1. What is linux?  
   Linux is a open sources platform it is derived from “Unix”. The founder of Linux is “Linus Torvald” and it is developed at Finland in 1991.  
   it's known for its stability, security, and versatility. What makes Linux unique is its open nature—its source code is accessible to anyone, allowing developers worldwide to contribute to its development, leading to numerous distributions (or "distros") tailored for various purposes, from desktop use to servers and embedded systems. It's widely used in servers, supercomputers, mobile devices (via Android), and even some appliances. The Linux kernel, combined with various software packages, forms complete operating systems like Ubuntu, Fedora, Debian, and many others.  
     
   **Flavours of Linux:**  
     
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   Linux comes in various flavours known as distributions or distros, each tailored to different needs and preferences. Some popular Linux distributions include:

* **Ubuntu:** Known for its user-friendliness and vast community support, Ubuntu is widely used for desktops, servers, and cloud environments.
* **Fedora:** Developed by the Fedora Project, it's known for being cutting-edge and often serves as a testing ground for new technologies. It's great for developers and tech enthusiasts.
* **Debian:** Known for its stability, Debian focuses on free and open-source software. It's the foundation for many other distributions, including Ubuntu.
* **Linux Mint:** Based on Ubuntu and Debian, Linux Mint provides an elegant and user-friendly experience out of the box, making it a popular choice for newcomers.
* **CentOS:** Renowned for its stability and used primarily for servers, CentOS is a community-supported rebuild of Red Hat Enterprise Linux (RHEL).
* **openSUSE:** It's known for its stability and robustness, suitable for both desktops and servers. It offers different editions catering to various user needs.  
    
  **Rocky Linux:** is a community-driven, enterprise-grade operating system designed as a replacement for CentOS Linux. It was created in response to the shift in CentOS's direction with CentOS Stream, which moved away from being a downstream rebuild of Red Hat Enterprise Linux (RHEL).   
    
  We are going to work with **Rocky Linux** majorly for our learning.

1. **Features of Linux:**

Linux offers various features that contribute to its popularity and utility across different domains. Here are some key features:

1. \*\*Open Source:\*\* Linux's source code is freely available, allowing anyone to modify and distribute it. This fosters innovation, collaboration, and customization.

2. \*\*Security:\*\* Linux is known for its robust security features. User permissions, firewall capabilities, regular security updates, and the ability to audit the code contribute to its security strengths.

3. \*\*Stability:\*\* Linux systems are renowned for their stability and reliability. They often run for extended periods without needing a reboot, which is crucial for servers and critical systems.

4. \*\*Customizability:\*\* Users have the freedom to customize nearly every aspect of the Linux operating system, from the kernel to the user interface, to suit specific needs.

5. \*\*Multitasking and Multiuser:\*\* Linux supports multitasking, enabling multiple processes to run simultaneously. It also supports multiple users accessing the system concurrently, making it ideal for servers and shared computing environments.

6. \*\*Compatibility:\*\* Linux can run on a wide range of hardware architectures, from embedded devices to supercomputers, making it highly versatile.

7. \*\*Package Management:\*\* Distributions often come with package management systems (e.g., apt, yum, pacman) that simplify software installation, updates, and removal.

8. \*\*Community Support:\*\* The Linux community is vast and supportive, offering extensive documentation, forums, and user groups to assist users with troubleshooting and learning.

9. \*\*Performance:\*\* Linux is known for its efficient resource utilization, making it suitable for resource-constrained devices and high-performance computing systems.

These features collectively make Linux a powerful and adaptable choice for various computing needs, from personal use to enterprise-level applications.

1. **Linux Kernel:**Kernel or also known as Heart of system is the core component of the Linux operating system. It acts as an interface between the hardware and the software, managing system resources, providing essential services, and enabling communication between the hardware and software components of a computer system.  
     
   Key functions of the Linux kernel include:  
     
   a) Hardware Abstraction  
   b) Process Management  
   c) Memory Management  
   d) File System Management  
   e) Security