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Computer :

- Operating System: Main functions of operating systems, Processes, Threads, Interprocess communication, concurrency, Synchronization, Deadlock, CPU scheduling, I/O scheduling, Resource scheduling. Deadlock and scheduling algorithms, banker's algorithm for deadlock handling. Memory management and virtual memory. File Systems, I/O systems, DOS, UNIX and Windows.
- **Data Structure:** Arrays and their Applications; Sparse Matrix, Stacks, Queues, Priority Queues, Linked Lists, Trees, Forest, Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree, B Tree, B+ Tree, B* Tree, Data Structure for Sets, Graphs, Sorting and Searching Algorithms; Hashing. Functions, Recursion, Parameter passing.
- **Digital Fundamentals: Data Types, Number Systems and Conversion, Complements, Fixed Point Representation, Floating Point Representation, Error Detection Codes, Computer Arithmetic - Addition, Subtraction, Multiplication and Division Algorithms, Digital Computers, Logic Gates, Boolean Algebra, Map Simplifications, Combinational Circuits, Flip-Flops, Sequential Circuits, Integrated Circuits, Decoders, Multiplexers, Registers and Counters, Memory Unit.**

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DATE	MOCK	TOPIC	COMPUTER	PART WISE MATHS	DATE	MOCK	TOPIC	COMPUTER	PART WISE MATHS
07-01-2024	#MOCK				11-02-2024	#MOCK			
08-01-2024		CO-ORDINATE			12-02-2024		CALCULUS		
10-01-2024			COMPUTER		14-02-2024			COMPUTER	
12-01-2024				CALCULUS	16-02-2024				ALGEBRA
14-01-2024	#MOCK				18-02-2024	#MOCK			
15-01-2024		ALGEBRA			19-02-2024		CO-ORDINATE		
17-01-2024			COMPUTER		21-02-2024			COMPUTER	
19-01-2024				CO-ORDINATE	23-02-2024				CALCULUS
21-01-2024	#MOCK				25-02-2024	#MOCK			
22-01-2024		CALCULUS			26-02-2024		ALGEBRA		
24-01-2024			COMPUTER		28-02-2024			COMPUTER	
26-01-2024				ALGEBRA	01-03-2024				CO-ORDINATE
28-01-2024	#MOCK				03-03-2024	#MOCK			
29-01-2024		CO-ORDINATE			04-03-2024		CALCULUS		
31-01-2024			COMPUTER		06-03-2024			COMPUTER	
02-02-2024				CALCULUS	08-03-2024				ALGEBRA
04-02-2024	#MOCK				10-03-2024	#MOCK			
05-02-2024		ALGEBRA							
07-02-2024			COMPUTER						
09-02-2024				CO-ORDINATE					



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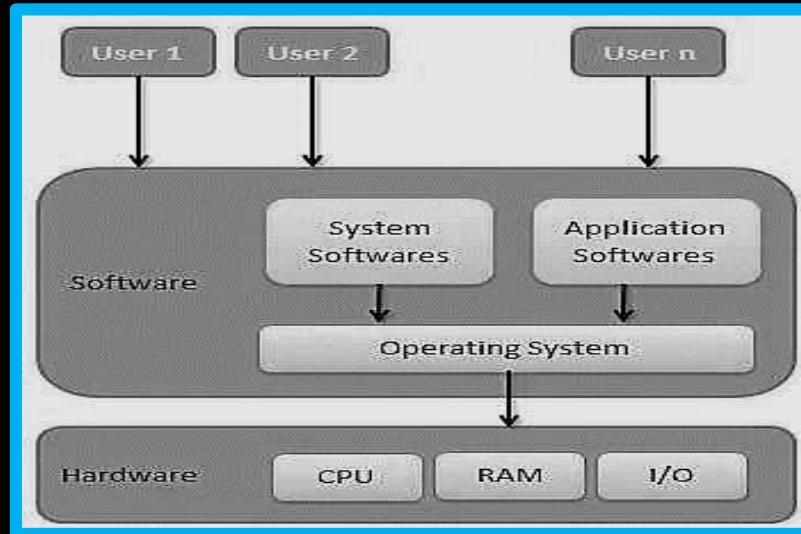
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1

OS:

- It acts as an interface between user and computer hardware
- Provides an environment in which user can execute programs, conveniently and efficiently
- Set of utilities to simplify application development/execution
- Software abstracting the hardware
- acts as a resource allocator and a government which control the program.





2

- **Services of OS:**

- **User Interface** - This can take several forms like

GUI (Graphical User Interface)

CLI (Command line Interface)

- **Program execution** → System must be able to load a program into memory and to run that program. The program must be able to end its execution, either normally or abnormally (indicating error).



3

- **I/O operation** → For efficiency and protection, users usually can't control I/O devices directly. There for OS must provide a means to do I/O.
- **File- system manipulation** → Programs need to read and write files and directories. They also need to create and delete them by name, search for a given file and list file information.
- **Communication** → There are many cases in which one process needs to exchange information with another process
- **Error detection** → Errors may occur in the CPU & memory hardware (such as power failure) etc, for each type of error, the OS should take appropriate action to ensure correct and consistent Computing



4

Resource allocation→ when there are multiple sources or multiple jobs running at same time, resources must be allocated to each of them

To keep track of which we have success and what kind of computer resources. Usage statistics may be valuable cost for researchers who wish to reconfigure the system to import computing services

Protection and security→ When several separate processes execute concurrently, it should not be possible for one process to interfere with the others or with the OS itself. Protection in values

Ensuring that all access to system resources is controlled.

Security of the system from outsiders is also important.



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NOTE→

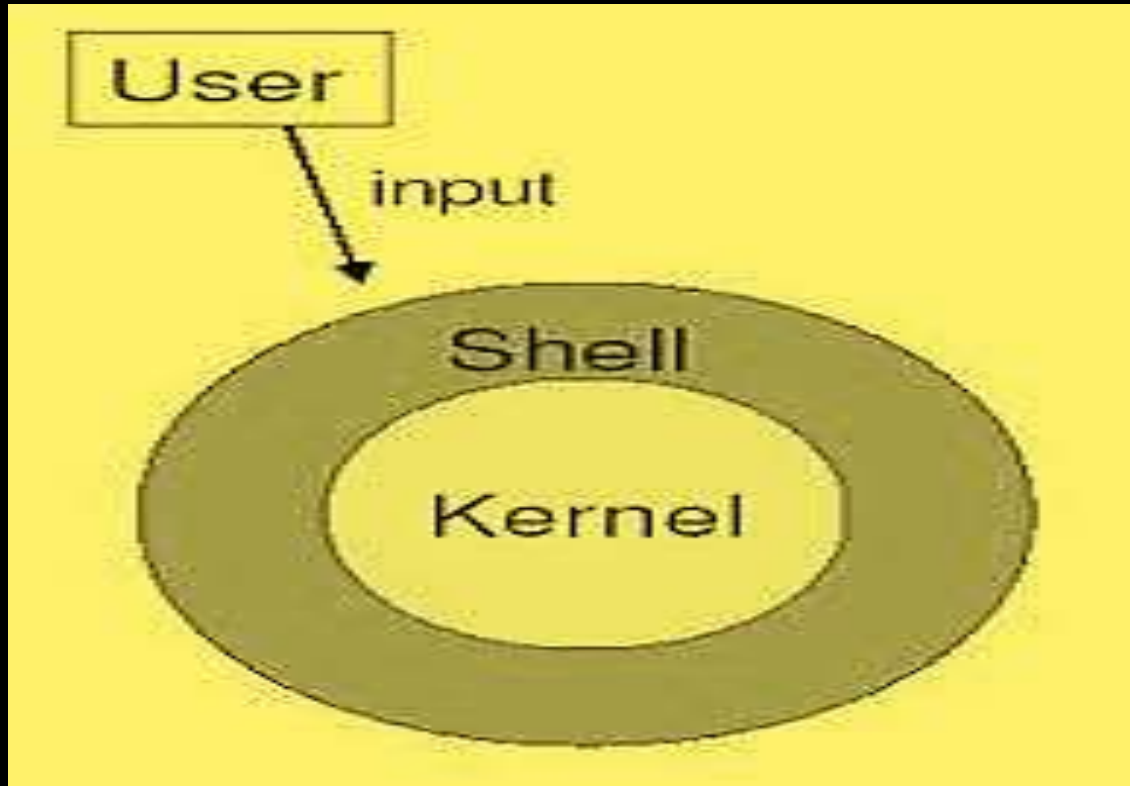
- Main functionality of OS is Program Execution
- In Protection, internal threats are involved.
- In security, external threats are involved

Goals of OS:

- **Primary**→ convenience (user friendly)
- **Secondary**→ Efficiency (time & space)

6

PARTS of OS:





7

Shell→ It is an environment or a special user program which provide an interface to user to services. It allows user to communicate with the kernel.

- It is the interface between kernel and user.
- It is a command line interpreter

Kernel→ It is the part and core of an OS that manage operations of computer and hardware.

- Kernel controls all the task of the system
- It is a low level program interfacing with the hardware on top of which applications are running.



THREAD→A Thread is a separate execution path. It is a lightweight process that the operating system can schedule and run concurrently with other threads.

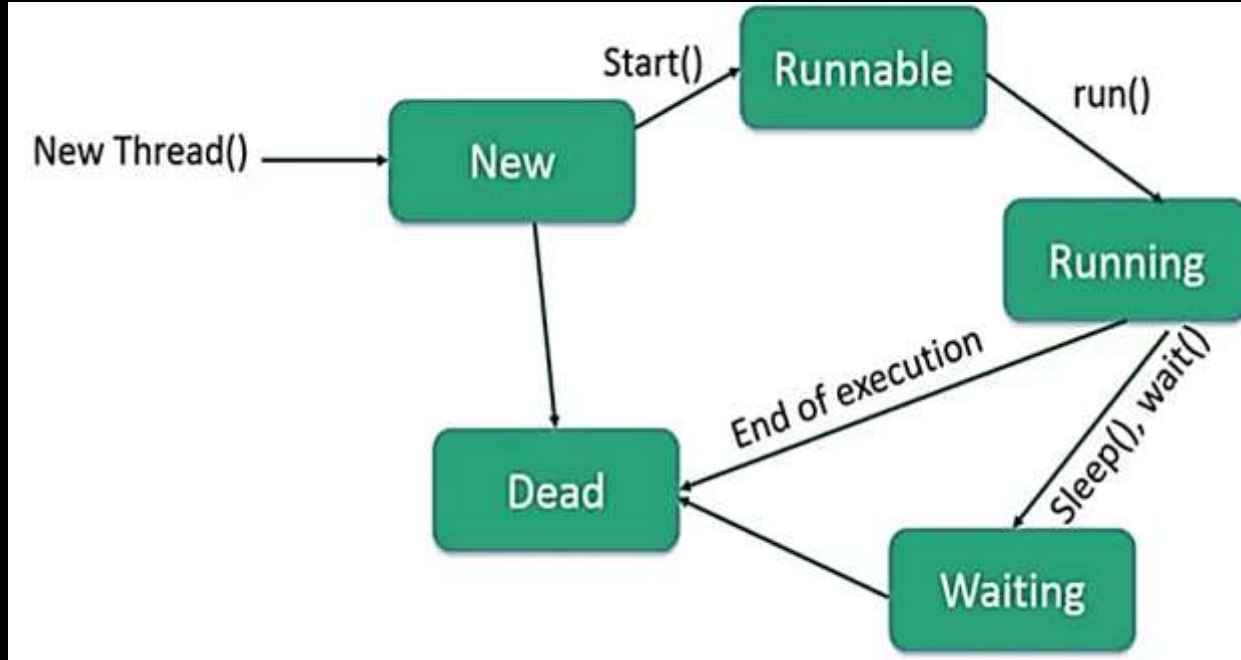
The operating system creates and manages threads, and they share the same memory and resources as the program that created them.

This enables multiple threads to collaborate and work efficiently within a single program.



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Note:- Each thread belongs to exactly one process. In an operating system that supports multithreading, the process can consist of many threads. But threads can be effective only if CPU is more than 1 otherwise two threads have to context switch for that single CPU.





10

Which one of the following is not shared by threads?

- a) program counter
- b) stack
- c) both program counter and stack
- d) none of the mentioned



11

A process can be ____

- a) single threaded
- b) multithreaded
- c) both single threaded and multithreaded
- d) none of the mentioned



12

If one thread opens a file with read privileges then ____

- a) other threads in the another process can also read from that file
- b) other threads in the same process can also read from that file
- c) any other thread can not read from that file
- d) all of the mentioned



13

The time required to create a new thread in an existing process is ____

- a) greater than the time required to create a new process**
- b) less than the time required to create a new process**
- c) equal to the time required to create a new process**
- d) none of the mentioned**



14

When the event for which a thread is blocked occurs?

- a) thread moves to the ready queue
- b) thread remains blocked
- c) thread completes
- d) a new thread is provided



15

Termination of the process terminates ____

- a) first thread of the process
- b) first two threads of the process
- c) all threads within the process
- d) no thread within the process



16

The register context and stacks of a thread are deallocated when the thread?

(a) Terminates

(b) blocks

(c) Unblocks

(d) spawns



17

Thread synchronization is required because ____

- a) all threads of a process share the same address space**
- b) all threads of a process share the same global variables**
- c) all threads of a process can share the same files**
- d) all of the mentioned**



18

A thread is also called ____

- a) Light Weight Process(LWP)**
- b) Heavy Weight Process(HWP)**
- c) Process**
- d) None of the mentioned**



19

Which one of the following is not a valid state of a thread?

- a) running
- b) parsing
- c) ready
- d) blocked



20

SYSTEM CALL:

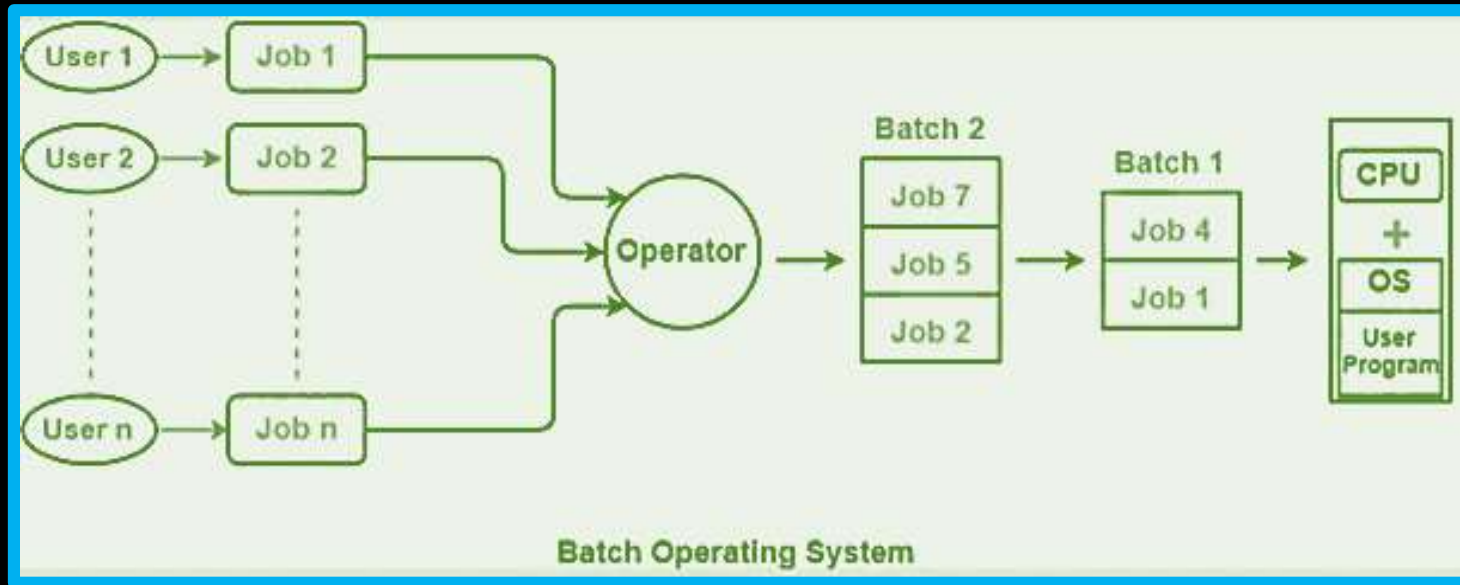
- It is a way for programs to interact with OS.
- It provides the service of OS to the user programs via API (Application Programming Interface).
- Interface between process and OS to allow user level. processes to request services of the OS.
- System calls que the only entry points into the kernel System.



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TYPES OF SYSTEM CALLS

- 1 **Process Control** → end, abort, create, terminate, allocate & free memory.
2. **File management** → create, open, close, delete, read file etc.
3. **Device management** → get device attribute, release
4. **Information maintenance** → getting system data, set time or data etc.
5. **Communication** → create, delete communication connection, send, receive message etc.



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