

Import Settings:  
Base Settings: Brownstone Default  
Highest Answer Letter: D  
Multiple Keywords in Same Paragraph: No

Chapter: Chapter 1

Multiple Choice

1. In what way is an operating system like a government?
- A) It seldom functions correctly.
  - B) It creates an environment within which other programs can do useful work.
  - C) It performs most useful functions by itself.
  - D) It is always concerned primarily with the individual's needs.

Ans: B  
Section 1.1  
Difficulty: Easy

2. \_\_\_\_ operating systems are designed primarily to maximize resource utilization.
- A) PC
  - B) Handheld computer
  - C) Mainframe
  - D) Network

Ans: C  
Feedback: 1.1.1  
Difficulty: Easy

3. The most common secondary storage device is \_\_\_\_.
- A) random access memory
  - B) solid state disks
  - C) tape drives
  - D) magnetic disk

Ans: D

Feedback: 1.2.2

Difficulty: Easy

4. Which of the following would lead you to believe that a given system is an SMP-type system?

- A) Each processor is assigned a specific task.
- B) There is a boss-worker relationship between the processors.
- C) Each processor performs all tasks within the operating system.
- D) None of the above

Ans: C

Feedback: 1.3.2

Difficulty: Medium

5. A \_\_\_\_ can be used to prevent a user program from never returning control to the operating system.

- A) portal
- B) program counter
- C) firewall
- D) timer

Ans: D

Feedback: 1.5.2

Difficulty: Medium

6. Embedded computers typically run on a \_\_\_\_ operating system.

- A) real-time
- B) Windows XP
- C) network
- D) clustered

Ans: A

Feedback: 1.11.8

Difficulty: Medium

7. Bluetooth and 802.11 devices use wireless technology to communicate over several feet, in essence creating a \_\_\_\_.

- A) local-area network

- B) wide-area network
- C) small-area network
- D) metropolitan-area network

Ans: C

Feedback: 1.11.3

Difficulty: Easy

8. A clustered system \_\_\_\_.

- A) gathers together multiple CPUs to accomplish computational work
- B) is an operating system that provides file sharing across a network
- C) is used when rigid time requirements are present
- D) can only operate one application at a time

Ans: A

Feedback: 1.3.3

Difficulty: Easy

9. Which of the following is a property of peer-to-peer systems?

- A) Clients and servers are not distinguished from one another.
- B) Separate machines act as either the client of the server but not both.
- C) They do not offer any advantages over traditional client-server systems.
- D) They suffer from the server acting as the bottleneck in performance.

Ans: A

Feedback: 1.11.5

Difficulty: Easy

10. Two important design issues for cache memory are \_\_\_\_.

- A) speed and volatility
- B) size and replacement policy
- C) power consumption and reusability
- D) size and access privileges

Ans: B

Feedback: 1.8.3

Difficulty: Medium

11. What are some other terms for kernel mode?

- A) supervisor mode
- B) system mode
- C) privileged mode
- D) All of the above

Ans: D

Feedback: 1.5.1

Difficulty: Easy

12. Which of the following statements concerning open source operating systems is true?

- A) Solaris is open source.
- B) Source code is freely available.
- C) They are always more secure than commercial, closed systems.
- D) All open source operating systems share the same set of goals.

Ans: B

Feedback: 1.12

Difficulty: Medium

13. Which of the following operating systems is not open source?

- A) Windows
- B) BSD UNIX
- C) Linux
- D) PCLinuxOS

Ans: A

Feedback: 1.12

Difficulty: Medium

14. A \_\_\_\_\_ provides a file-system interface which allows clients to create and modify files.

- A) compute-server system
- B) file-server system
- C) wireless network
- D) network computer

Ans: B

Difficulty: Easy

Feedback: 1.11.4

15. A \_\_\_\_ is a custom build of the Linux operating system

- A) LiveCD
- B) installation
- C) distribution
- D) VMWare Player

Ans: C

Difficulty: Easy

Feedback: 1.12.2

16. \_\_\_\_\_ is a set of software frameworks that provide additional services to application developers.

- A) System programs
- B) Virtualization
- C) Cloud computing
- D) Middleware

Ans: D

Difficulty: Medium

Feedback: 1.1.3

17. What statement concerning privileged instructions is considered false?

- A) They may cause harm to the system.
- B) They can only be executed in kernel mode.
- C) They cannot be attempted from user mode.
- D) They are used to manage interrupts.

Ans: C

Difficulty: Hard

Feedback: 1.5.1

18. Which of the following statements is false?

- A) Mobile devices must be concerned with power consumption.
- B) Mobile devices can provide features that are unavailable on desktop or laptop computers.
- C) The difference in storage capacity between a mobile device and laptop is shrinking.
- D) Mobile devices usually have fewer processing cores than a standard desktop computer.

Ans: C

Difficulty: Medium

Feedback:1.11.2

19. A(n) \_\_\_\_\_ is the unit of work in a system.

- A) process
- B) operating system
- C) timer
- D) mode bit

Ans: A

Difficulty:Medium

Feedback:1.6

20. The two separate modes of operating in a system are

- A) supervisor mode and system mode
- B) kernel mode and privileged mode
- C) physical mode and logical mode
- D) user mode and kernel mode

Ans: D

Difficulty:Medium

Feedback: 1.5.1

Essay

21. Explain why an operating system can be viewed as a resource allocator.

Ans: A computer system has many resources that may be required to solve a problem: CPU time, memory space, file-storage space, I/O devices, and so on. The operating system acts as the manager of these resources. Facing numerous and possibly conflicting requests for resources, the operating system must decide how to allocate them to specific programs and users so that it can operate the computer system efficiently and fairly.

Feedback: 1.1.2

Difficulty: Medium

22. Explain the purpose of an interrupt vector.

Ans: The interrupt vector is merely a table of pointers to specific interrupt-handling routines. Because there are a fixed number of interrupts, this table allows for more efficient handling of the interrupts than with a general-purpose, interrupt-processing routine.

Feedback: 1.2.1

Difficulty: Medium

23. What is a bootstrap program, and where is it stored?

Ans: A bootstrap program is the initial program that the computer runs when it is powered up or rebooted. It initializes all aspects of the system, from CPU registers to device controllers to memory contents. Typically, it is stored in read-only memory (ROM) or electrically erasable programmable read-only memory (EEPROM), known by the general term firmware, within the computer hardware.

Feedback: 1.2.1

Difficulty: Medium

24. What role do device controllers and device drivers play in a computer system?

Ans: A general-purpose computer system consists of CPUs and multiple device controllers that are connected through a common bus. Each device controller is in charge of a specific type of device. The device controller is responsible for moving the data between the peripheral devices that it controls and its local buffer storage. Typically, operating systems have a device driver for each device controller. This device driver understands the device controller and presents a uniform interface for the device to the rest of the operating system.

Feedback: 1.2.1

Difficulty: Medium

25. Why are clustered systems considered to provide high-availability service?

Ans: Clustered systems are considered high-availability in that these types of systems have redundancies capable of taking over a specific process or task in the case of a failure. The redundancies are inherent due to the fact that clustered systems are composed of two or more individual systems coupled together.

Feedback: 1.3.3

Difficulty: Medium

26. Describe the differences between physical, virtual, and logical memory.

Ans: Physical memory is the memory available for machines to execute operations (i.e., cache, random access memory, etc.). Virtual memory is a method through which programs can be executed that requires space larger than that available in physical memory by using disk memory as a backing store for main memory. Logical memory is an abstraction of the computer's different types of memory that allows programmers and applications a simplified view of memory and frees them from concern over memory-storage limitations.

Feedback: 1.4

Difficulty: Medium

27. Describe the operating system's two modes of operation.

Ans: In order to ensure the proper execution of the operating system, most computer systems provide hardware support to distinguish between user mode and kernel mode. A mode bit is added to the hardware of the computer to indicate the current mode: kernel (0) or user (1). When the computer system is executing on behalf of a user application, the system is in user mode. However, when a user application requests a service from the operating system (via a system call), it must transition from user to kernel mode to fulfill the request.

Feedback: 1.5.1

Difficulty: Medium

28. Explain cache coherency.

Ans: In multiprocessor environments, two copies of the same data may reside in the local cache of each CPU. Whenever one CPU alters the data, the cache of the other CPU must receive an updated version of this data. Cache coherency involves ensuring that multiple caches store the most updated version of the stored data.

Feedback: 1.8.3

Difficulty: Medium

29. Why is main memory not suitable for permanent program storage or backup purposes? Furthermore, what is the main disadvantage to storing information on a magnetic disk drive as opposed to main memory?

Ans: Main memory is a volatile memory in that any power loss to the system will result in erasure of the data stored within that memory. While disk drives can store more information permanently than main memory, disk drives are significantly slower.

Feedback: 1.2

Difficulty: Hard



30. Describe the compute-server and file-server types of server systems.

Ans: The compute-server system provides an interface to which a client can send a request to perform an action (for example, read data from a database); in response, the server executes the action and sends back results to the client. The file-server system provides a file-system interface where clients can create, update, read, and delete files. An example of such a system is a Web server that delivers files to clients running Web browsers.

Feedback: 1.11.4

Difficulty: Medium

31. Computer systems can be divided into four approximate components. What are they?

Ans: Hardware, operating system, application programs, and users.

Feedback: 1.1

Difficulty: Easy

32. Distinguish between system and application programs.

Ans: System programs are not part of the kernel, but still are associated with the operating system. Application programs are not associated with the operating of the system.

Feedback: 1.1.3

Difficulty: Easy

33. Describe why direct memory access (DMA) is considered an efficient mechanism for performing I/O.

Ans: DMA is efficient for moving large amounts of data between I/O devices and main memory. It is considered efficient because it removes the CPU from being responsible for transferring data. DMA instructs the device controller to move data between the devices and main memory.

Feedback: 1.2.3

Difficulty: Medium

34. Describe why multi-core processing is more efficient than placing each processor on its own chip.

Ans: A large reason why it is more efficient is that communication between processors on the

same chip is faster than processors on separate chips.

Feedback: 1.3.2

Difficulty: Medium

35. Distinguish between uniform memory access (UMA) and non-uniform memory access (NUMA) systems.

Ans: On UMA systems, accessing RAM takes the same amount of time from any CPU. On NUMA systems, accessing some parts of memory may take longer than accessing other parts of memory, thus creating a performance penalty for certain memory accesses.

Feedback: 1.3.2

Difficulty: Medium

36. Explain the difference between singly, doubly, and circularly linked lists.

Ans: A singly linked list is where each item points to its successor. A doubly linked list allows an item to point to its predecessor or successor. A circularly linked list is the where the last element points back to the first.

Feedback: 1.10.1

Difficulty: Easy

37. What two operating systems currently dominate mobile computing?

Ans: Apple's iOS and Google's Android

Feedback: 1.11.2

Difficulty: Easy

38. Explain the difference between protection and security.

Ans: Protection is concerned with controlling the access of processes or users to the resources of the computer system. The role of security is to defend the system from internal or external attacks.

Feedback: 1.9

Difficulty: Medium

39. Distinguish mobile computing from traditional desktop computing.

Ans: Mobile computing takes place on handheld devices and tablets. Because these devices are portable and lightweight, they typically do not have the processing power and storage capacity of desktop systems. However, features such as GPS and accelerometers have allowed mobile devices to provide functionality that is unavailable to desktop systems.

Feedback: 1.11.2

Difficulty: Medium

40. Describe cloud computing.

Ans: Cloud computing is a type of computing that delivers computing, storage, and application services across a network. Cloud computing often uses virtualization to provide its functionality. There are many different types of cloud environments, as well as services offered. Cloud computing may be either public, private, or a hybrid of the two. Additionally, cloud computing may offer applications, platforms, or system infrastructures.

Feedback: 1.11.7

Difficulty: Hard

True/False

41. The operating system kernel consists of all system and application programs in a computer.

Ans: False

Feedback: 1.1.3

Difficulty: Easy

42. Flash memory is slower than DRAM but needs no power to retain its contents.

Ans: True

Feedback: 1.2.2

Difficulty: Easy

43. A system call is triggered by hardware.

Ans: False

Feedback: 1.5.1

Difficulty: Easy

44. UNIX does not allow users to escalate privileges to gain extra permissions for a restricted activity.

Ans: False

Feedback: 1.9

Difficulty: Medium

45. Processors for most mobile devices run at a slower speed than a processor in a desktop PC.

Ans: True

Feedback: 1.11.2

Difficulty: Medium

46. Interrupts may be triggered by either hardware or software

Ans: True

Feedback: 1.2.1

Difficulty: Medium

47. A dual-core system requires each core has its own cache memory.

Ans: False

Feedback: 1.3.2

Difficulty: Easy

48. Virtually all modern operating systems provide support for SMP

Ans: True

Feedback: 1.3.2

Difficulty: Easy

49. All computer systems have some sort of user interaction.

Ans: False  
Feedback: 1.1.1  
Difficulty: Medium

50. Solid state disks are generally faster than magnetic disks.

Ans: True  
Feedback: 1.2.2  
Difficulty: Easy

51. Solid state disks are considered volatile storage.

Ans: False  
Feedback: 1.2.2  
Difficulty: Medium

52. There is no universally accepted definition of an operating system.

Ans: True  
Feedback: 1.1.3  
Difficulty: Medium