**Lab 1 Answers**

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

* First, check CPU virtualization support via tools like CPU - Z (on Windows) or terminal commands (e.g., grep - E 'vmx|svm' /proc/cpuinfo on Linux). If supported, restart the computer and enter BIOS (usually by pressing Del, F2, etc. during boot), then find and enable virtualization options (like Intel VT - x or AMD - V).

**2. 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 computing.**

* **Fundamental reasons for cloud success**:
  + On - demand self - service: Users can provision resources (like storage, computing power) without manual IT intervention.
  + Broad network access: Cloud services are accessible over networks via various devices (laptops, mobiles).
  + Resource pooling: Providers pool computing resources to serve multiple users, optimizing resource utilization.
* **Pros**:
  + Cost - efficiency: Reduces upfront hardware/software investment as users pay for what they use.
  + Scalability: Easily scale resources up/down to match demand.
  + Reliability: Cloud providers offer robust data backup, disaster recovery, and high availability.
* **Cons**:
  + Security risks: Data stored off - premise may face breaches or unauthorized access.
  + Dependency on internet: Cloud services are unavailable during internet outages.
  + Vendor lock - in: Migrating between cloud providers can be complex and costly.

**3. What is the primary function of a hypervisor in virtualization?**

* A hypervisor (or virtual machine monitor) creates and manages virtual machines (VMs). It abstracts physical hardware, allowing multiple VMs to run simultaneously on a single physical host, and allocates hardware resources (CPU, memory, storage, network) to each VM.

**4. What is a virtual machine (VM)?**

* A virtual machine is a software - based emulation of a physical computer. It runs its own operating system and applications, isolated from other VMs and the host system, while sharing the host’s physical hardware resources via a hypervisor.

**5. What are the benefits of using virtual machines?**

* **Isolation**: VMs are isolated from each other, so issues in one VM (e.g., crashes, malware) don’t affect others or the host.
* **Resource efficiency**: Multiple VMs run on a single physical host, reducing hardware costs.
* **Flexibility**: Easily create, clone, move, or delete VMs to match changing workloads.
* **Testing/development**: Provide safe environments to test new software, OS versions, or configurations without risking the host system.

**6. List five use cases of virtual machines.**

* **Server consolidation**: Combine multiple physical servers into VMs on fewer hosts to save hardware and energy.
* **Application virtualization**: Run legacy apps on modern OSs or incompatible apps side - by - side.
* **Development/testing**: Create isolated environments for coding, testing, and debugging software.
* **Disaster recovery**: Replicate VMs for backup; quickly restore systems in case of failures.
* **Cloud computing**: Underpin public/private cloud infrastructures to deliver on - demand services.

**7. In virtualization, what is the guest operating system?**

* **Answer**: b) The operating system running inside a virtual machine.

**8. What does virtual machine isolation mean?**

* **Answer**: c) Each virtual machine is completely isolated from each other and the host system.

**9. What is the benefit of virtual machine portability?**

* **Answer**: c) It allows virtual machines to be moved between different physical machines with compatible hypervisors.

**10. What is the purpose of cloning a virtual machine?**

* Cloning a VM creates an exact copy of an existing VM. This is useful for:
  + Rapidly deploying multiple identical VMs (e.g., for a fleet of web servers).
  + Creating backup copies for testing or disaster recovery without reconfiguring a new VM from scratch.
  + Duplicating a pre-configured environment for development or training purposes.