**Chapter 11**

**I/O Management and Disk Scheduling**

**TRUE/FALSE QUESTIONS:**

T F 1)  Examples of human readable external I/O devices are printers, terminals,

and keyboards.

T F 2)  The use to which a device is put does not have an influence on the software

and polices in the operating system and supporting utilities.

T F 3)  Direct memory access is the dominant form of transfer that must be supported

by the operating system.

T F 4)  The hierarchical philosophy is that the functions of the operating system

should be separated according to their complexity, their characteristic time scale,

and their level of abstraction.

T F 5)  The actual queuing and scheduling of I/O operations occurs at the logical I/O module.

T F 6)  Access rights are managed at the physical organization layer.

T F 7)  Double buffering is when a process transfers data to (or from) one buffer while the

operating system empties (or fills) the other.

T F 8)  RAID 0 provides real-time backups of all data so that in the event of a disk failure,

all of the critical data is still immediately available.

T F 9)  The SCAN policy favors jobs whose requests are for tracks nearest to both innermost

and outermost tracks, and favors the latest arriving jobs.

T F 10)  RAID is a set of physical disk drives viewed by the operating system as a single

logical drive.

T F 11)  Windows has no way to support the encryption of entire volumes.

T F 12)  Cache memory reduces average memory access time by exploiting the principle

of locality.

T F 13)  A key aspect of I/O is the use of buffers that are controlled by I/O utilities rather

than by application processes.

T F 14)  Two of the most widely used approaches to improve disk I/O performance are

disk scheduling and disk cache.

T F 15)  In the C-SCAN disk scheduling algorithm, the disk arm is required to move in

one direction only until it reaches the last track or there are no more requests to

service in that direction, then it reverses direction and the scan proceeds in the

opposite direction in the same fashion.

**MULTIPLE CHOICE QUESTIONS:**

1)  The \_\_\_\_\_\_\_\_\_\_ category of external devices are suitable for communicating with the computer user.

A)  application   B)  machine readable

C)  communication   D)  human readable

2)  The \_\_\_\_\_\_\_\_\_\_ unit is capable of mimicking the processor and of taking over control of the

system bus just like a processor.

A)  interrupt-driven I/O   B)  I/O channel

C)  direct memory access   D)  programmed I/O

3)  \_\_\_\_\_\_\_\_\_\_ external devices are suitable for communicating with electronic equipment.

A)  Communication   B)  Application

C)  Machine readable   D)  Human readable

4)  The requested operations and data are converted into appropriate sequences of I/O instructions,

channel commands, and controller orders at the \_\_\_\_\_\_\_\_\_\_ layer.

A)  device I/O   B)  scheduling and control

C)  logical I/O   D)  physical organization

5)  \_\_\_\_\_\_\_\_\_\_ external devices are suitable for communicating with modems.

A)  Human readable   B)  Application

C)  Machine readable   D)  Communication

6)  \_\_\_\_\_\_\_\_\_\_ is a technique that smoothes out peaks in I/O demand.

A)  Buffering   B)  Blocking

C)  Smoothing   D)  Tracking

7)  The advantage of \_\_\_\_\_\_\_\_\_ is that it provides extremely high data availability.

A)  RAID 2   B)  RAID 4

C)  RAID 0   D)  RAID 6

8)  The \_\_\_\_\_\_\_\_\_ technique is used on a Windows server to optimize the use of threads.

A)  polling   B)  asynchronous procedure call

C)  signaling an event object   D)  I/O completion ports

9)  On a moveable-head system, the time it takes to position the head at the track is known as \_\_\_\_\_\_\_\_ .

A)  access time   B)  seek time

C)  transfer time   D)  rotational delay

10)  RAID level \_\_\_\_\_\_\_\_\_\_ is not a true member of the RAID family because it does not include redundancy to improve performance or provide data protection.

A)   3   B)   0

C)   5   D)   4

11)  The \_\_\_\_\_\_\_\_\_\_ technique allows multiple simultaneous I/O requests against a

single device or file.

A)  asynchronous procedure call   B)  signaling an event object

C)  polling   D)  signaling the file object

12)  \_\_\_\_\_\_\_\_\_\_ are an efficient way of making consistent snapshots of volumes so that they

can be backed up.

A)  Photo copies   B)  Process copies

C)  Transfer copies   D)  Shadow copies

13)  RAID 5 is organized in a similar fashion to \_\_\_\_\_\_\_\_\_ , but is different in the fact that

RAID 5 distributes the parity strips across all disks.

A)  RAID 3   B)  RAID 2

C)  RAID 1   D)  RAID 4

14)  The disk scheduling algorithm that implements two sub-queues in a measure to avoid

the problem of "arm stickiness" is the \_\_\_\_\_\_\_\_\_\_ .

A)  C-SCAN policy   B)  FSCAN policy

C)  DMA   D)  N-step-SCAN policy

15)  The simplest type of support that the operating system can provide is \_\_\_\_\_\_\_\_\_ .

A)  overflow buffering   B)  dual buffering

C)  single buffering   D)  circular buffering

**SHORT ANSWER QUESTIONS:**

1)  External devices that engage in I/O with computer systems are grouped into three

categories: human readable, machine readable, and \_\_\_\_\_\_\_\_\_\_ .

2)  Disk drives, USB keys, sensors, and controllers are examples of \_\_\_\_\_\_\_\_\_\_ external I/O devices.

3)  A \_\_\_\_\_\_\_\_\_\_ module controls the exchange of data between main memory and an I/O module.

4)  Two objectives are paramount in designing the I/O facility: generality and \_\_\_\_\_\_\_\_\_\_ .

5)  The \_\_\_\_\_\_\_\_\_\_ module deals with the device as a logical resource and is not concerned with

the details of actually controlling the device.

6)  The \_\_\_\_\_\_\_\_\_ layer deals with the logical structure of files and with the operations that can

be specified by users, such as open, close, read, and write.

7)  At the \_\_\_\_\_\_\_\_\_ layer, symbolic file names are converted to identifiers that either reference

the file directly or indirectly through a file descriptor or index table.

8)  The \_\_\_\_\_\_\_\_\_\_ policy is to select the disk I/O request that requires the least movement of

the disk arm from its current position.

9)  A \_\_\_\_\_\_\_\_\_\_ transfers data in and out as a stream of bytes, with no block structure.

10)  When more than two buffers are used, the collection of buffers is itself referred to as

a \_\_\_\_\_\_\_\_\_\_, with each individual buffer being one unit.

11)  The sum of the seek time and the rotational delay equals the \_\_\_\_\_\_\_\_\_\_ , which is the

time it takes to get into position to read or write.

12)  The simplest form of scheduling is \_\_\_\_\_\_\_\_\_\_\_ scheduling, which processes items from

the queue in sequential order.

13)  A set of logically consecutive strips that maps exactly one strip to each array member is

referred to as a \_\_\_\_\_\_\_\_\_\_ .

14)  The term \_\_\_\_\_\_\_\_\_ is usually used to apply to a memory that is smaller and faster than

main memory, and that is interposed between main memory and the processor.

15)  Windows supports two sorts of RAID configurations: Software RAID and \_\_\_\_\_\_\_\_ .