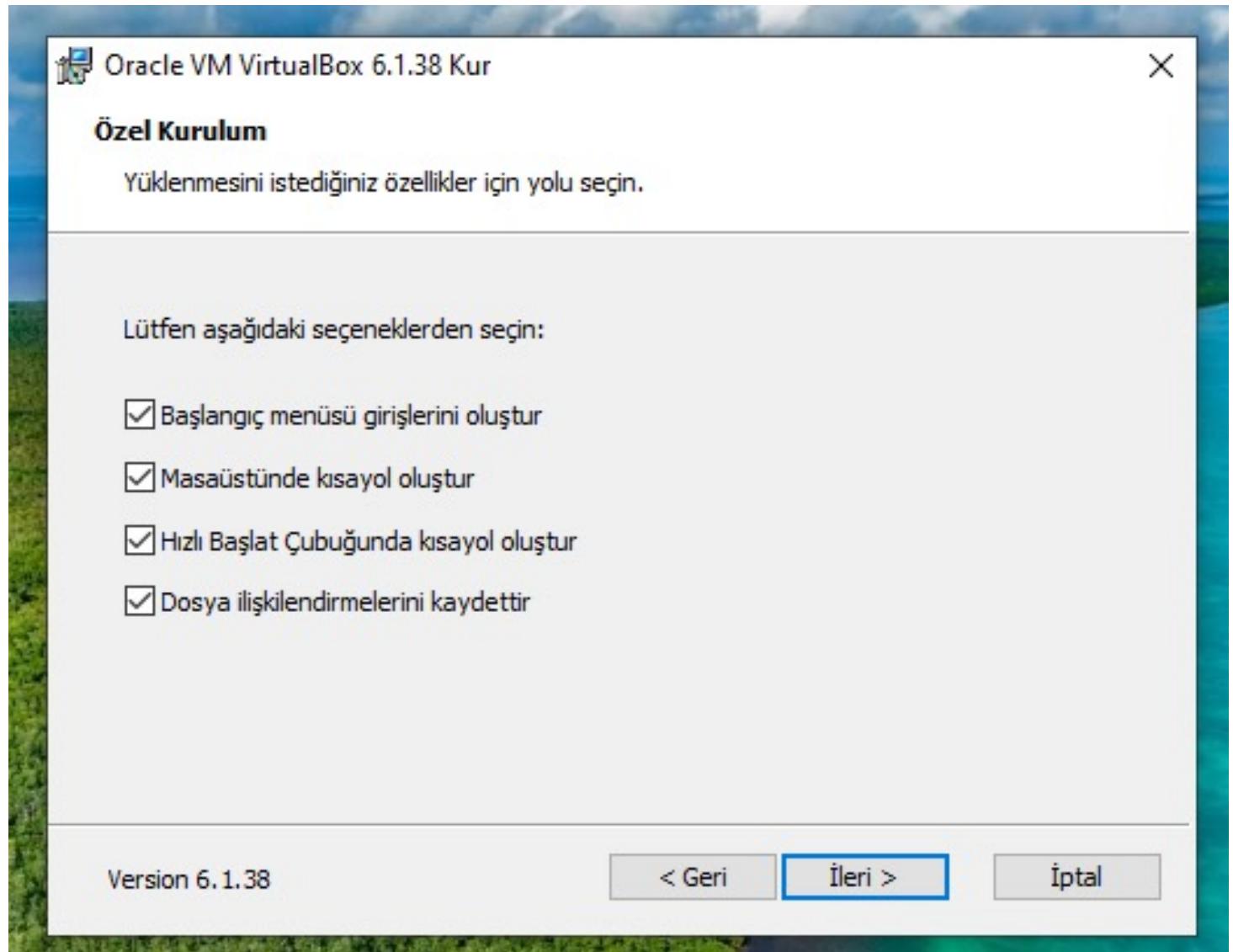
Step 4

- The default installation location of VirtualBox should satisfy most users but if you can change the install folder. Then, make sure that all the icons in the VirtualBox Feature tree are selected, Click Next to move on!



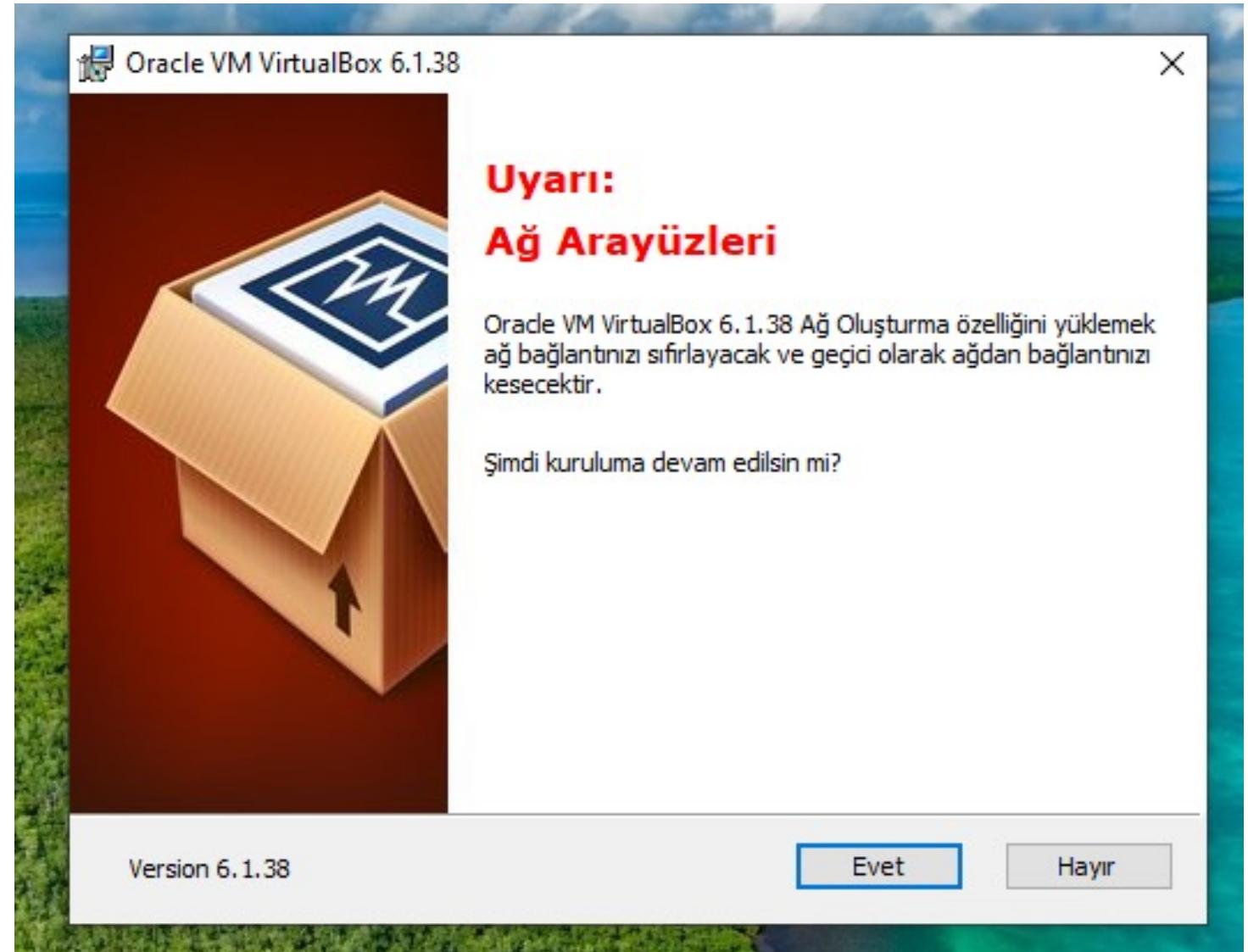
Step 5

- This section can be left alone to the defaults, should you wish.



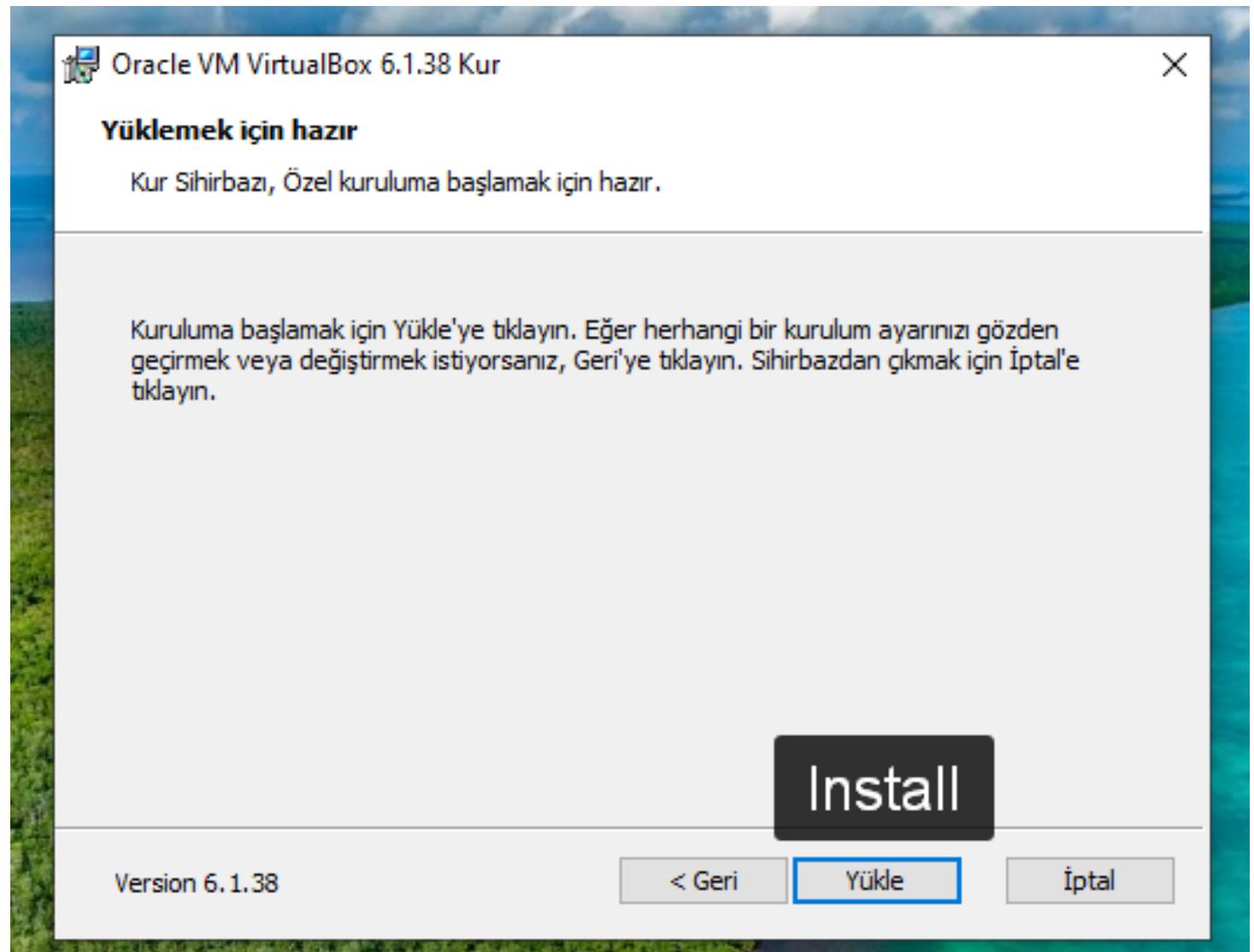
Step 6

- When installing VirtualBox, your network connection is disabled for a brief period. This is due to VirtualBox creating a linked, virtual network connection so that any VM installed can access the Internet, and your home network resources, via the computer's already established network connection. Click Yes, then Install to begin the installation.



Step 7

- Just click on the install button!



Step 8

- After installation is completed, you can close the window. Now you are ready to start VM VirtualBox!!!



Installing a Virtual Environment For Mac OS Systems

Step 1

- We're using VirtualBox in this instance, as it's one of the most accessible virtual environments to get to grips with. Enter www.virtualbox.org and click on 'Download VirtualBox.' This takes you to the main download page. Locate the correct host for your system: The Host is windows now, and click the link to begin downloading.



Step 2

- Next, click the correct download link while still on the VirtualBox download page. Then you can complete the program's installation by completing similar usage steps.

The screenshot shows a web browser window with the URL virtualbox.org/wiki/Downloads. The page content discusses the availability of version 5.2 for 32-bit support. Below this, a section titled "VirtualBox 6.1.38 platform packages" lists several host operating system options. A red arrow points to the "OS X hosts" link in the list.

Please also use version 5.2 if you still need support for 32-bit hosts. Version 5.2 will remain supported until 2020.
VirtualBox 6.1.38 platform packages

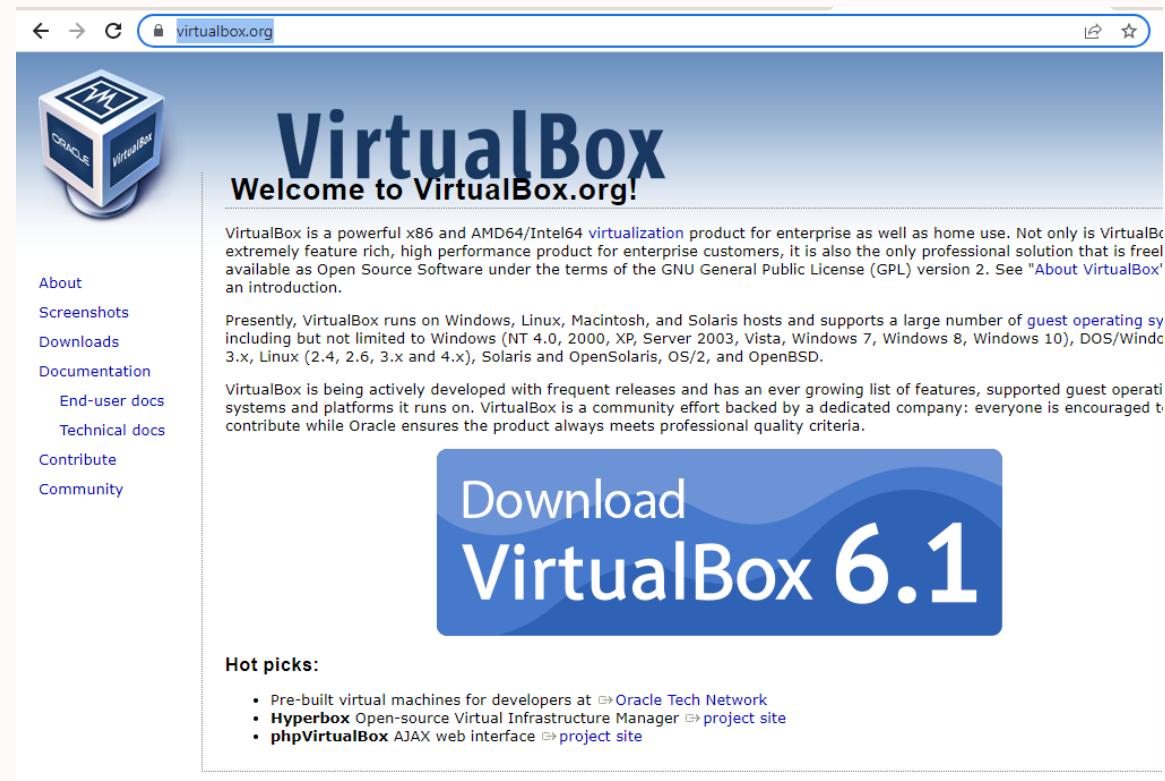
- [Windows hosts](#)
- [OS X hosts](#) ← Red arrow
- [Linux distributions](#)
- [Solaris hosts](#)
- [Solaris 11 IPS hosts](#)

The binaries are released under the terms of the GPL version 2. See the [changelog](#) for what has changed.

Installing a Virtual Environment For Linux Distributions

Step 1

- We're using VirtualBox in this instance, as it's one of the most accessible virtual environments to get to grips with. Enter www.virtualbox.org and click on 'Download VirtualBox.' This takes you to the main download page. Locate the correct host for your system: The Host is windows now, and click the link to begin downloading.



Step 2

- Next, click on the Linux distributions link. Then it would help if you were to choose your correct host distro, and you can download the VM box. The program's installation by completing similar usage steps.

The screenshot shows a web browser window with the URL virtualbox.org/wiki/Downloads. The page content is as follows:

Please also use version 5.2 if you still need support for 32-bit hosts. Version 6.0 has been discontinued in 6.0. Version 5.2 will remain supported.

VirtualBox 6.1.38 platform packages

- [Windows hosts](#)
- [OS X hosts](#)
- [Linux distributions](#) ← Red arrow pointing here
- [Solaris hosts](#)
- [Solaris 11 IPS hosts](#)

The binaries are released under the terms of the GPL version 2.

See the [changelog](#) for what has changed.

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Please choose the appropriate package for your Linux distribution.

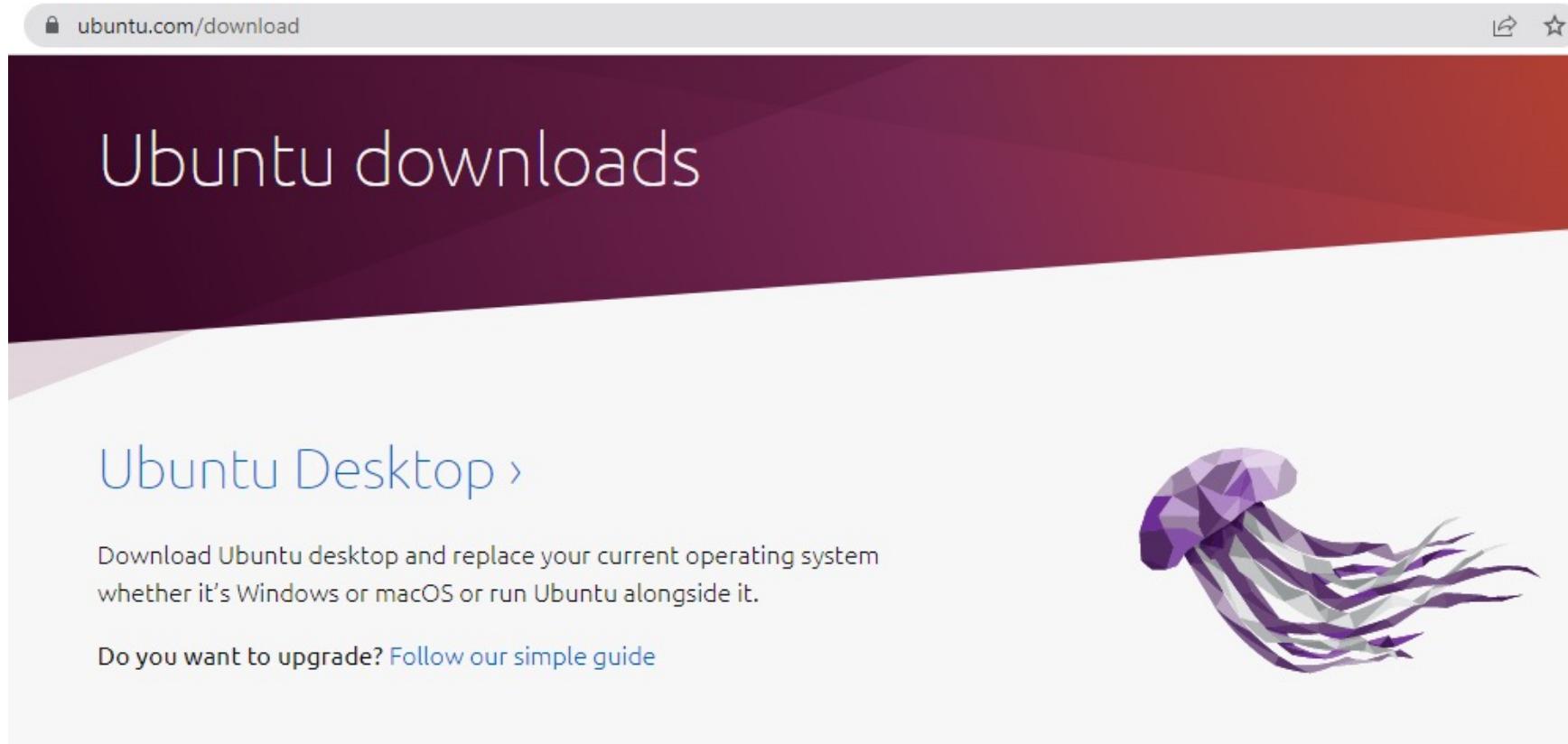
VirtualBox 6.1.38 for Linux

- [Oracle Linux 9 / Red Hat Enterprise Linux 9](#)
- [Oracle Linux 8 / Red Hat Enterprise Linux 8](#)
- [Oracle Linux 7 / Red Hat Enterprise Linux 7 / CentOS 7](#)
- [Oracle Linux 6 / Red Hat Enterprise Linux 6 / CentOS 6](#)
- [Ubuntu 22.04](#)
- [Ubuntu 20.04](#)
- [Ubuntu 19.10 / 20.10 / 21.04](#)
- [Ubuntu 18.04 / 18.10 / 19.04](#)
- [Ubuntu 16.04](#)
- [Debian 11](#)
- [Debian 10](#)
- [Debian 9](#)
- [openSUSE 15.3](#)
- [openSUSE 15.0](#)
- [openSUSE 13.2 / Leap 42](#)
- [Fedora 36](#)
- [Fedora 35](#)
- [Fedora 33 / 34](#)
- [Fedora 32](#)
- [All distributions \(built on EL6 and therefore not requiring recent system lib\)](#)

Downloading Ubuntu Installation File & Installing

Step 1

- With Oracle's VirtualBox now up and running, the next task is to create the Virtual Machine (VM) environment into which you install Linux. This process won't affect your currently installed operating system, which is why a VM is a great choice. We can go to <https://ubuntu.com/download>



Step 2

- We can download the ubuntu installation file throughout this page.

Ubuntu 22.04.1 LTS

Download the latest [LTS](#) version of Ubuntu, for desktop PCs and laptops. LTS stands for long-term support — which means five years, until April 2027, of free security and maintenance updates, guaranteed.

[Ubuntu 22.04 LTS release notes](#)

Recommended system requirements:

✓ 2 GHz dual-core processor or better	✓ Internet access is helpful
✓ 4 GB system memory	✓ Either a DVD drive or a USB port for the installer media
✓ 25 GB of free hard drive space	

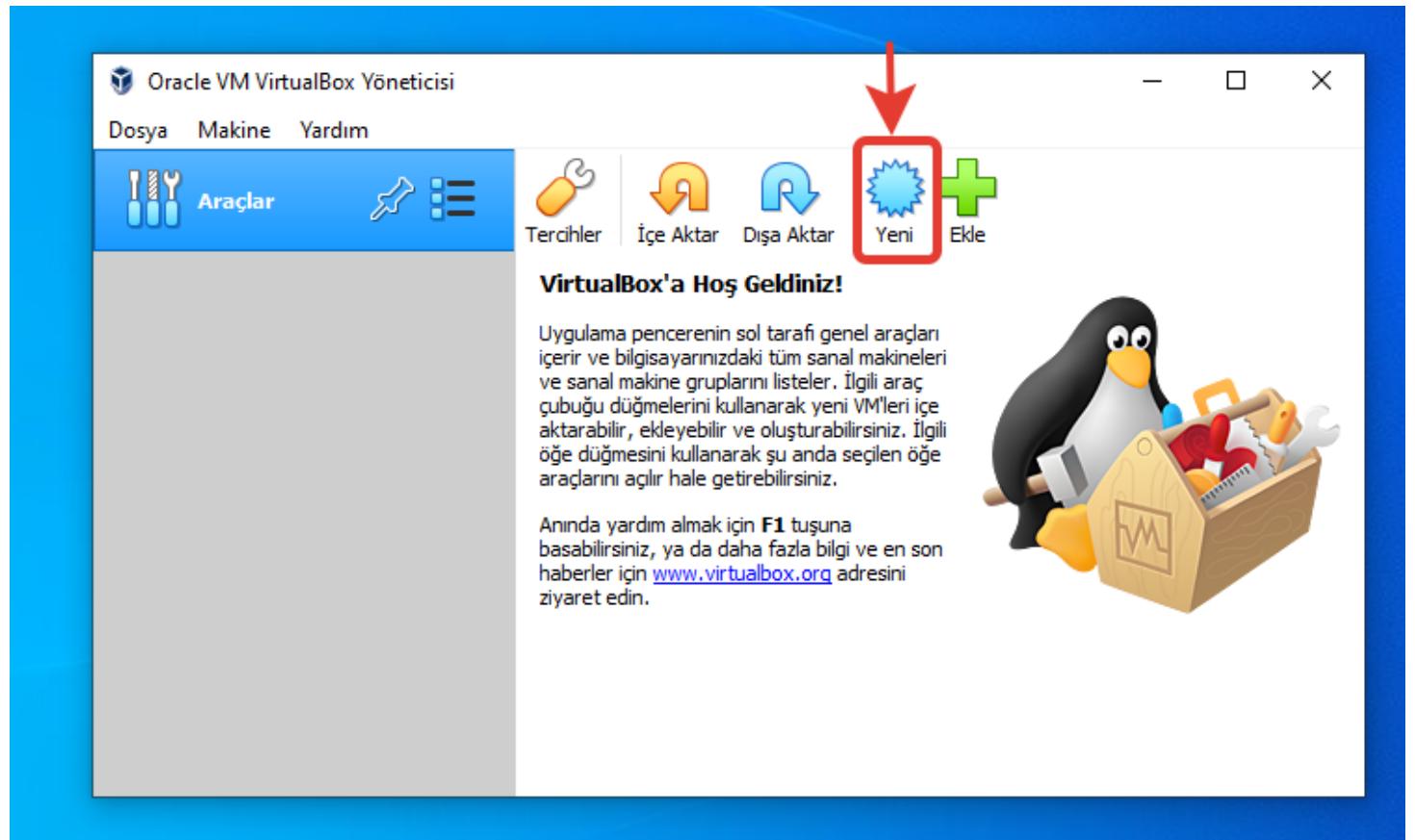
[Download](#)

For other versions of Ubuntu Desktop including torrents, the network installer, a list of local mirrors, and past releases [see our alternative downloads](#).

How to install Ubuntu Desktop

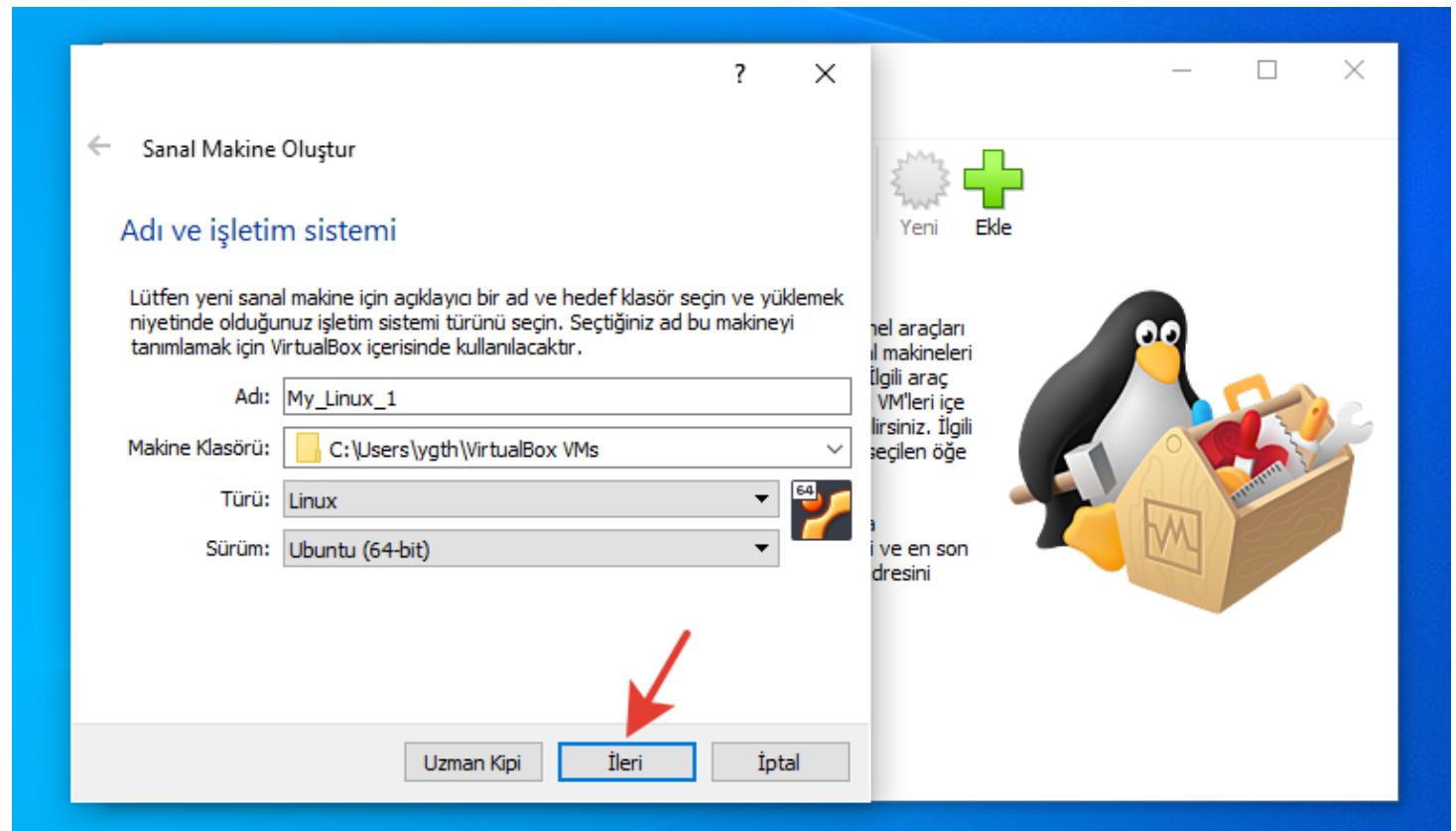
Step 3

- With VirtualBox open, click on the New icon in the top right of the app. This opens the new VM Wizard.



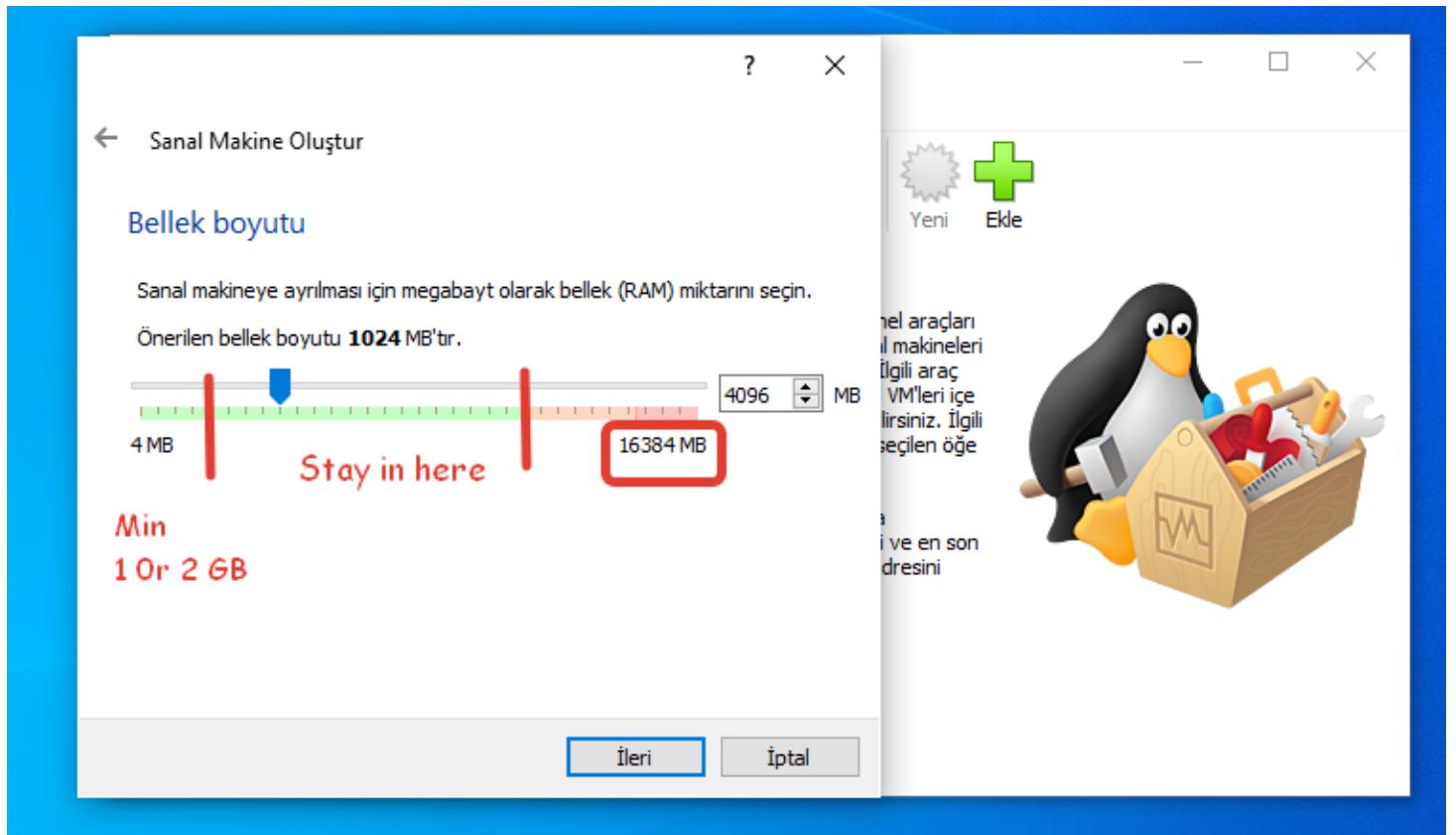
Step 4

- In the box next to Name, type a name. If you write Linux in the title, VirtualBox should automatically choose Linux as the Type and Ubuntu (64-bit) as the Version; if not, then use the drop-down boxes to select the correct settings. Click Next when we are ready to proceed.



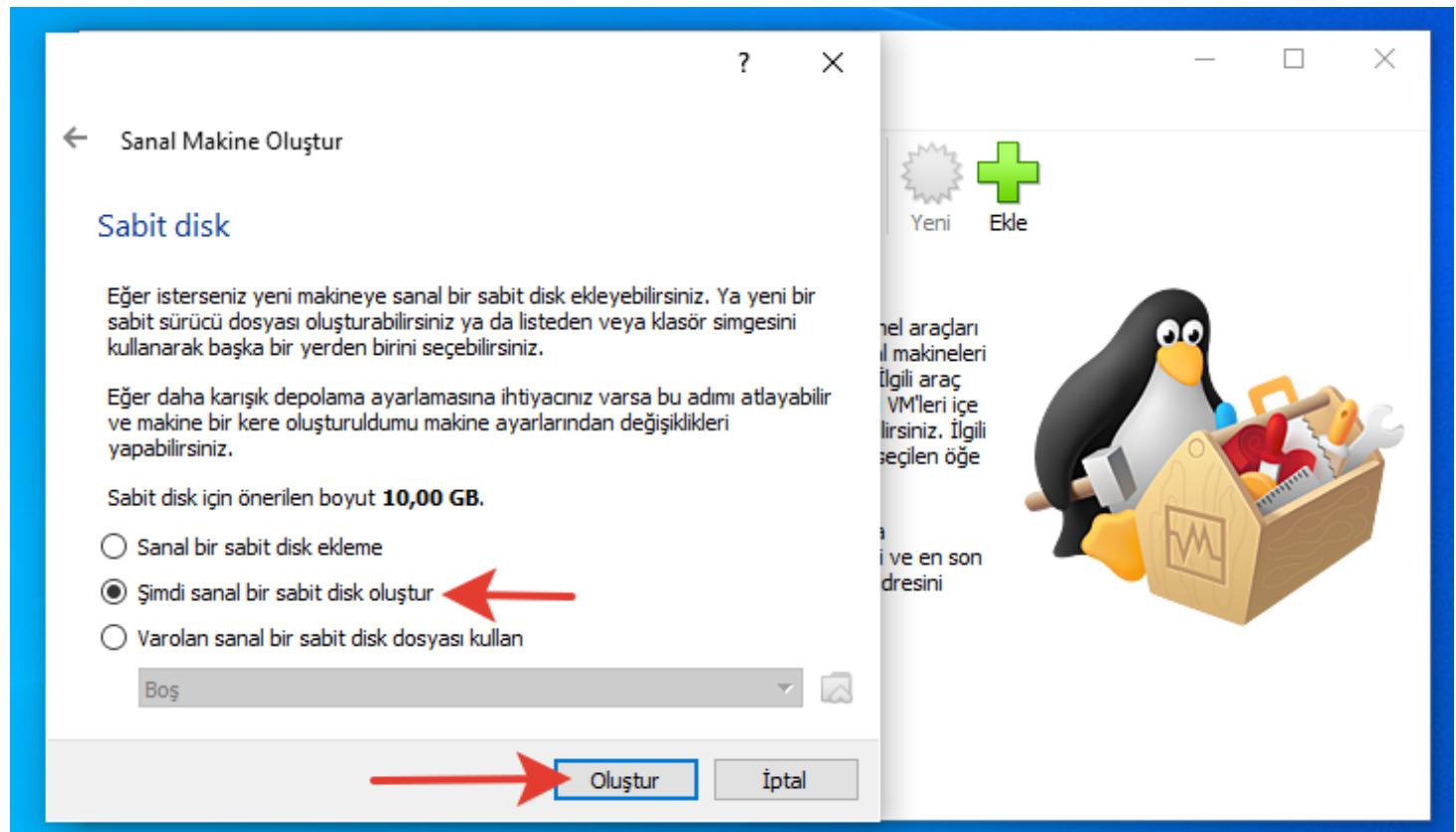
Step 4

- This section defines the amount of system memory, or RAM, the VM has allocated. Remember, this amount is taken from the available memory installed on your computer, so don't give the VM too much.



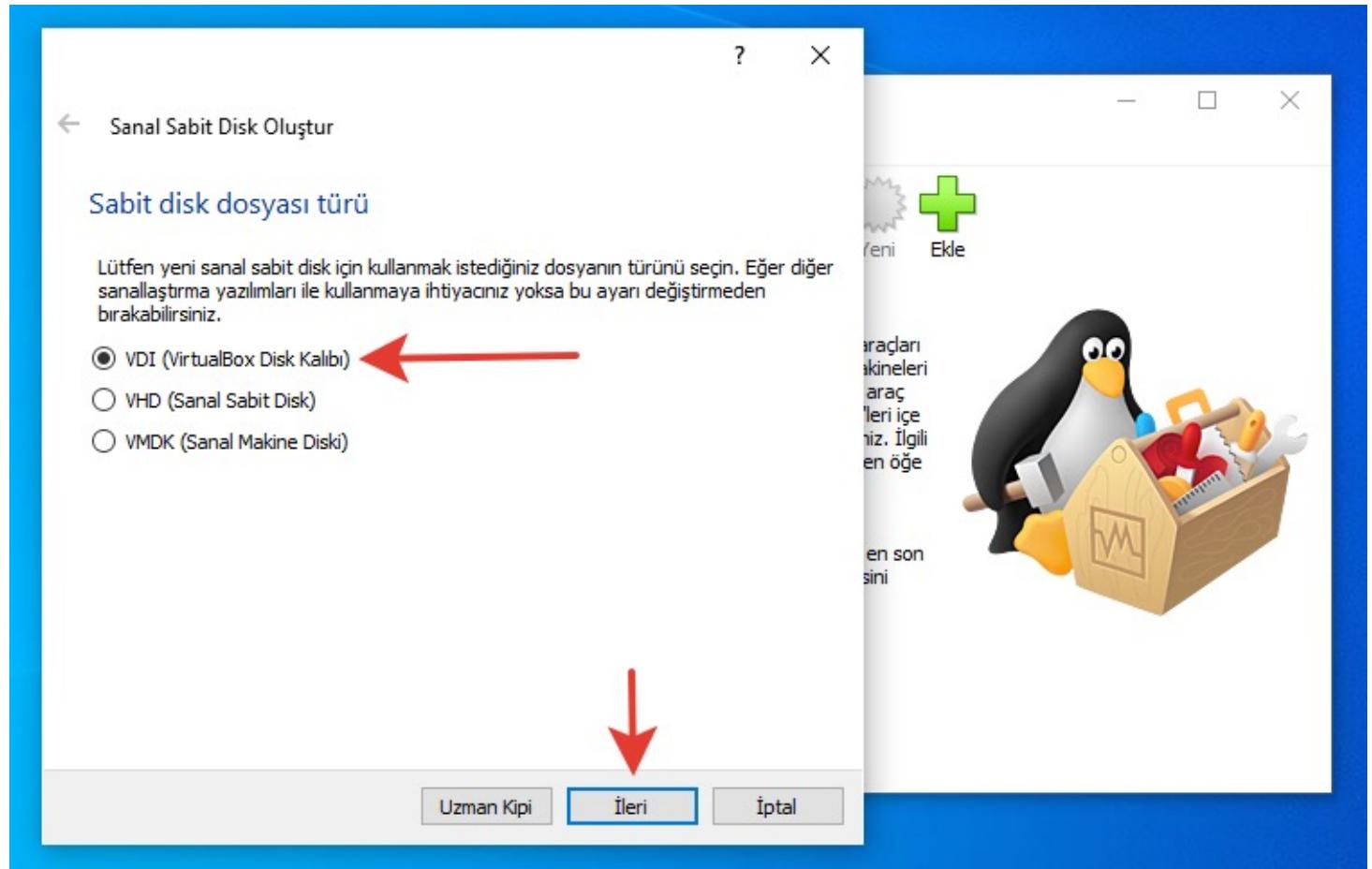
Step 5

- This section is where you start to create the virtual hard disk that the VM uses to install our Ubuntu OS; the default option, 'Create a virtual hard disk now, is the one we're using. Click Create to move on.



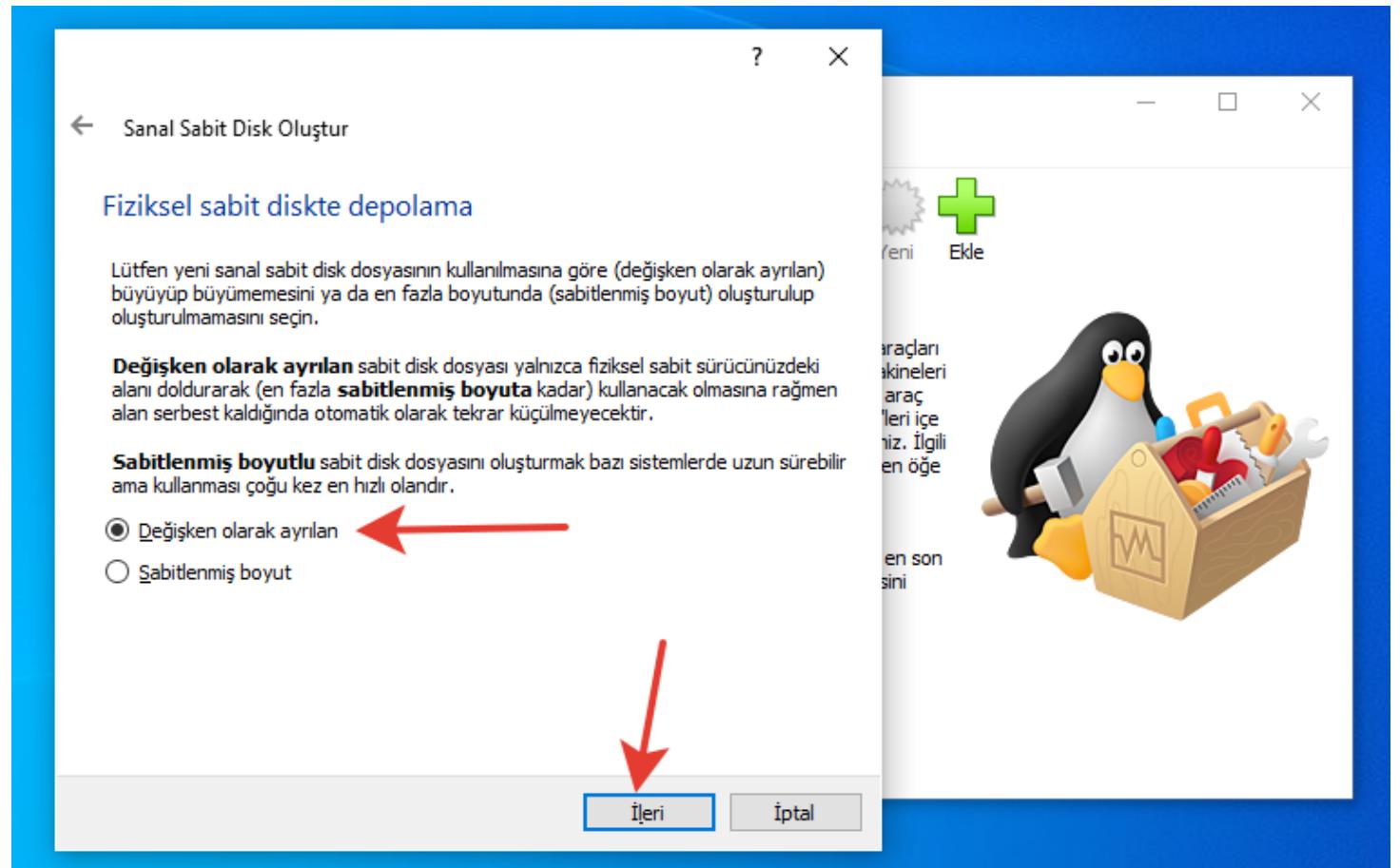
Step 6

- The pop-up window that appears after clicking Create asks you what type of virtual hard disk you want to create. In this case, we will use the default VDI (VirtualBox Disk Image) as the others are often used to move VMs From one VM application to the next. Make sure VDI is selected and click Next.



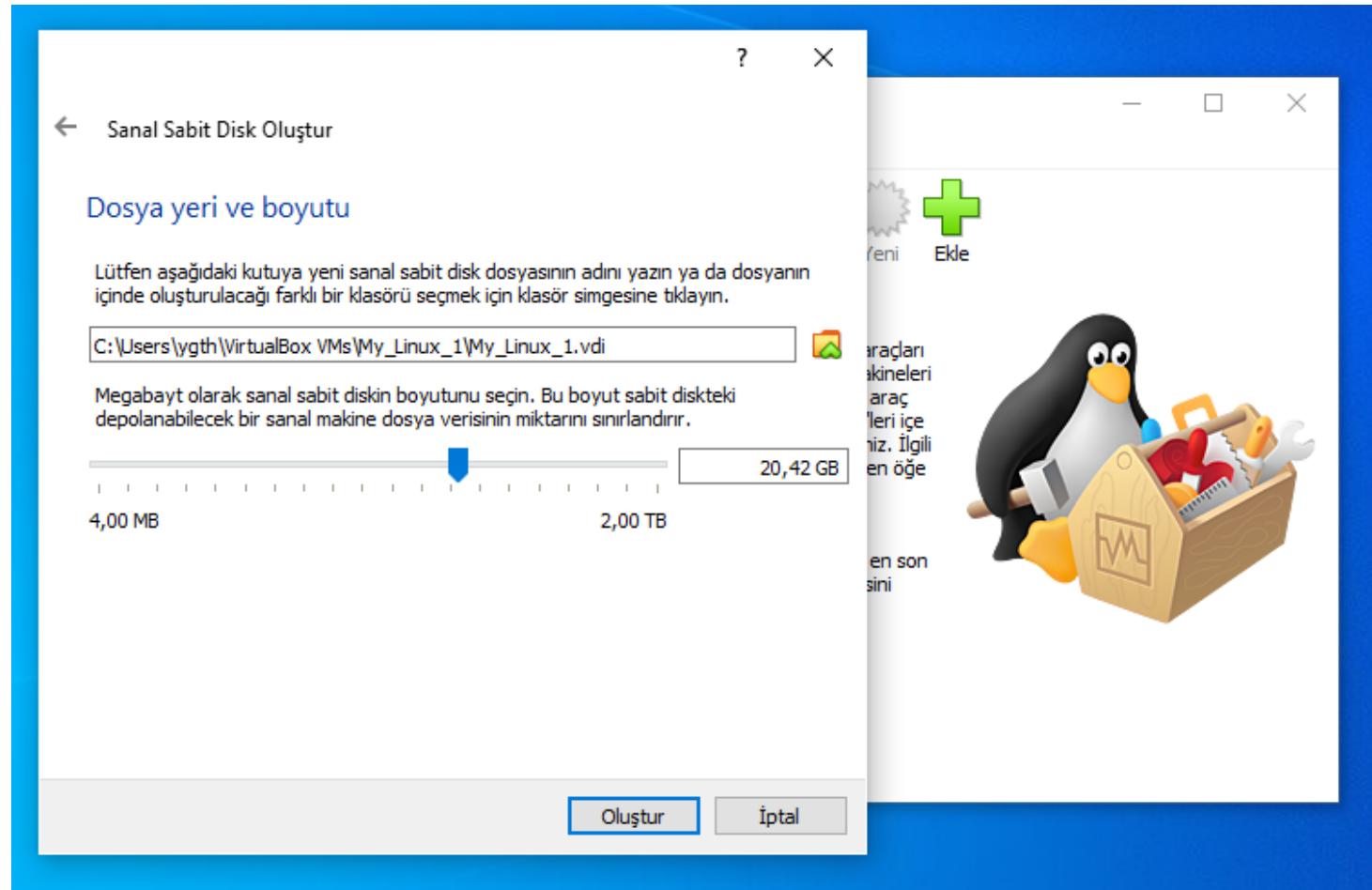
Step 7

- The question of whether to opt for Dynamically or Fixed sized virtual hard disks may confuse the newcomer. A dynamically allocated virtual hard disk is a more flexible storage management option and won't take up much space within your physical hard disk. Ensure Dynamically Allocated is selected and click Next.



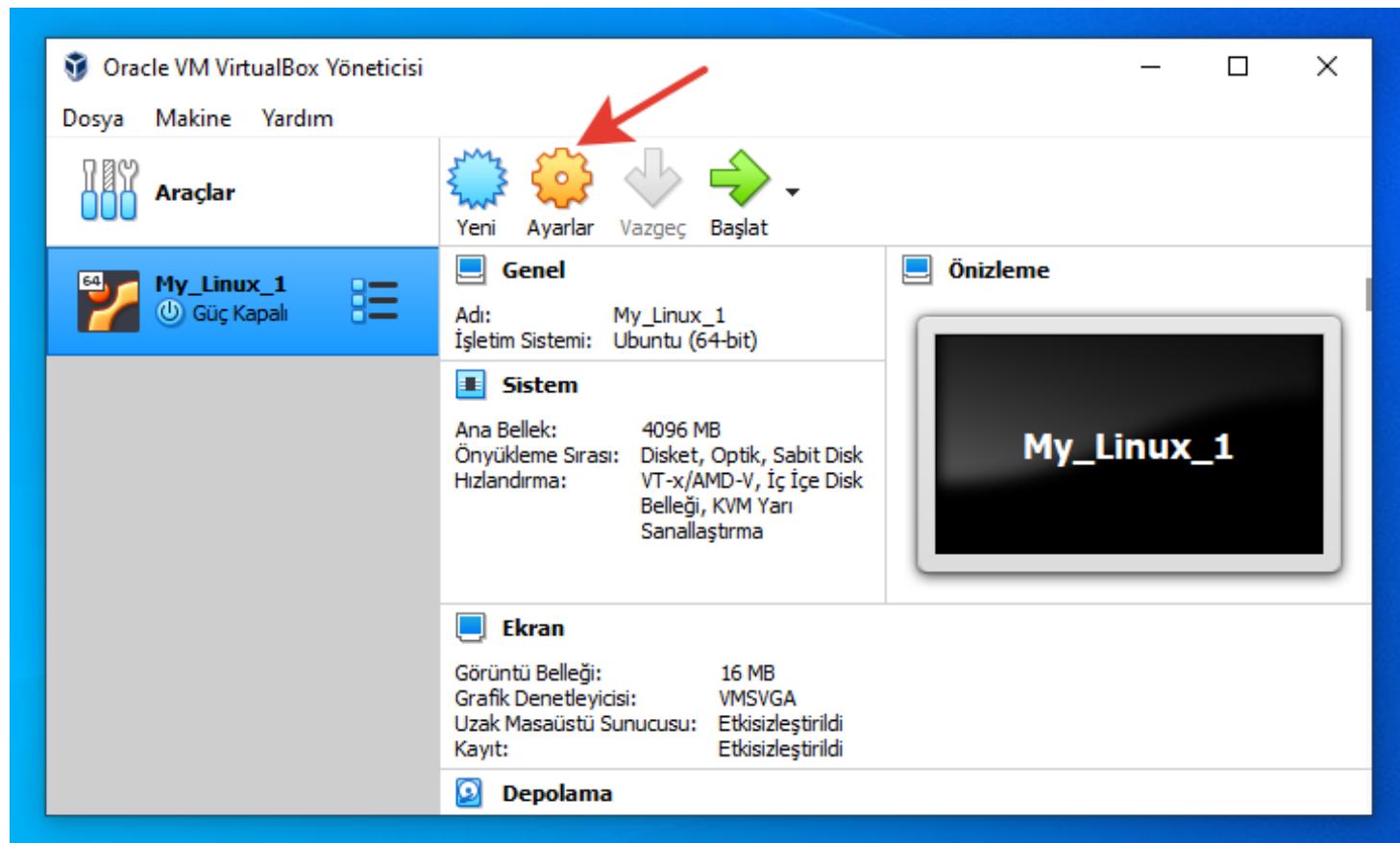
Step 8

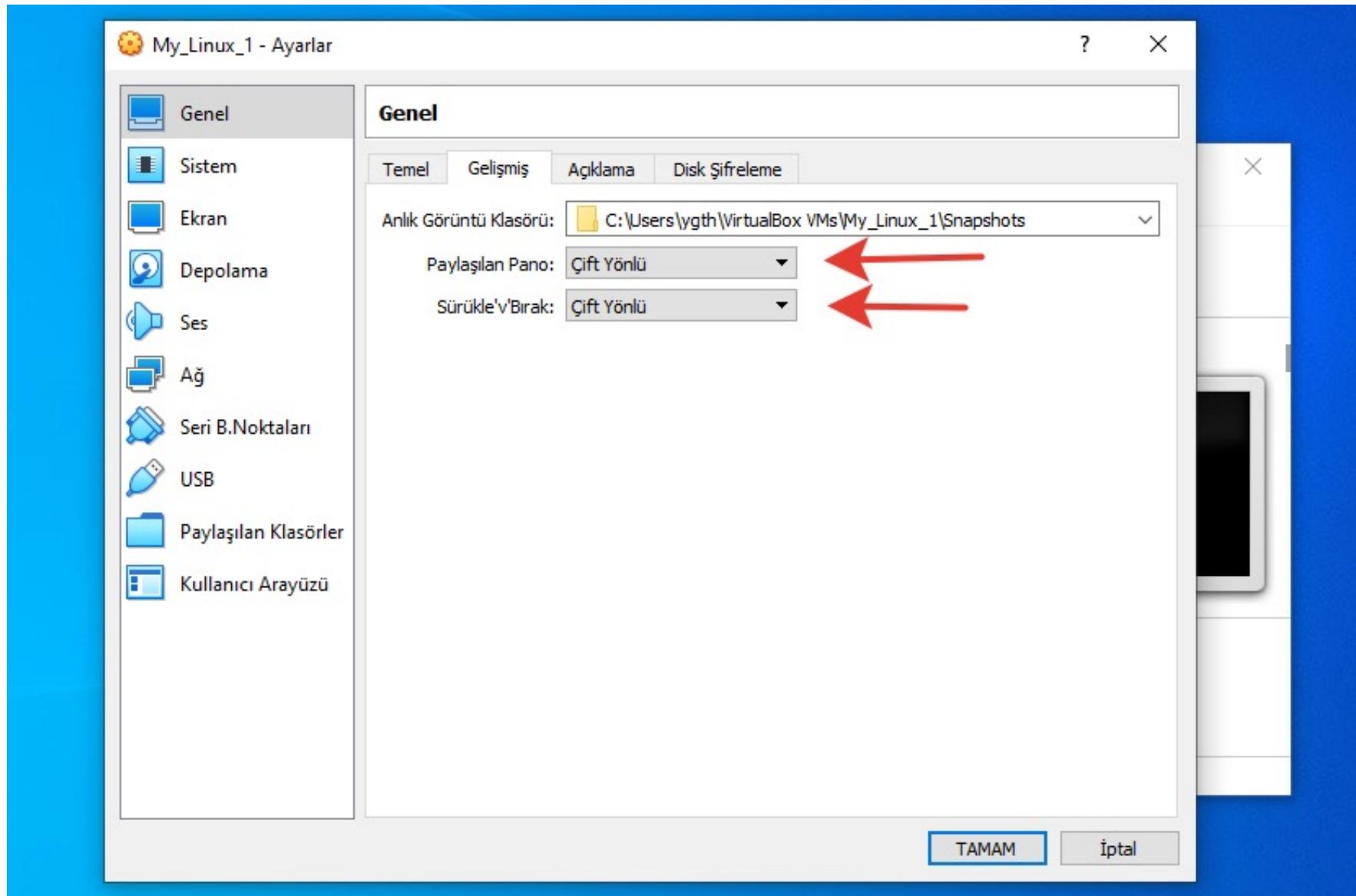
- The virtual hard disk is a single folder, up to the size you state in this section. Ensure the location of the virtual hard disk or SSD on your computer has enough free space available.



Step 9

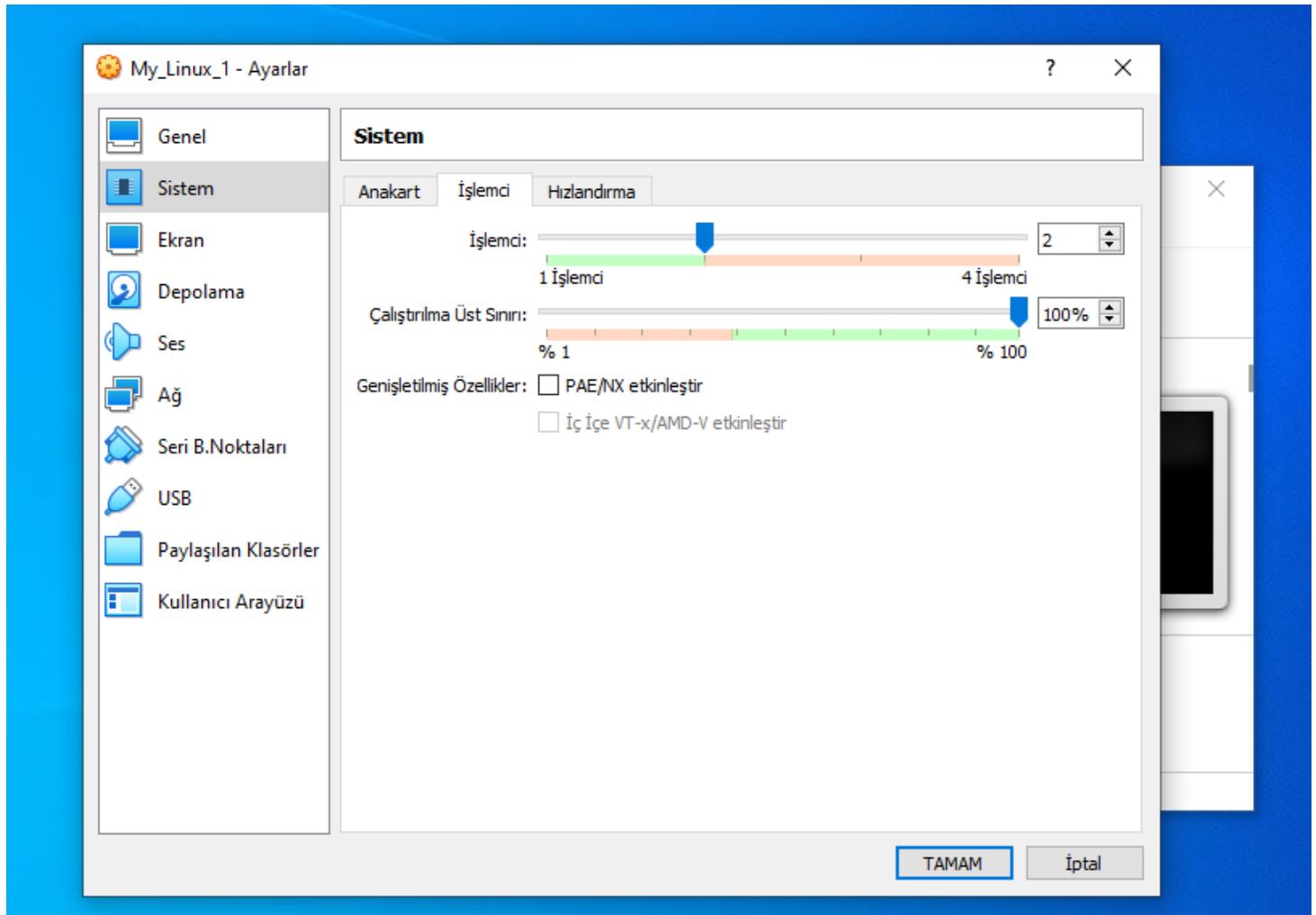
- After clicking Create, the initial setup of the VM is complete; you should now be looking at the newly created VM within the VirtualBox application. Before you begin, click the Settings button, and within the General section, click the Advanced tab. Using the pull-down menus, choose bidirectional for both the shared clipboard and Drag&Drop.

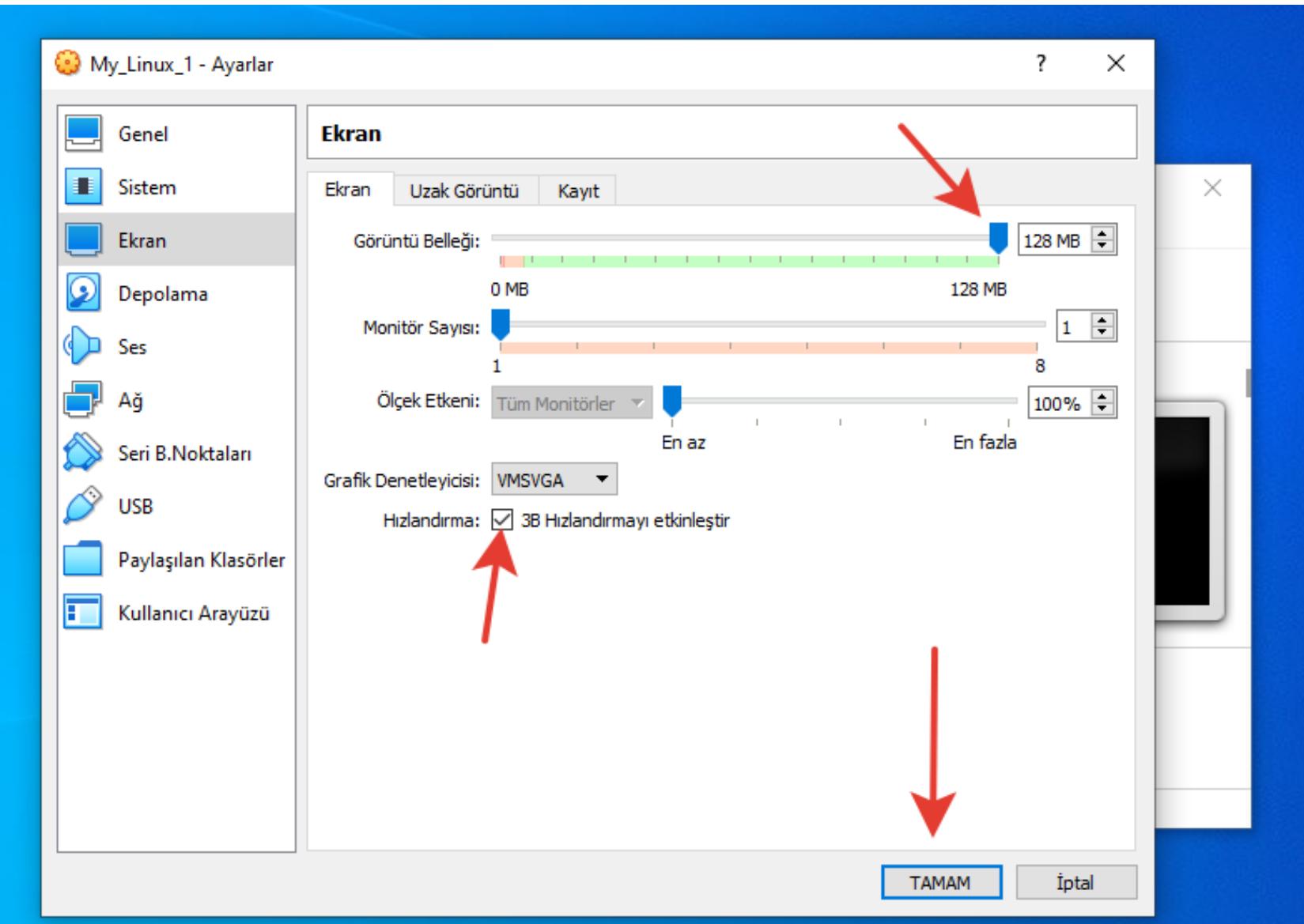




Step 10

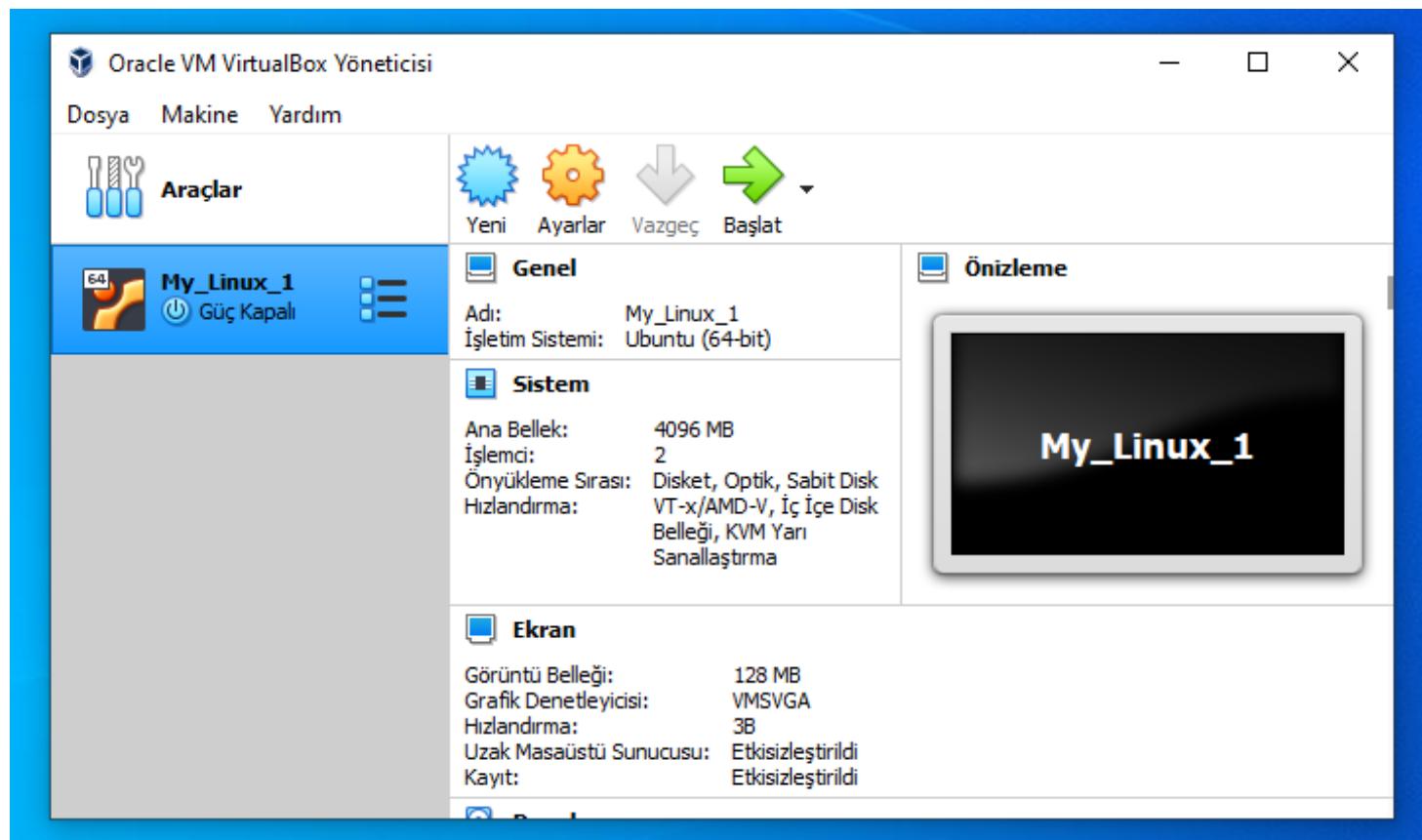
- Follow that by clicking on the System section, then the Processor tab. Depending on your CPU, allocate as many cores as possible without detriment to your host system; we've opted for two CPUs. Now click on the Display section, slide the Video Memory up to the maximum and tick 'Enable 3D Acceleration'. Click OK to commit the new settings.

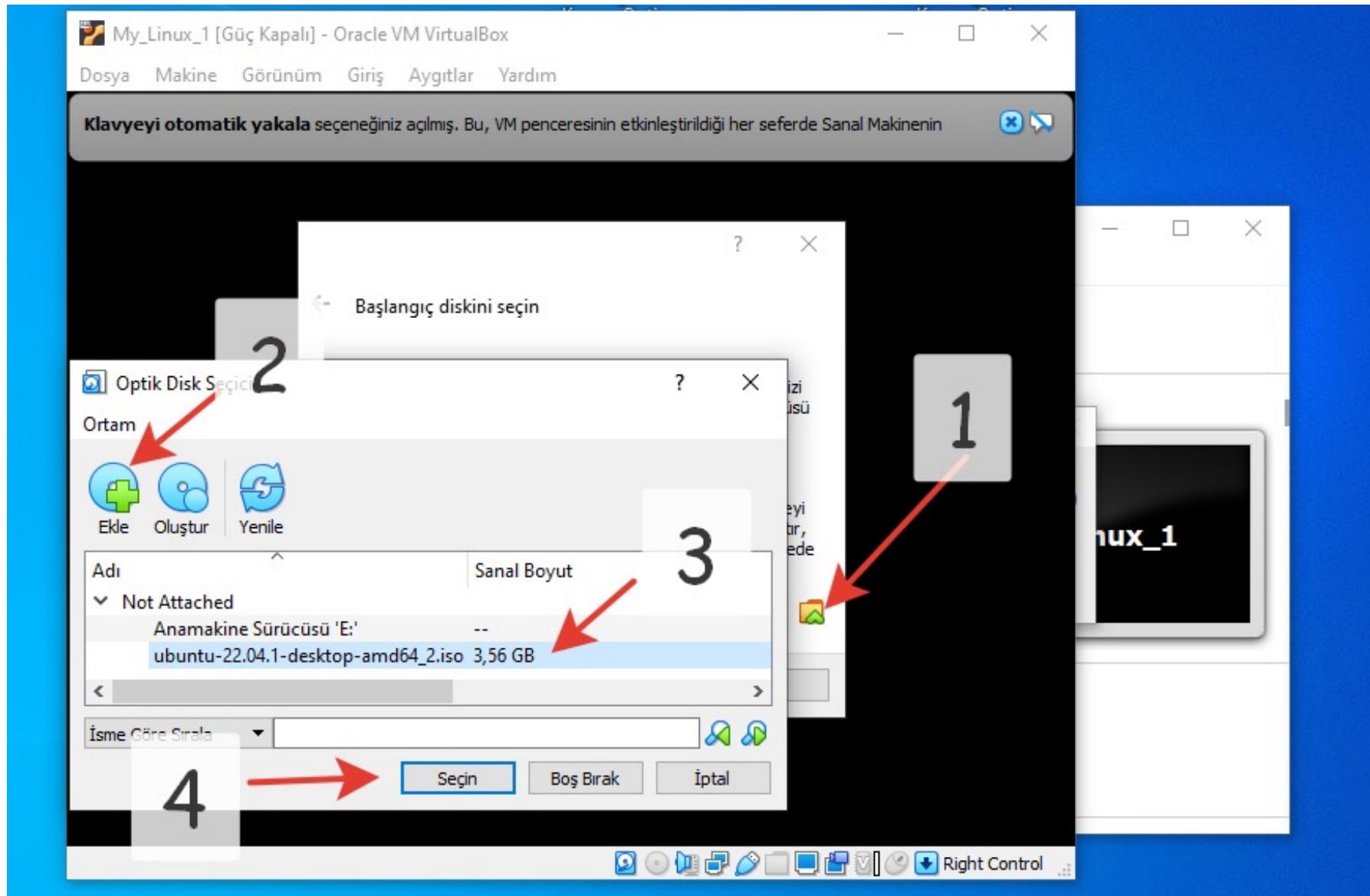


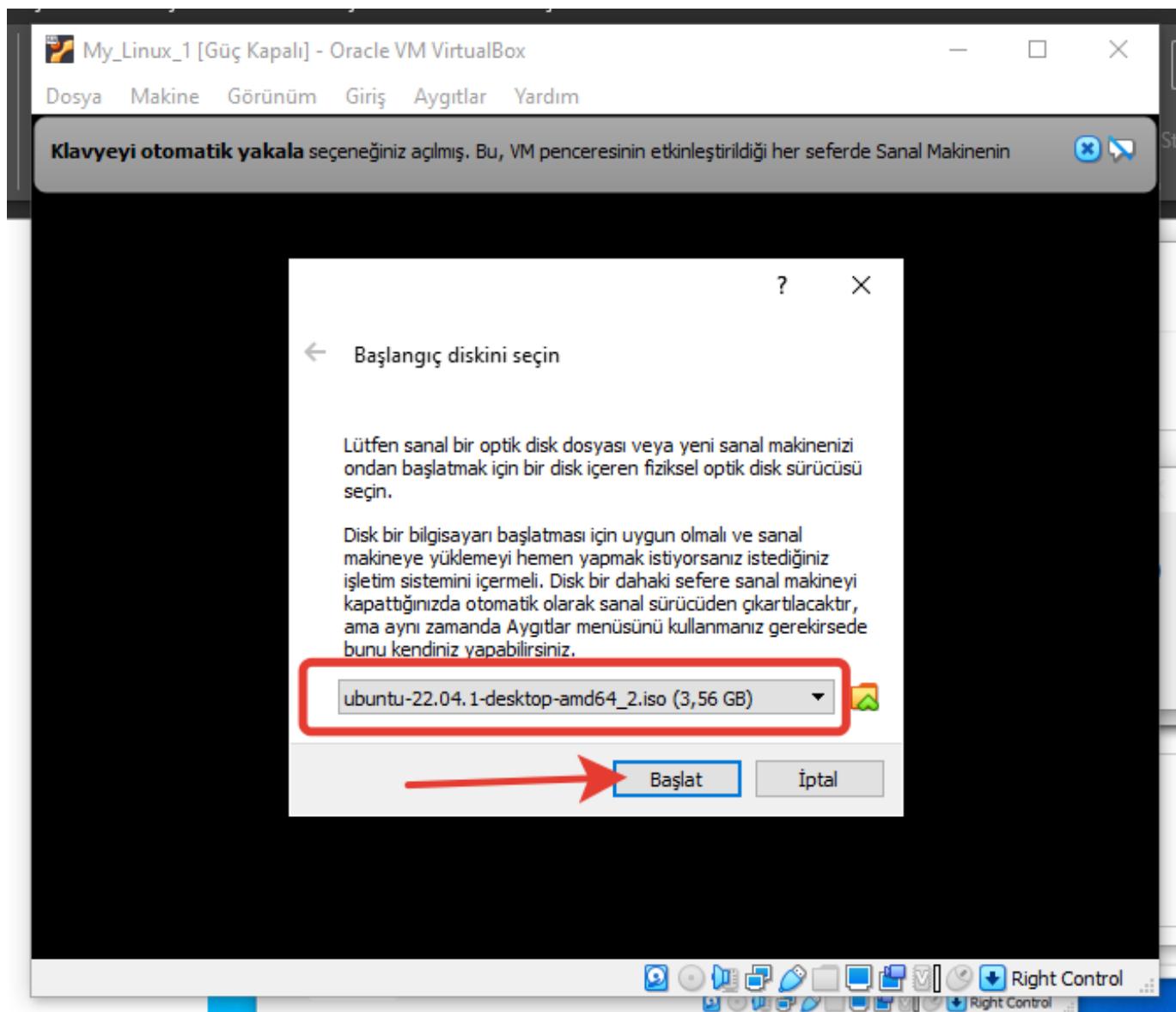


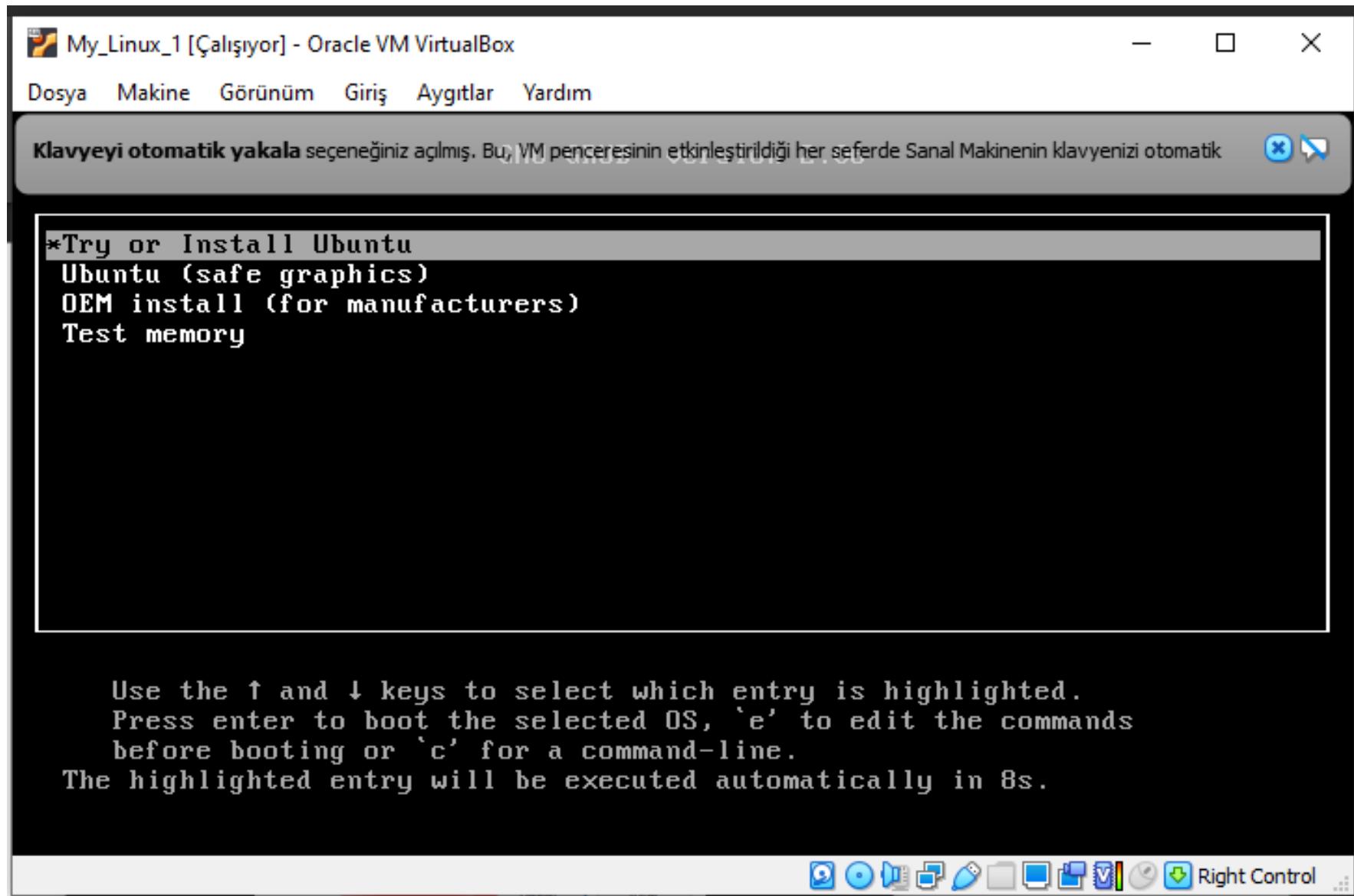
Step 11

- Click on the Start button and use the explorer button (a Folder with a green arrow) in the 'Select Start-up Disk' window to locate the downloaded ISO of our Ubuntu; then click Start to boot the VM with the Ubuntu Live Environment. You can now install Linux as per the standard PC installation requirements.

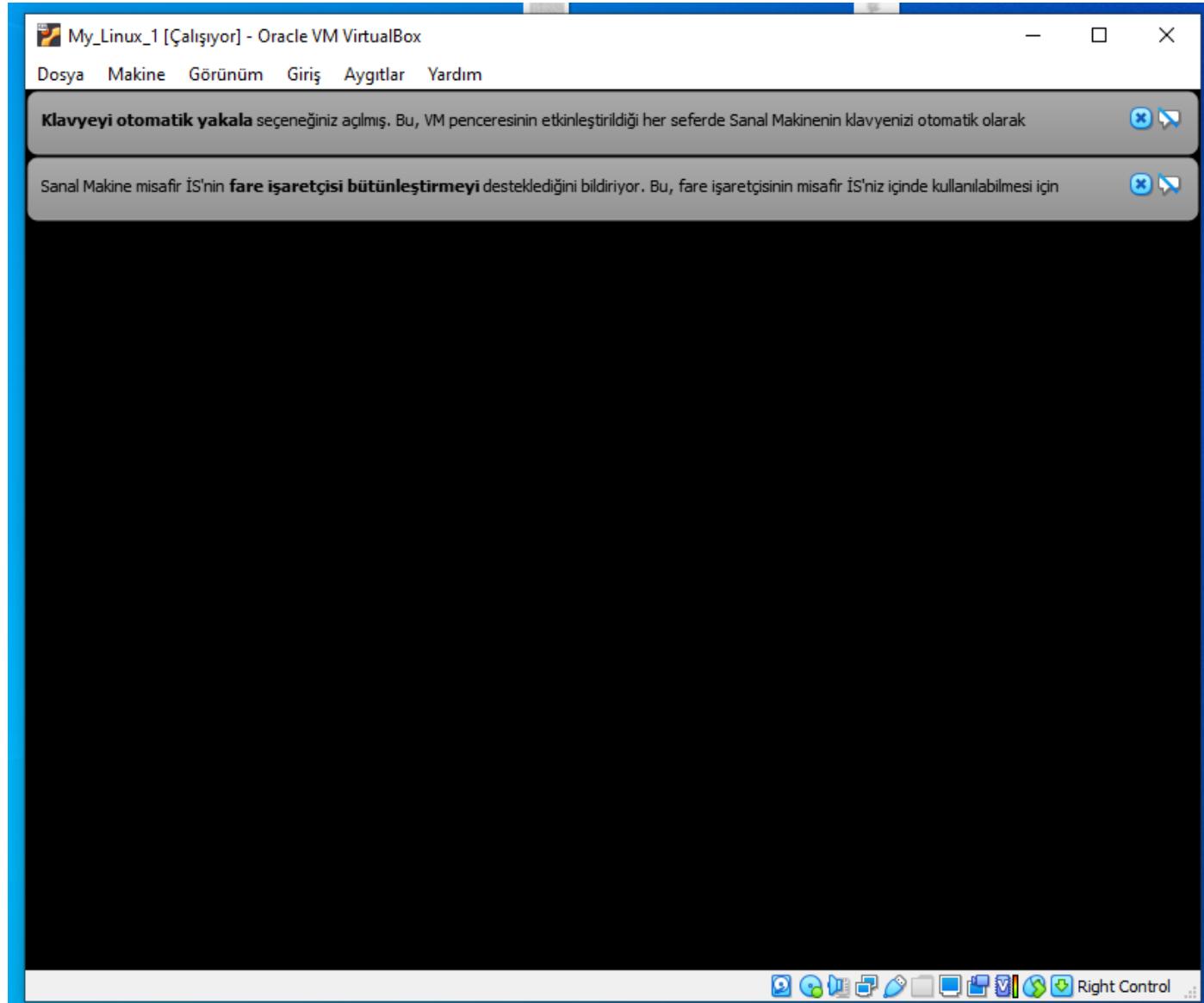


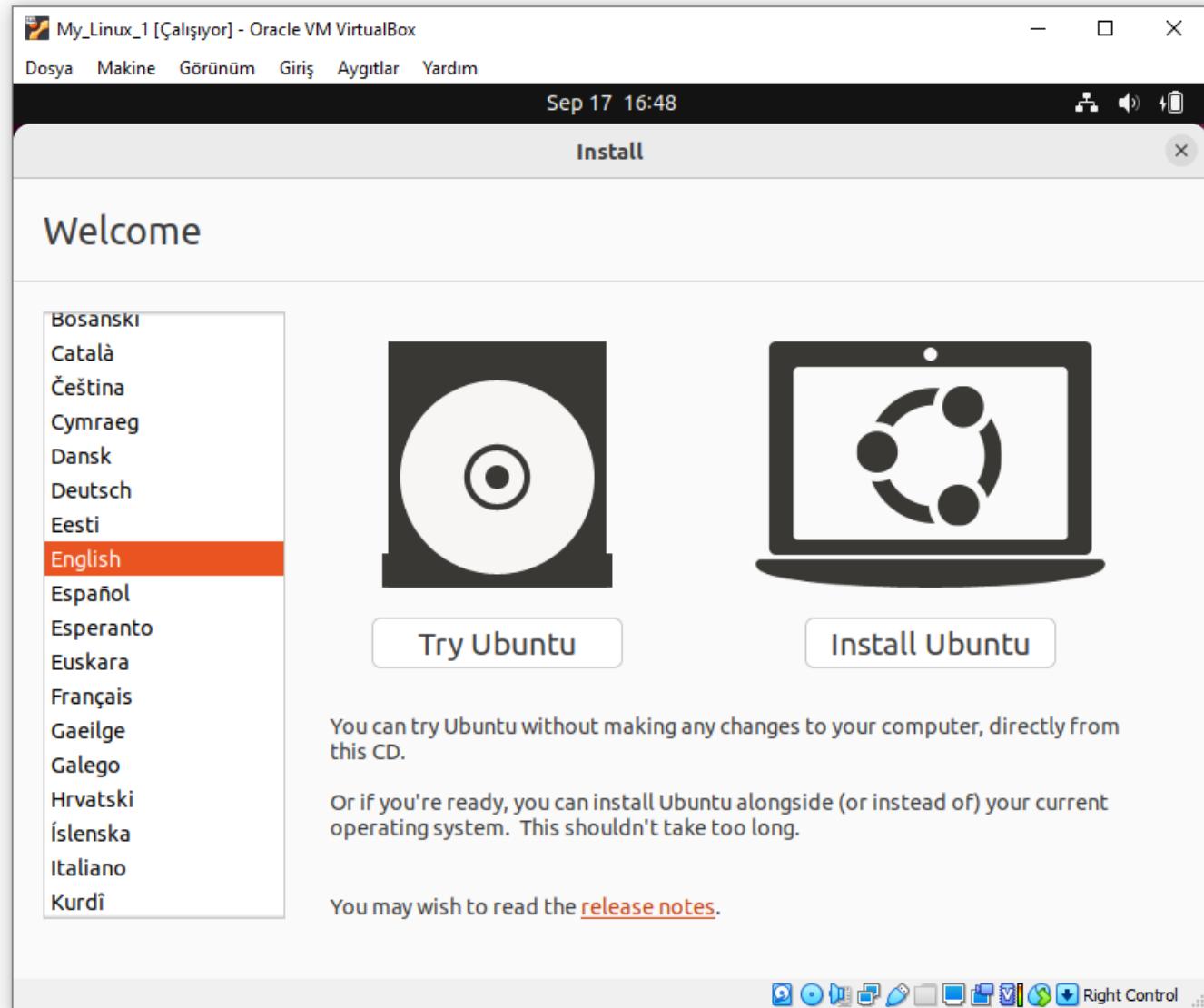






It is opening





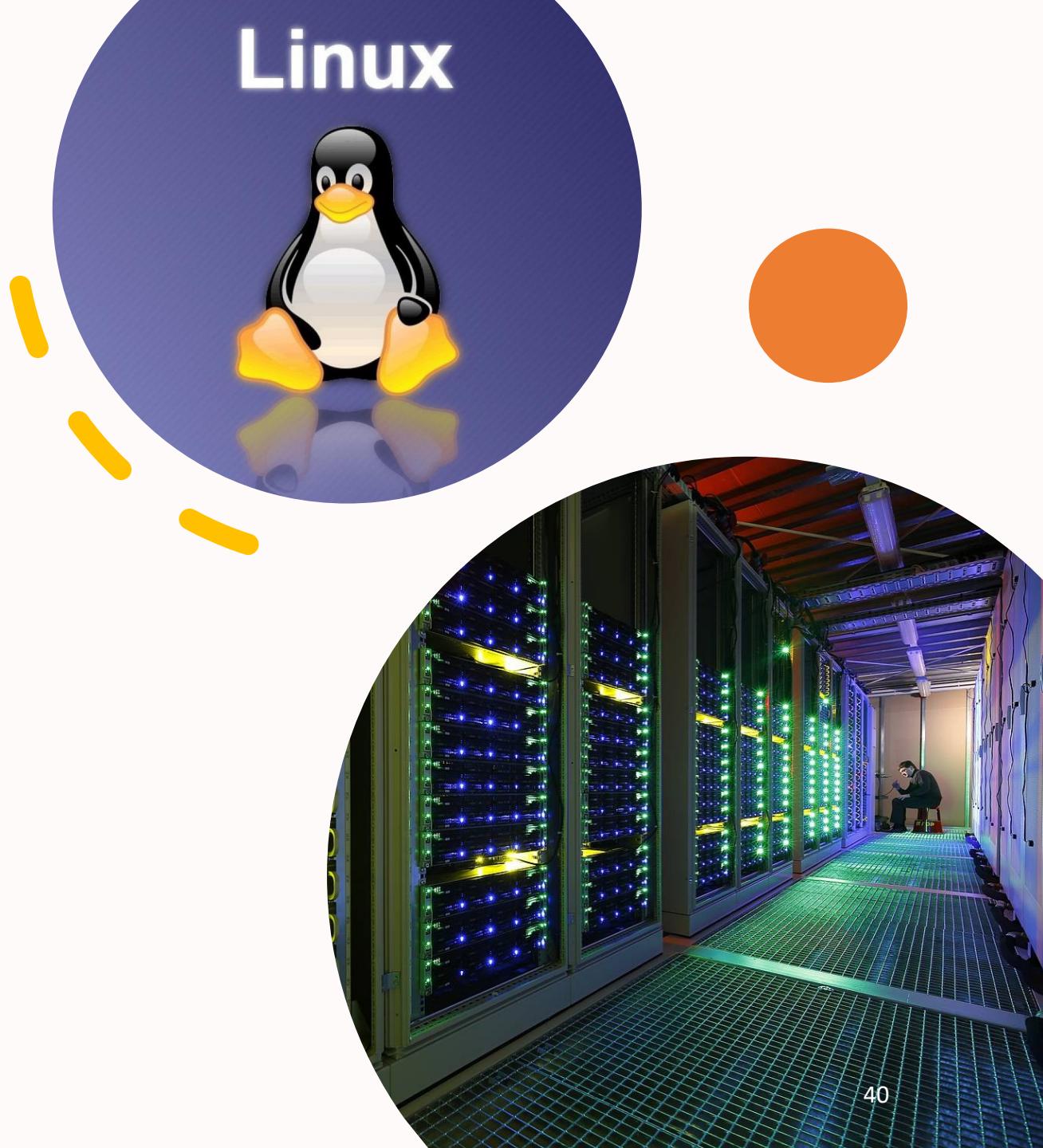
Introduction to Linux

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Introduction

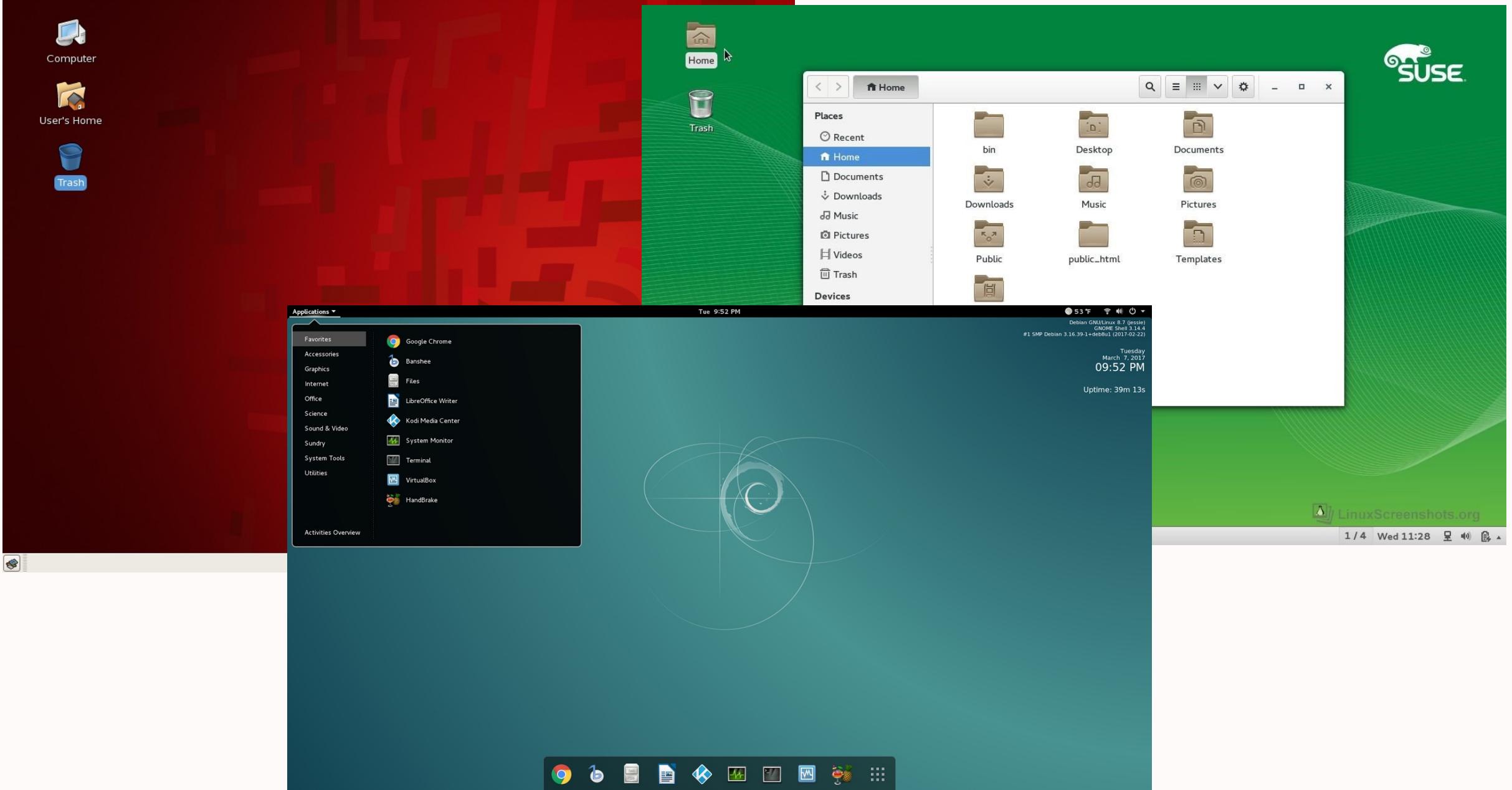
- Linux powers 100% of the world's supercomputers, most of the servers powering the Internet, most financial trades worldwide and a billion Android devices. In short, Linux is everywhere. It appears in many different architectures, from mainframes to servers to desktops to mobile and on a staggeringly wide variety of hardware.
- Moreover, 80% of hiring managers reported that they would prioritize hiring Linux talent relative to other skill areas in the next six months, and 47% of hiring managers said they are more likely to hire a candidate with Linux certification.



Introduction...

- On the next page, you will learn some more details about the many available Linux distributions and the families they can be considered to belong to. Because there are hundreds of distributions, we have not covered them all. Instead, we have decided to focus on the three prominent distribution families, and we have chosen distributions from within each family to use for illustrations, examples, and exercises. This is not meant to suggest that we endorse these specific distributions; they were chosen because they are widely used, and each is broadly representative of its respective family.
- The families and representative distributions we are using are:
 1. Red Hat Family Systems (including CentOS and Fedora)
 2. SUSE Family Systems (including openSUSE)
 3. Debian Family Systems (including Ubuntu and Linux Mint).

Applications Places System



More...

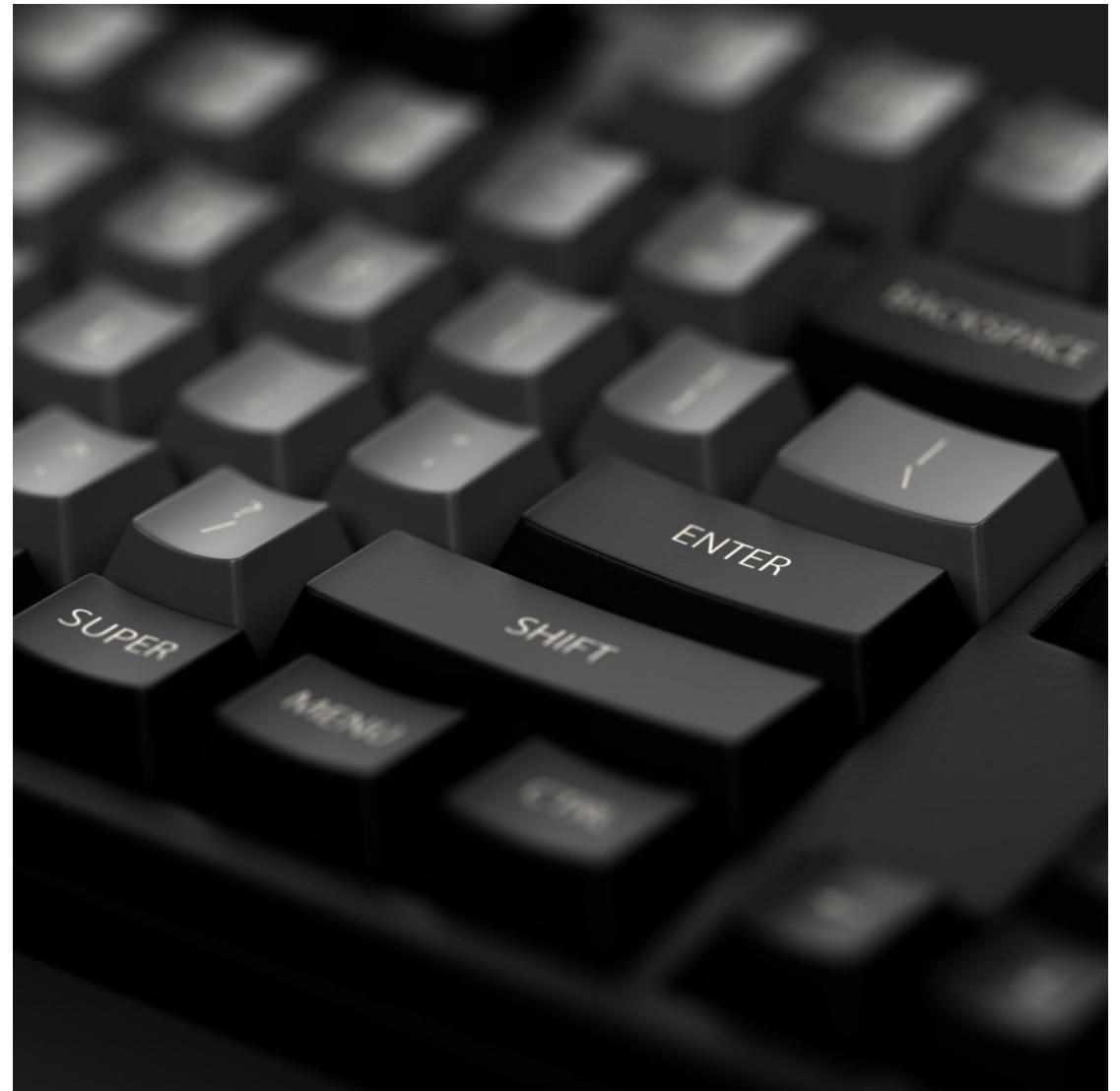
- The families of distributions and the distributions within these families will continue to change and grow. People see and develop unique configurations and utilities to respond to that need. Sometimes that effort creates a whole new distribution of Linux. Sometimes, that effort will leverage an existing distribution to expand the members of a current family.



Linux Overview

Linux Terminology

- When you start exploring Linux, you will soon come across some terms that may be unfamiliar, such as distribution, boot loader, desktop environment, etc. Before we proceed further, let's stop and take a look at some basic terminology used in Linux to help you get up to speed.



The Kernel

- The kernel is considered the brain of the Linux operating system. It controls the hardware and makes the hardware interact with the applications. An example of a kernel is the Linux kernel. The most recent Linux Kernel and past Linux kernels can be found at the kernel.org website.

kernel.org

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Location

<https://www.kernel.org/pub/>
<https://git.kernel.org/>
<https://rsync.kernel.org/pub/>

Latest Release

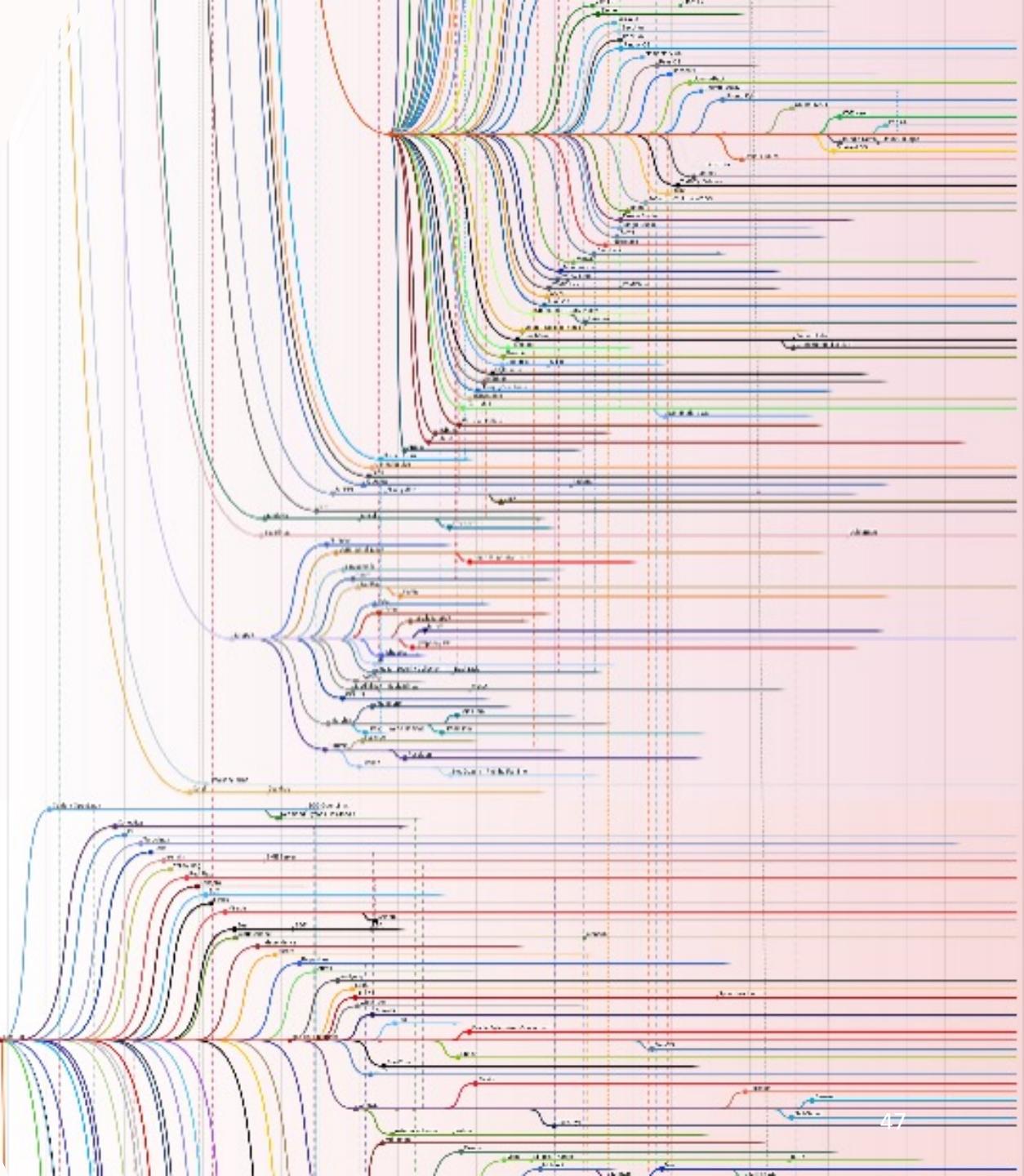
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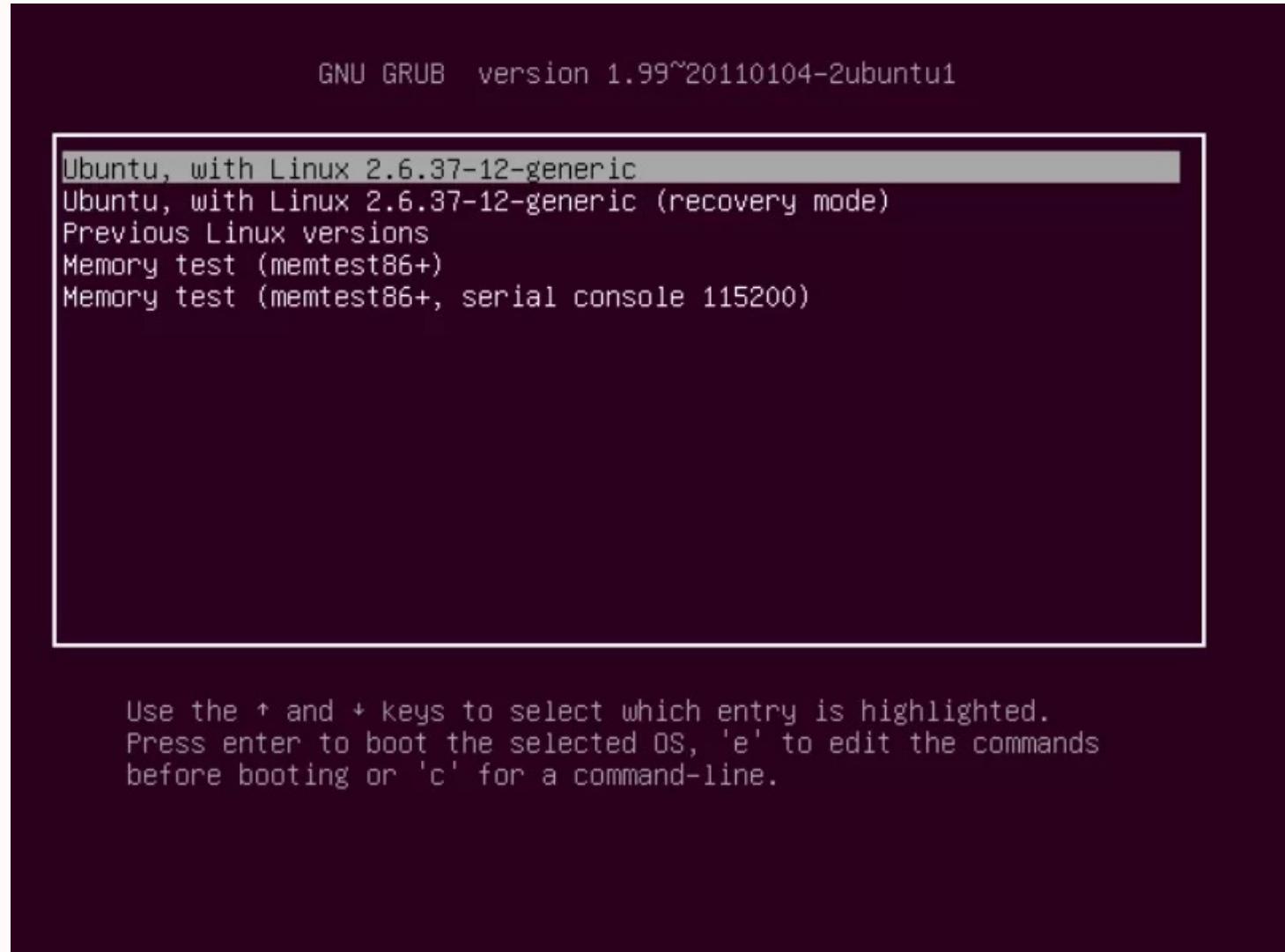
Distribution

- A distribution, also known as Distros, is a collection of programs combined with the Linux kernel to make up a Linux-based operating system. Some common distribution examples are Red Hat Enterprise Linux, Fedora, Ubuntu, and Gentoo.



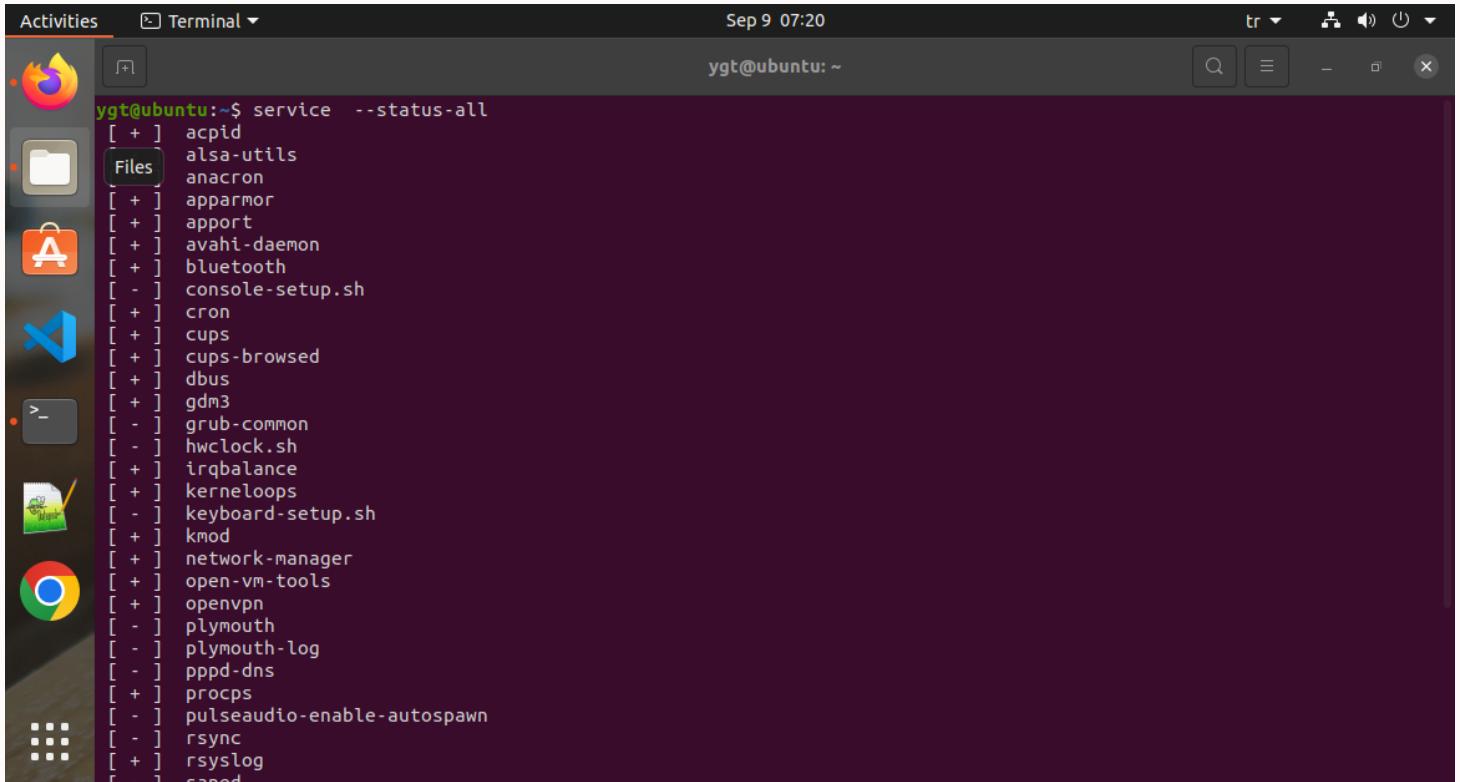
The boot loader

- The boot loader, as the name implies, is a program that boots the operating system. Two examples of a bootloader are GRUB and ISOLINUX.



A service

- A service is a program that runs as a background process. Some examples of the service are httpd, nfsd, ntpd, ftpd and named.

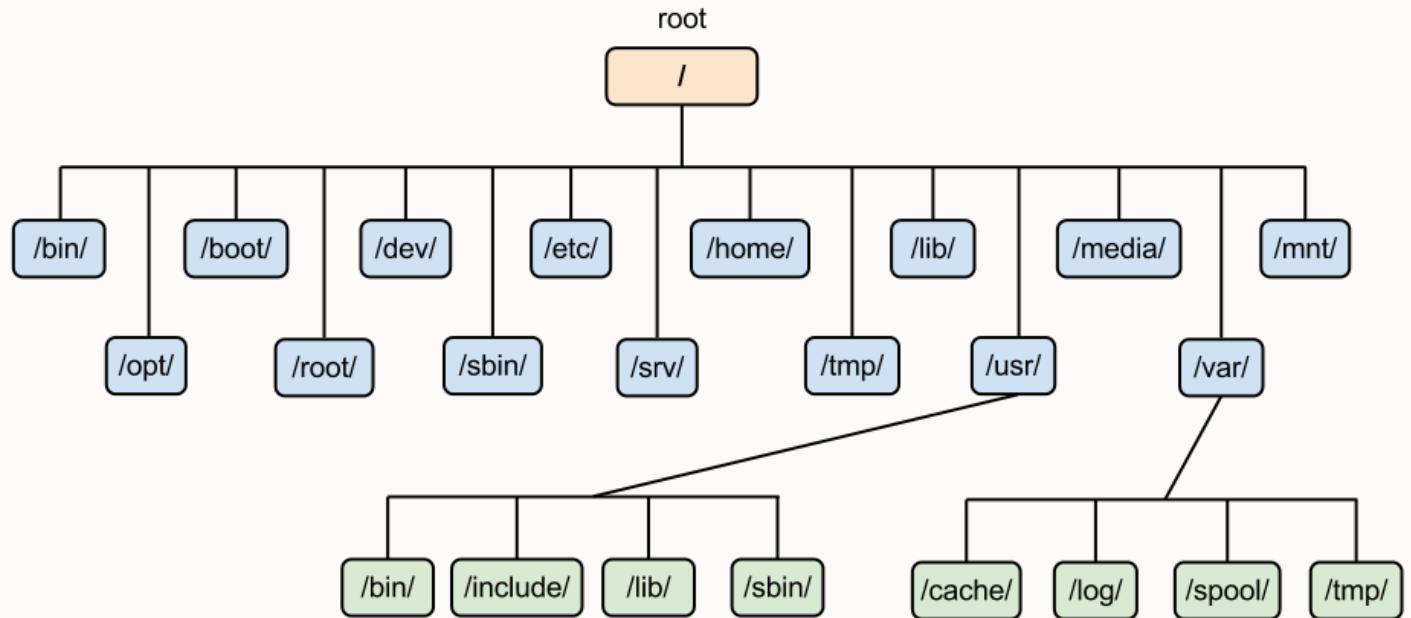


The image shows a screenshot of a Ubuntu desktop environment. In the top right corner, there is a terminal window titled "Terminal". The terminal window has a dark theme and displays the command "service --status-all" followed by a long list of system services. The services listed include acpid, alsa-utils, anacron, apparmor, apport, avahi-daemon, bluetooth, console-setup.sh, cron, cups, cups-browsed, dbus, gdm3, grub-common, hwclock.sh, irqbalance, kerneloops, keyboard-setup.sh, kmod, network-manager, open-vm-tools, openvpn, plymouth, plymouth-log, pppd-dns, procps, pulseaudio-enable-autospawn, rsync, rsyslog, and s�ed. The terminal window also shows the date and time as "Sep 9 07:20" and the user as "ygt@ubuntu: ~". The desktop interface includes a dock with icons for the Dash, Home, Activities, Terminal, and Dash search, along with several application windows like a browser, file manager, and code editor.

```
ygt@ubuntu:~$ service --status-all
[ + ] acpid
[ + ] alsa-utils
[ + ] anacron
[ + ] apparmor
[ + ] apport
[ + ] avahi-daemon
[ + ] bluetooth
[ - ] console-setup.sh
[ + ] cron
[ + ] cups
[ + ] cups-browsed
[ + ] dbus
[ + ] gdm3
[ - ] grub-common
[ - ] hwclock.sh
[ + ] irqbalance
[ + ] kerneloops
[ - ] keyboard-setup.sh
[ + ] kmod
[ + ] network-manager
[ + ] open-vm-tools
[ + ] openvpn
[ - ] plymouth
[ - ] plymouth-log
[ - ] pppd-dns
[ + ] procps
[ - ] pulseaudio-enable-autospawn
[ - ] rsync
[ + ] rsyslog
[ - ] s�ed
```

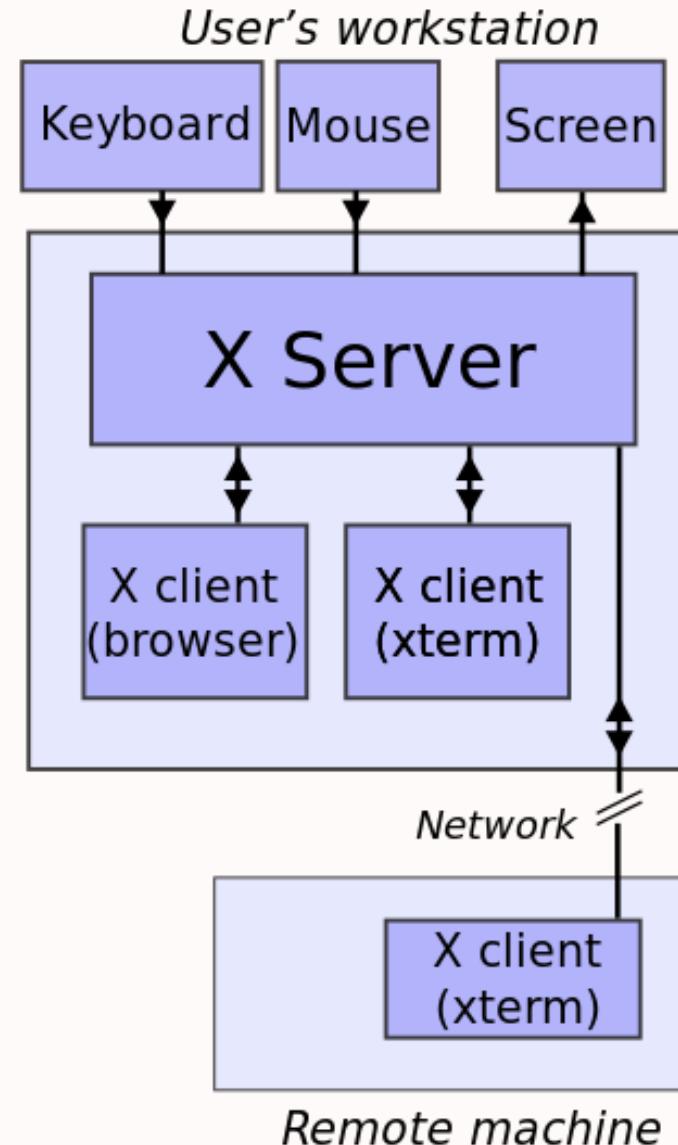
A filesystem

- A filesystem is a method for storing and organizing files in Linux. Some examples of filesystems are ext3, ext4, FAT, XFS and Btrfs.



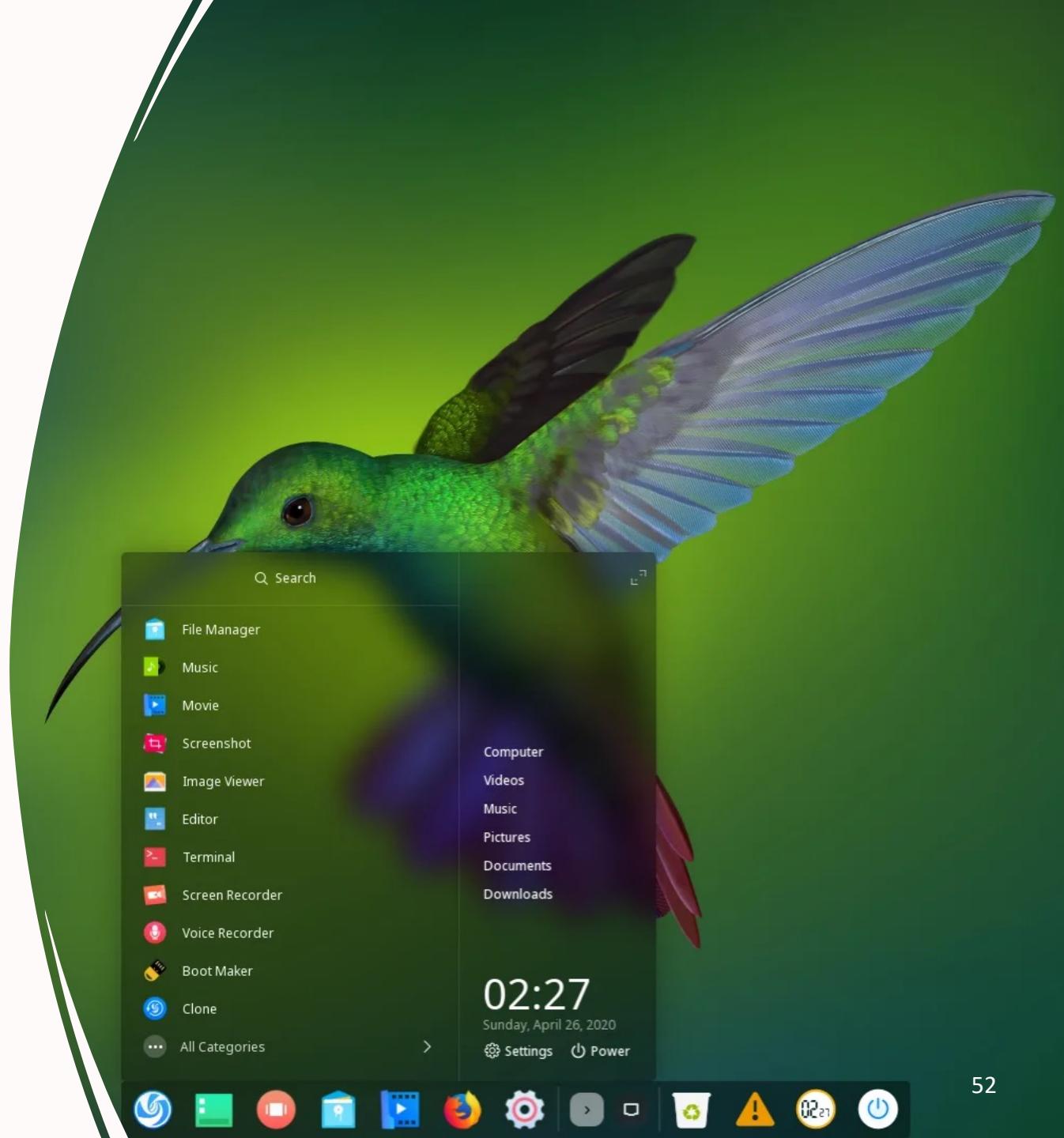
The X Window System

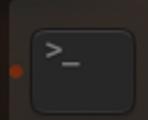
- The X Window System provides the standard toolkit and protocol to build graphical user interfaces on nearly all Linux systems.



The desktop environment

- The desktop environment is a graphical user interface on top of the operating system. GNOME, KDE, Xfce and Fluxbox are some examples of the desktop environment.





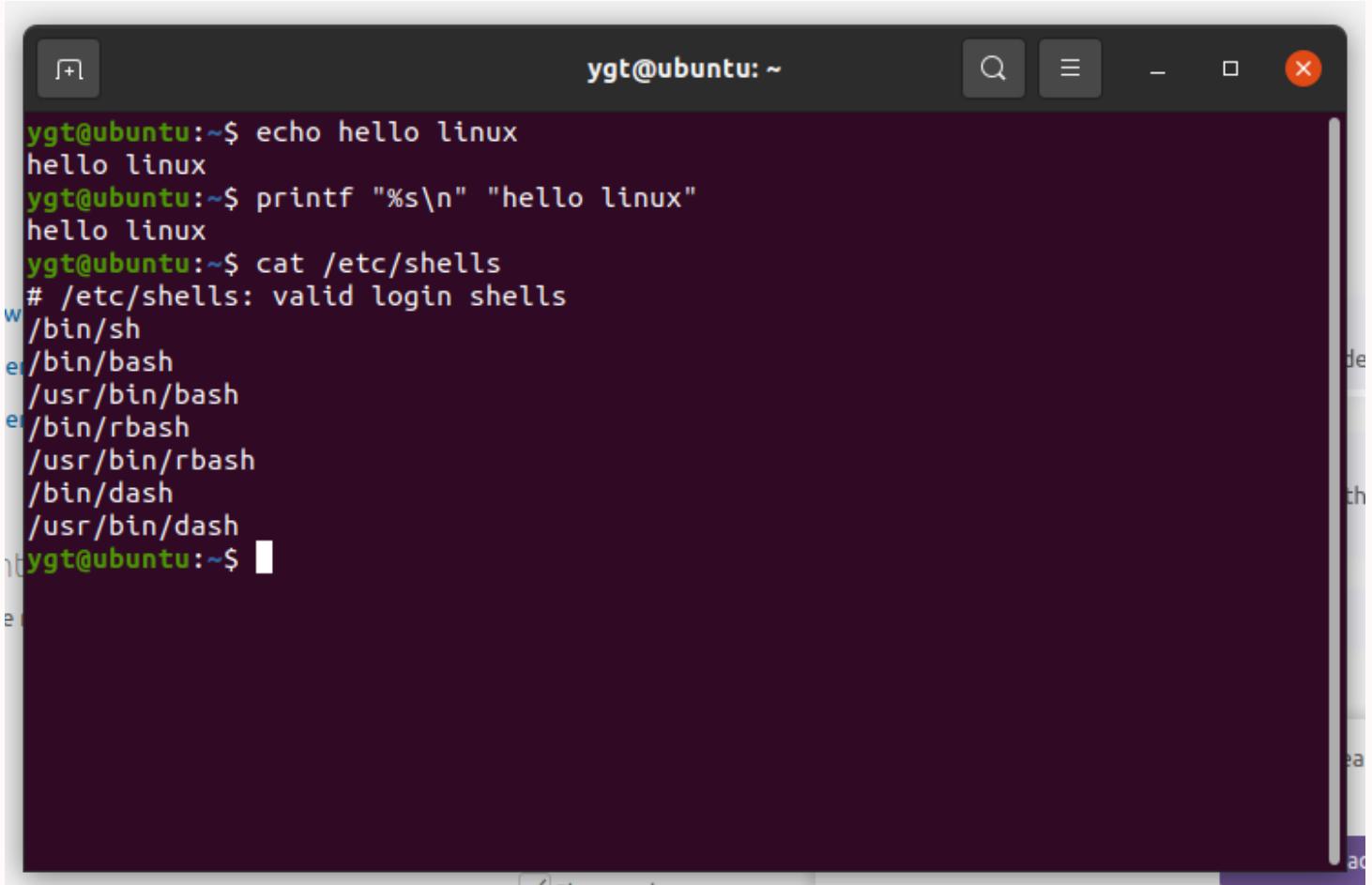
ygt@ubuntu:~\$ echo hello linux
hello linux
ygt@ubuntu:~\$ printf "%s\n" "hello linux"

The command line

The command line is an interface for typing commands on the operating system.

The Shell

- The Shell is the command line interpreter that interprets the command line input and instructs the operating system to perform any necessary tasks and commands. For example, bash, tcsh and zsh.



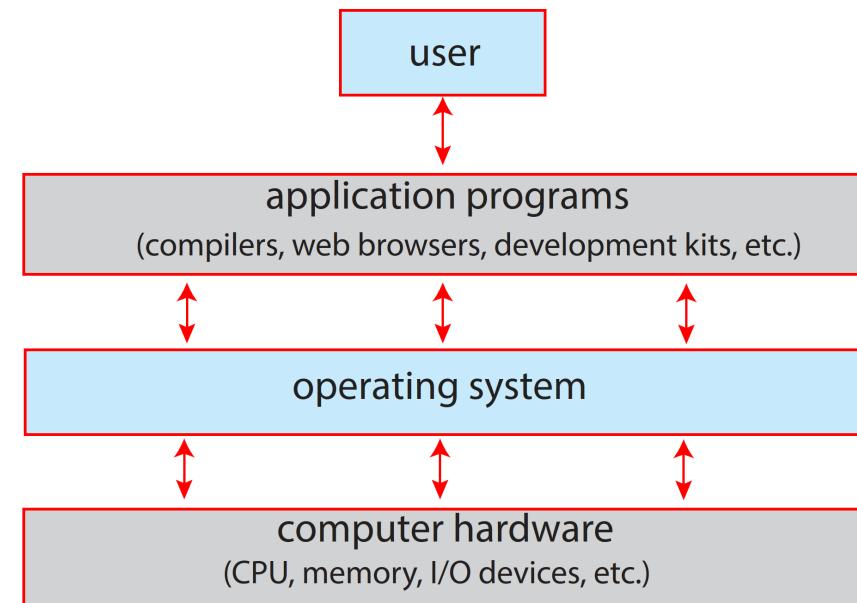
A screenshot of a terminal window titled "ygt@ubuntu: ~". The window contains the following text:

```
ygt@ubuntu:~$ echo hello linux
hello linux
ygt@ubuntu:~$ printf "%s\n" "hello linux"
hello linux
ygt@ubuntu:~$ cat /etc/shells
# /etc/shells: valid login shells
/bin/sh
/bin/bash
/usr/bin/bash
/bin/rbash
/usr/bin/rbash
/bin/dash
/usr/bin/dash
ygt@ubuntu:~$
```

A Computer System

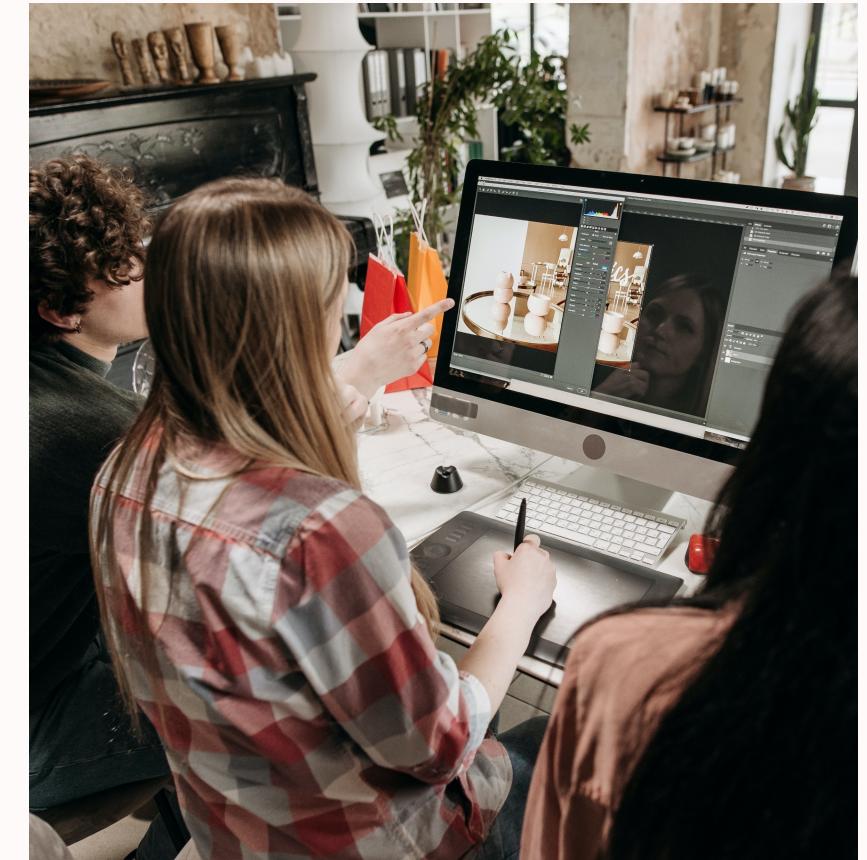
Overview

- Before we continue our deep topics, it is helpful to understand the operating system's role in the overall computer system.
- A computer system can be divided roughly into four components: the hardware, the operating system, the application programs, and the user. Now let's define these concepts.



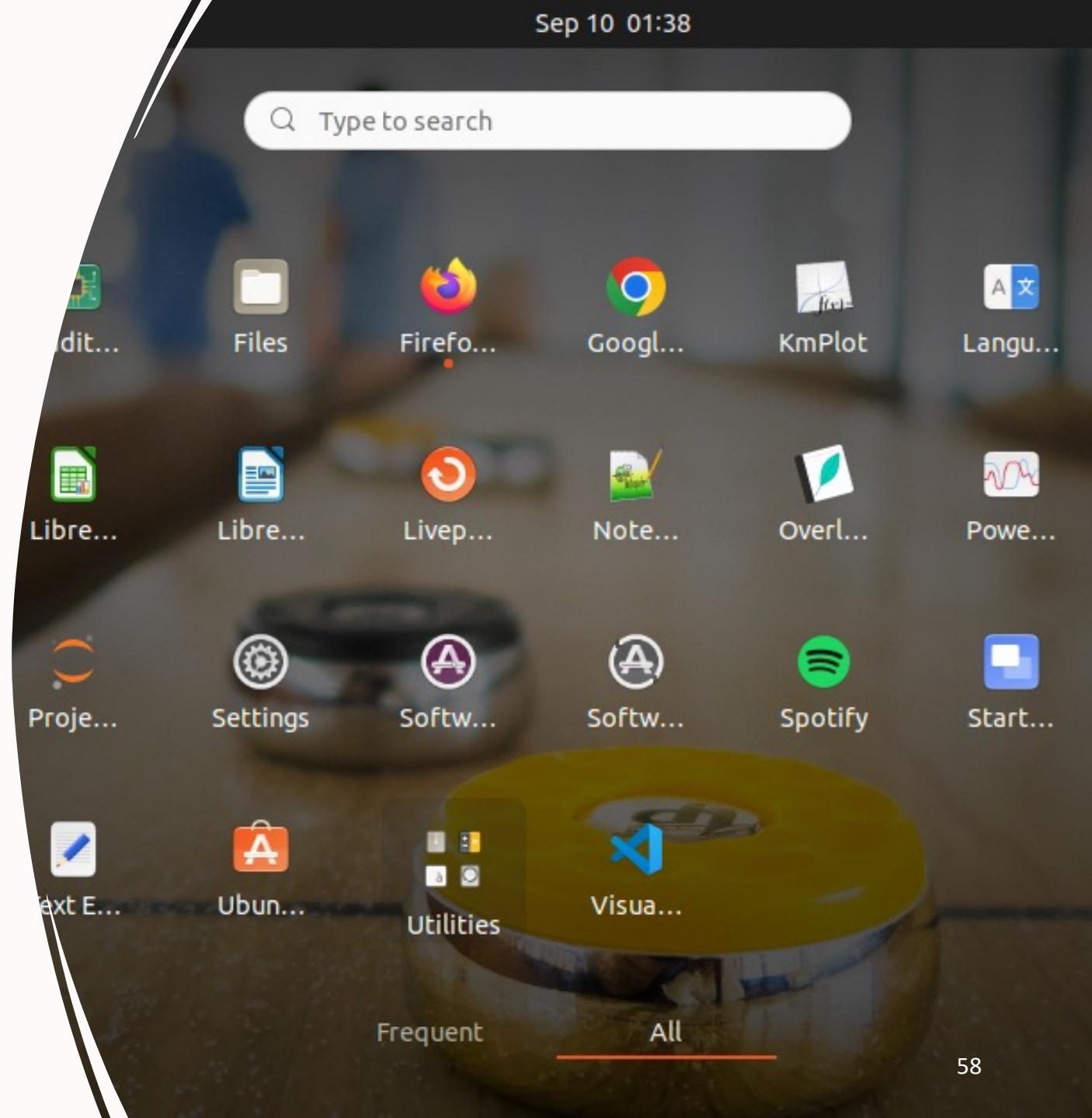
The user

- The user's view of the computer varies according to the interface used. Many computer users sit with a laptop or in front of a PC with a monitor, keyboard, and mouse. The user performs their work or plays using computer systems. The computer system's goal is to maximize the job (or play) the user performs.
- In this case, the operating system is designed mainly for ease of use, with some attention paid to performance and security and none paid to resource utilization—how various hardware and software resources are shared.



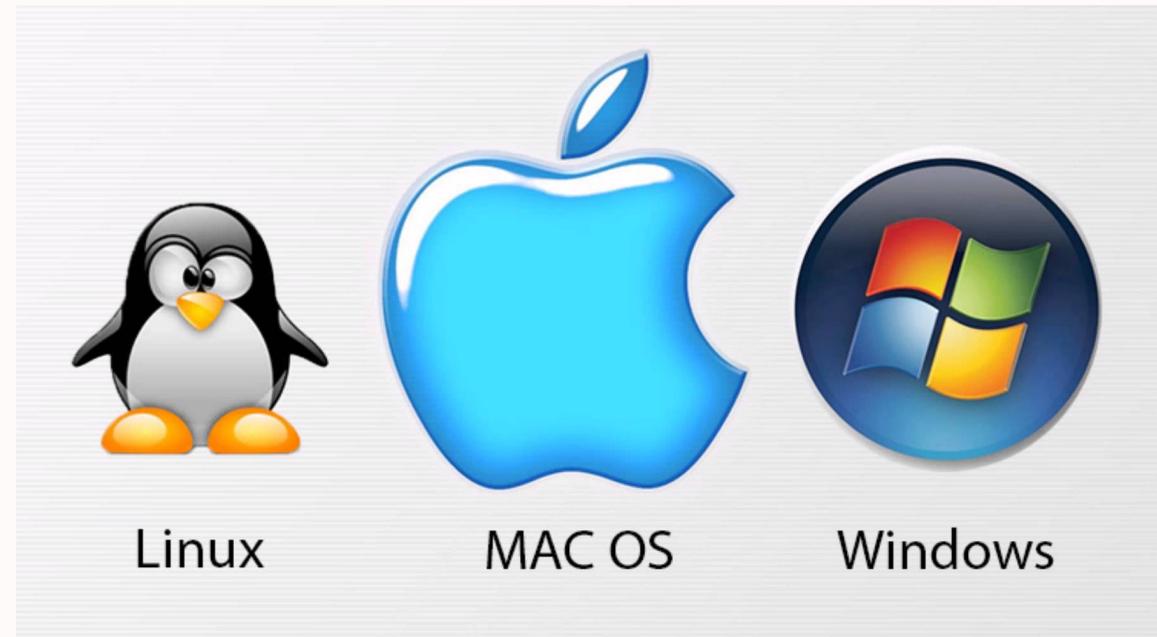
Application Programs

- The application programs—such as word processors, spreadsheets, compilers, and web browsers—define how computing resources are used to solve users' computing problems.



The operating system

- The operating system controls the hardware and coordinates its use among the various application programs for multiple users. We can also view a computer system as hardware, software, and data. The operating system provides the means for adequately using these resources in the operation of the computer system. An operating system is similar to a manager. Like a manager, it performs no proper function by itself without other employees. It simply provides an environment within which other programs can do valuable work.



Hardware

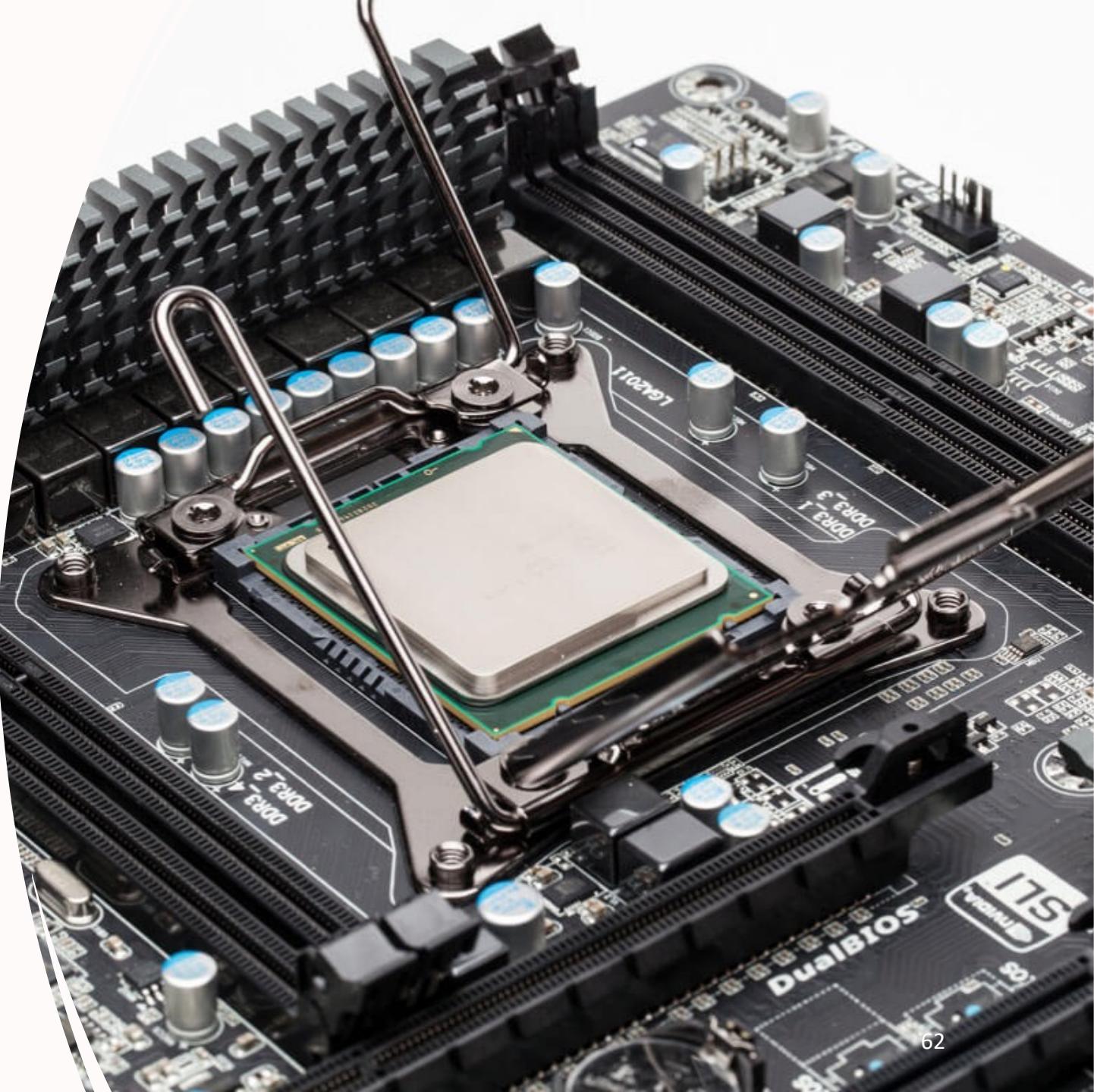
- Mainly, we can define the hardware as a provider of required essential computing resources for the computer system.
- Computer hardware refers to a computer system's physical, electronic, and mechanical components. These components can be broken down into the central processing unit, memory, storage, terminals, printers, etc.

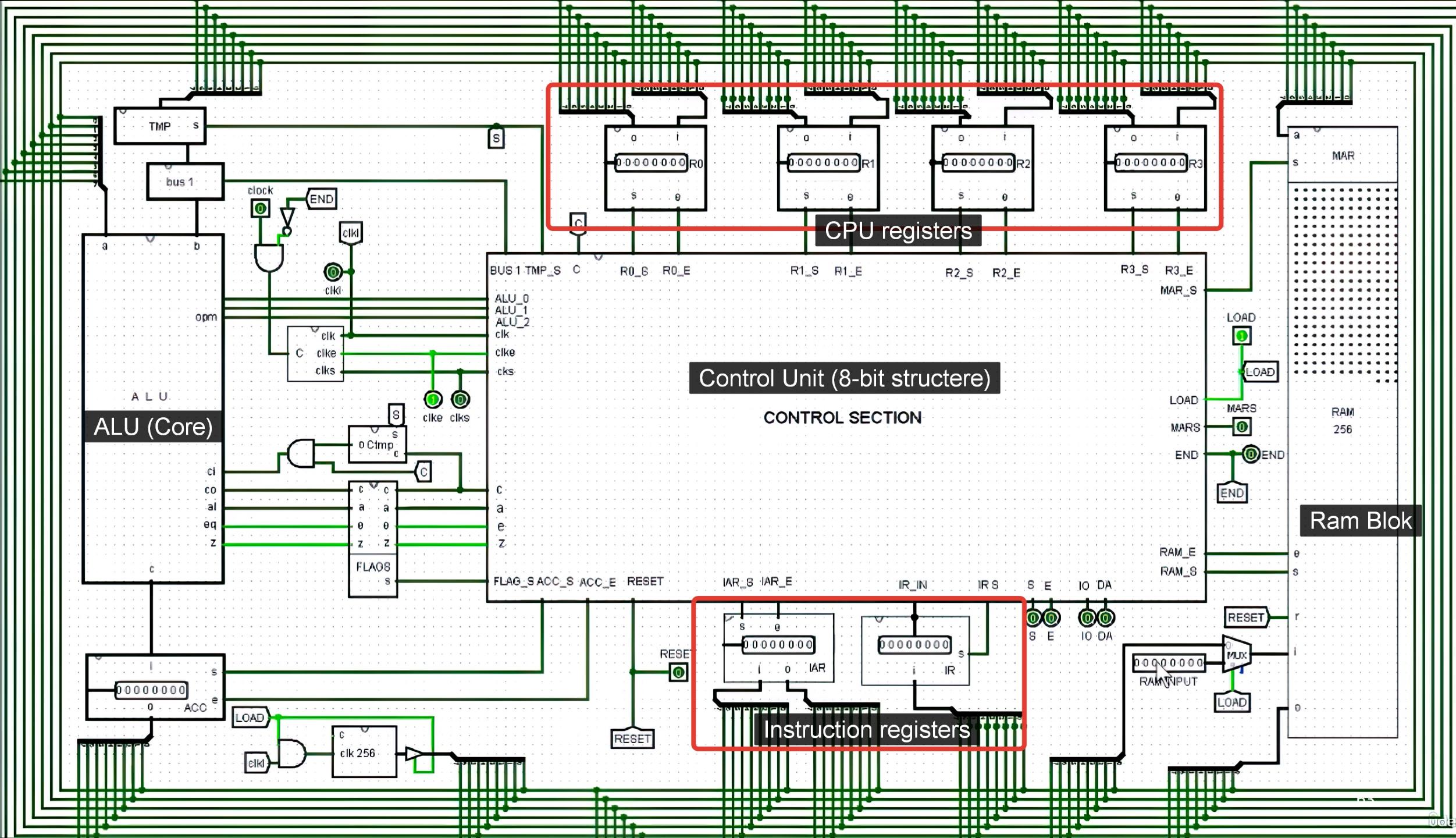


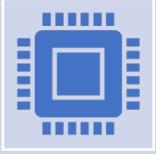
Computer Hardware

CPU Central Process Unit

- The computer's central processing unit (CPU) is the portion of a computer that retrieves and executes instructions. The CPU is essentially the brain of a computer system. It consists of an arithmetic and logic unit (ALU), a control unit, and various registers. The CPU is often referred to as the processor. The ALU performs arithmetic, logic, and related operations according to the program instructions.







Registers are high-speed internal memory-storage units within the CPU.



The instruction set, also called ISA (instruction set architecture), is part of a computer that pertains to programming, which is more or less machine language. The instruction set provides commands to the processor to tell it what it needs to do. The instruction set addresses modes, instructions, native data types, registers, memory architecture, interrupt and exception handling, and external I/O.

Çözüm Gezgini

Çözüm Gezgini İçinde Ara (Ctrl+Ş)

Çözüm 'MicroprocessorLabPeractice1' (1 / 1 proje)

MicroprocessorLabPeractice1

- ■ Başvurular
- Dış Bağımlılıklar
- Kaynak Dosyalar
- main.asm
- Kaynak Dosyaları
- Üst Bilgi Dosyaları

main.asm

```
.386 ; 8086 no available but all 8086 code can run 86 families Intel 80386 mic. is used
.model small ; Segment definition small= DS=SS
.stack 100h ; marks the beginning of the stack segment
.data ; marks the beginning of the data segment
.code ; marks the beginning of the code segment
main proc ; starts with PROC (procedures) directive

MOV DX,14h ; write 14h into DX register
MOV AX,28h ; write 28h into AX register
ADD AX,DX ; 14h add with 28h and write the result into the AX register
MOV DX,10h ; write 10h into DX register
MOV AX,2h ; write 2h into AX register
MUL DX ; 10h multiply by 2h and write the result into the AX register

main endp ; ends by ENDP directive
end main ; end of the file
```

121 % Sorun bulunamadı Sat: 18 Krkt: 2 SEKMELER CRLF

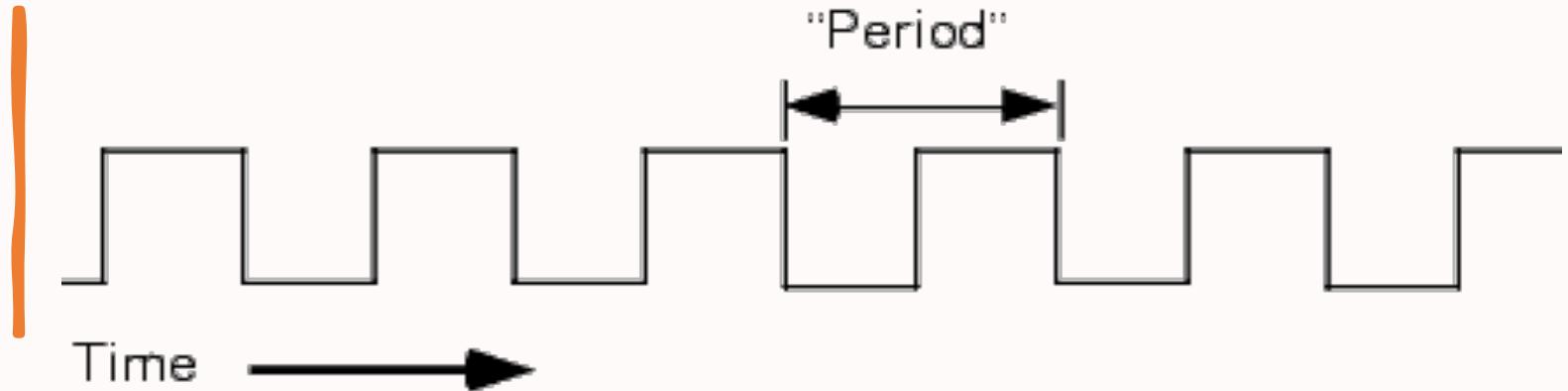
Çıktı

Şu çıktıyi göster: Derleme

```
1>Assembling main.asm...
1>main.asm(16): warning A4023: with /coff switch, leading underscore required for start address : main
1>MicroprocessorLabPeractice1.vcxproj -> C:\Users\HASAN\source\repos\MicroprocessorLabPeractice1\Debug\MicroprocessorLabPeractice1.exe
1>"MicroprocessorLabPeractice1.vcxproj" projesini oluşturma tamamlandı.
===== Oluşturma: 1 başarılı, 0 başarısız, 0 güncel, 0 atlandı =====
```

İşlemler Çözüm Gezgini Takım Gezgini Hata Listesi Çıktı

Clock speed of Cpu



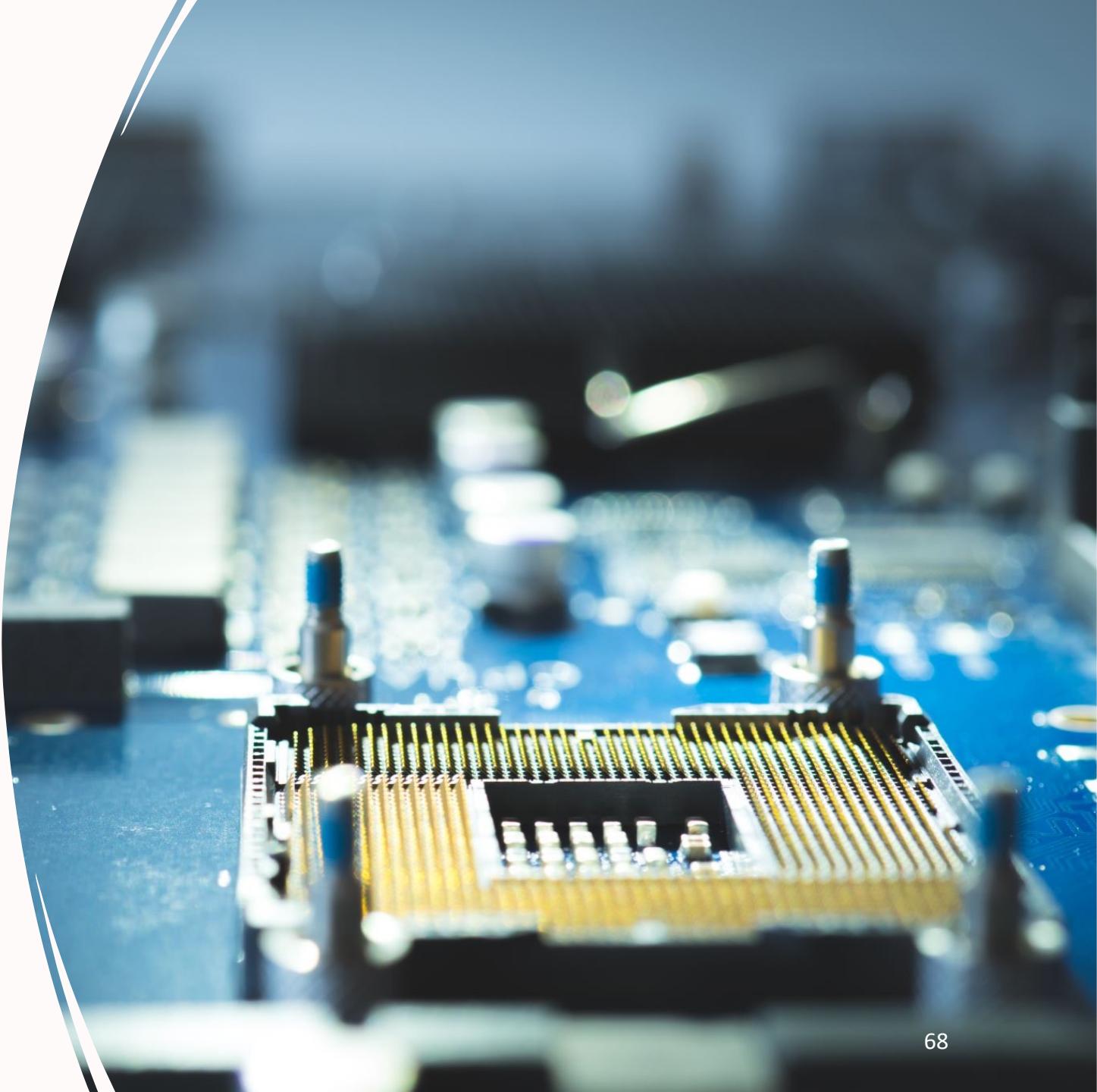
- In general, a higher clock speed means a faster CPU. However, many other factors come into play.
- CPUs process many instructions from different programs every second. The clock speed measures the number of cycles your CPU executes per second; A “cycle” is technically a pulse that lets the CPU process data. For example, a CPU with a clock speed of 2.2 GHz executes 2.2 billion cycles per second. That means all CPU unit takes 2.2 billion steps in one second.
- The processing speed also depends on many other things. One of them is CPU designs. Sometimes, multiple instructions are completed in a single clock cycle; in other cases, one instruction might be handled over multiple clock cycles.

Cache size of Cpu

- Cache is a small amount of high-speed random-access memory (RAM) built directly within the processor. It temporarily holds data and instructions that the processor will likely reuse.
- The bigger its cache, the less time a processor waits for instructions to be fetched.

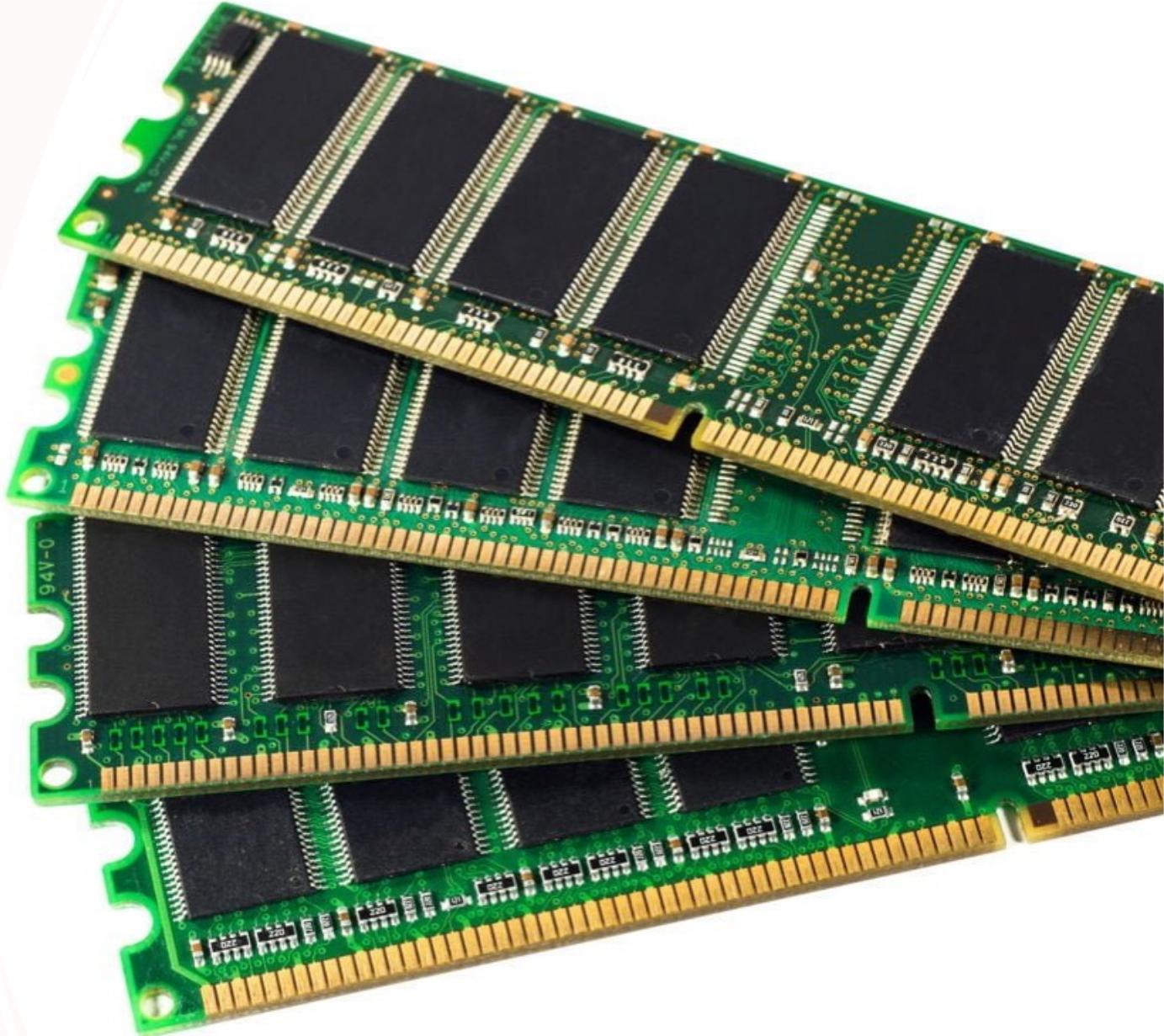
Number of cores of Cpu

- A processing unit within a CPU is known as a core. Each core is capable of fetching, decoding and executing its instructions.
- The more cores a CPU has, the greater the number of instructions it can process in a given space. Many modern CPUs are now multiple-core processors. This provides vastly superior processing power compared to CPUs with a single core for some operations.



Ram

- RAM stands for random-access memory, but what does that mean? Your computer RAM is essentially short-term memory, storing data as the processor needs it.
- RAM (random access memory) is a computer's short-term memory, where the data the processor uses is stored. Your computer can access RAM much faster than data on a hard disk, SSD, or another long-term storage device, which is why RAM capacity is critical for system performance.



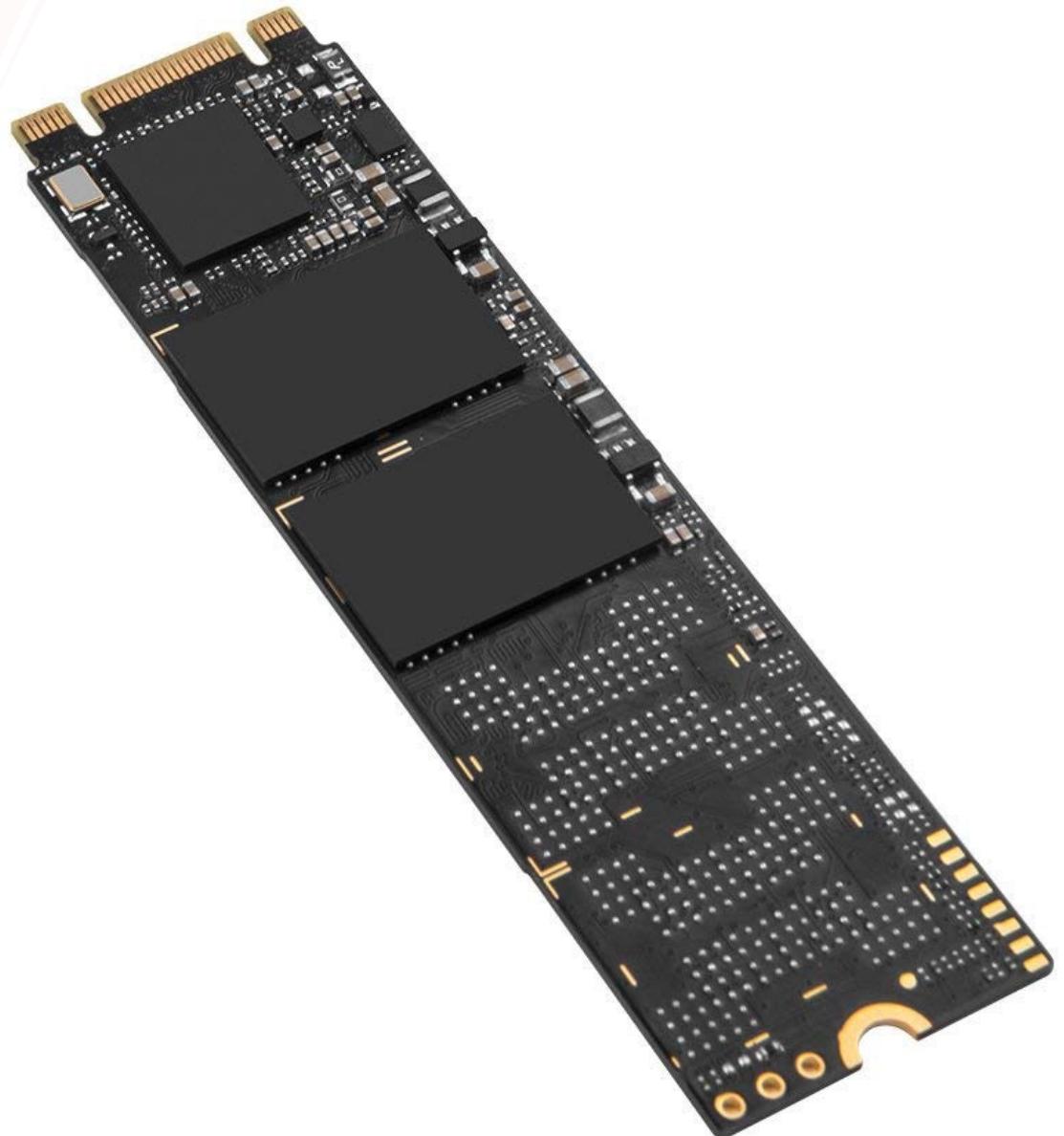
HDD

- An HDD is a data storage device that lives inside the computer. It has spinning disks inside where data is stored magnetically. The HDD has an arm with several "heads" (transducers) that read and write data on the disk. It is similar to how a turntable record player works, with an LP record (hard disk) and a needle on the arm (transducers). The arm moves the heads across the disk's surface to access different data.



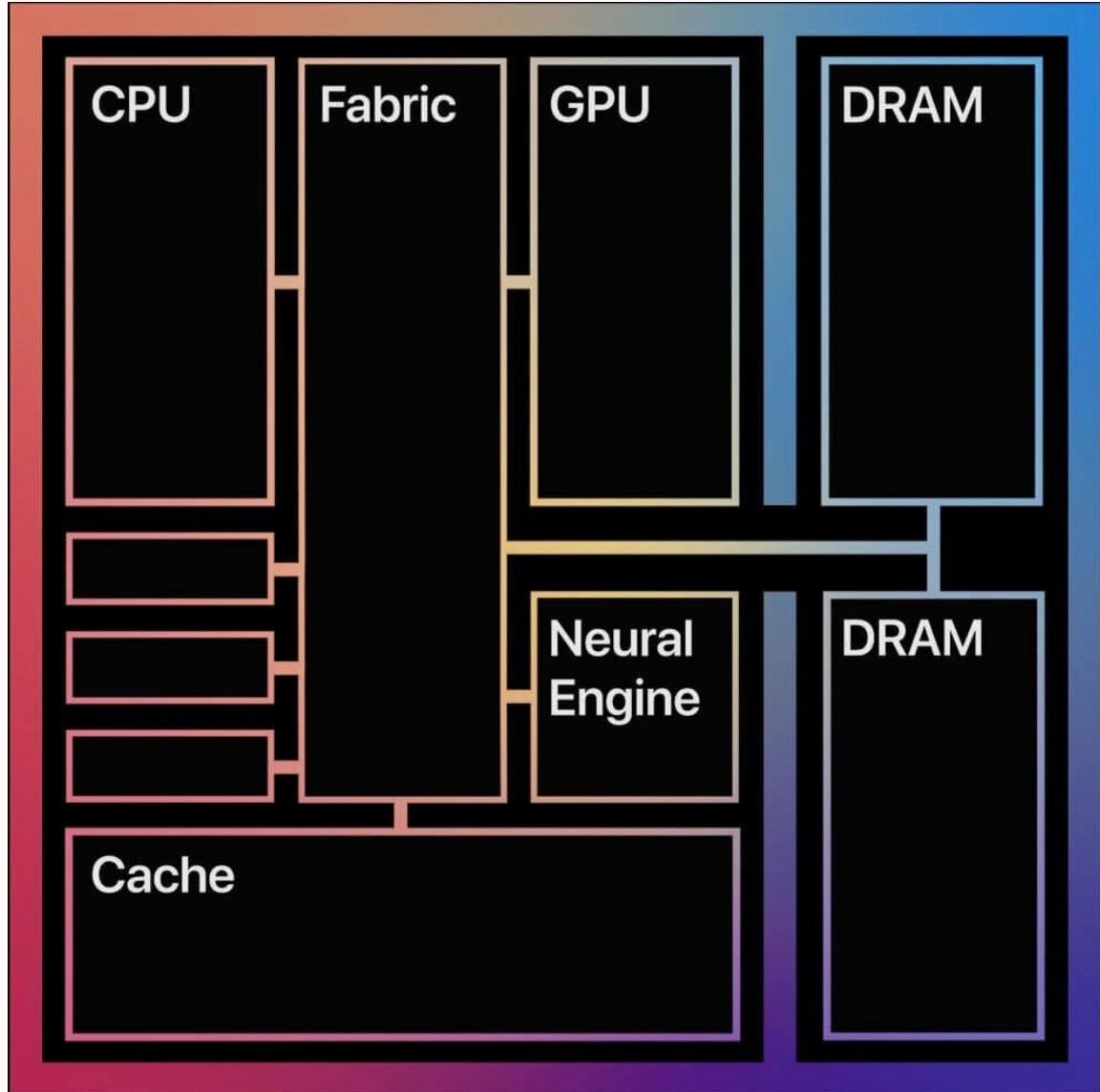
SSD

- In an SSD, all data is stored in integrated circuits. This difference from HDDs has many implications, especially in size and performance. Without the need for a spinning disk, SSDs can reduce to the shape and size of a stick of gum (what's known as the M.2 form factor) or even as small as a postage stamp. Their capacity—or how much data they can hold—varies, making them flexible for smaller devices, such as slim laptops, convertibles, or 2-in-1s. And SSDs dramatically reduce access time since users don't have to wait for platter rotation to start up.

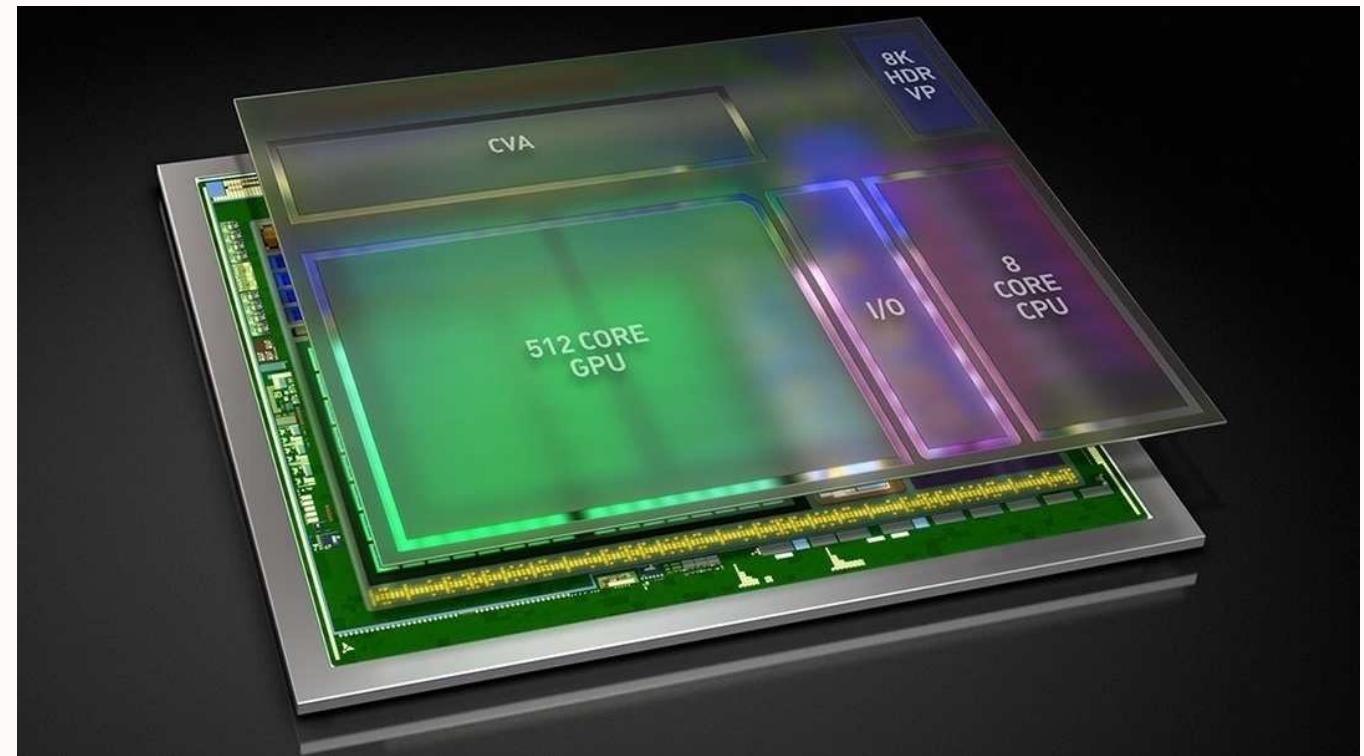


System-on-Chip Technology

- System on a chip means an IC (chip) that integrates multiple system components onto a single chip.
- System-on-Chip SoC brings more computer units such as cores, busses, networks, memories and many others into a single chip. Thus increasing performance, low power consumption and small sizes are aimed.



System-on-Chip



Linux Graphical Interface

Hasan Yiğit, RA

mu.edu.tr

 Type to search7
5

Introduction

- We will learn in this section:
 - Manage the graphical interface
 - Perform basic operations using the graphical interface.
 - Change the graphical desktop to suit your needs



Graphical Desktop

- You can use either a Command Line Interface (CLI) or a Graphical User Interface (GUI) when using Linux. To work at the CLI, you must remember which programs and commands are used to perform tasks and how to quickly and accurately obtain more information about their use and options. On the other hand, using the GUI is often quick and easy. It allows you to interact with your system through graphical icons and screens. For repetitive tasks, the CLI is often more efficient, while the GUI is easier to navigate if you do not remember all the details or do something only rarely.



ivities

Terminal

Sep 28 21:13



+

hasan@localhost:~

hasan@localhost:~>

```
ygt@ygt: ~
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\ygth> ssh ygt@192.168.1.4
ygt@192.168.1.4's password:
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 4.9.253-tegra aarch64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage
This system has been minimized by removing packages and content that are
not required on a system that users do not log into.

To restore this content, you can run the 'unminimize' command.

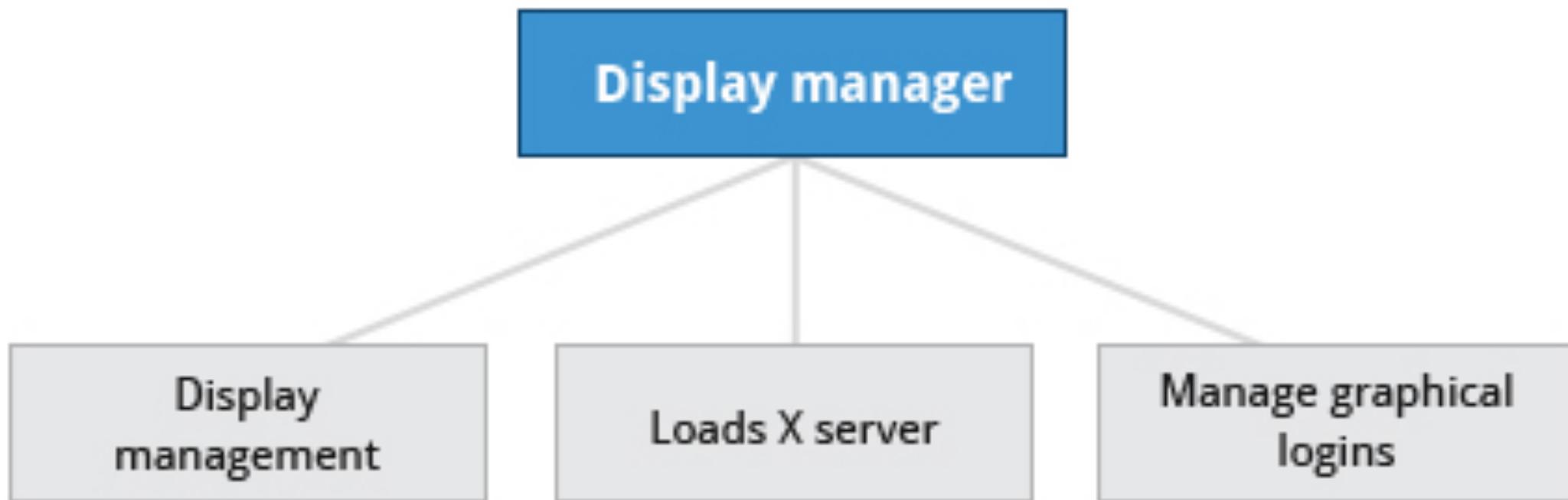
7 updates can be applied immediately.
4 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Last login: Mon Sep 26 11:35:29 2022 from 192.168.1.2
ygt@ygt:~$ echo hello
hello
ygt@ygt:~$
```

X Window System

- Generally, in a Linux desktop system, the X Window System is loaded as one of the final steps in the boot process. It is often just called X.
- A service called the **Display Manager** keeps track of the displays being provided and loads the X server (so-called because it allows for graphical services to applications, sometimes called X clients). The display manager handles graphical logins and starts the appropriate desktop environment after a user logs in.

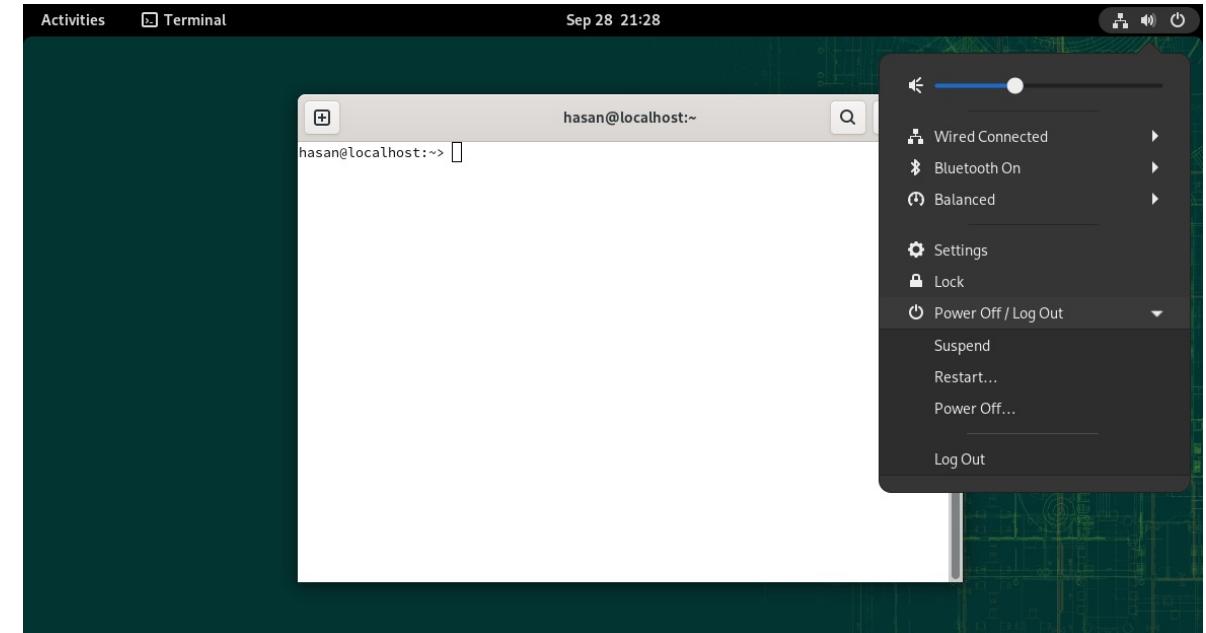
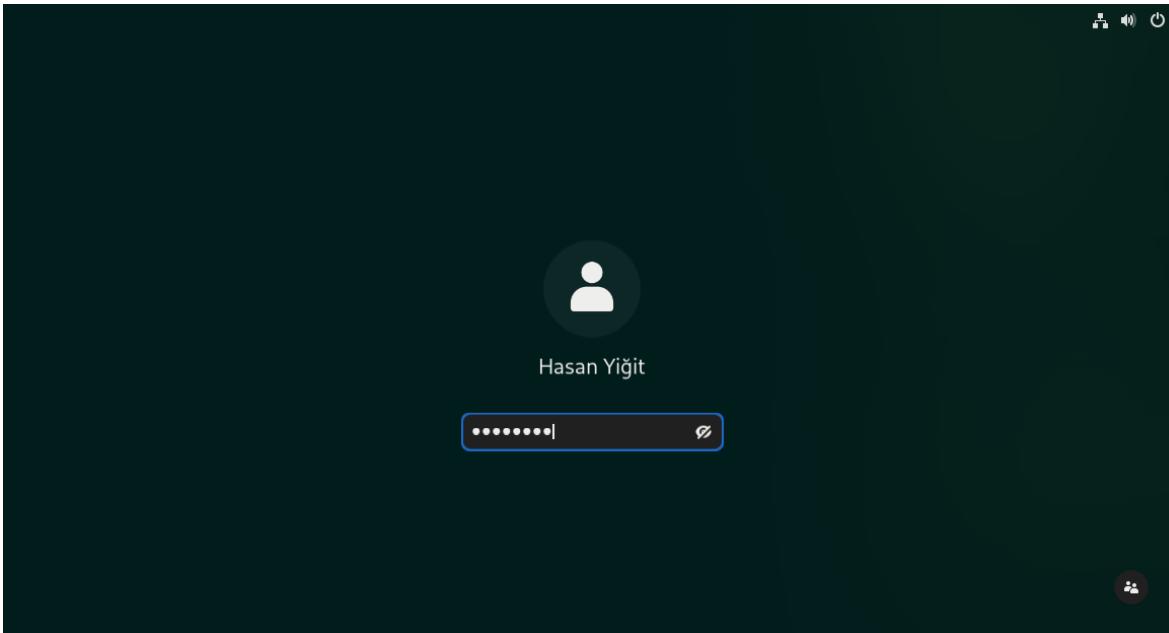




GUI Startup

- When you install a desktop environment, the X display manager starts at the end of the boot process. It is responsible for starting the graphics system, logging in to the user, and starting the user's desktop environment. You can often select from a choice of desktop environments when logging in to the system.
- GNOME is a popular desktop environment with an easy-to-use graphical user interface. GNOME has menu-based navigation and is sometimes an easy transition to accomplish for Windows users. However, as you will see, the look and feel can be pretty different across distributions, even if they are all using GNOME.

System Startup and Logging In and Out





Locking the Screen

- It is often a good idea to lock your screen to prevent other people from accessing your session while you are away from your computer.
- NOTE: This does not suspend the computer; all your applications and processes continue to run while the screen is locked.

- There are two ways to lock your screen:
- Using the graphical interface
- Clicking in the desktop's upper-right corner, then clicking on the lock icon.
- Using the keyboard shortcut SUPER-L
- (The SUPER key is also known as the Windows key).
- The keyboard shortcut for locking the screen can be modified by altering keyboard settings; the exact prescription varies by distribution but is not hard to ascertain.
- To re-enter the desktop session, you must provide your password again.

ties

Sep 28 22:09



- Volume slider (blue bar with white dot)
- Wired Connected ▶
- Bluetooth On ▶
- Balanced ▶
- Settings
- Lock ←
- Power Off / Log Out ▶

Suspending

- All modern computers support **Suspend** (or **Sleep**) **Mode** when you want to stop using your computer for a while. *Suspend Mode* saves the current system state and allows you to resume your session more quickly while remaining on, but it uses very little power in the sleeping state. It works by keeping your system's applications, desktop, and so on in system RAM but turning off all other hardware. This shortens the time for a complete system start-up and conserves battery power. One should note that modern Linux distributions boot so fast that the amount of time saved is often minor.



ties

Sep 28 22:15



Wired Connected

Bluetooth On

Balanced

Settings

Lock

Power Off / Log Out

Suspend

Restart...

Power Off...

Log Out





Starting Applications

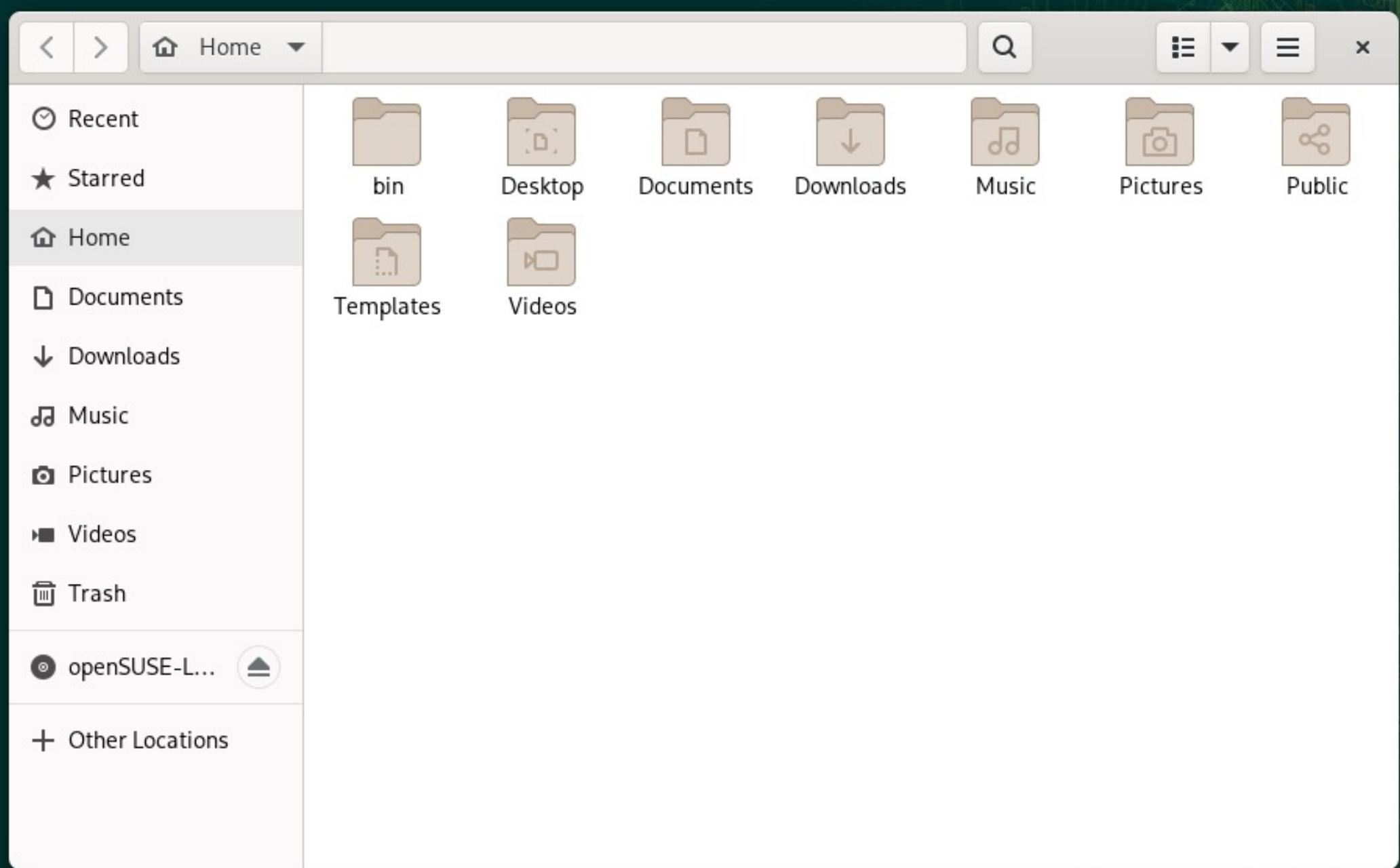
- Linux allows you to open applications using the graphical interface quickly.
- Applications are found at different places in Linux (and within GNOME):
 - From the Applications menu in the upper-left corner.
 - From the Activities menu in the upper-left corner.
 - In some Ubuntu versions, from the Dash button in the upper-left corner.
 - For KDE and some other environments, applications can be opened from the button in the lower-left corner.



File Manager

- Each distribution implements the **Nautilus (File Manager)** utility, which is used to navigate the file system. It can locate files, and when a file is clicked upon, either it will run if it is a program, or an associated application will be launched using the file as data. This behavior is entirely familiar to anyone who has used other operating systems.

- The File Manager lets you access different locations on your computer and the network, including the Home directory, Desktop, Documents, Pictures, and Other Locations.
- Every user with an account on the system will have a home directory, usually created under /home and traditionally named according to the user, such as /home/student.
- By default, files the user saves will be placed in a directory tree. Account creation, whether during system installation or later, when a new user is added, also induces default directories to be created under the user's home directory, such as Documents, Desktop, and Downloads.



- Graphical interfaces are designed to be easy to navigate and figure out. They do not vary very much, not only from one distribution to another but even between operating systems. So, the only way you can get more adept at working efficiently on your desktop is to explore, play, and modify.
- Linux is so customizable that very few people who use it stay with the default look and feel of the desktop. You may start making your desktop reflect your likes and **personality**.

Linux System Configuration from the Graphical Interface

Hasan Yiğit, RA

mu.edu.tr

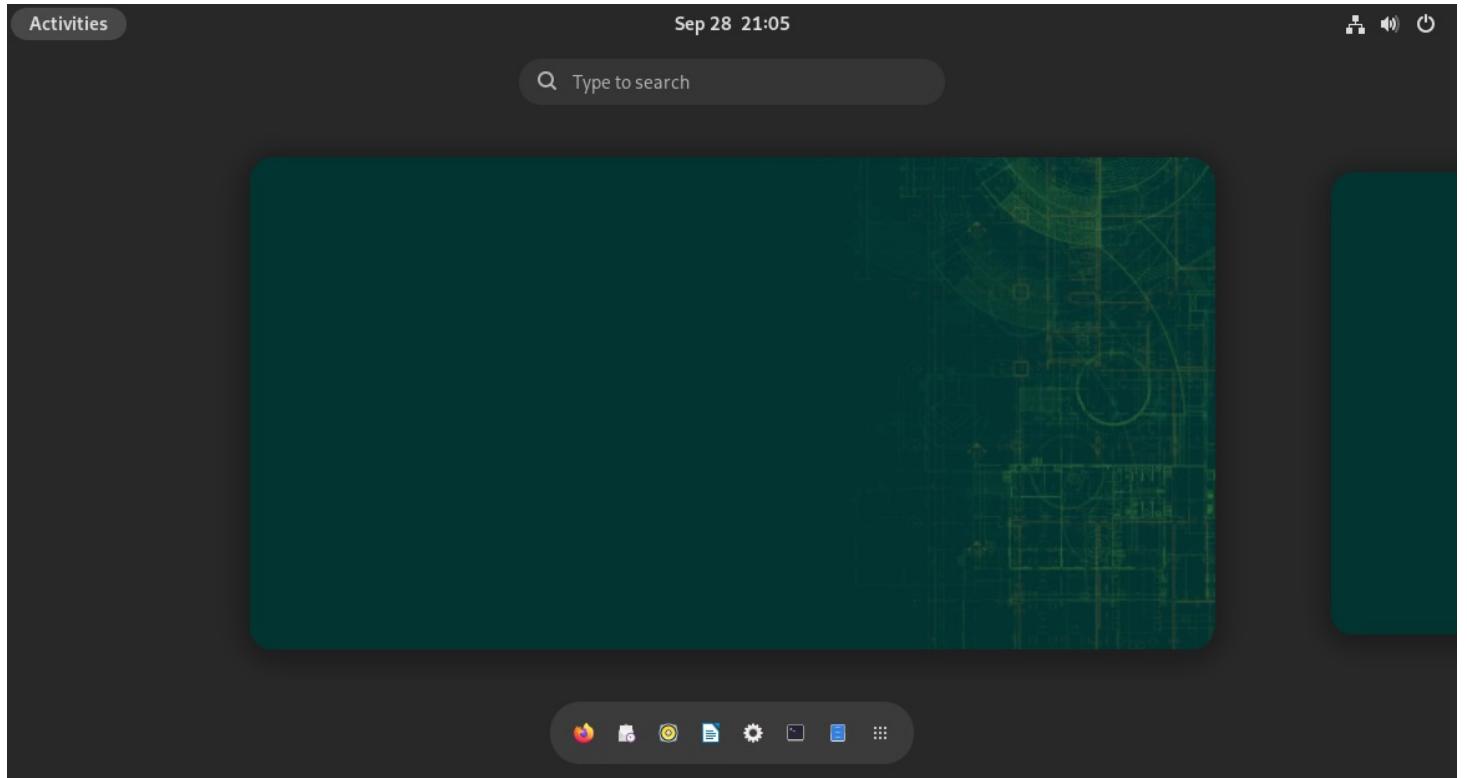
Introduction

- We will learn in this section:

 Apply system,
display, and date and time
settings using the System
Settings panel.

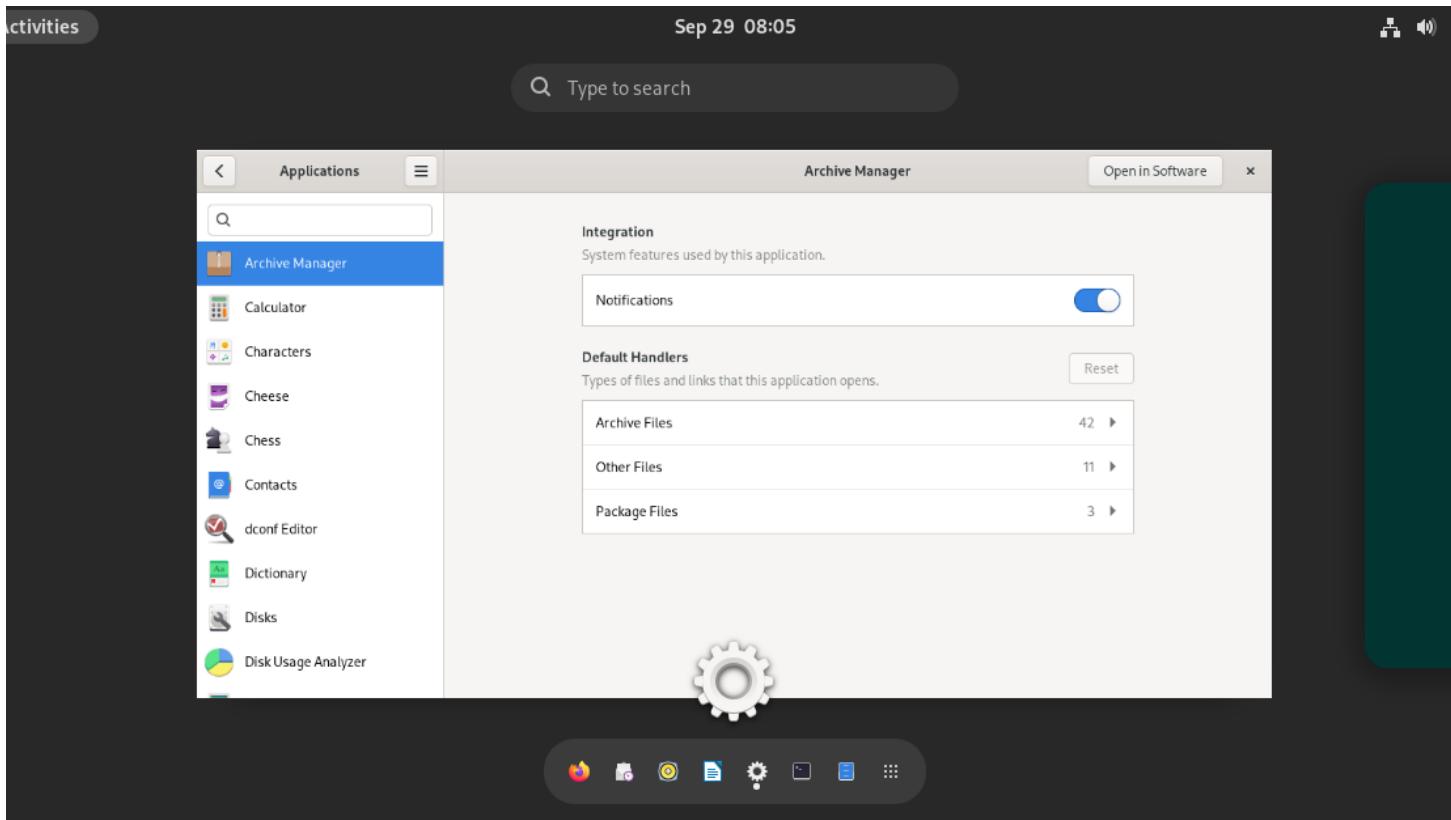
 Track the network
settings and manage
connections using Network
Manager in Linux.

 Install and update
software in Linux from a
graphical interface.



System Settings

- The System Settings panel allows you to control most of the basic configuration options and desktop settings, such as specifying the screen resolution, managing network connections, or changing the date and time of the system.





Settings



Sharing

Sound

Power

Displays

Mouse & Touchpad

Keyboard

Printers

Removable Media

- Configuring the User Attributes

Color

Region & Language

Accessibility

Users

Default Applications

Date & Time

About

Users

Add User...



Unlock to Add Users and Change Settings

Some settings must be unlocked before they can be changed.

Unlock...

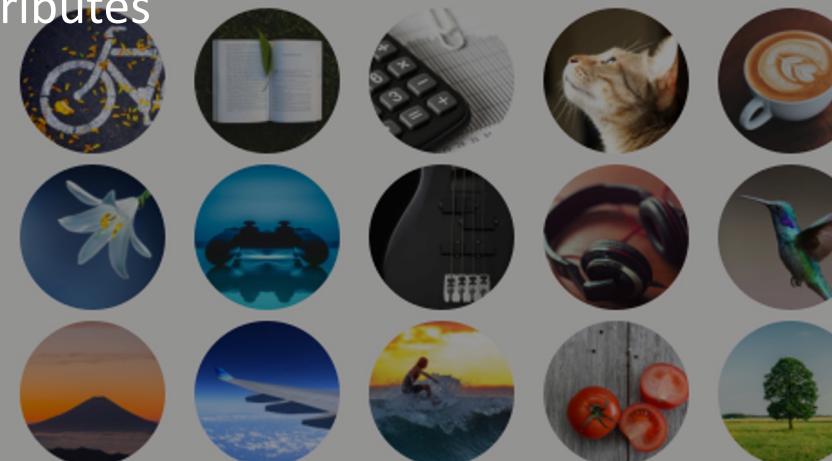
Hasan Yiğit



..... >



Logged in >



Remove User...

• WiFi

Bluetooth

Background

Dock

Notifications

Search

Region

Universities

Online

Privacy

Sharing

Sound

Power

Network

Devices

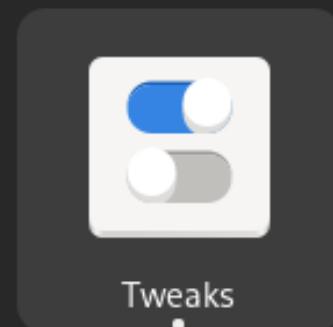
Details

Cancel

Wallpapers Pictures Colors

• You can change the background easily.

- A lot of personalized configuration settings do not appear on the settings menus.
- Instead, you have to launch a tool called either `gnome-tweaks` (`tweaks`) (or `gnome-tweak-tool` on older Linux distributions).
- Some distributions link to the tweaks menus in the settings, but for some mysterious reason, many obscure this tool's existence.
- It becomes hard to discover how to modify even rather primary desktop attributes and behavior.

 tweaks|

Firefox



Search the web for tweaks

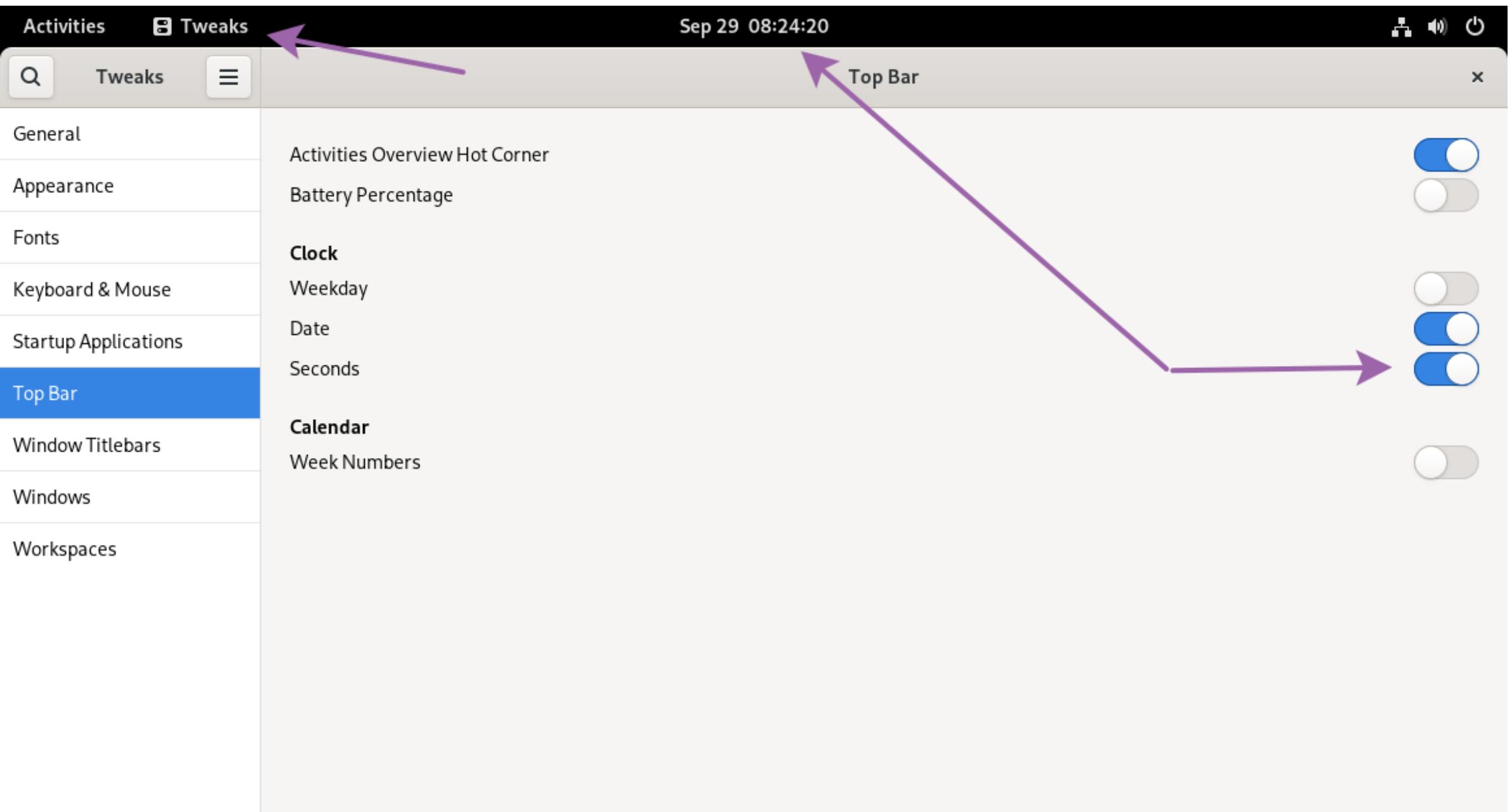


Software

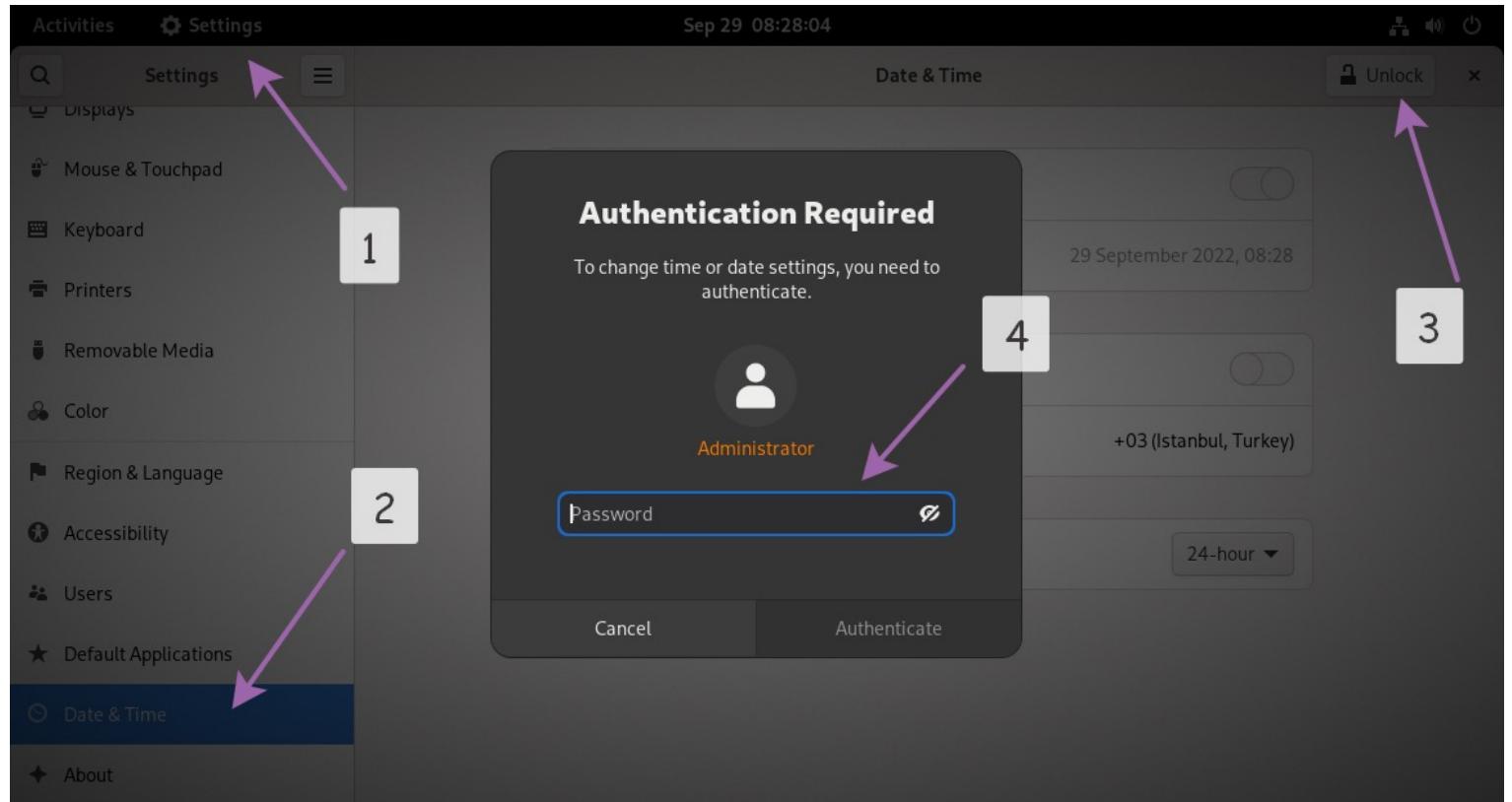


GNOME Tweaks Tweak advanced GNOME 3 settings





Date and Time Settings



Network Configuration

- We can reach the Network and Bluetooth settings under the setting section.

The screenshot shows the 'Network' tab selected in the Settings application. On the left sidebar, 'Network' is highlighted in blue, along with other options like 'Bluetooth', 'Background', 'Notifications', and 'Search'. The main area displays 'Wired' network information, showing a connection to 'Connected - 1000 Mb/s' with a blue toggle switch and a gear icon for settings. Below it is a 'VPN' section with the status 'Not set up' and a 'Manual' button with a gear icon. The top right corner of the window has a close button ('x').

Cancel **Wired** Apply

Details Identity **IPv4** IPv6 Security

IPv4 Method

- Automatic (DHCP)
- Link-Local Only
- Manual
- Disable
- Shared to other computers

DNS Automatic

Separate IP addresses with commas

Routes Automatic

Address	Netmask	Gateway	Metric
			<input type="button" value="x"/>

Use this connection only for resources on its network

x

+



+



Installing and Updating Software

- Each package in a Linux distribution provides one piece of the system, such as the Linux kernel, the C compiler, utilities for manipulating text or configuring the network, or your favorite web browsers and email clients.
- For Debian-based systems, **dpkg** is the underlying package manager for these systems. It can install, remove, and build packages. Unlike higher-level package management systems, it does not automatically download and install packages and satisfy their dependencies.



- Red Hat Package Manager (RPM) is another package management system popular on Linux distributions. It was developed by Red Hat and adopted by several other distributions, including SUSE/openSUSE, Mageia, CentOS, Oracle Linux, and others.
- **openSUSE's**
The **Y**et **a**nother **S**etup **T**ool (YaST) software manager is similar to other graphical package managers. It is an RPM-based application. You can easily add, remove, or update packages using this application.



Activities Software

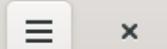
Sep 29 09:16



* Explore

Installed

Updates •



Q chr



Chromium Web Browser



The web browser from Chromium project



Gromit-MPX



Gromit-MPX is a tool to make annotations on the screen



Kronometer



Chronometer

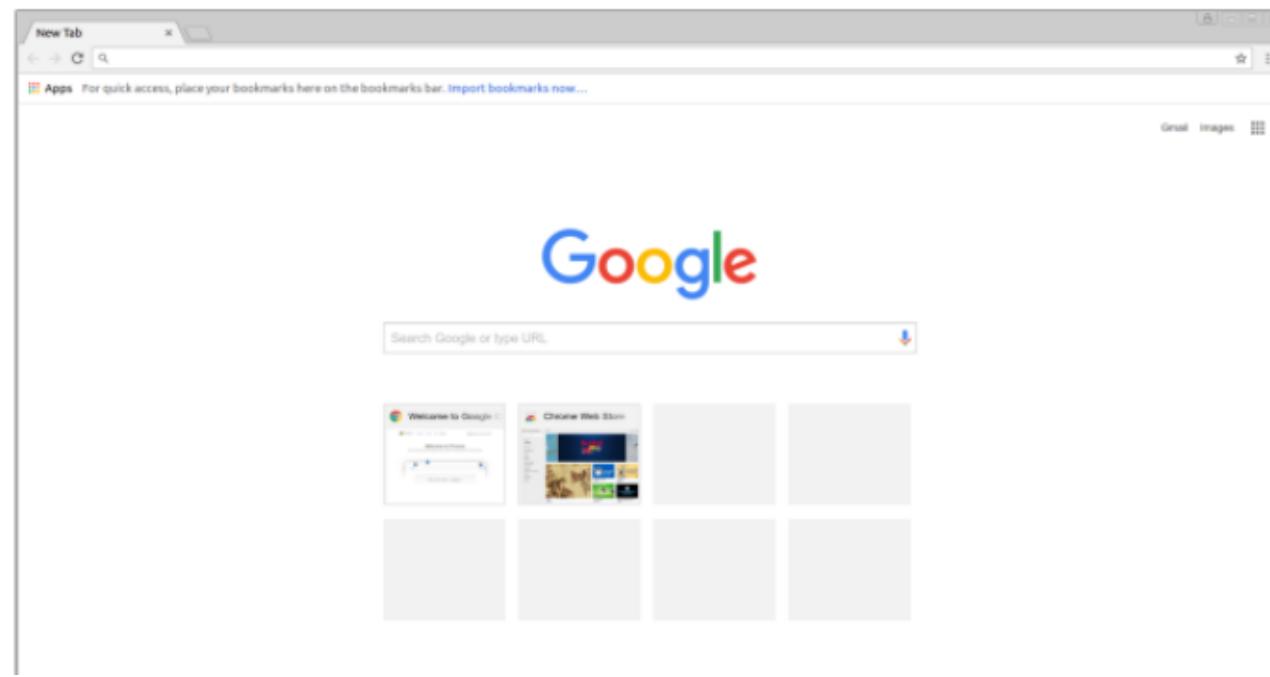


Archive Manager



Create and modify an archive

Installed



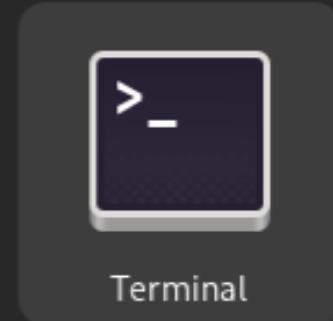
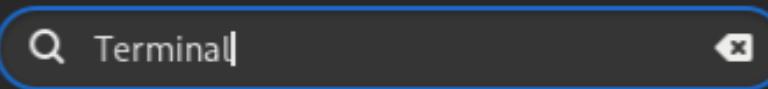
Linux Command Line

Hasan Yiğit, RA

mu.edu.tr

Introduction

- We will learn in this section:
 - Use the command line to perform operations in Linux.



Terminal



XTerm

- MATE Terminal A terminal emulator for the MATE desktop environment
- Terminator Multiple terminals in one window
- Konsole Terminal
- Tilda A configurable drop-down terminal
- QTerminal A lightweight multiplatform terminal emulator.



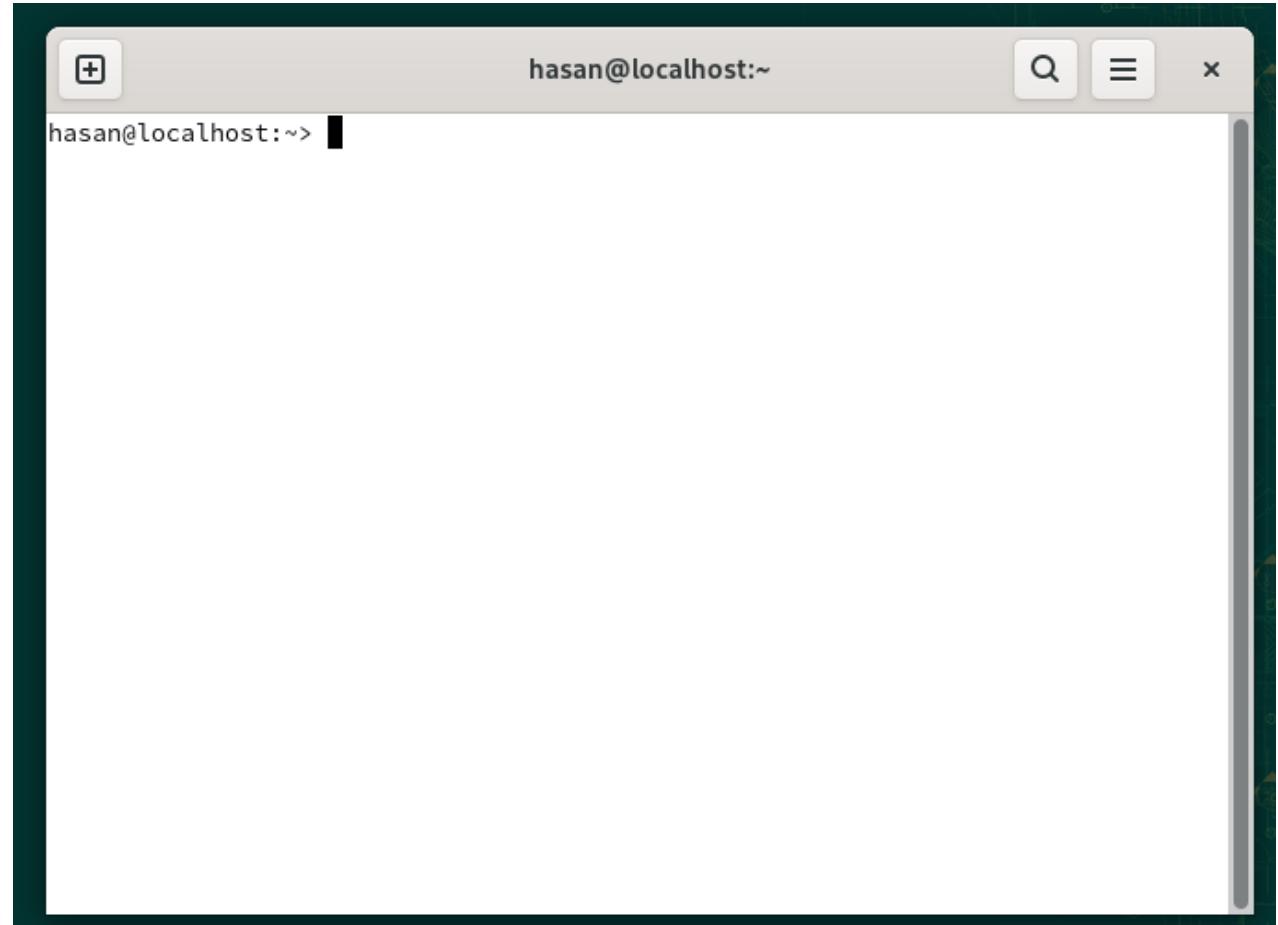
System Settings

- There is a saying, "graphical user interfaces make easy tasks easier, while command line interfaces make complex tasks possible. " Linux relies heavily on the abundance of command line tools.



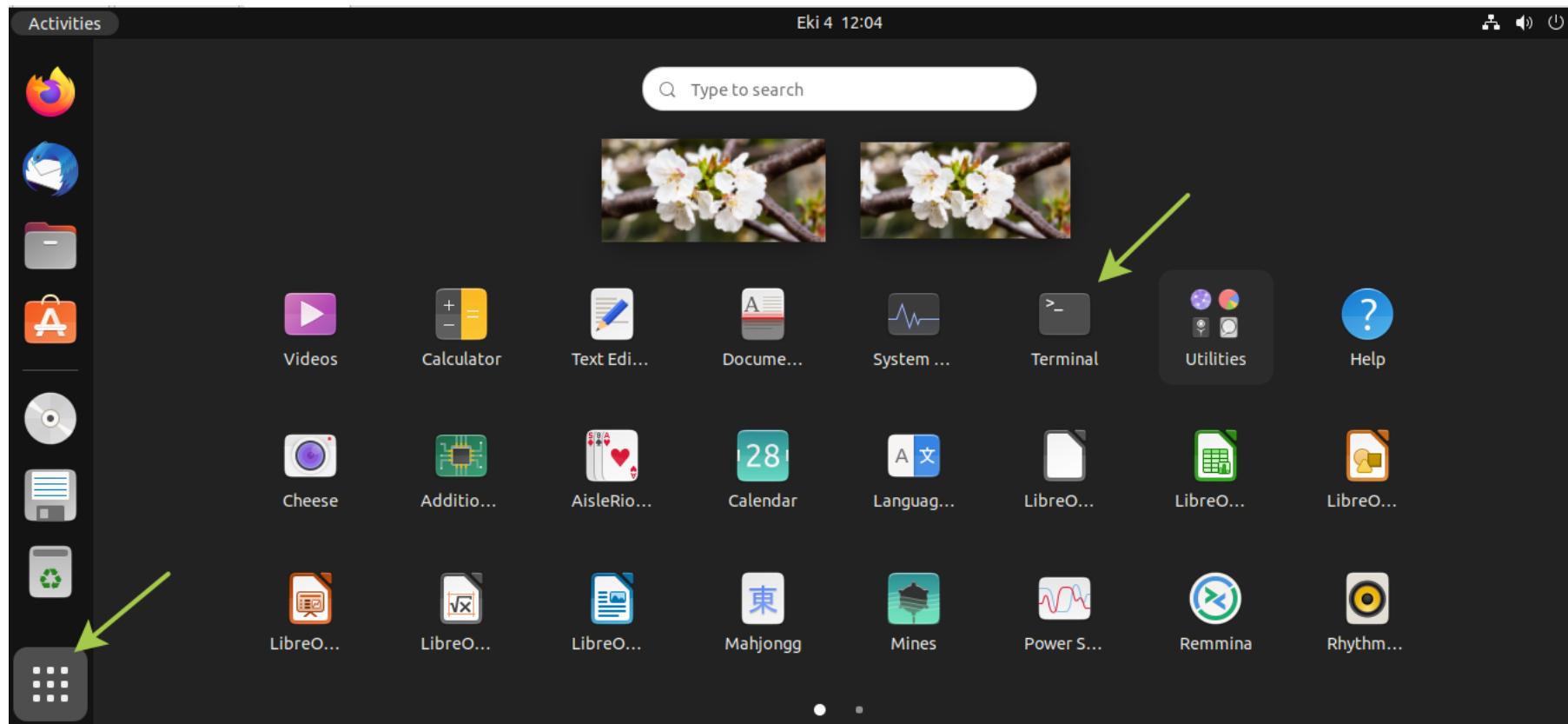
- The command line interface provides the following advantages:
 - No GUI overhead is incurred.
 - Virtually any task can be accomplished while sitting at the command line.
 - You can implement scripts for often-used (or easy-to-forget) tasks and procedures.
 - You can sign into remote machines anywhere on the Internet.
 - You can initiate graphical applications directly from the command line instead of hunting through menus.
 - While graphical tools may vary among Linux distributions, the command line interface does not.

- A **terminal emulator** program emulates (simulates) a standalone terminal within a window on the desktop. By this, we mean it behaves like you were logging into the machine at a pure text terminal with no running graphical interface.



Launching Terminal Windows

- To open a terminal on any system using a recent GNOME desktop click on Applications > System Tools > Terminal or Applications > Utilities > Terminal.



The Command Line

- Most input lines entered at the shell prompt have three essential elements:
 - Command
 - Options
 - Arguments
- The command is the name of the program you are executing. It may be followed by one or more options (or switches) that modify what the command may do. Options usually start with one or two dashes, for example, -p or --print, to differentiate them from arguments, which represent what the command operates on.

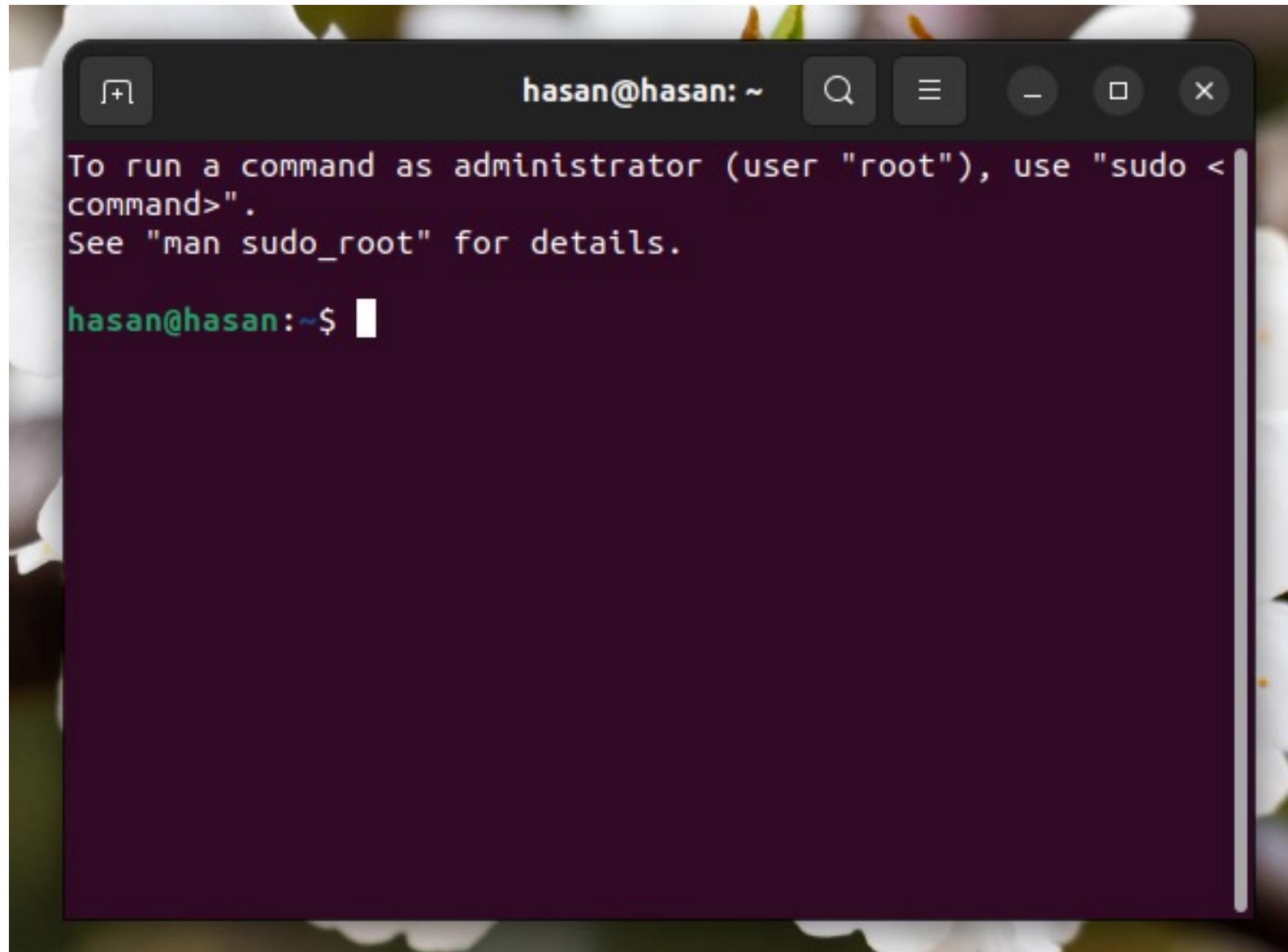
Some Basic Utilities

- some essential command line utilities are used constantly, and it would be impossible to proceed further without using some of them in the simple form before we discuss them in more detail. A short list has to include:
 - **cat**: used to type out a file (or combine files).
 - **head**: used to show the first few lines of a file.
 - **tail**: used to show the last few lines of a file.
 - **man**: used to view documentation.



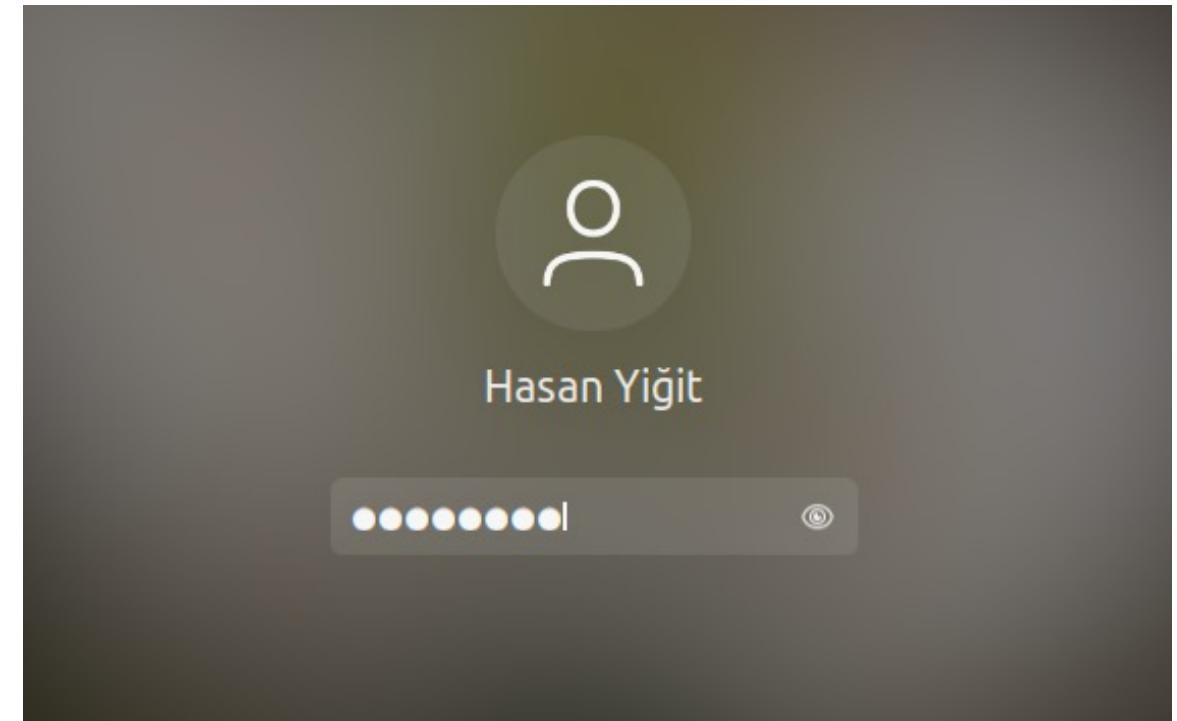
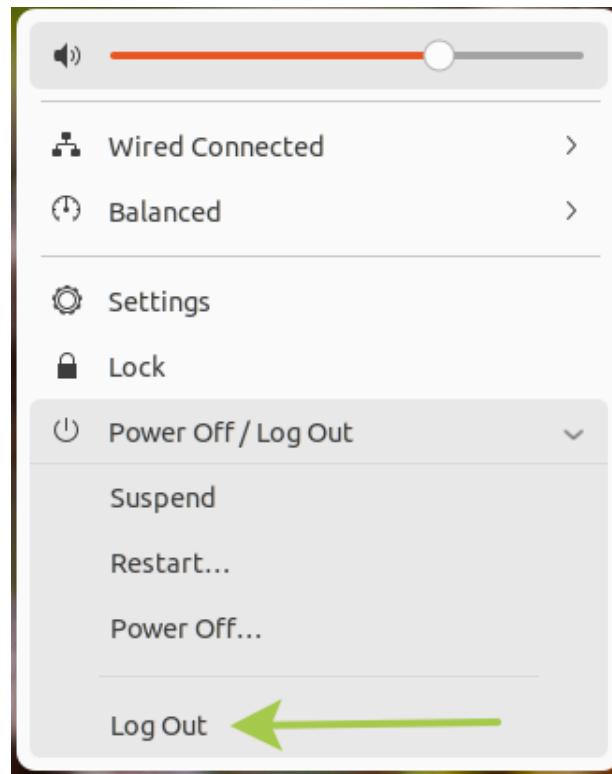
sudo

- All the demonstrations created have a user configured with **sudo** capabilities to provide the user with administrative (admin) privileges when required.
- **Sudo** allows users to run programs using the security privileges of another user, generally root (superuser).



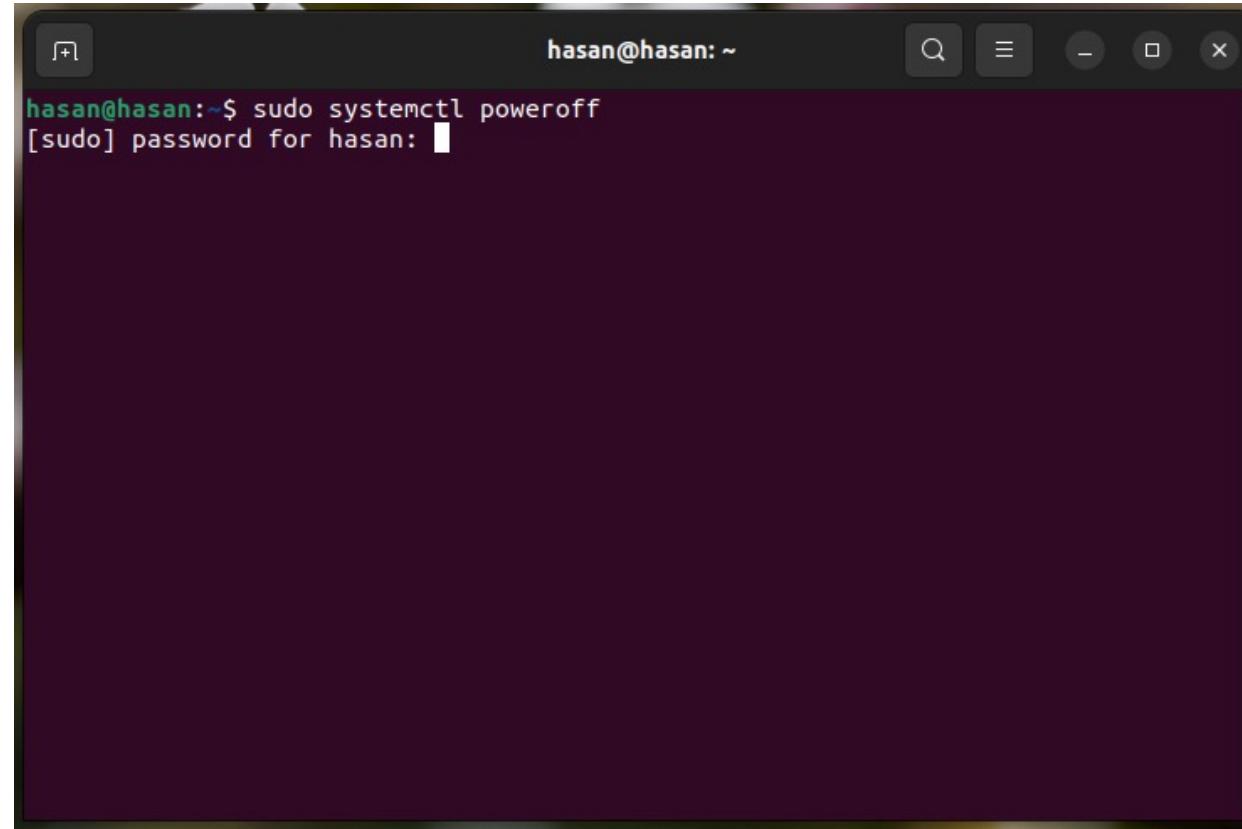
Logging In and Out

- When you begin working on your system, you must log in. Logging in tells the system who you are and what you have permission to do. Likewise, when you finish, you will log out so that no one else can access your files without permission.



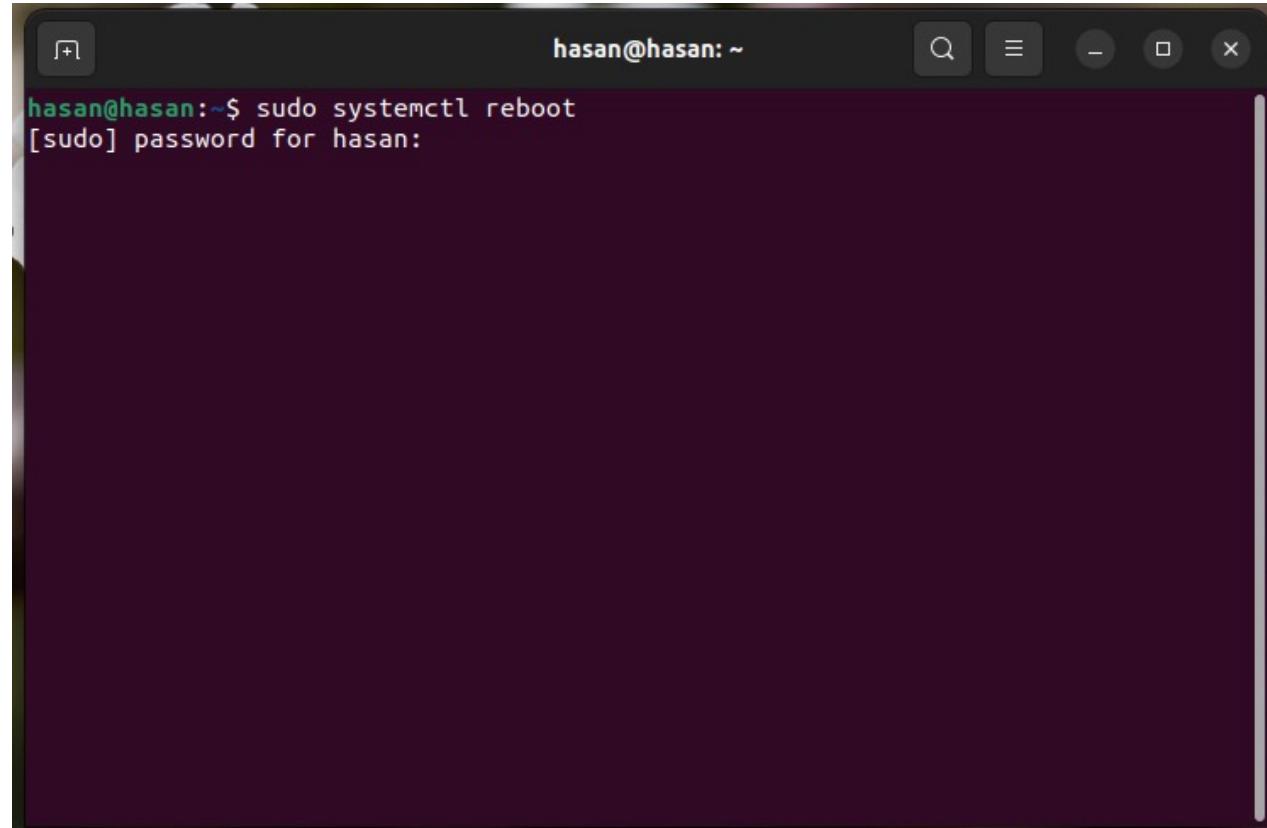
Shutting Down

The preferred method to shut down the system is to use the '**sudo systemctl poweroff**' command.



Rebooting System

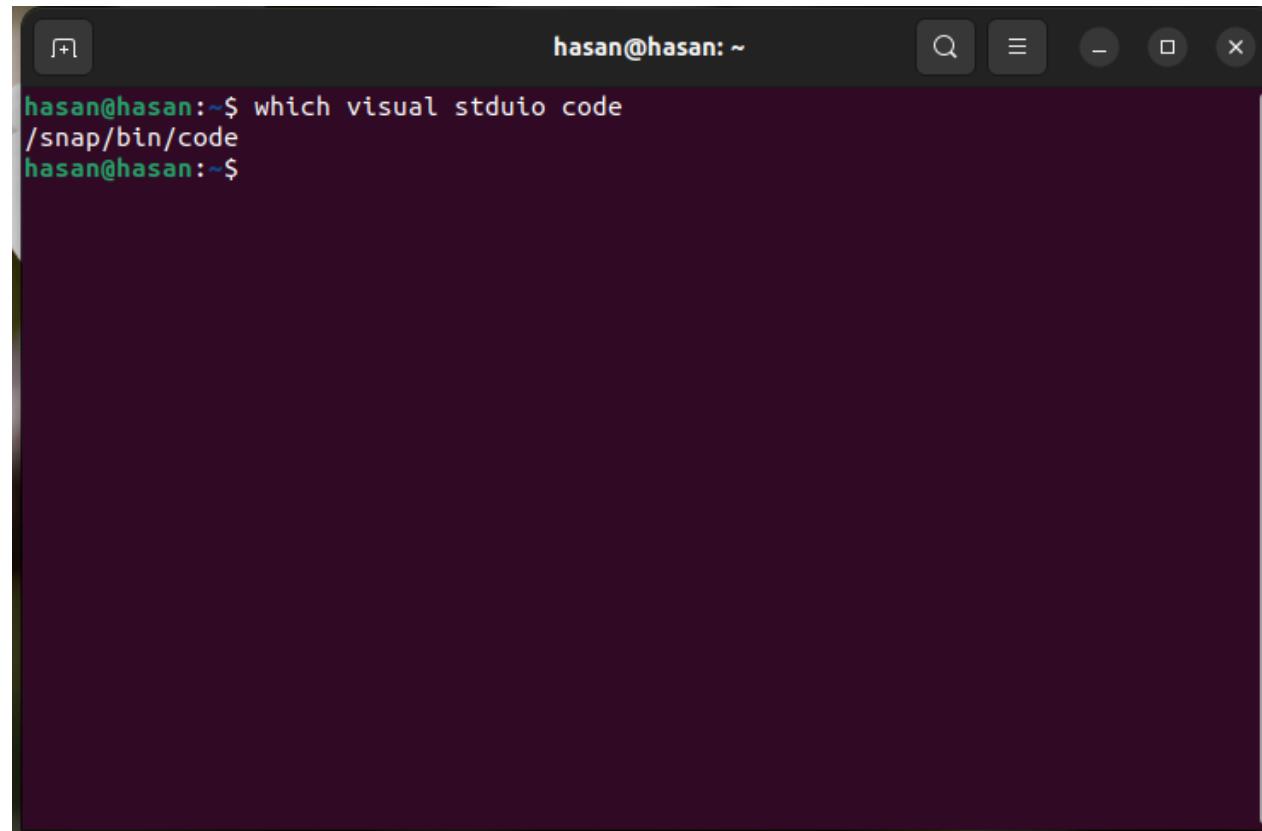
- The preferred method to reboot the system is to use the '**sudo systemctl reboot**' command.



A screenshot of a terminal window titled 'hasan@hasan: ~'. The window shows the command 'sudo systemctl reboot' being typed, followed by a password prompt '[sudo] password for hasan:'. The terminal has a dark background and light-colored text.

Locating Applications

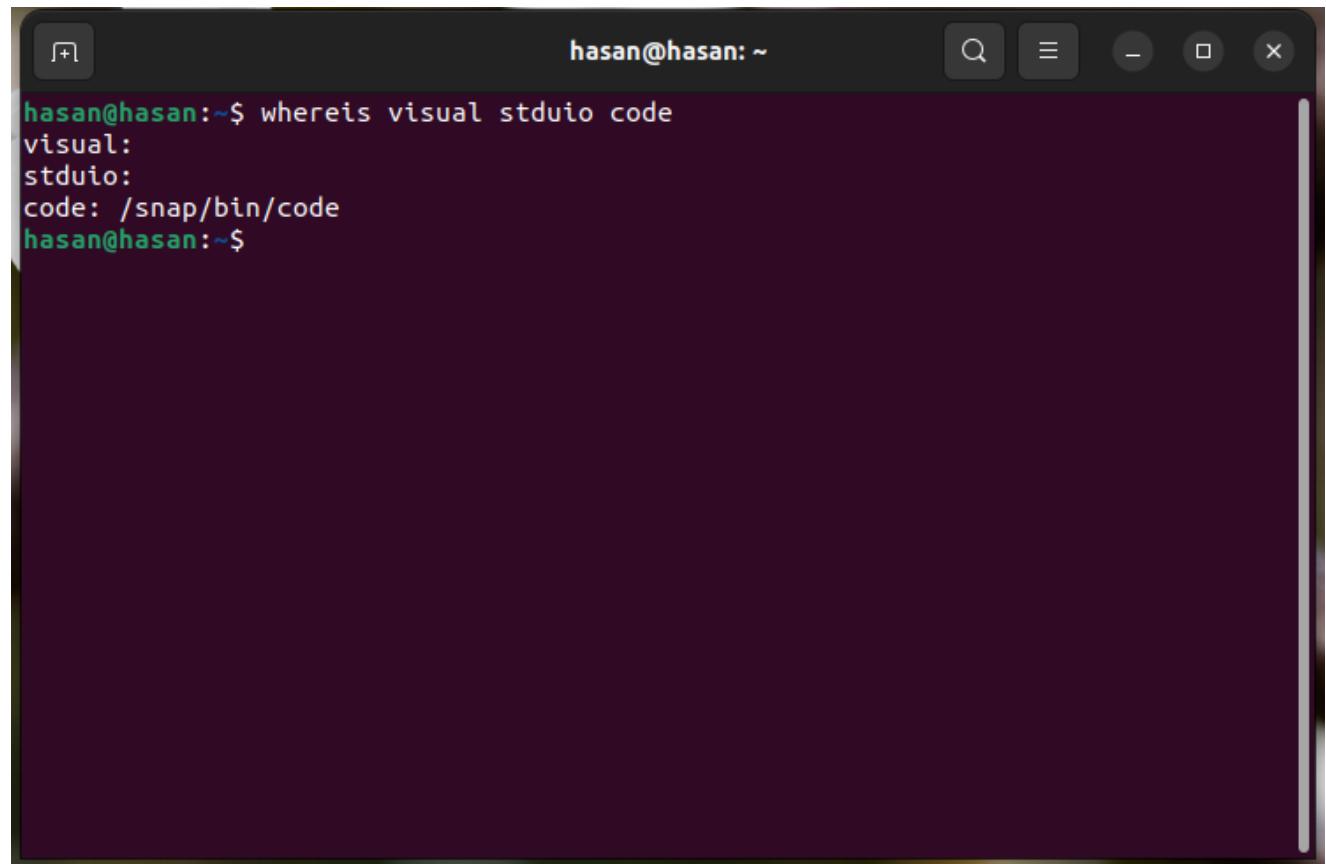
- if we find the location of any programs, we employ the which utility.



A screenshot of a terminal window titled "hasan@hasan: ~". The window contains the following text:

```
hasan@hasan:~$ which visual stduio code
/snap/bin/code
hasan@hasan:~$
```

- If which does not find the program, whereis is a good alternative because it looks for packages in a broader range of system directories:

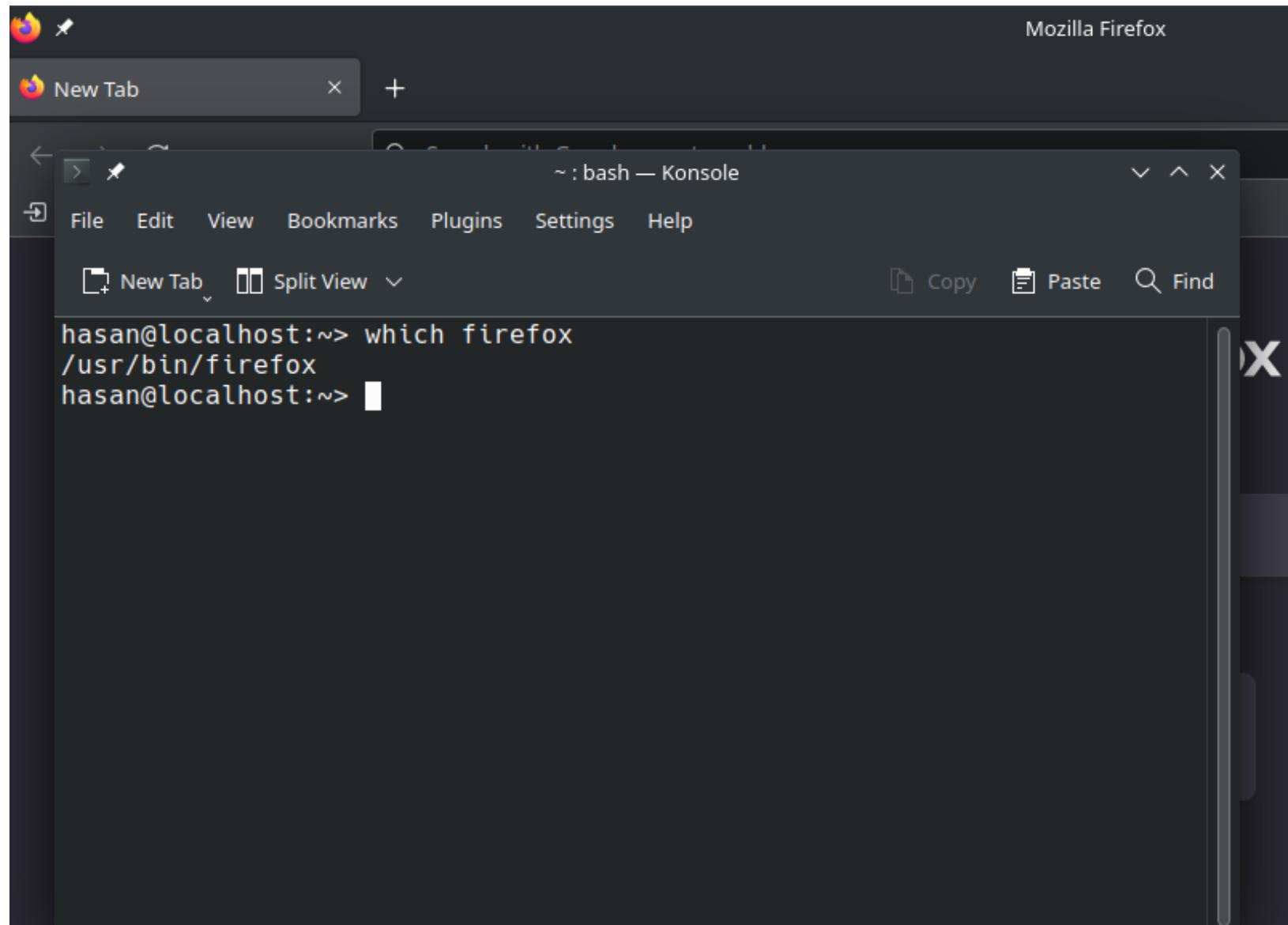


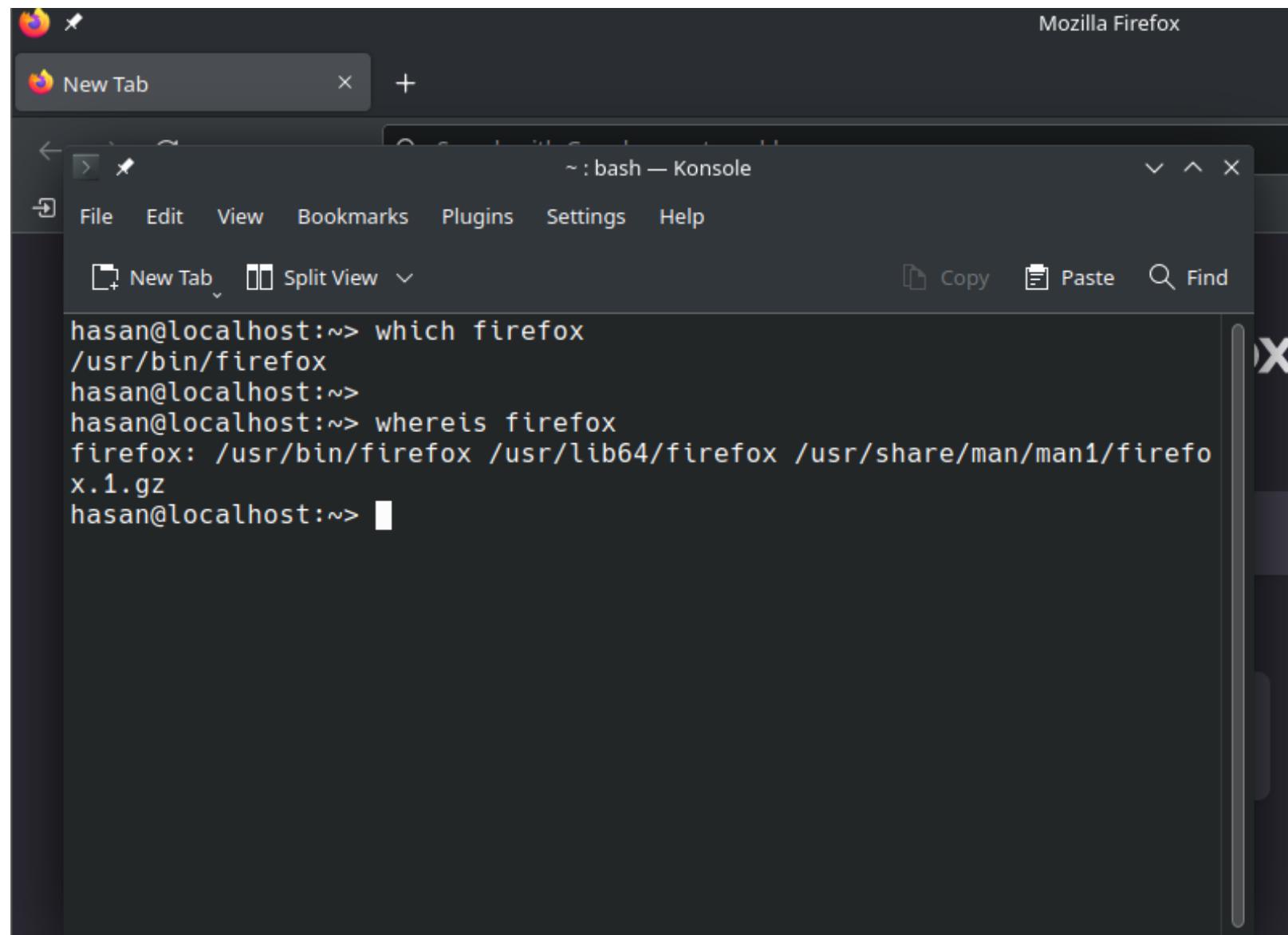
A screenshot of a terminal window titled "hasan@hasan: ~". The window shows the command "whereis visual stduio code" being run, followed by its output. The output includes "visual:", "stduio:", and "code: /snap/bin/code". The terminal has a dark background and a light-colored text area.

```
hasan@hasan:~$ whereis visual stduio code
visual:
stduio:
code: /snap/bin/code
hasan@hasan:~$
```

Your turn now !!!

Now, everyone, please find the directory of Firefox
with previous commands.





A screenshot of a Mozilla Firefox browser window. The title bar says "Mozilla Firefox". A single tab is open, titled "New Tab". Inside the tab, there is a terminal window titled "~ : bash — Konsole". The terminal window has a dark background and contains the following text:

```
hasan@localhost:~> which firefox
/usr/bin/firefox
hasan@localhost:~>
hasan@localhost:~> whereis firefox
firefox: /usr/bin/firefox /usr/lib64/firefox /usr/share/man/man1/firefo
x.1.gz
hasan@localhost:~>
```

Your turn now !!!

Now, everyone; restarts the system, logs in to the machine and finally logs out of the system.

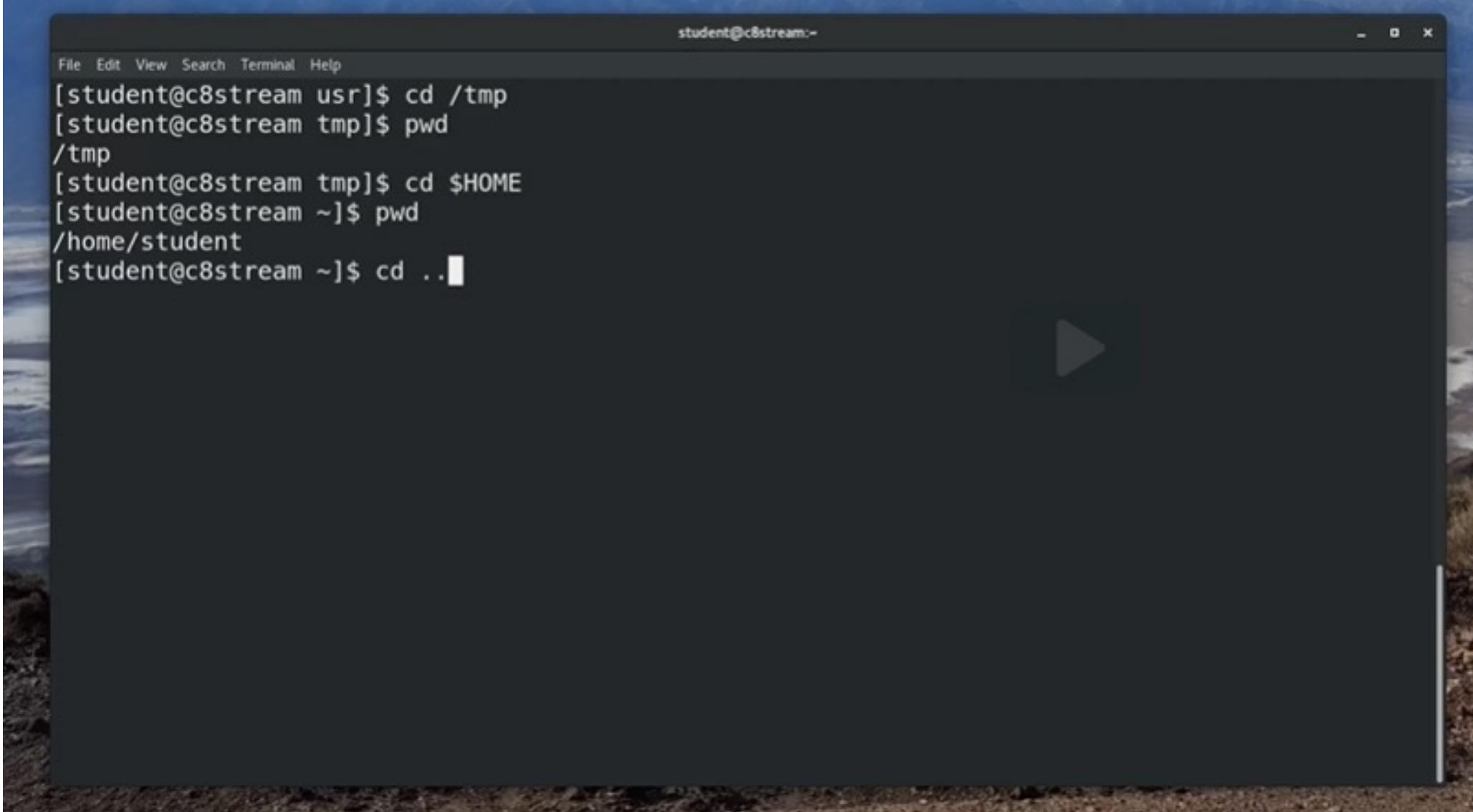
Accessing Directories

- When you first log into a system or open a terminal, the default directory should be your home directory.
- You can print the exact path by typing **echo \$HOME**. Many Linux distributions open new graphical terminals in **\$HOME/Desktop**.



Your turn now !!!

Now, finds your home directory using the terminal



A screenshot of a terminal window titled "student@c8stream:~". The window has a dark theme with a blue header bar. The title bar shows the user "student" and the host "c8stream" followed by a colon and a tilde (~). The window frame includes standard window controls (minimize, maximize, close) at the top right. The main area of the terminal shows the following command history:

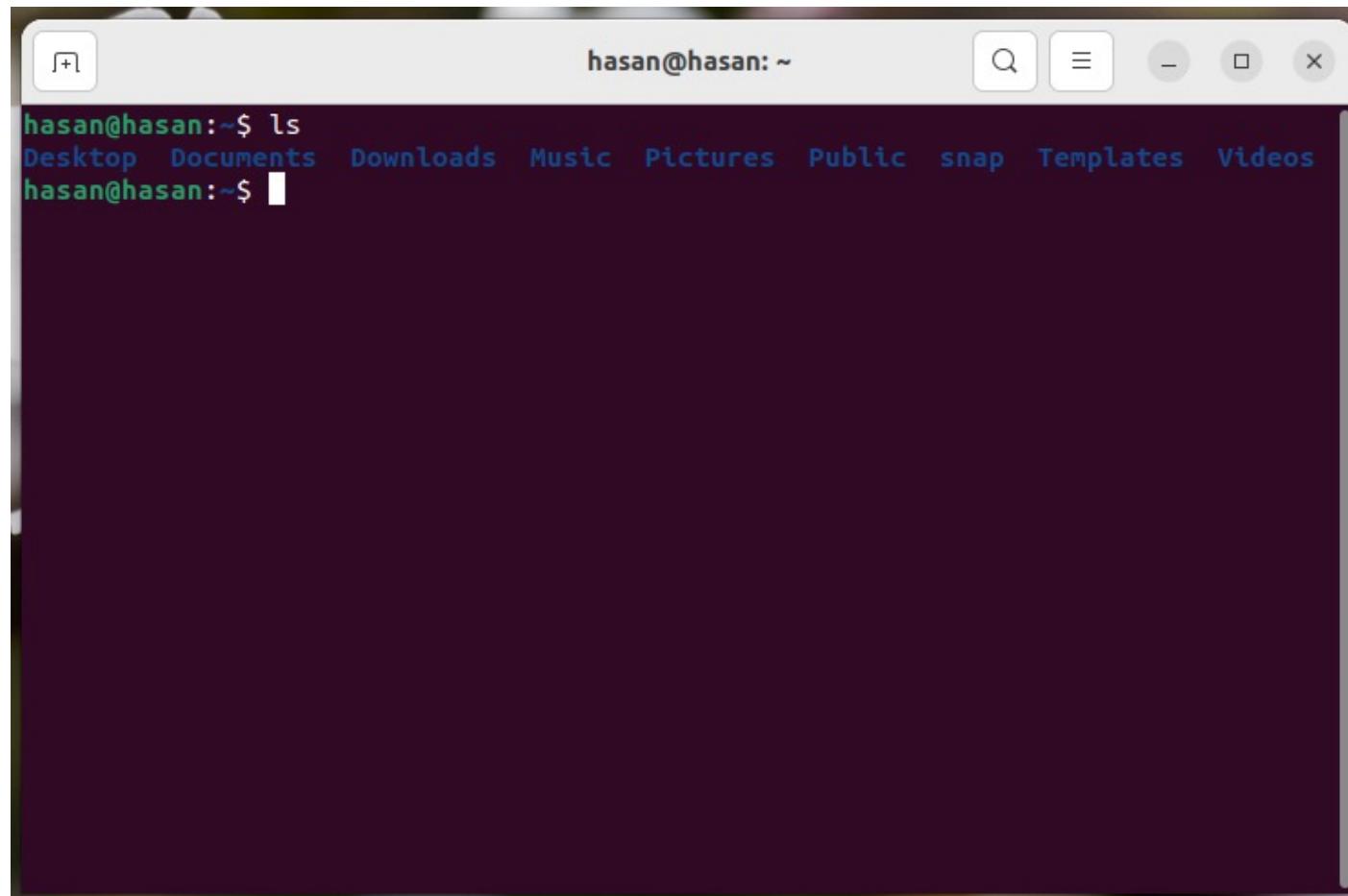
```
student@c8stream ~]$ cd /tmp  
[student@c8stream tmp]$ pwd  
/tmp  
[student@c8stream tmp]$ cd $HOME  
[student@c8stream ~]$ pwd  
/home/student  
[student@c8stream ~]$ cd ..
```

- The following commands are helpful for directory navigation:

Command	Result
<code>pwd</code>	Displays the present working directory
<code>cd ~</code> or <code>cd</code>	Change to your home directory (shortcut name is <code>~</code> (tilde))
<code>cd ..</code>	Change to parent directory (<code>..</code>)
<code>cd -</code>	Change to previous directory (<code>-</code> (minus))

Listing Files and Directories in a Specific Directory

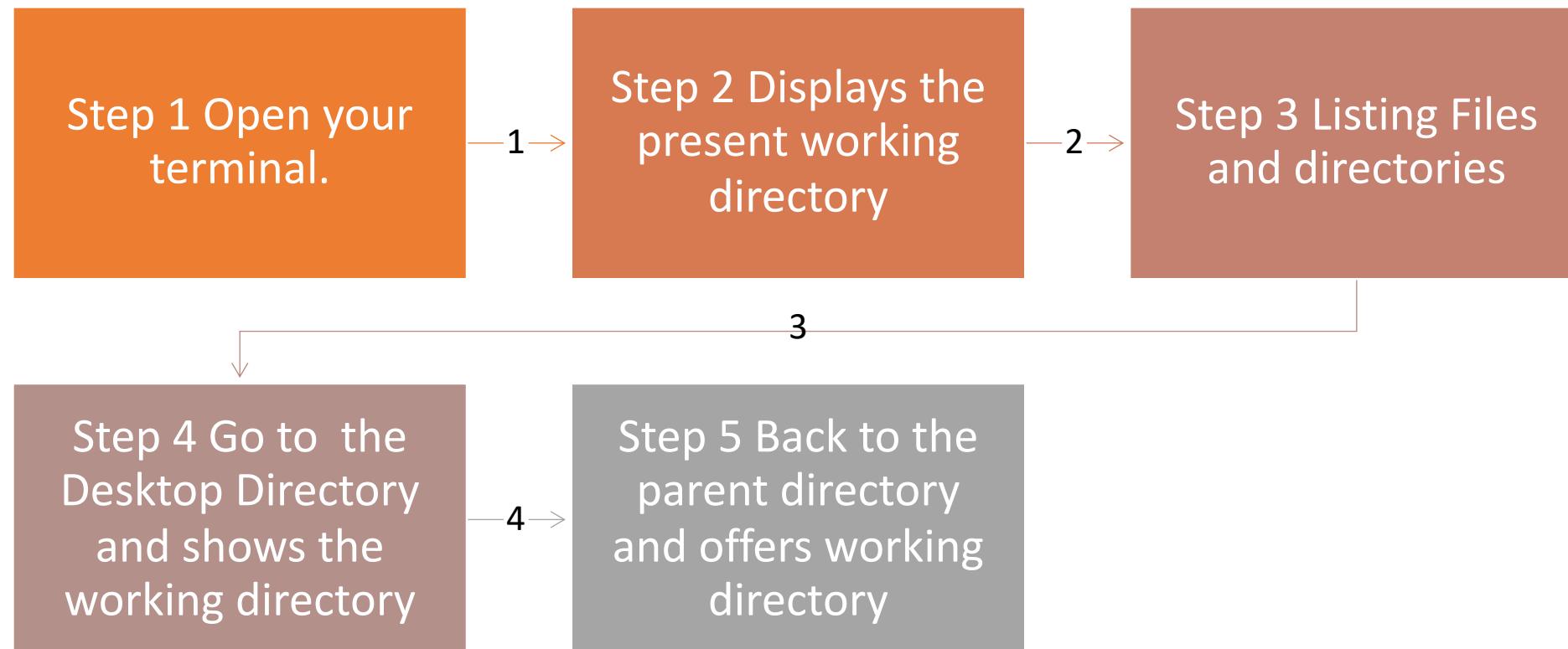
The ls command is used to list files or directories in Linux

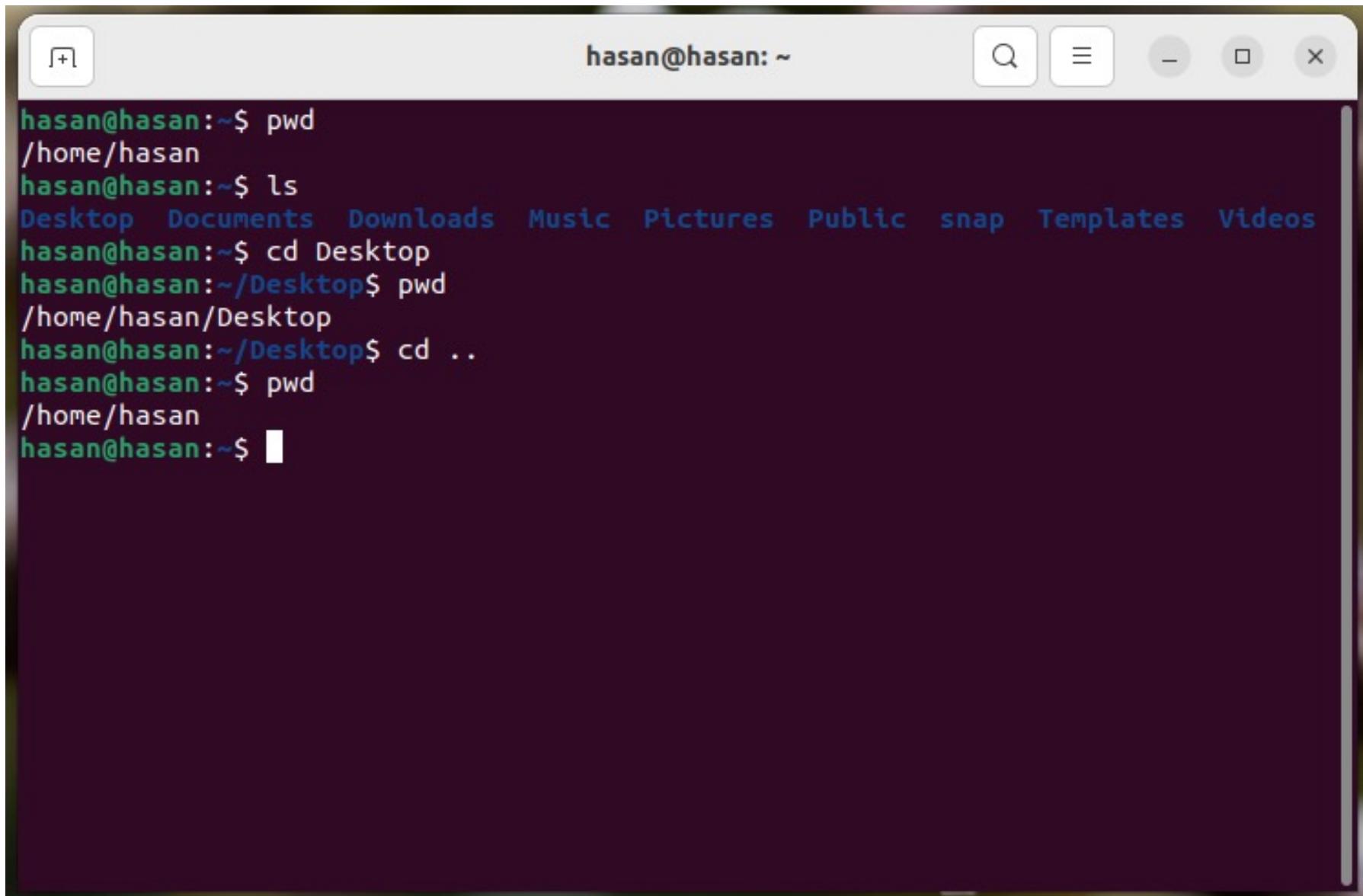


A screenshot of a Linux desktop environment showing a terminal window. The window title bar says "hasan@hasan: ~". The terminal itself has a dark background and displays the following text:

```
hasan@hasan:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
hasan@hasan:~$
```

Your turn now !!!





A screenshot of a terminal window titled "hasan@hasan: ~". The window has standard OS X-style controls (minimize, maximize, close) at the top right. The terminal background is dark purple. The user's session is as follows:

```
hasan@hasan:~$ pwd  
/home/hasan  
hasan@hasan:~$ ls  
Desktop Documents Downloads Music Pictures Public snap Templates Videos  
hasan@hasan:~$ cd Desktop  
hasan@hasan:~/Desktop$ pwd  
/home/hasan/Desktop  
hasan@hasan:~/Desktop$ cd ..  
hasan@hasan:~$ pwd  
/home/hasan  
hasan@hasan:~$
```

Understanding Absolute and Relative Paths

There are two ways to identify paths:

Absolute pathname

- An absolute pathname begins with the root directory and follows the tree, branch by branch until it reaches the desired directory or file. Absolute paths always start with /.

Relative pathname

- A relative pathname starts from the present working directory. Relative paths never start with /.



- Absolute pathname method

```
$ cd /usr/bin
```

- Relative pathname method

```
$ cd ../../usr/bin
```

Our turn !!!

Step 1 Finding
Current directory.

1

Step 2 going to the
root directory using
relative paht name
method

2

Step 4 Going to
the first directory
using relative paht
name method

3

Step3 Showing
current directory

A screenshot of a terminal window titled "bash — Konsole". The window has a light gray header bar with icons for back, forward, and close, and tabs for "File", "Edit", "View", "Bookmarks", "Plugins", "Settings", and "Help". Below the header is a toolbar with "New Tab", "Split View", "Copy", "Paste", and "Find" buttons. The main area is a dark gray terminal window showing the following command-line session:

```
hasan@localhost:~> pwd  
/home/hasan  
hasan@localhost:~> cd ../../  
hasan@localhost:/> pwd  
/  
hasan@localhost:/> cd home/hasan  
hasan@localhost:~> pwd  
/home/hasan  
hasan@localhost:~>
```

Exploring the Filesystem