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FACULTY OF ENGINEERING & TECHNOLOGY

BCS-501 Operating System

Lecturer-02

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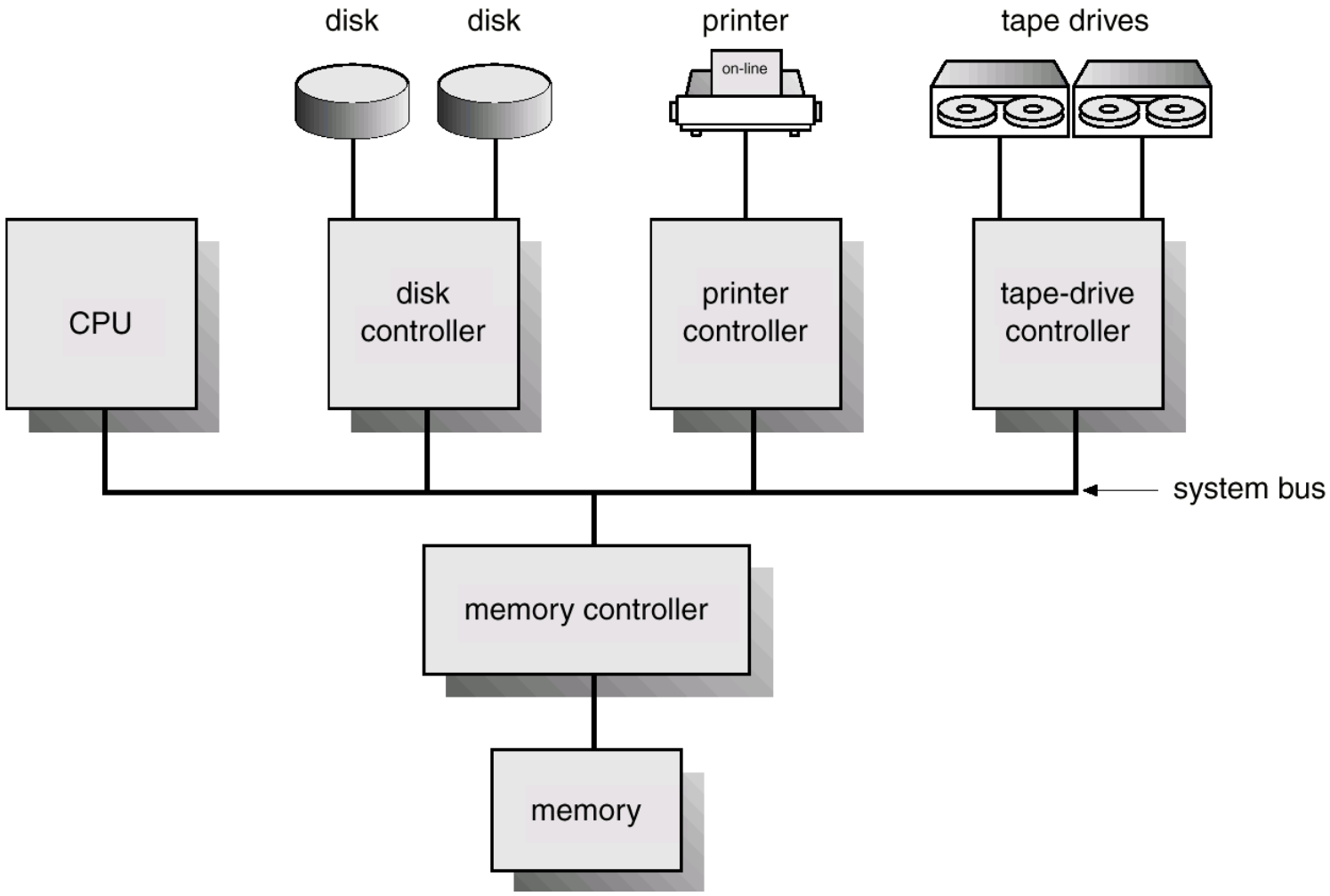
Operating-System Structures

Computer System Operation

SYSTEM ARCHITECTURE



Computer System Operation

I/O devices and the CPU can execute concurrently.

Each device controller is in charge of a particular device type.

Each device controller has a local buffer.

CPU moves data from/to main memory to/from local buffers

I/O is from the device to local buffer of controller.

Device controller informs CPU that it has finished its operation by causing an *interrupt*.

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Computer System Operation

One set of operating-system services provides functions that are helpful to the user (Cont.):

File-system manipulation - The file system is of particular interest. Programs need to read and write files and directories, cr eate and delete them, search them, list file Information, permission management.

Communications – Processes may exchange information, on the same computer or between computers over a Network Communications may be via shared memory or through message passing (packets moved by the OS)

Error detection – OS needs to be constantly aware of possible errors ,May occur in the CPU and memory hardware, in I/O d evices, in user program .For each type of error, OS should take the appropriate action to ensure correct and consistent com puting

Debugging facilities can greatly enhance the user's and programmer's abilities to efficiently use the system

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Computer System Operation

Another set of OS functions exists for ensuring the efficient operation of the system itself via resource sharing

Resource allocation - When multiple users or multiple jobs running concurrently, resources must be allocated to each of the

Many types of resources - CPU cycles, main memory, file storage, I/O devices.

Accounting - To keep track of which users use how much and what kinds of computer resources

Protection and security - The owners of information stored in a multiuser or networked computer system may want to control use of that information, concurrent processes should not interfere with each other

Protection involves ensuring that all access to system resources is controlled

Security of the system from outsiders requires user authentication, extends to defending external I/O devices from invalid acc ess attempts

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Computer System Operation

Interrupts transfers control to the interrupt service routine generally, through the interrupt vector, which contains the addresse s of all the service routines.
Interrupt architecture must save the address of the interrupted instruction.
Incoming interrupts are disabled while another interrupt is being processed to prevent a lost interrupt.
A trap is a software-generated interrupt caused either by an error or a user request.
An operating system is interrupt driven

Operating systems provide an environment for execution of programs and services to programs and users
One set of operating-system services provides functions that are helpful to the user:

User interface - Almost all operating systems have a user interface (UI).
Varies between Command-Line (CLI), Graphics User Interface (GUI), Batch
Program execution - The system must be able to load a program into memory and to run that program, end execution, either normally or abnormally (indicating error)
I/O operations - A running program may require I/O, which may involve a file or an I/O device

Interrupt Handling

The operating system preserves the state of the CPU by storing registers and the program counter.

--Determines which type of interrupt has occurred:

- polling
- vectored interrupt system

Separate segments of code determine what action should be taken for each type of interrupt

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MCQ

Which of the following is crucial time while accessing data on the disk?
1 Seek time
2 Rotational time
3 Transmission time
4 Waiting time

What do you understand by interruption?
1 Seek time
2 Rotational time
3 Transmission time
4 Waiting time

Which of the following is crucial time while accessing data on the disk?
1 Seek time
2 Rotational time
3 Transmission time
4 Waiting time

Super computers typically employ _____.
1 Real time Operating system
2 Multiprocessors OS
3 desktop OS
4 None of the above

Memory tables are used to keep the track of

1.Real and Virtual Memory
2.I/O Devices
3.Resources
4.I/O Modules+J77

Dual mode of operating system has

1 mode
2 modes
3 modes
4 modes