National University

Of Computer & Emerging Sciences Faisalabad-Chiniot Campus

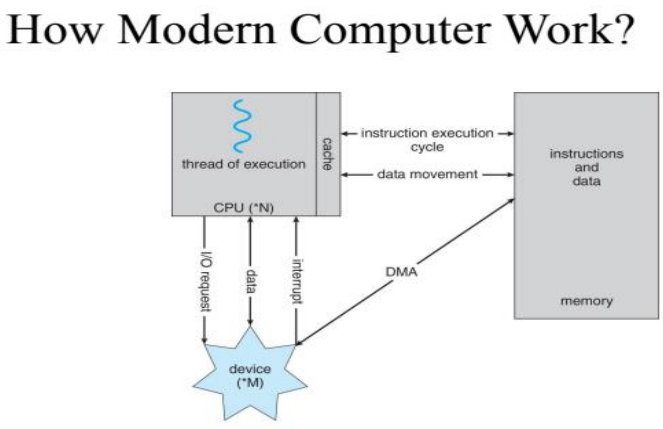
CS2006 Operating System Course Instructor Ms. Mahzaib Younas		
Time allowed = 30 min	**Quiz 1**	**Total Marks = 25**

Roll No	Name	Signature

Question No 01: Choose the correct one. [6]

1. What is the primary function of Middleware?	**2. Where is the bootstrap program stored and when is it loaded?**
a) Manages hardware **b) Facilitates communication** c) Acts as an OS d) Provides security	a) In RAM at boot **b) In ROM at power-up** c) On disk at start-up d) In cache during use
3. Which of the following best describes the key difference between a trap and an interrupt?	**4. In a symmetric multiprocessing system, what is the primary mechanism for coordinating the activities of multiple processors?**
a) Trap is user-triggered **b) Interrupt is system-generated** c) Trap is hardware-based d) Interrupt is always synchronous	a) Hardware interlocks b) Software interrupts **c) Shared memory** d) Separate caches
5. In a multiprocessor system, what is the primary advantage of using tightly-coupled architecture?	**6. Which one of the following is not true?**
a) Lower power consumption **b) Reduced communication overhead** c) Improved fault tolerance d) Increased system complexity	a) kernel remains in the memory during the entire computer session b) kernel is made of various modules which can't loaded in running OS c) kernel is the first part of the OS to load into memory during booting d) kernel is the program that constitutes the central core of the OS

Question No 02: How modern computer works? Explain diagrammatically? [3]



Question No 03: Explain the difference between programmed I/O and interrupt-driven I/O. Also, Differentiate between the interrupt and trap. [4]

Programmed I/O: The CPU continuously checks the device status to see if it's ready to send or receive data. This method is simple but inefficient because the CPU spends a lot of time waiting.

Interrupt-Driven I/O: The CPU initiates the I/O operation and continues executing other tasks. When the device is ready, it sends an interrupt to the CPU, which then pauses its current task to handle the I/O operation. This method is more efficient as it reduces CPU idle time.

Trap: A trap is a synchronous interrupt triggered by an exception in a user process to execute functionality.
Example: A program tries to divide by zero, and the OS handles the error.

Interrupt: An interrupt is a hardware or software signal that demands instant attention by an OS
Example: A keyboard key is pressed, sending a signal to the CPU to respond immediately.

Question No 04: Write the definition privilege and non-privilege instruction. And, also Identify the privilege and non-privilege instructions. [6]

Privileged Instruction: A command that runs only in kernel mode because it manages important system functions. Running it in user mode causes an interrupt.

Non-Privileged Instruction: A command that runs safely in user mode and doesn't control critical system parts, so it doesn't cause an interrupt.

Instruction	privilege and non-privilege	Reason
Modify entries in device-status table.	**Privileged**	Directly alters the state of hardware, requiring kernel access
Clear the Memory	**Privileged**	Involves managing critical system memory, affecting all processes
Generate any Trap Instruction	**Non-Privileged**	Typically used in user mode to request a system service
Switch from user to kernel mode.	**Privileged**	Transitions control to the kernel, allowing access to critical functions

Modify entries in the Device-status table	**Privileged**	Directly alters the state of hardware, requiring kernel access

Question No 05: Explain the types and services of cloud computing. [3]

Types of cloud computing:

1. Private cloud
• run by a company for the company's own use
• Example: WMware

2. Public Cloud
• available via Internet to anyone willing to pay
• Example: AWS (Amazon Web Services)

3. Hybird Cloud
• includes both public and private cloud components
• Example: Nutanix Cloud Clusters, VMware Cloud Foundation

Services:

Software as a Service (SaaS):
One or more applications available via the Internet
Example: word processor

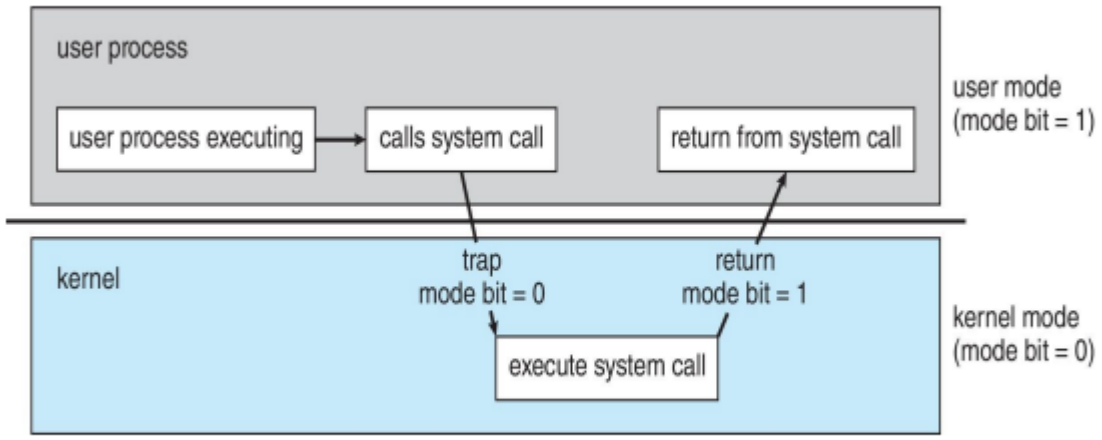
Platform as a Service (PaaS):
Software stack ready for application use via the Internet
Example: database servers

Infrastructure as a Service (IaaS):
Servers or storage available over Internet storage available for backup use

Question No 06: Show the transition between user mode and kernel mode? [3]

Mode Bit:

Used to indicate the current mode of the system.
0 represents the kernel mode.
1 represents the user mode.


user process
user process executing
calls system call
return from system call
user mode
(mode bit = 1)
kernel
trap
mode bit = 0
return
mode bit = 1
execute system call
kernel mode
(mode bit = 0)