OPERATING SYSTEM

SUBJECT CODE:16SCCCS8

CLASS:III B.Sc(CS)

UNIT-I

1.What is an operating system?

An operating system is a program that manages the computer hardware. It also provides a basis for application programs and act as an intermediary between a user of a computer and the computer hardware. It controls and coordinates the use of the hardware among the various application
programs for the various users.

2.What are the different types of operating systems?

- ✓ Batch Operating System.
- ✓ Multi-Tasking/Time-sharing Operating systems. …
- ✓ Real time OS. …
- ✓ Distributed Operating System. …
- ✓ Network Operating System.
- ✓ Mobile OS.

3.What is the relationship between operating systems and computer hardware?

The main difference between operating system and application software is that an operating system is a system software that works as the interface between the user and the hardware while the application software is a program that performs a specific task

4.What are the characteristics of operating system?

- ✓ Most modern operating systems allow running multiple tasks both: a computer can, while executing a user program, read the data from a disk or display results on a terminal or printer.
- ✓ The fundamental notion of multi-tasking operating systems is the process.
- ✓ A process is a program instance being run.

5.What do you mean by kernel?

A Kernel is the central part of an operating system. It manages the operations of the computer and the hardware, most notably memory and CPU time.

6.What are Batch systems?

Batch systems are quite appropriate for executing large jobs that need little interaction. The user can submit jobs and return later for the results.

It is not necessary to wait while the job is processed. Operators batched together
jobs with similar needs and ran them through the computer as a group.

7.What is an Interactive computer system?

Interactive computer system provides direct communication between the user and the system. The user gives instructions to the operating system or to a program directly, using a keyboard or mouse ,and waits for immediate
results.

8.What are the various OS components?

The various system components are

- Process management
- Main-memory management
- File management
- I/O-system management
- Secondary-storage management
- Networking
- Protection system
- Command-interpreter system

9.What is a thread?

A thread otherwise called a lightweight process (LWP) is a basic unit of CPU
utilization, it comprises of a thread id, a program counter, a register set and a stack.
It shares with other threads belonging to the same process its code section, data section, and operating system resources such as open files and signals.

10.What is a process?

A process is a program in execution. It is the unit of work in a modern operating system. A process is an active entity with a program counter specifying the next instructions to execute and a set of associated resources. It also includes the process stack, containing temporary data and a data section containing global variables.

11.What are the benefits of multithreaded programming?

The benefits of multithreaded programming can be broken down into four major categories:

- Responsiveness
- Resource sharing
- Economy
- Utilization of multiprocessor architectures

12. What is turnaround time?

Turnaround time is the interval from the time of submission to the time of completion of a process. It is the sum of the periods spent waiting to get into memory, waiting in the ready queue, executing on the CPU, and doing I/O.

13. What are the various components of a computer system?

- The hardware
- The operating system
- The application programs
- The user

14. What is a sector?

Smallest addressable portion of a disk.

15. What is a deadlock?

- Deadlock is a situation where a group of processes are all blocked and none of them can become unblocked until one of the other becomes unblocked.
- The simplest deadlock is two processes each of which is waiting for a message from the other.

16. What are the states of a process?

- New
- Running
- Waiting
- Ready
- Terminated

17. What are the different types of Real-Time Scheduling?

Hard real-time systems required to complete a critical task within a guaranteed amount of time.

Soft real-time computing requires that critical processes receive priority over less fortunate ones.

18. What is fragmentation?

Fragmentation occurs in a dynamic memory allocation system when many of the free blocks are too small to satisfy any request.

19. What do you mean by Time-sharing systems?

Time-sharing or multitasking is a logical extension of multiprogramming. It allows many users to share the computer simultaneously. The CPU executes multiple jobs by switching among them, but the switches occur so frequently that the users can interact with each program while it is running.

20. What is an embedded system definition?

An embedded system is a combination of computer hardware and software, either fixed in capability or programmable, designed for a specific function or functions within a larger system.

UNIT-II

21.Define Memory management.

Memory management is the functionality of an operating system which handles or manages primary memory and moves processes back and forth between main memory and disk during execution. Memory management keeps track of each and every memory location, regardless of either it is allocated to some process or it is free.

22.What is swapping?

Swapping is a mechanism in which a process can be swapped temporarily out of main memory (or move) to secondary storage (disk) and make that memory available to other processes. At some later time, the system swaps back the process from the secondary storage to main memory.

Though performance is usually affected by swapping process but it helps in running multiple and big processes in parallel and that's the reason Swapping is also known as a technique for memory compaction.

23.Define Fixed Partitions.

This is the oldest and simplest technique used to put more than one processes in the main memory. In this partitioning, number of partitions (non-overlapping) in RAM are fixed but size of each partition may or may not be same. As it is contiguous allocation, hence no spanning is allowed. Here partition are made before execution or during system configure.

24.List out Advantages of fixed Partitions.

Advantages of Fixed Partitioning –

1. Easy to implement:
   Algorithms needed to implement Fixed Partitioning are easy to implement. It simply requires putting a process into certain partition without focussing on the emergence of Internal and External Fragmentation.
2. Little OS overhead:
   Processing of Fixed Partitioning require lesser excess and indirect computational power.

25. List out Disadvantages of fixed Partitions.

- **Internal Fragmentation**

- **External fragmentation**
- **Limit process size**
- **Limitation on Degree of Multiprogramming**

24.What is Dynamic Partitions.

It is a part of Contiguous allocation technique. It is used to alleviate the problem faced by Fixed Partitioning. In contrast with fixed partitioning, partitions are not made before the execution or during system configure.
Various **features** associated with variable Partitioning.

25. List out Advantages of Dynamic Partitions.

Advantages of Variable Partitioning –

1. No Internal Fragmentation:
   In variable Partitioning, space in main memory is allocated strictly according to the need of process, hence there is no case of internal fragmentation. There will be no unused space left in the partition.
2. No restriction on Degree of Multiprogramming:
   More number of processes can be accommodated due to absence of internal fragmentation. A process can be loaded until the memory is not empty.
3. No Limitation on the size of the process:
   In Fixed partitioning, the process with the size greater than the size of the largest partition could not be loaded and process can not be divided as it is invalid in contiguous allocation technique. Here, In variable partitioning, the process size can't be restricted since the partition size is decided according to the process size.

26. List out Disadvantages of Dynamic Partitions.

1. Difficult Implementation:
   Implementing variable Partitioning is difficult as compared to Fixed Partitioning as it involves allocation of memory during run-time rather than during system configure.
2. External Fragmentation:
   There will be external fragmentation inspite of absence of internal fragmentation.

27.Define Compaction.

The process of collecting fragments of available memory space into contiguous blocks by moving programs and data in a computers memory or disk.Also called garbage collection.

28.Define Internal Fragmentation.

A situation in which a fixed partition is only partially used by the program.The remaining space within the partition is unavailable to any other job and iis therefore wasted.

29.What is main memory?

The unit that works directly with the CPU and in which the data and instructions must reside in order to be processed .Also called random access memory
(RAM),Primary memory ,or Internal memory.

30.Define Relocation.

The process o moving a program rom one area o memory to another.

31.What is address resolution?

The process o changing the address of an instruction or data item to the address in main memory at which its to be loaded or instructed

32.Define Cache memory.

A small, fast memory used to hold selected data and to provided faster

Access than would otherwise be possible..

33.What is Demand paging.

A memory allocation scheme that loads a programs page into memory at the time needed or processing..

34.Define page fault..

A type of hardware interrupt caused by a reference to a page not residing in

Memory. The effect is to move a page out of main memory and into secondary storage so another page can be moved into memory.

35.Define page swapping..

The process of moving a page out o main memory and into secondary storage so another page can be moved into memory in its place.

36.What is segment?

A variable size section of a users job that contains a logical grouping of code.

37.Define SMT..

Segment Map Table in main memory with the vital information for each segment including the segment number and its corresponding memory address.

38.Define PMT.

Page Map Table in main memory with the vital information for each page including the page number and its corresponding page frame memory address..

39.What is Segmented memory allocation?

A memory allocation scheme based on the concept o dividing a user job into logical groupings of code to allow for noncontiguous program storage during executions.

40.Define Subroutine.

Also called a "subprogram" a segment o a program that can perform a specific function .Subroutines can reduce programming time when a specific function is required at more than one point in a program.

UNIT-III

41.Define Aging.

A policy used to ensure that jobs that have been in the system for a long time in the lower level queues will eventually complete their execution.

42.What is mean by Context Switching?

The acts of saving a jobs processing information in its PCB so the job can be swapped out of memory and of loading the processing information from the PCB o another job into the appropriate registers so the CPU can process it.Context Switching occurs in all preemptive policies…

43.Define Interrupt Handler.

The program that controls what action should be taken by the operating system when a sequence of events is interrupted.

44.Define Job scheduler.

The high level scheduler o the processor manager that selects jobs from a queue o incoming jobs based on each jobs characteristics..

45.Define preemptive scheduling policy.

Any process scheduling strategy that based on predetermined policies interrupts the processing o a job and transfers the CPU to another job..It is widely used in time sharing environments.

46.What is priority scheduling?

A non preemptive process scheduling policy that allow for the execution of high priority jobs before low priority jobs..

47.Define Round Robin..

A preemptive process scheduling policy that allocates to each job one unit off processing time per turn to ensure that the CPU is equally shared among all active processes and isn't monopolized by any one job.

48.Define deadlock..

A problem occurring when the resources needed by some jobs to finish execution are held by other jobs, which, in turn, are waiting for other resources to become available .Also called deadly embrace.

49.What is spooling?

A technique developed to speed I/O by collecting in a disk file either input

Received from slow input devices or output going to slow output going to slow output devices such as printers.

50.Define Starvation.

The result o conservative allocation of resources in which a single job is prevented from execution because its kept waiting for resources that never become available.

51.Define Multiprocessing.

When two or more processors share system resources that may include some or all of the following: the same main memory ,I/O devices, and control program routines .

53.Define Implicit parallelism.

A type of concurrent programming in which the compiler automatically detects which instructions can be performed in parallel.

54.Define Explicit parallelism.

A type of concurrent programming that requires the programmer explicitly

State which instructions can be executed in parallel.

55.What is parallel processing ?

The process of operating two or more CPU in parallel ,with more than one CPU executing instructions simultaneously.

56.Define process synchronization.

The need for algorithms to resolve conflicts between processors in a multiprocessing environment .or The need to ensure that events occur in the proper order even if they are carried out by several processes.

57.Define Semaphore.

A type of shared data item that may contain either binary or nonnegative integer values and is used to provide mutual exclusion.

58.What is thread control block?

A data structure that contains information about the current status and characteristics of a thread.

59.Definee WAIT&SIGNAL.

A modification of the test and set synchronization mechanism that's designed to remove busy waiting.

60.Define Master/Slave.

An asymmetric multiprocessing configuration consisting off a single processor system connected to "'slave" processors each of which is managed by the primary "master" processor, which provides the scheduling functions and jobs.

UNIT-IV

61.What is buffers?

Temporary storage areas residing in main memory,Channels,and control units.

62.Define CSW.

A data structure that contains information indicating the condition of the channel ,including three bits for the three components of the I/O subsystem one each for the channel,control unit,and device.

63.Define DASD(Direct access storage device).

Any secondary storage device that can directly read or write to a specific place. sometimes called a random access storage device.

64.Define Direct memory access(DMA)

An I/O technique that allows a control unit to access main memory directly and transfer data without the intervention o thee CPU.

65.Define Flash memory.

A type of nonvolatile memory used as a secondary storage device that can be erased and reprogrammed in block of data.

66.Define Hamming code

An error detecting and error correcting code that greatly improves the reliability of data .

67.Define traffic controller.

One of the modules of the I/O subsystem that monitors the status of every device, control unit, and channel.

68.Define Interrupt.

A hardware signal that suspends execution o a program and activities the execution of a special program known as the interrupt handler.

69.Define universal serial bus(USB) controller.

The interface between the operating system,device drivers,,and applications that read and write to devices connected to the computer through the USB port.

70.Define virtual device.

A dedicated device that has been transformed into a shared device through the use of spooling techniques.

71.What is I/O control unit?

The hardware unit containing the electronic components common to one type of I//O devices such as a disk drive,

72.What is SCAN?

A Scheduling strategy for direct access storage devices that's used to optimize seek time.The most common variation are N-step SCAN and C-SCAN.

73.What is search time?

The time it takes to rotate the disk from the moment an IO command is issued until the requested record is moved under the read/write head.Also known as rotational delay.

74.What is stripe?

A set of consecutive strips across disks;the strips contain data bits and sometimes parity bits depending on the RAID level.

75.Deine transfer rate.

The rate at which data is transferred from sequential access media.

76.Define Transfer time.

The time required for data to be transferred between secondary storage and main memory.

77. How many types of device are there?

There are three different types of peripherals: Input, used to interact with, or send data to the computer (mouse, keyboards, etc.) Output, which provides output to the user from the computer (monitors, printers, etc.) Storage, which stores data processed by the computer (hard drives, flash drives, etc.)

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79.Why mobile device management is important?

Businesses need to have app control on mobile devices, and MDM software enables them to enforce access control and allowed application policies. ... Encryption and data management policies are important elements in securing enterprise data.

80. What are the functions of device management?

Device management generally performs the following: Installing device and component-level drivers and related software. Configuring a device so it performs as expected using the bundled operating system, business/workflow software

and/or with other hardware devices. Implementing security measures and processes.

UNIT-V

81. What is meant by Demand Paging?

Whenever the CPU tries to fetch the first instruction, it gets a page fault causing the 0S to bring in the page containing that instruction. Thus the pages are loaded only on demand is called as Demand Paging.

82. What is meant by Locality of reference?

During any phase of execution, the page references only a relative small fraction of its pages. This reference of fraction of all pages is called as Locality of Reference.

83.What are the principal events of Process Creation?

Execution of a System call by a running process. System Initialization. Initiation of a batch job. A user request to create a new process .

84. What is meant by Page Fault?

Whenever memory management unit notices that the page is unmapped and causes the CPU to trap to the Operating System. This trap is called as Page Fault.

85. What is meant by Thrashing?

A Program which is causing page faults every few instructions to occur is called as Thrashing.

8 6. What is meant by Text File, Source File, Object File?

- ✓ A Text File is a sequence of characters organized into lines.
- ✓ A Source File is a sequence of subroutines and functions, each of which is further organized as declarations followed by executable statements.
- ✓ An Object file is a sequence of bytes organized into blocks understandable by the system's linker.

87. What is meant by Executable file?

An Executable file is a series of code sections that the loader can bring into memory and execute.

88. What are the Access methods available?

- Direct Access
- Sequential Access
- Other Access methods

89. What is meant by Page Table?

Page Table is a table which has the ability to mark an entry invalid through a Valid – Invalid bit or special value of protection bits.

90. What are the various operations performed in a File?

- Creating
- Deleting
- Opening
- Closing
- Reading
- Writing
- Appending
- Seeking
- Renaming
- Getting & Setting Attributes.

91. What are the operations performed in a Directory?

1) Create 2) Delete 3) Opendir 4) Closedir 5) Readdir 6) Rename 7) Link 8) Unlink

92. What are the different directory structures available?

Single - Level Directory Two - Level Directory Three - Structured Directory A cyclic - Graph Directory General Graph Directory

93. What is meant by Swapping?

It is a process of bringing in each process in its entirety, running it for a while, then putting it back on the disk.

94. What is meant by Memory Compaction?

When swapping creates multiple holes in memory, it is possible to combine them all into one big by moving all the processes downward as far as possible.

95. What is meant by Boot Control block?

The Block which contains information needed by the system to boot an operating system from that partition is called as Boot Control Block.

96. Define data compression.

A procedure used to reduce the amount o space required to store data by reducing ,encoding,or abbreviating repetitive terms or characters.

97.Define hashing algorithm.

The set o instructions used to perform a key to address transformation in which a record key field determines its location.

98.What is directory?

A storage area in a secondary storage volume (disk,disk pack,etc) containing information about files stored in the volume.

99. What is meant by File Pointer?

This pointer is unique to each process operating on the file and it is the pointer used by the pointer used by the system to track the last read-write location as a current - file position pointer.

100. What is meant by Double Buffering?

Memory Mapping proceeds by reading in disk blocks from the file system and storing them in the buffer cache. Because the virtual memory system cannot interface with the buffer cache, the contents of file in the buffer cache must be copied into the page cache. This situation is known as Double Caching.

OPERATING SYSTEM
TWO mark questions

UNIT-I

1. What is an operating system?
2. What are the different types of operating systems?
3. What is the relationship between operating systems and computer hardware?
4. What are the characteristics of operating system?
5. What do you mean by kernel?
6. What are Batch systems?
7. What is an Interactive computer system?
8. What are the various OS components?
9. What is a thread?
10. What is a process?
11. What is turnaround time?
12. What are the various components of a computer system?
13. What is a sector?
14. What is a deadlock?
15. What are the states of a process?
16. What are the different types of Real-Time Scheduling?
17. What is fragmentation?
18. What do you mean by Time-sharing systems
19. What is an embedded system definition?

UNIT-II

20. Define Memory management.
21. What is swapping?
22. Define Fixed Partitions.
23. List out Advantages of fixed Partitions.
24. List out Disadvantages of fixed Partitions.
25. What is Dynamic Partitions.
26. List out Advantages of Dynamic Partitions.
27. List out Disadvantages of Dynamic Partitions.
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39. 38.Define PMT.
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UNIT-III

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100. What is meant by Double Buffering?

FIVE MARKS QUESTIONS

Unit-1

1. Explain operating system software.
2. Write a short note on Types of operation system.
3. Explain a brief history of machine hardware.

Unit-2

1. Explain single user contiguous scheme.
2. Explain Dynamic partitions.
3. Write a short note on Demand paging .
4. Briefly explain the cache memory.
5. Explain Segmented memory allocation.

Unit-3

1. Explain job scheduling versus process scheduling.
2. Write a short note on process scheduling policies.
3. Explain Deadlock.
4. What is parallel processing? Explain.
5. Explain process cooperation.
6. Explain concurrent programming .

Unit-4

1. Explain types of devices.
2. Explain magnetic disk drive access times.
3. Write short note on components of the I/O subsystem.

Unit-5

1. Explain The file manager.
2. Explain the file organization.
3. Explain the Access methods.

TENMARK QUESTIONS

Unit-1

1.Explain brief history of operating system development.
2. Explain operating system software

Unit-2

1.Explain De allocation in memory management.
2.Explain Page replacement policies and concepts.
3.Explain virtual memory and cache memory.

Unit-3

1.Explain processor management.
2.Explain process scheduler.
3.Write a note on process management in Seven cases of Deadlock.
4.Explain (i)Modeling deadlocks
(ii)Starvation.

5.Explain Concurrent processes.
6.Explain (i)Typical multiprocessing configuration
(ii)Process Synchronization software

Unit-4

1.Explain Device management.
2.Explain Direct access storage devices.
3.Explain (i)Magnetic disk drive access times.
(ii)Mnagement of I/O Requests
4.Explain RAID

Unit-5

1.Explain the file management.
2.Explain (i)Interacting with the file manager
(ii)File Organization
3.Explain Physical storage allocation.