Lab 1:

1. Check if your processor supports Intel/AMD virtualization technology. Enable Intel virtualization technology in BIOS if possible.

1. The cloud is almost everywhere in our lives now. What do you think are the fundamental reasons behind its success? Name three pros and three cons of cloud.  
   **Fundamental Reasons:**

* **Economic Shift (CapEx to OpEx):** It eliminates the need for massive upfront capital expenditure (CapEx) on hardware and data centers, replacing it with a pay-as-you-go operational expense (OpEx) model.
* **Scalability and Elasticity:** Resources can be scaled up or down instantly to meet demand, providing agility that is impossible with physical infrastructure.
* **Ubiquitous Access and Global Reach:** Services and data are available from anywhere with an internet connection, enabling remote work and global application deployment.

**Three Pros:**

1. **Cost Efficiency:** Reduced IT costs by eliminating hardware purchases and maintenance.
2. **Speed and Agility:** Resources can be provisioned in minutes, accelerating development.
3. **Reliability and Disaster Recovery:** Data is backed up across redundant sites, facilitating business continuity.

**Three Cons:**

1. **Potential Vendor Lock-in:** Difficulty in migrating services and data between different cloud providers.
2. **Security and Compliance Concerns:** Entrusting sensitive data to a third party introduces risks and requires careful management of compliance.
3. **Limited Control and Customization:** Users have less control over the underlying infrastructure compared to an on-premises data center.

3.What is the primary function of a hypervisor in virtualization?  
**Answer:** The primary function of a hypervisor is to create and run virtual machines (VMs). It acts as a layer that abstracts the physical hardware, allowing multiple guest operating systems to share a single physical host system's resources.

1. What is a virtual machine (VM)?  
   **Answer:** A virtual machine (VM) is a software-based emulation of a physical computer. It runs its own operating system and applications as if it were a separate physical machine, but it shares the resources of a single host computer.
2. What are the benefits of using virtual machines?  
   **Answer:**

* **Consolidation:** Running multiple VMs on one physical server improves hardware utilization.
* **Isolation:** VMs are isolated from each other, enhancing security and stability.
* **Portability:** VMs can be easily moved between different physical hosts.
* **Legacy Application Support:** Older operating systems and applications can run on modern hardware.
* **Disaster Recovery:** VMs can be backed up and restored quickly.

1. List five use cases of virtual machines.  
   **Answer:**

**Server Consolidation:** Running multiple server workloads (e.g., web, database) on a single physical machine.

**Development and Testing:** Creating isolated environments to develop and test software without affecting other systems.

**Running Incompatible Software:** Using software designed for a different operating system (e.g., running Windows software on a Mac).

**Sandboxing:** Isolating potentially dangerous code for analysis in a secure environment.

**Virtual Desktop Infrastructure (VDI):** Hosting desktop operating systems on a central server for users to access remotely.

1. In virtualization, what is the guest operating system?  
   **Answer:** b) The operating system installed on a virtual machine
2. What does virtual machine isolation mean?  
   **Answer:** c) Virtual machines run independently and are isolated from each other and the host system.
3. What is the benefit of virtual machine portability?  
   **Answer:** c) It allows virtual machines to be moved between different physical machines with compatible hypervisors.
4. What is the purpose of cloning a virtual machine?  
   **Answer:** The purpose of cloning a virtual machine is to quickly create an identical copy. This is useful for rapidly deploying multiple identical systems (e.g., for a classroom lab), creating backups, or replicating a configured environment for testing.