Operating Systems Lab 1- answers

1.Protect and separate processes from each other.

Controls execution of programs to prevent errors and improper use of the computer.

Decides between conflicting requests for efficient and fair resource use between processes.

2. **bootstrap program** is loaded at power-up or reboot

Typically stored in ROM or EPROM, generally known as **firmware.**

Initializes all aspects of system.

Loads operating system kernel and starts execution.

3.interrupts are more time efficient, when polling takes a lot more time.

**Polling:** Once the interrupt occurs, the system must determine which device, of all the devices associated with a given IPL or IRQ, actually interrupted. It does this by calling all the interrupt handlers for the designated IPL or IRQ, until one handler **claims** the interrupt.

4. Used for high-speed I/O devices able to transmit information at close to memory speeds.

Device controller transfers blocks of data from buffer storage directly to main memory without CPU intervention

5.volatile-main memory

Non-volatile-secondary storage-extension of memory

6. A processing unit that contains an arithmetic logic unit and processor registers.

A control unit that contains an instruction register and program counter.

Memory that stores data and instructions.

External mass storage.

Input and output mechanisms.

Also means any stored-program computer in which an instruction fetch and a data operation cannot occur at the same time because they share a common bus.

7.multiprogramming- When job has to wait (for I/O for example), OS switches to another job

Multitasking- a logical extension in which CPU switches jobs so frequently that users can interact with each job while it is running, creating **interactive** computing

8.copy-on-write is a resource-management technique used by operating systems to efficiently implement a "duplicate" or "copy" operation on modifiable resources such as main memory. If a resource is duplicated but not modified, it is **not** necessary to create a new resource; the resource can be shared between the copy and the original. Modifications must still create a copy, hence the technique: the copy operation is deferred until the first write. By sharing resources in this way, it is possible to significantly reduce the resource consumption of unmodified copies, while adding a small overhead to resource-modifying operations.

9. **Emulation** used when source CPU type different from target type (i.e. PowerPC to Intel x86). The OS is simulated in software.

Generally slowest method

When computer language not compiled to native code – **Interpretation**

**Virtualization** – OS natively compiled for CPU, running **guest** OSes also natively compiled

Consider VMware running WinXP guests, each running applications, all on native WinXP **host** OS

Alternatively, the native operating system may be designed to allow the guest direct access to hardware.

10. defense of the system against internal and external attacks

Huge range, including denial-of-service, worms, viruses, identity theft, theft of service.

11. Client-Server Computing

Dumb terminals supplanted by smart PCs

Many systems now **servers**, responding to requests generated by **clients**

**Compute-server system** provides an interface to client to request services (i.e., database)

**File-server system** provides interface for clients to store and retrieve files

Peer-to-Peer

P2P does not distinguish clients and servers

Instead all nodes are considered peers

May each act as client, server or both

Node must join P2P network

Registers its service with central lookup service on network, or

Broadcast request for service and respond to requests for service via ***discovery protocol***

Examples includeNapsterandGnutella*,* **Voice over IP** *(***VoIP***)* such as Skype