Operating System Interview Question and Answers-1

1. **What is an operating system?**

   An operating system is a program that acts as an intermediary between the user and the computer hardware. The purpose of an OS is to provide a convenient environment in which user can execute programs in a convenient and efficient manner. It is a resource allocator responsible for allocating system resources and a control program which controls the operation of the computer hardware.

2. **Why paging is used?**

   Paging is solution to external fragmentation problem which is to permit the logical address space of a process to be noncontiguous, thus allowing a process to be allocating physical memory wherever the latter is available.

3. **Explain the concept of the batched operating systems?**

   In batched operating system the users gives their jobs to the operator who sorts the programs according to their requirements and executes them. This is time consuming but makes the CPU busy all the time.

4. **What is purpose of different operating systems?**

   The machine purpose workstation individual usability &resources utilization mainframe optimize utilization of hardware PC support complex games, business application Hand held PCs Easy interface & min. power consumption.

5. **What is virtual memory?**

   Virtual memory is hardware technique where the system appears to have more memory that it actually does. This is done by time-sharing, the physical memory and storage parts of the memory one disk when they are not actively being used.

6. **What is Throughput, Turnaround time, waiting time and Response time?**

   ***Throughput** : number of processes that complete their execution per time unit.*

   ***Turnaround time** : amount of time to execute a particular process.*

   ***Waiting time** : amount of time a process has been waiting in the ready queue.*

   ***Response time** : amount of time it takes from when a request was submitted until the firstresponse is produced, not output (for time-sharing environment).*

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

The hardware

The operating system

The application programs

The users.

8. What is a Real-Time System?

A real time process is a process that must respond to the event switch in a certain time period. A real time operating system is an operating system that can run real time processes successfully.

9. Explain the concept of the Distributed systems?

Distributed systems work in a network. They can share the network resources, communicate with each other.

10. What is SCSI?

SCSI - Small computer systems interface is a type of interface used for computer components such as hard drives, optical drives, scanners and tape drives. It is a competing technology to standard IDE (Integrated Drive Electronics).

11. What is a sector?

Smallest addressable portion of a disk.

12. What are the different operating systems?

Batched operating systems

Multi-programmed operating systems

Timesharing operating systems

Distributed operating systems

Real-time operating systems.

13. What is busy waiting?

The repeated execution of a loop of code while waiting for an event to occur is called busy waiting.

14. What are system calls?

System calls provide the interface between a process and the operating system. System calls for modern Microsoft windows platforms are part of the win32 API, which is available for all the compilers written for Microsoft windows.

15. What are various scheduling queues?

Job queue

Ready queue

Device queue

16. What are java threads?

Java is one of the small number of languages that support at the language level for the creation and management of threads. However, because threads are managed by the java virtual machine (JVM), not by a user-level library or kernel, it is difficult to classify Java threads as either user- or kernel-level.

17. What are types of threads?

User thread

Kernel thread

18. What is a semaphore?

It is a synchronization tool used to solve complex critical section problems. A semaphore is an integer variable that, apart from initialization, is accessed only through two standard atomic operations: Wait and Signal.

19. 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.

20. What is cache memory?

Cache memory is random access memory (RAM) that a computer microprocessor can access more quickly than it can access regular RAM. As the microprocessor processes data, it looks first in the cache memory and if it finds the data there (from a previous reading of data), it does not have to do the more time-consuming reading of data.

21. What is thrashing?

It is a phenomenon in virtual memory schemes when the processor spends most of

its time swapping pages, rather than executing instructions. This is due to an inordinate number of page faults.

22. What are the states of a process?

New

Running

Waiting

Ready

Terminated

23. What is a binary semaphore?

A binary semaphore is one, which takes only 0 and 1 as values. They are used to implement mutual exclusion and synchronize concurrent processes.

24. What is a job queue?

When a process enters the system it is placed in the job queue.

25. What is a ready queue?

The processes that are residing in the main memory and are ready and waiting to execute are kept on a list called the ready queue.

26. What are turnaround time and response time?

Turnaround time is the interval between the submission of a job and its completion. Response time is the interval between submission of a request, and the first response to that request.

27. What are the operating system components?

Process management

Main memory management

File management

I/O system management

Secondary storage management

Networking

Protection system

Command interpreter system

28. What is mutex?

Mutex is a program object that allows multiple program threads to share the same resource, such as file access, but not simultaneously. When a program is started a mutex is created woth a unique name. After this stage, any thread that needs the resource must lock the mutex from other threads while it is using the resource. the mutex is set to unlock when the data is no longer needed or the routine is finished.

29. What is Marshalling?

The process of packaging and sending interface method parameters across thread or process boundaries.

30. What are residence monitors?

Early operating systems were called residence monitors.

31. Why thread is called as a lightweight process?

It is called light weight process to emphasize the fact that a thread is like a process but is more efficient and uses fewer resources(n hence "lighter")and they also share the address space.

32. What are operating system services?

Program execution

I/O operations

File system manipulation

Communication

Error detection

Resource allocation

Accounting

Protection

33. What is a process?

A program in execution is called a process. Or it may also be called a unit of work. A process needs some system resources as CPU time, memory, files, and i/o devices to accomplish the task. Each process is represented in the operating system by a

process control block or task control block (PCB).Processes are of two types

Operating system processes

User processes

34. What are the different job scheduling in operating systems?

Scheduling is the activity of the deciding when process will receive the resources they request.

FCFS *---> FCSFS stands for First Come First Served. In FCFS the job that has been waiting the longest is served next.*

Round Robin Scheduling*--->Round Robin scheduling is a scheduling method where each process gets a small quantity of time to run and then it is preempted and the next process gets to run. This is called time-sharing and gives the effect of all the processes running at the same time*

Shortest Job First *---> The Shortest job First scheduling algorithm is a nonpreemptive scheduling algorithm that chooses the job that will execute the shortest amount of time.*

Priority Scheduling*--->Priority scheduling is a scheduling method where at all times the highest priority process is assigned the resource.*

35. What is dual-mode operation?

In order to protect the operating systems and the system programs from the malfunctioning programs the two mode operations were evolved

System mode

User mode.

36. What is a device queue?

A list of processes waiting for a particular I/O device is called device queue.

37. 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.

38. What is starvation ?

Starvation is a resource management problem where a process does not get the resources it needs for a long time because the resources are being allocated to other processes.

39. What is a long term scheduler & short term schedulers?

Long term schedulers *are the job schedulers that select processes from the job queue and load them into memory for execution.*
The ***Short term schedulers*** *are the CPU schedulers that select a process form the ready queue and allocate the CPU to one of them.*

40. What is fragmentation?

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

41. What is context switching?

Transferring the control from one process to other process requires saving the state of the old process and loading the saved state for new process. This task is known as context switching.

42. What is relative path and absolute path?

Absolute path-- Exact path from root directory.

Relative path-- Relative to the current path.

43. What are the disadvantages of context switching?

Time taken for switching from one process to other is pure over head. Because the system does no useful work while switching. So one of the solutions is to go for threading when ever possible.

44. What is the state of the processor, when a process is waiting for some event to occur?

Waiting state

45. What is the difference between Primary storage and secondary storage?

Main memory *- only large storage media that the CPU can access directly.*

Secondary storage *- extension of main memory that provides large nonvolatile*

storage capacity.

46. What is process synchronization?

A situation, where several processes access and manipulate the same data concurrently and the outcome of the execution depends on the particular order in which the access takes place, is called race condition. To guard against the race condition we need to ensure that only one process at a time can be manipulating the same data. The technique we use for this is called process synchronization.

47. What is a data register and address register?

Data registers *- can be assigned to a variety of functions by the programmer. They can be used with any machine instruction that performs operations on data.*
Address registers *- contain main memory addresses of data and instructions or they contain a portion of the address that is used in the calculation of the complete addresses.*

48. What are deadlock prevention techniques?

Mutual exclusion

Hold and wait

No preemption

Circular wait

49. What is the difference between Complier and Interpreter?

An interpreter reads one instruction at a time and carries out the actions implied by that instruction. It does not perform any translation. But a compiler translates the entire instructions.

50. What is a Safe State and what is its use in deadlock avoidance?

When a process requests an available resource, system must decide if immediate allocation leaves the system in a safe state. System is in safe state if there exists a safe sequence of all processes. Deadlock Avoidance : ensure that a system will never enter an unsafe state.

51. What is the difference between microkernel and macro kernel?

Micro-Kernel *: A micro-kernel is a minimal operating system that performs only the essential functions of an operating system. All other*

operating system functions are performed by system processes. ***Monolithic*** *: A monolithic operating system is one where all operating system code is in a single executable image and all operating system code runs in system mode.*

52. What is DRAM?

Dynamic Ram stores the data in the form of Capacitance, and Static RAM stores the data in Voltages.

53. What are the different functions of Scheduler?

Scheduler deals with the problem of deciding which of the process in the ready queue is to be allocated the CPU. Short Term Schedulers, Long Term Schedulers

54. What is a trap and trapdoor?

Trapdoor is a secret undocumented entry point into a program used to grant access without normal methods of access authentication. A trap is a software interrupt, usually the result of an error condition.

55. What are local and global page replacements?

Local replacement means that an incoming page is brought in only to the relevant process' address space. Global replacement policy allows any page frame from any process to be replaced. The latter is applicable to variable partitions model only.

56. What is cache-coherency?

In a multiprocessor system there exist several caches each may containing a copy of same variable A. Then a change in one cache should immediately be reflected in all other caches this process of maintaining the same value of a data in all the caches s called cache-coherency.

57. What are the benefits of multithreaded programming?

Responsiveness

Resources sharing

Economy

Utilization of multiprocessor architectures.

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Operating System Interview Question and Answers-2

1. Explain the concept of Reentrancy?

It is a useful, memory-saving technique for multiprogrammed timesharing systems. A Reentrant Procedure is one in which multiple users can share a single copy of a program during the same period. Reentrancy has 2 key aspects: The program code cannot modify itself, and the local data for each user process must be stored separately. Thus, the permanent part is the code, and the temporary part is the pointer back to the calling program and local variables used by that program. Each execution instance is called activation. It executes the code in the permanent part, but has its own copy of local variables/parameters. The temporary part associated with each activation is the activation record. Generally, the activation record is kept on the stack.
Note: A reentrant procedure can be interrupted and called by an interrupting program, and still execute correctly on returning to the procedure.

2. Explain Belady's Anomaly?

Also called FIFO anomaly. Usually, on increasing the number of frames allocated to a process virtual memory, the process execution is faster, because fewer page faults occur. Sometimes, the reverse happens, i.e., the execution time increases even when more frames are allocated to the process. This is Belady's Anomaly. This is true for certain page reference patterns.

3. What is a binary semaphore? What is its use?

A binary semaphore is one, which takes only 0 and 1 as values. They are used to implement mutual exclusion and synchronize concurrent processes.

4. What is thrashing?

It is a phenomenon in virtual memory schemes when the processor spends most of its time swapping pages, rather than executing instructions. This is due to an inordinate number of page faults.

5. List the Coffman's conditions that lead to a deadlock.

1. **Mutual Exclusion**: Only one process may use a critical resource at a time.
2. **Hold & Wait**: A process may be allocated some resources while waiting for others.
3. **No Pre-emption**: No resource can be forcible removed from a process holding it.
4. **Circular Wait**: A closed chain of processes exist such that each process holds

at least one resource needed by another process in the chain.

6. What are short, long and medium-term scheduling?

Long term scheduler determines which programs are admitted to the system for processing. It controls the degree of multiprogramming. Once admitted, a job becomes a process.

Medium term scheduling is part of the swapping function. This relates to processes that are in a blocked or suspended state. They are swapped out of real-memory until they are ready to execute. The swapping-in decision is based on memory-management criteria.

Short term scheduler, also know as a dispatcher executes most frequently, and makes the finest-grained decision of which process should execute next. This scheduler is invoked whenever an event occurs. It may lead to interruption of one process by preemption.

7. What are turnaround time and response time?

Turnaround time is the interval between the submission of a job and its completion. Response time is the interval between submission of a request, and the first response to that request.

8. What are the typical elements of a process image?

User data: Modifiable part of user space. May include program data, user stack area, and programs that may be modified.

User program: The instructions to be executed.

System Stack: Each process has one or more LIFO stacks associated with it. Used to store parameters and calling addresses for procedure and system calls.

Process control Block (PCB): Info needed by the OS to control processes.

9. What is the Translation Lookaside Buffer (TLB)?

In a cached system, the base addresses of the last few referenced pages is maintained in registers called the TLB that aids in faster lookup. TLB contains those page-table entries that have been most recently used. Normally, each virtual memory reference causes 2 physical memory accesses- one to fetch appropriate page-table entry, and one to fetch the desired data. Using TLB in-between, this is reduced to just one physical memory access in cases of TLB-hit.

10. What is the resident set and working set of a process?

Resident set is that portion of the process image that is actually in real-memory at a particular instant. Working set is that subset of resident set that is actually needed for execution. (Relate this to the variable-window size method for swapping techniques.)

11. When is a system in safe state?

The set of dispatchable processes is in a safe state if there exists at least one temporal order in which all processes can be run to completion without resulting in a deadlock.

12. What is cycle stealing?

We encounter cycle stealing in the context of Direct Memory Access (DMA). Either the DMA controller can use the data bus when the CPU does not need it, or it may force the CPU to temporarily suspend operation. The latter technique is called cycle stealing. Note that cycle stealing can be done only at specific break points in an instruction cycle.

13. What is meant by arm-stickiness?

If one or a few processes have a high access rate to data on one track of a storage disk, then they may monopolize the device by repeated requests to that track. This generally happens with most common device scheduling algorithms (LIFO, SSTF, C-SCAN, etc). High-density multisurface disks are more likely to be affected by this than low density ones.

14. What are the stipulations of C2 level security?

C2 level security provides for:

1. Discretionary Access Control
2. Identification and Authentication
3. Auditing
4. Resource reuse

15. What is busy waiting?

The repeated execution of a loop of code while waiting for an event to occur is called busy-waiting. The CPU is not engaged in any real productive activity during this period, and the process does not progress toward completion.

16. Explain the popular multiprocessor thread-scheduling strategies.

1. **Load Sharing**: Processes are not assigned to a particular processor. A global queue of threads is maintained. Each processor, when idle, selects a thread from this queue. Note that load balancing refers to a scheme where work is allocated to processors on a more permanent basis.
2. **Gang Scheduling**: A set of related threads is scheduled to run on a set of processors at the same time, on a 1-to-1 basis. Closely related threads / processes may be scheduled this way to reduce synchronization blocking, and minimize process switching. Group scheduling predated this strategy.
3. **Dedicated processor assignment**: Provides implicit scheduling defined by assignment of threads to processors. For the duration of program execution, each program is allocated a set of processors equal in number to the number of threads in the program. Processors are chosen from the available pool.
4. **Dynamic scheduling**: The number of thread in a program can be altered during the course of execution.

17. When does the condition 'rendezvous' arise?

In message passing, it is the condition in which, both, the sender and receiver are blocked until the message is delivered.

18. What is a trap and trapdoor?

Trapdoor is a secret undocumented entry point into a program used to grant access without normal methods of access authentication. A trap is a software interrupt, usually the result of an error condition.

19. What are local and global page replacements?

Local replacement means that an incoming page is brought in only to the relevant process address space. Global replacement policy allows any page frame from any process to be replaced. The latter is applicable to variable partitions model only.

20. Define latency, transfer and seek time with respect to disk I/O.

Seek time is the time required to move the disk arm to the required track. Rotational delay or latency is the time it takes for the beginning of the required sector to reach the head. Sum of seek time (if any) and latency is the access time. Time taken to actually transfer a span of data is transfer time.

21. Describe the Buddy system of memory allocation.

Free memory is maintained in linked lists, each of equal sized blocks. Any such block is of size 2^k. When some memory is required by a process, the block size of next

higher order is chosen, and broken into two. Note that the two such pieces differ in address only in their kth bit. Such pieces are called buddies. When any used block is freed, the OS checks to see if its buddy is also free. If so, it is rejoined, and put into the original free-block linked-list.

22. What is time-stamping?

It is a technique proposed by Lamport, used to order events in a distributed system without the use of clocks. This scheme is intended to order events consisting of the transmission of messages. Each system 'i' in the network maintains a counter Ci. Every time a system transmits a message, it increments its counter by 1 and attaches the time-stamp Ti to the message. When a message is received, the receiving system 'j' sets its counter Cj to 1 more than the maximum of its current value and the incoming time-stamp Ti. At each site, the ordering of messages is determined by the following rules: For messages x from site i and y from site j, x precedes y if one of the following conditions holds....(a) if Ti<Tj or (b) if Ti=Tj and i<j.

23. How are the wait/signal operations for monitor different from those for semaphores?

If a process in a monitor signal and no task is waiting on the condition variable, the signal is lost. So this allows easier program design. Whereas in semaphores, every operation affects the value of the semaphore, so the wait and signal operations should be perfectly balanced in the program.

24. In the context of memory management, what are placement and replacement algorithms?

Placement algorithms determine where in available real-memory to load a program. Common methods are first-fit, next-fit, best-fit. Replacement algorithms are used when memory is full, and one process (or part of a process) needs to be swapped out to accommodate a new program. The replacement algorithm determines which are the partitions to be swapped out.

25. In loading programs into memory, what is the difference between load-time dynamic linking and run-time dynamic linking?

For **load-time dynamic linking**: Load module to be loaded is read into memory. Any reference to a target external module causes that module to be loaded and the references are updated to a relative address from the start base address of the application module.

With **run-time dynamic loading**: Some of the linking is postponed until actual

reference during execution. Then the correct module is loaded and linked.

26. What are demand-paging and pre-paging?

With demand paging, a page is brought into memory only when a location on that page is actually referenced during execution. With pre-paging, pages other than the one demanded by a page fault are brought in. The selection of such pages is done based on common access patterns, especially for secondary memory devices.

27. Paging a memory management function, while multiprogramming a processor management function, are the two interdependent?

Yes.

28. What is page cannibalizing?

Page swapping or page replacements are called page cannibalizing.

29. What has triggered the need for multitasking in PCs?

1. Increased speed and memory capacity of microprocessors together with the support fir virtual memory and
2. Growth of client server computing

30. What are the four layers that Windows NT have in order to achieve independence?

1. Hardware abstraction layer
2. Kernel
3. Subsystems
4. System Services.

31. What is SMP?

To achieve maximum efficiency and reliability a mode of operation known as symmetric multiprocessing is used. In essence, with SMP any process or threads can be assigned to any processor.

32. What are the key object oriented concepts used by Windows NT?

Encapsulation, Object class and instance.

33. Is Windows NT a full blown object oriented operating system? Give reasons.

No Windows NT is not so, because its not implemented in object oriented language and the data structures reside within one executive component and are not represented as objects and it does not support object oriented capabilities.

34. What is a drawback of MVT?

It does not have the features like

1. ability to support multiple processors
2. virtual storage
3. source level debugging

35. What is process spawning?

When the OS at the explicit request of another process creates a process, this action is called process spawning.

36. How many jobs can be run concurrently on MVT?

15 jobs.

37. List out some reasons for process termination.

1. Normal completion
2. Time limit exceeded
3. Memory unavailable
4. Bounds violation
5. Protection error
6. Arithmetic error
7. Time overrun
8. I/O failure
9. Invalid instruction
10. Privileged instruction
11. Data misuse
12. Operator or OS intervention
13. Parent termination.

38. What are the reasons for process suspension?

1. swapping
2. interactive user request
3. timing
4. parent process request

39. What is process migration?

It is the transfer of sufficient amount of the state of process from one machine to the target machine.

40. What is mutant?

In Windows NT a mutant provides kernel mode or user mode mutual exclusion with the notion of ownership.

41. What is an idle thread?

The special thread a dispatcher will execute when no ready thread is found.

42. What is FtDisk?

It is a fault tolerance disk driver for Windows NT.

43. What are the possible threads a thread can have?

1. Ready
2. Standby
3. Running
4. Waiting
5. Transition
6. Terminated

44. What are rings in Windows NT?

Windows NT uses protection mechanism called rings provides by the process to implement separation between the user mode and kernel mode.

45. What is Executive in Windows NT?

In Windows NT, executive refers to the operating system code that runs in kernel mode.

46. What are the sub-components of I/O manager in Windows NT?

1. Network redirector/ Server
2. Cache manager.
3. File systems
4. Network driver
5. Device driver

47. What are DDks? Name an operating system that includes this feature.

DDks are device driver kits, which are equivalent to SDKs for writing device drivers. Windows NT includes DDks.

48. What level of security does Windows NT meets?

C2 level security.

Networking Interview Question and Answers

1. **What is a network?**

   It is a set of devices connected by communication links. A node can be a computer or any other device capable of sending and/or receiving data generated by other nodes on the network.

2. **What is a protocol?**

   It is a set of rules that governs data communication.

3. **What is multiplexing?**

   Multiplexing is the process of dividing a link, the phycal medium, into logical channels for better efficiency. Here medium is not changed but it has several channels instead of one.

4. **Define bandwidth?**

   The range of frequencies that a medium can pass is called bandwidth. It is the difference between the highest and lowest frequencies that the medium can satisfactorily pass.

5. **What do you mean by switching?**

   It is a method in which communication devices are connected to one another efficiently. A switch is intermediary hardware or software that links devices together temporarily.

6. **What are the important topologies for networks?**

   BUS topology

   STAR topology

RING topology

MESS topology

7. What are the duties of data link layer?

Data link layer is responsible for carrying packets from one hop (computer or router) to the next. The duties of data link layer include packetizing, adderssing, error control, flow control, medium access control.

8. What is virtual channel?

Virtual channel is normally a connection from one source to one destination, although multicast connections are also permitted. The other name for virtual channel is virtual circuit.

9. What is multicast routing?

Sending a message to a group is called multicasting, and its routing algorithm is called multicast routing.

10. What is TELNET ?

TELNET is a client - server application that allows a user to log on to a remote machine,giving the user access to the remote system. TELNET is an abbreviation of terminal network.

11. What do you mean by data communication?

It is the exchange of data between two devices via some form of transmission medium such as wire cable. The communicating system must be part of a communication system made up of a combination of hardware and software.The effectiveness of a data communication system depends on three fundamental characteristics: delivery, accuracy and timeliness.

12. What is distributed processing?

It is a strategy in which services provided by the network reside at multiple sites.

13. What is point to point connection?

It provides a dedicated link between two devices. The entire capacity of the link is reserved for transmission between the two devices.

14. What is Redundancy?

The concept of including extra information in the transmission solely for the purpose

of comparison. This technique is called redundancy.

15. **What is subnet?**

A generic term for section of a large networks usually separated by a bridge or router.

16. **What is multipoint connection?**

In multipoint connection more than two specific devices share a single link. Here the capacity of the channel is shared either separately or temporally.

17. **What is simplex?**

It is the mode of communication between two devices in which flow of data is unidirectional.

18. **What is half-duplex?**

It is the mode of communication between two devices in which flow of data is bidirectional but not at the same time. ie each station can transmit and receive but not at the same time.

19. **What is full duplex?**

It is the mode of communication between two devices in which flow of data is bidirectional and it occurs simultaneously. Here signals going in either direction share the capacity of the link.

20. **What is a topology?**

Topology of a network is defined as the geometric representation of the relationship of all the links and linking devices (node) to one another .

21. **What is Bandwidth?**

Every line has an upper limit and a lower limit on the frequency of signals it can carry. This limited range is called the bandwidth.

22. **What is point-to-point protocol?**

A communications protocol used to connect computers to remote networking services including Internet service providers.

23. **What is switching?**

Switching in data communication is of three types

Circuit switching

Packet switching

Message switching

24. Compare analog and digital signals?

Analog signals can have an infinite number of values in a range but digital signal can have only a limited number of values.

25. What is the difference between ARP and RARP?

ARP - Address resolution protocol is used to associate the 32 bit IP address with the 48 bit physical address, used by a host or a router to find the physical address of another host on its network by sending a ARP query packet that includes the IP address of the receiver.

RARP - Reverse address resolution protocol allows a host to discover its Internet address when it knows only its physical address.

26. What is ICMP?

ICMP is Internet Control Message Protocol, a network layer protocol of the TCP/IP suite used by hosts and gateways to send notification of datagram problems back to the sender.

27. What is logical link control?

One of two sublayers of the data link layer of OSI reference model, as defined by the IEEE 802 standard. This sublayer is responsible for maintaining the link between computers when they are sending data across the physical network connection.

28. What is difference between baseband and broadband transmission?

In a baseband transmission, the entire bandwidth of the cable is consumed by a single signal. In broadband transmission, signals are sent on multiple frequencies, allowing multiple signals to be sent simultaneously.

29. What is mesh network?

A network in which there are multiple network links between computers to provide multiple paths for data to travel.

30. Define bit rate and bit interval?

Digital signals are aperiodic.so instead of using period and frequency we use bit interval and bit rate respectively.Bit interval is the time required to send one single bit.Bit rate is the number of bit intervals per second.

31. What is sampling?

It is the process of obtaining amplitude of a signal at regular intervals.

32. Define pulse amplitude modulation?

It is an analog to digital conversion method which takes analog signals, samples it and generates a series of pulse based on the results of the sampling. It is not used in data communication because the series of pulses generated still of any amplitude. To modify it we use pulse code modulation.

33. What is Nyquist Theorem?

According to this theorem, the sampling rate must be at least 2 times the highest frequency of the original signal.

34. What is Asynchronous mode of data transmission?

It is a serial mode of transmission.In this mode of transmission, each byte is framed with a start bit and a stop bit. There may be a variable length gap between each byte.

35. What are the different types of multiplexing?

Multiplexing is of three types. Frequency division multiplexing and wave division multiplexing is for analog signals and time division multiplexing is for digital signals.

36. What MAU?

In token Ring, hub is called Multistation Access Unit(MAU).

37. What do you mean by switching?

It is a method in which communication devices are connected to one another efficiently.A switch is intermediary hardware or software that links devices together temporarily.

38. What do you mean by flow control?

It is the regulation of sender's data rate so that the receiver buffer doesn't become overwhelmed.i.e. flow control refers to a set of procedures used to restrict the amount of data that the sender can send before waiting for acknowledgement.

39. What do you mean by Bluetooth?

It is a wireless LAN technology designed to connect devices of different functions such as telephones, notebooks, computers, cameras, printers and so on. Bluetooth LAN Is an adhoc network that is the network is formed spontaneously? It is the implementation of protocol defined by the IEEE 802.15 standard.

40. What is virtual channel?

Virtual channel is normally a connection from one source to one destination, although multicast connections are also permitted. The other name for virtual channel is virtual circuit.

41. What is multicast routing?

Sending a message to a group is called multicasting, and its routing algorithm is called multicast routing.

42. What is Mail Gateway?

It is a system that performs a protocol translation between different electronic mail delivery protocols.

43. What is IP address?

The internet address (IP address) is 32bits that uniquely and universally defines a host or router on the internet.
The portion of the IP address that identifies the network is called netid. The portion of the IP address that identifies the host or router on the network is called hostid.

44. What do you mean by subnetting?

Subnetting divides one large network into several smaller ones. It adds an intermediate level of hierarchy in IP addressing.

45. What is Firewalls?

It is an electronic downbridge which is used to enhance the security of a network. It's configuration has two components.

Two routers

Application gateway

46. What is Repeaters ?

A receiver receives a signal before it becomes too weak or corrupted, regenerates the original bit pattern, sand puts the refreshed copy back onto the link. It operates

on phycal layer of OSI model.

47. What is Bridges?

They divide large network into smaller components.They can relay frames between two originally separated LANs. They provide security through partitioning traffic. They operate on phycal and data link layer of OSI model.

48. What is Gateway ?

It is a protocol converter.A gateway can accept a packet formatted for one protocol and convert it to a packet formatted for another protocol. It operates on all the seven layers of OSI model.

49. What do you mean by peer ?

Entities comprising the corresponding layers on different machines are called peers.

50. What do you mean by broadcasting ?

Broadcast system allow addressing a packet to all destination by using a special code in address field. when packet is transmitted it is received and processed by every machine on the network.

51. What is source route?

It is a sequence of IP addresses identifying the route a datagram must follow. A source route may optionally be included in an IP datagram header.

52. What are major types of networks?

Server-based network

Peer-to-peer network

53. What are the protocols in application layer ?

The protocols defined in application layer are

TELNET

FTP

SMTP

SMTP

54. What do you mean by point to point network?

Point to point network consist of many connections between individual pair of machines.large networks are point to point.Routing algorithm plays an important in point to point network.It uses stored ad forword technique.It is a packet switching network.

55. Define Retransmission?

Retransmission is a technique in which the receiver detects the occurrence of an error and asks the sender to resend the message. Resending is repeated until a message arrives that the receiver believes is error-freed.

56. What are major types of networks?

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59. What are the protocols in transport layer ?

The protocols defined in transport layer are :

TCP

UDP

60. Define TCP ?

It is connection oriented protocol.It consist byte streams oeiginating on one machine to be delivered without error on any other machine in the network.while transmitting it fragments the stream to discrete messages and passes to interner layer.At the destination it reassembles the messages into output stream.

61. What is URL ?

It is a standard for specifying any kind of information on the World Wide Web.

62. Define UDP ?

It is unreliable connectionless protocol.It is used for one-shot,client-server type,request reply queries and applications in which prompt delivery is required than accuracy.

63. What is World Wide Web ?

World Wide Web is a repository of information spread all over the world and linked together.It is a unique combination of flexibility,portability,and user-friendly features .The World Wide Web today is a distributed client-server service,in which a client using a browser can access a service using a server.The service provided is distributed over many locations called web sites.

64. What is Hypertext Transfer Protocol(HTTP) ?

It is the main protocol used to access data on the World Wide Web .the protol transfers data in the form of plain text,hypertext,audio,video,and so on. It is so called because its efficiency allows its use in a hypertext environment where there are rapid jumps from one document to another.

65. What do you mean by Simple Mail Transfer Protocol ?

The TCP/IP protocol that supports electronic mail on the internet is called Simple Mail Transfer Protocol.SMTP provides for mail exchange between users on the same or different computer and supports Sending a single message to one or more recipient Sending message that include text, voice,video,or graphics.Sending message to users on network outside the internet.

66. What do you mean by local login and remote login ?

When a user logs into a local time-sharing system ,it is called local login. When a user wants to access an application program or utility located on a remote machine,he or she performs remote login.

67. What is Network Virtual Terminal ?

A universal interface provided by TELNET is called Network Virtual Terminal(NVT) character set. Via this interface TELNET translates characters (data or command) that come from local terminal into NVT form and delivers them to the network.

Software Engineering Interview Question and Answers

1. Define software engineering?

According to IEEE, Software engineering is the application of a systematic, disciplined, quantifiable approach to the development, operation and maintenance of sofware.

2. What are the categories of software?

System software

Application software

Embedded software

Web Applications

Artificial Intelligence software

Scientific software.

3. Define testing?

Testing is a process of executing a program with the intent of finding of an error.

4. What is white box testing?

White box testing is a test case design method that uses the control structure of the procedural design to derive test cases. It is otherwise called as **structural testing.**

5. What is Black box testing?

Black box testing is a test case design method that focuses on the functional requirements of the software. It is otherwise called as **functional testing**.

6. What is verification and validation?

Verification refers to the set of activities that ensure that software correctly implements a specific function.

Validation refers to the set of activities that ensure that the software that has been built is traceable to customer requirements.

7. What is debugging?

Debugging is the process that results in the removal of error. It occurs as a consequence of successful testing.

8. Define cyclomatic complexity?

Cyclomatic complexity is a software metric that provides a quantitative measuer of the logical complexity of a program.

9. What is error tracking?

Error tracking is an activity that provides a means for assessing the status of a current project.

10. What are case tools?

Computer Aided Software Engineering - CASE tools assist software engineering managers and practitioners in evey activity associated with the software process. They automate project management activities manage all work products produced throughout the process and assist the engineers in their analysis, design, coding and test work.

11. What is data design?

Data design transforms the information domain model created during analysis into the data structures that will be required to implement the software.

12. Define cohension and coupling?

Cohension is a measure of the relative functional strength of a module.

Coupling is a measure of the relative interdependence among modules.

13. What are the different types of cohension?

There are different types of cohension are

Coincidental cohension

Logical cohension

Temporal cohension

Procedural cohension

Communicational cohension

14. What are the different types of coupling?

There are different types of coupling are

Data coupling

Stamp coupling

Control coupling

External coupling

Common coupling

Content coupling

15. What is user interface design?

User interface design creates an effective communication medium between a human and a computer.

16. What is meant by specification?

A specification can be a written document, a graphical model, a formal mathematical model, a collection of usage scenarios, a prototype or any combination of these.

17. Define process?

A series of steps involving activities, constraints, and resources that produce an intended output of some kind is known as process.

18. How spiral model works?

The spiral model is an evolutionary software process model that couples the iterative nature of prototyping with the controlled and systematic aspects of the waterfall lifecycle model. It also has an emphasis on the use of risk management techniques.

19. What is winwin spiral model?

Winwin spiral model defines a set of negotiation activities at the beginning of each pass around the spiral. The best negotiations strive for a win-win result.

20. Mention the various views in system engineering hierarchy?

The various views in system engineering hierarchy from top to bottom in order are

World view

Domain view

Element view

Detailed view

21. What is software requirements definition?

A software requirements definition is an abstract description of the services which the system should provide and the constraints under which the system must operate.

22. What is SDLC ?

A software cycle deals with various parts and phases from planning to testing and deploying. All these activities are carried out in different ways, as per the needs. Each way is known as a Software Development Lifecycle Model (SDLC).

23. What are data aquistion systems?

Systems that collects data from sensors for subsequent processing and analysis are termed as Data acquistion systems. Data collection process and processing processes may have different periods and deadlines.

24. Define software configuration model?

SCM is the art of identifying, organizing, and controlling modifications to the software being built by a programming team. It is an umbrella activity that is applied throughout the software process.

25. What are the SCM activities?

SCM activities are developed to

Identify change

Control change

Ensure that change is being properly implemented

Report changes to others who may have an interest.

26. What are the advantages and disadvantages of white box testing?

Advantages :

Software's structure logic can be tested.

Disadvantages :

Doesn't ensure that user requirements are met.

Its test may not mimic real world situations.

27. What is meant by loop testing?

Loop testing is a white box testing techniques that focuses exclusively on the validity of loop constructs. This technique can be applied to simple loops, nested loops, concatenated loops and unstructured loops.

28. What is meant by smoke testing?

Smoke testing is an integration testing approach that is commonly used ehen "shrink wrapped " software products are being developed.

29. What is alpha and beta tests?

Alpha test is the test that is conducted at the developer's site by a customer. Beta test is the test that is conducted at one or more customer sites by the end-user of the software.

30. What is meant by system testing?

System testing is actually a series of different tests whose primary purpose is to fully exercise the computer based system. It verifies whether the system elements have been properly integrated and perform the allocated functions.

31. Mention the categories of debugging approaches?

There are three categories of debugging approaches as follows :

Brute force

Back tracking

Cause elimination

32. Define metric?

IEEE93 defines as a quantitative measure of the degree to which a system, componen, or process possesses a given attribute.

33. Mention some of the process models appropriate for the software to be engineered?

Linear sequential or waterfall model

Prototyping model

Rad model

Incremental model

Spiral model

Winwin spiral model

Component based development model

34. What is adaptive maintenance?

Adaptive maintanence is the maintenance to adapt software to a different operating environment. It involves changing a system so that it operates in a different environment from its initial implementation.

35. What are the advantages and disadvantages of black box testing?

Advantages:
Simulates actual system usage.
makes no system structure assumptions.

Disadvantages :
Potential of missing logical errors in software.
Possibility of redundant testing.

36. What are the broad categories of system requirements?

System requirements may be either functional or non-functional requirements.

37. What are user requirements?

User requirements should describe functional and non-functional requirements so that they are understandable by system users who don't have detailed technical knowledge. User requirements are defined using natural language, tables and diagrams.

38. What is test scenario ?

Test scenario is the hypothetical story to test the particular functionality of an application. It serves as an input to functional testing. For test scenario we need use case.

39. Define an analysis model?

An analysis model is a set of models that serves as the technical representation of

system.

40. Define prototype?

Prototype is an initial version of a software system which is used to demonstrate concepts, try out design options and generally to find out more about the problem and its possible solutions.

41. What is the function of the user model?

The user model establishes the profile of end users of the system.

42. What is system image?

The system image combines the outward manifestation of the computer based system, coupled with all supporting information that describes system syntax and semantics.

43. what is transform mapping?

Transform mapping is a set of design steps that allows a DFD with transform flow charactersistics to be mapped into a specific architectural style.

44. What is tracebility matrix?

Traceability matrix is a document in which we map the test cases with the requirements. In general we check whether the application works as per requirements or whether we had covered all the required functionality through test cases.

45. List the metrics for specifying non functional requirements?

The possible metrics that specify the non-functional requirements are :

Speed

Size

Easy of use

Reliability

46. What is the difference between black box testing and white box testing?

Black box testing :

No knowledge of the internal logic of the system is used to develop test cases.

Uses validation techniques.

Applied during later stages of testing.

Examples include unit testing, integration testing, system testing, acceptance testing.

White box testing :

Knowledge of the internal logic of the system is used to develop test cases.

Uses verification techniques

Performed early in the testing process.

47. Mention the various types of maintenance?

The various types of maintenance are :

Corrective maintenance

Adaptive maintenance

Perfective maintenance

Preventive maintenance

48. What is the difference between software engineering and system engineering?

System Engineering - is concerned with all aspects of computer based systems development including hardware, software and process engineering.

System Engineering - are involves in system specification architectural design intergration and deployment.

Data Structure Interview Question and Answers

1. What is data structure?

The logical and mathematical model of a particular organization of data is called data structure.
There are two types of data structure

Linear

Nonlinear

2. What is a linked list?

A linked list is a linear collection of data elements, called nodes, where the linear order is given by pointers. Each node has two parts first part contain the information of the element second part contains the address of the next node in the list.

3. What is a queue?

A queue is an ordered collection of items from which items may be deleted at one end (front end) and items inserted at the other end (rear end). It obeys FIFO rule there is no limit to the number of elements a queue contains.

4. What is a spanning Tree?

A spanning tree is a tree associated with a network. All the nodes of the graph appear on the tree once. A minimum spanning tree is a spanning tree organized so that the total edge weight between nodes is minimized.

5. What is precision?

Precision refers the accuracy of the decimal portion of a value. Precision is the number of digits allowed after the decimal point.

6. What are the goals of Data Structure?

It must rich enough in structure to reflect the actual relationship of data in real world. The structure should be simple enough for efficient processing of data.

7. What is the difference between a Stack and an Array?

Stack

Stack is a dynamic object whose size is constantly changing as items are pushed and popped .

Stack may contain different data types.

Stack is declared as a structure containing an array to hold the element of the stack, and an integer to indicate the current stack top within the array.

Stack is a ordered collection of items.

Array

Array is an ordered collection of items.

Array is a static object.

It contains same data types.

Array can be home of a stack i.e. array can be declared large enough for maximum size of the stack.

8. What is sequential search?

In sequential search each item in the array is compared with the item being searched until a match occurs. It is applicable to a table organized either as an array or as a linked list.

9. What are the disadvantages array implementations of linked list?

The no of nodes needed can't be predicted when the program is written.
The no of nodes declared must remain allocated throughout its execution.

10. What is a priority queue?

The priority queue is a data structure in which the intrinsic ordering of the elements.

11. What are the disadvantages of sequential storage?

Fixed amount of storage remains allocated to the data structure even if it contains less element.
No more than fixed amount of storage is allocated causing overflow.

12. Define circular list?

In linear list the next field of the last node contain a null pointer, when a next field in the last node contain a pointer back to the first node it is called circular list.

13. What does abstract Data Type Mean?

Data type is a collection of values and a set of operations on these values. Abstract data type refer to the mathematical concept that define the data type.

14. What do you mean by recursive definition?

The definition which defines an object in terms of simpler cases of itself is called recursive definition.

15. What actions are performed when a function is called?

When a function is called

arguments are passed

local variables are allocated and initialized

transferring control to the function

16. Define double linked list?

It is a collection of data elements called nodes, where each node is divided into three parts

An info field that contains the information stored in the node.

Left field that contain pointer to node on left side.

Right field that contain pointer to node on right side.

17. What do you mean by overflow and underflow?

When new data is to be inserted into the data structure but there is no available space i.e.free storage list is empty this situation is called overflow.

When we want to delete data from a data structure that is empty this situation is called underflow.

18. Whether Linked List is linear or Non-linear data structure?

According to Access strategies Linked list is a linear one. According to Storage Linked List is a Non-linear one.

19. What do you mean by free pool?

Pool is a list consisting of unused memory cells which has its own pointer.

20. What are the methods available in storing sequential files ?

Straight merging

Natural merging

Polyphase sort

Distribution of Initial runs

21. What is a node class?

A node class is a class that has added new services or functionality beyond the services inherited from its base class.

22. what is binary tree?

A binary tree is a tree data structure in which each node has at most two child nodes, usually distinguished as left and right.