

Operating Systems

IMPORTANT NOTE: This document contains stuff that has been picked up from the Internet.

<http://www.techinterviews.com/?p=170>

<http://www.indiastudycenter.com/studyguides/cs/objtest/os1.asp>

<http://www.indiastudycenter.com/studyguides/cs/objtest/os2.asp>

<http://rc.usf.edu/tutorials/classes/tutorial/quizes/?quiz=linuxc4>

<http://rc.usf.edu/tutorials/classes/tutorial/quizes/?quiz=linuxc3>

1. The operating system for a computer does the following:

- ☐ manages the disks and files
- ☐ manages the computer's resources
- ☐ manages the computer's memory
- ☒ **all of the above**
- ☐ none of the above

2. Spooling helps because _____.

- ☐ it is a more secure method of accessing data
- ☐ print jobs go more smoothly with less stop and go
- ☒ **the computer is released to do other things while still printing**
- ☐ none of the above

3. A proprietary operating system is _____.

- ☒ **unique to a manufacturer**
- ☐ similar to those of other manufacturers
- ☐ used by many different computer manufacturers
- ☐ properly configured to operate

4. A computer's BIOS will _____

- ☐ check for the presence of peripherals like mouse, sound card, scanner
- ☐ run a check of memory
- ☒ **be loaded first when the computer is powered on**
- ☐ none of the above

5. Windows versions before Windows 95 _____

- ☐ a. are proprietary operating systems
- ☐ b. are not operating systems at all
- ☐ c. rely on DOS as the operating system
- ☐ d. were the first successful graphical operating systems
- ☒ e. both a and d
- ☐ f. **both b and c**
- ☐ g. a, b, c, and d

6. A backup program _____.

- ☒ **makes a copy of files you select.**
- ☐ returns you to the previous program
- ☐ undoes the last change you made
- ☐ none of the above

7. The autoexec.bat file can tell the computer where to look first for executable files. This set of locations is called _____.

- ☒ **the path**
- ☐ the command directory
- ☐ home
- ☐ the system directory

8. When a computer is "swapping", it is _____.

- ☐ moving data from the hard drive to the floppy drive
- ☒ **moving data from memory to the swap file on the hard drive**
- ☐ moving data between registers in memory
- ☐ none of the above

9. A computer virus can be _____.

- ☐ annoying only
- ☐ damaging to your data
- ☐ copied without your knowledge onto floppies used in the infected computer
- ☒ **all of the above**

10. A foreground task has more _____ than a background task.

- ☐ buffers
- ☐ microseconds
- ☐ registers
- ☒ **time slices**

8) "Programs, users and systems should be given just enough privileges to perform their tasks". This principle is more popularly known as _____.

- 1) **Principle of least privilege**
- 2) Banker's principle for allocation of permissions
- 3) Belady's algorithm for granting permissions
- 4) None of the above

- 15) Maximize CPU utilization, maximize system throughput, minimize turnaround time and minimize waiting time are the main objectives of _____.
- 1) Paging
 - 2) Segmentation
 - 3) Both paging as well as segmentation
 - 4) None of the above**
- NOTE: These are the objectives of CPU scheduling
- 16) Pre-emptive type of Shortest-Job-First (SJF) scheduling is also known as _____.
- 1) Shortest Remaining Time First**
 - 2) First Come First Serve
 - 3) Priority Scheduling
 - 4) Quantum based scheduling
- 17) Incase of race conditions, the outcome of the execution depends on _____.
- 1) the critical section
 - 2) the sequence in which the access takes place**
 - 3) CPU Scheduling
 - 4) proper synchronization mechanisms
 - 5) None of the above
- 21) The LRU (Least Recently Used) algorithm for page replacement can be implemented using _____.
- 1) clocks and counters**
 - 2) FIFO queue
 - 3) De-queue
 - 4) None of the above
- 26) What is stored on a PCB of a process:
- a. Program counter
 - b. Memory limits
 - c. Amount of CPU time used
 - d. All of the above**
- 27) A currently running process can be put on a ready queue or one of the I/O queues by each of the following except:
- a. The process did an illegal memory access.**
 - b. The process issued an I/O request
 - c. There was an interrupt
 - d. The process issued a system call
- 28) Multiprogramming systems
- ☐ Are easier to develop than single programming systems
 - ☐ Execute each job faster
 - ☐ **Execute more jobs in the same time period**
 - ☐ Are used only one large mainframe computers.

29) _____ is used in operating system to separate mechanism from policy

- ☐ Single level implementation
- ☒ **Two level implementation**
- ☐ Multi level implementation
- ☐ None

1. The operating system creates _____ from the physical computer

- ☐ Virtual space
- ☐ Virtual computers
- ☐ Virtual device
- ☐ None

Ans : 2

2. Swapping

- ☐ Works best with many many small partitions
- ☐ Allows many programs to use memory simultaneously
- ☐ Allows each program in turn to use the memory
- ☐ Does not work with overlaying

Ans : 3

3. Which of the following Operating systems does not implement multitasking truly

- ☐ Windows 98
- ☐ Windows NT
- ☐ Windows XP
- ☐ MS DOS

Ans : 4

4. When a computer is first turned on or restarted, a special type of absolute loader called _____ is executed

- ☐ Compile and Go loader
- ☐ Boot loader
- ☐ Bootstrap loader
- ☐ Relating loader

Ans : 3

5. Poor response times are usually caused by

- ☐ Process busy
- ☐ High I/O rates
- ☐ High paging rates
- ☐ Any of the above

Ans : 4

6. Which of the following program is not a utility?

- ☐ Debugger
- ☐ Editor
- ☐ Spooler
- ☐ All of the above

Ans : 3

7. A co-processor

- ☐ Is relatively easy to support in software
- ☐ Causes all processors to function equally
- ☐ Works with any application
- ☐ Is quite common in modern computers

Ans : 1

8. Which of the following Operating systems do you choose to implement a Client-Server network

- ☐ MS DOS
- ☐ Windows 95
- ☐ Windows 98
- ☐ Windows 2000

Ans : 4

9. Page stealing

- ☐ Is a sign of an efficient system
- ☐ Is taking page frames from other working sets
- ☐ Should be the tuning goal
- ☐ Is taking larger disk spaces for pages paged out

Ans : 2

10. The operating system manages

- ☐ Memory
- ☐ Processes

- ☐ Disks and I/O devices
- ☐ All of the above

Ans : 4

Operating system questions:

1. **What are the basic functions of an operating system?** - Operating system controls and coordinates the use of the hardware among the various applications programs for various uses. Operating system acts as resource allocator and manager. Since there are many possibly conflicting requests for resources the operating system must decide which requests are allocated resources to operating the computer system efficiently and fairly. Also operating system is control program which controls the user programs to prevent errors and improper use of the computer. It is especially concerned with the operation and control of I/O devices.
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. **While running DOS on a PC, which command would be used to duplicate the entire diskette?** diskcopy
4. **What resources are used when a thread created? How do they differ from those when a process is created?** - When a thread is created the threads does not require any new resources to execute the thread shares the resources like memory of the process to which they belong to. The benefit of code sharing is that it allows an application to have several different threads of activity all within the same address space. Whereas if a new process creation is very heavyweight because it always requires new address space to be created and even if they share the memory then the inter process communication is expensive when compared to the communication between the threads.
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 first response is produced, not output (for time-sharing environment).
7. **What is the state of the processor, when a process is waiting for some event to occur?** - Waiting state
8. **What is the important aspect of a real-time system or Mission Critical Systems?** - A real time operating system has well defined fixed time constraints. Process must be done within the defined constraints or the system will fail. An

example is the operating system for a flight control computer or an advanced jet airplane. Often used as a control device in a dedicated application such as controlling scientific experiments, medical imaging systems, industrial control systems, and some display systems. Real-Time systems may be either hard or soft real-time. **Hard real-time:** Secondary storage limited or absent, data stored in short term memory, or read-only memory (ROM), Conflicts with time-sharing systems, not supported by general-purpose operating systems. **Soft real-time:** Limited utility in industrial control of robotics, Useful in applications (multimedia, virtual reality) requiring advanced operating-system features.

9. **What is the difference between Hard and Soft real-time systems?** - A hard real-time system guarantees that critical tasks complete on time. This goal requires that all delays in the system be bounded from the retrieval of the stored data to the time that it takes the operating system to finish any request made of it. A soft real time system where a critical real-time task gets priority over other tasks and retains that priority until it completes. As in hard real time systems kernel delays need to be bounded
10. **What is the cause of thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem?** - Thrashing is caused by under allocation of the minimum number of pages required by a process, forcing it to continuously page fault. The system can detect thrashing by evaluating the level of CPU utilization as compared to the level of multiprogramming. It can be eliminated by reducing the level of multiprogramming.
11. **What is multi tasking, multi programming, multi threading?** - **Multi programming:** Multiprogramming is the technique of running several programs at a time using timesharing. It allows a computer to do several things at the same time. Multiprogramming creates logical parallelism. The concept of multiprogramming is that the operating system keeps several jobs in memory simultaneously. The operating system selects a job from the job pool and starts executing a job, when that job needs to wait for any i/o operations the CPU is switched to another job. So the main idea here is that the CPU is never idle. **Multi tasking:** Multitasking is the logical extension of multiprogramming .The concept of multitasking is quite similar to multiprogramming but difference is that the switching between jobs occurs so frequently that the users can interact with each program while it is running. This concept is also known as time-sharing systems. A time-shared operating system uses CPU scheduling and multiprogramming to provide each user with a small portion of time-shared system. **Multi threading:** An application typically is implemented as a separate process with several threads of control. In some situations a single application may be required to perform several similar tasks for example a web server accepts client requests for web pages, images, sound, and so forth. A busy web server may have several of clients concurrently accessing it. If the web server ran as a traditional single-threaded process, it would be able to service only one client at a time. The amount of time that a client might have to wait for its request to be serviced could be enormous. So it is efficient to have one process that contains multiple threads to serve the same purpose. This approach would multithread the web-server process, the

- server would create a separate thread that would listen for client requests when a request was made rather than creating another process it would create another thread to service the request. To get the advantages like responsiveness, Resource sharing economy and utilization of multiprocessor architectures multithreading concept can be used.
12. **What is hard disk and what is its purpose?** - Hard disk is the secondary storage device, which holds the data in bulk, and it holds the data on the magnetic medium of the disk. Hard disks have a hard platter that holds the magnetic medium, the magnetic medium can be easily erased and rewritten, and a typical desktop machine will have a hard disk with a capacity of between 10 and 40 gigabytes. Data is stored onto the disk in the form of files.
 13. **What is fragmentation? Different types of fragmentation?** - Fragmentation occurs in a dynamic memory allocation system when many of the free blocks are too small to satisfy any request. **External Fragmentation:** External Fragmentation happens when a dynamic memory allocation algorithm allocates some memory and a small piece is left over that cannot be effectively used. If too much external fragmentation occurs, the amount of usable memory is drastically reduced. Total memory space exists to satisfy a request, but it is not contiguous. **Internal Fragmentation:** Internal fragmentation is the space wasted inside of allocated memory blocks because of restriction on the allowed sizes of allocated blocks. Allocated memory may be slightly larger than requested memory; this size difference is memory internal to a partition, but not being used
 14. **What is DRAM? In which form does it store data?** - DRAM is not the best, but it's cheap, does the job, and is available almost everywhere you look. DRAM data resides in a cell made of a capacitor and a transistor. The capacitor tends to lose data unless it's recharged every couple of milliseconds, and this recharging tends to slow down the performance of DRAM compared to speedier RAM types.
 15. **What is Dispatcher?** - Dispatcher module gives control of the CPU to the process selected by the short-term scheduler; this involves: Switching context, Switching to user mode, Jumping to the proper location in the user program to restart that program, dispatch latency – time it takes for the dispatcher to stop one process and start another running.
 16. **What is CPU Scheduler?** - Selects from among the processes in memory that are ready to execute, and allocates the CPU to one of them. CPU scheduling decisions may take place when a process: 1.Switches from running to waiting state. 2.Switches from running to ready state. 3.Switches from waiting to ready. 4.Terminates. Scheduling under 1 and 4 is non-preemptive. All other scheduling is preemptive.
 17. **What is Context Switch?** - Switching the CPU to another process requires saving the state of the old process and loading the saved state for the new process. This task is known as a context switch. Context-switch time is pure overhead, because the system does no useful work while switching. Its speed varies from machine to machine, depending on the memory speed, the number of registers which must be copied, the existed of special instructions(such as a single instruction to load or store all registers).

18. **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 from larger memory.
19. **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.
20. **What is a Real-Time System?** - A real time process is a process that must respond to the events within a certain time period. A real time operating system is an operating system that can run real time processes successfully.

1. This is what starts up the computer and functions as the principal coordinator of all hardware components and applications software programs.

- A. system hardware
- B. system server
- C. system software**
- D. system operator

2. When you turn on the computer, the boot routine will perform this test.

- A. power-on self-test**
- B. RAM test
- C. disk drive test
- D. memory test

3. This part of the operating system manages the essential peripherals, such as the keyboard, screen, disk drives, and parallel and serial ports.

- A. basic input/output system
- B. secondary input/output system
- C. peripheral input/output system**
- D. marginal input/output system

4. Which of the following functions is not controlled by the operating system?

- A. managing memory
- B. managing programs and data
- C. managing input and output
- D. All of the above are controlled by the operating system.**

5. Executing more than one program concurrently by one user on one computer is known as

- A. multiprogramming.
- B. time-sharing.

- C. multitasking.**
- D. multiprocessing.

6. The simultaneous processing of two or more programs by multiple processors is

- A. multitasking.
- B. multiprogramming.
- C. time-sharing.
- D. multiprocessing.**

7. This occurs when several full-fledged processors work together on the same tasks, sharing memory.

- A. multitasking
- B. multiprogramming
- C. parallel processing**
- D. serial processing

8. This comprises the detailed machine language necessary to control a specific device and is controlled by the operating system.

- A. driver**
- B. utility program
- C. virtual memory
- D. peripheral device

9. After a user has saved and deleted many files, many scattered areas of stored data remain that are too small to be used efficiently, causing

- A. disarray.
- B. fragmentation.**
- C. turmoil.
- D. disorder.

10. Which of the following controls the manner of interaction between the user and the operating system?

- A. language translator
- B. platform
- C. user interface**
- D. None of the above is correct.

11. Which of the following is generally a hardware device or a microcomputer hooked up to the network?

- A. client**
- B. motherboard
- C. expansion card
- D. user interface

12. Which of the following is a computer with large amounts of storage used by many clients that still performs certain functions independently?

- A. client
- B. motherboard
- C. server**
- D. user interface

13. Which of the following allows people to create graphical onscreen documents for the Internet that can easily be linked by words and pictures to other documents?

- A. Netscape Navigator
- B. HTML**
- C. OS
- D. applets

14. The operating system commands the driver, which in turns commands the peripheral device.

- A. True**
- B. False

15. _____ remove redundant elements, gaps, and unnecessary data from a computer's storage space so that fewer bits are required to store or transmit data.

ANSWER: **Data compression utilities**

1. What command displays the contents of a file to stdout?

- A. echo
- B. print
- C. cat**
- D. display

2. What is the correct command to store the output from `ls -al` into a file called `listing.txt`?

- A. `ls -al > listing.txt`**
- B. `ls -al < listing.txt`
- C. `ls -al < listing.txt >`
- D. `ls -al > listing.txt <`

3. Which symbol represents a pipe?

- A. %
- B. |**
- C. !
- D. -

4. Which program searches given input for a pattern?

- A. sort
- B. grep**
- C. search
- D. find

1. What is the command to get into edit mode in vi?

- A. e
- B. i**
- C. ESC
- D. Ctrl-i

2. True or False: The 'o' command in vi inserts a new line below the current line and puts the user into edit mode.

- A. True**
- B. False

3. Which command in vi saves a buffer to the filename names.txt?

- A. :s names.txt
- B. :w names.txt**
- C. :r names.txt
- D. :f names.txt

4. Which command in vi quits the editor?

- A. :q**
- B. :e
- C. :c
- D. :z

5. True or False: In vi, entering the command 5dd will delete the 5 lines, starting with the current line.

- A. True**
- B. False

1. Which account is the super-user account that can modify any file?

- A. bin
- B. root**
- C. sys
- D. admin

2. What command can you do to view the contents to the \$path variable?

- A. echo \$path**
- B. print \$path
- C. set \$path
- D. show \$path

3. Which argument to the command ls will display all the files in a directory, including hidden files?

- A. -h
- B. -l
- C. -a**
- D. -s

4. True or False: Creating a file beginning with a '.' will make the file hidden.

- A. True**
- B. False

1. The pwd command...

- A. Changes your password.
- B. Prints the current directory.**
- C. Prints a file.
- D. None of the above.

2. True or False: The tilde, ~, can be used to represent the current user's home directory.

- A. True**
- B. False

3. Which command will delete a directory?

- A. del -d dirname
- B. rm -d dirname
- C. del -r dirname
- D. rm -r dirname**

4. True or False: cp -d source target will copy a directory named source to target.

- A. True
- B. False**

5. True or False: A symbolic link has the same permissions as the original file.

- A. True
- B. False**

1. The CPU utilization is low when the system is _____.

- a) Timesharing
- b) Thrashing**
- c) Multiprocessing
- d) None of the above.

12. The I/O subsystem consist of:

- a. A memory management component including buffering, caching, and spooling
- b. A general device-driver interface
- c. Drivers for specific hardware devices
- d. All of the above**

23. Suppose the architecture of a computer system is layered into the following four layers -

- 1) Operating systems software
- 2) users' applications software
- 3) hardware
- 4) programming environment software

Which of the following is a logical sequence of the four layers from bottom to top?

- a. 1, 2, 3, 4
- b. 1, 3, 4, 2
- c. 3, 1, 4, 2**
- d. 3, 4, 1, 2