Chapter 10 Computer Peripherals

1) All components comprising a computer system except for the \_\_\_\_\_\_\_\_ , are considered peripherals.

a) CPU

b) CPU and memory

c) CPU, memory, and power source

d) CPU, memory, disk drives and power source

2) Storage not immediately available to the CPU is referred to as

a) cloud storage.

b) off-line storage.

c) network storage.

d) secondary storage.

3) Most of the access time specified for secondary storage devices consists of

a) seek time.

b) latency time.

c) transfer time.

d) rotational delay.

4) In technical specifications for flash memory, the read/write block is called a

a) page.

b) lump.

c) chunk.

d) paragraph.

5) On a modern hard disk, what is the typical size of a block of data?

a) 64 bytes

b) 128 bytes

c) 512 bytes

d) 1024 bytes

6) With the hard drive read/write head in a fixed position, it traces out a circle on the disk surface as the disk rotates; this circle is known as a

a) page.

b) block.

c) track.

d) cluster.

7) When a disk drive has multiple platters, the heads on each surface all line up. The set of tracks for all the surfaces form a geometric shape similar to a

a) bottle.

b) ellipse.

c) sphere.

d) cylinder.

8) In a disk drive where the drive motor turns at constant angular velocity, which is true of the linear velocity?

a) inner tracks move the fastest

b) outer racks move the fastest

c) middle tracks move the fastest

d) all tracks move at the same speed

9) The time it takes for the hard-disk read/write head to move from one track to another is called

a) latency. .

b) seek time.

c) flight time.

d) arrival time.

10) Once the hard-disk read/write head is located over the desired track, the read/write operation must wait for the disk to rotate to the beginning of the correct sector. This time is called

a) seek time.

b) arrival time.

c) transfer time.

d) rotational latency time.

11) The time required to transfer one block of data is called as the

a) seek time.

b) arrival time.

c) transfer time.

d) rotational latency time.

12) What system performance attribute is most increased by using a redundant array of independent disks (RAID)?

a) System reliability

b) System accessibility

c) System serviceability

d) System maintainability

13) In a mirrored array with 4 disks, each of the disks stores exactly the same data. The access time for a multiblock read is reduced by a factor of about \_\_\_\_\_\_.

a) two

b) four

c) eight

d) sixteen

14) A special fault-tolerant computer system uses an array of 3 disks. The following logic is used to detect errors: If the data from all three disks is identical, then it is safe to assume that the integrity of the data is acceptable. If the data from one disk differs from the other two, then accept the data where both match and flag the other as an error. This logic is known as

a) disk logic.

b) majority logic.

c) difference logic.

d) greater-part logic.

15) A mirrored array requires a minimum of \_\_\_\_\_\_\_\_\_ disk drives.

a) two

b) three

c) four

d) five

16) The technique used for storage and retrieval in an LTO formatted data cartridge is called

a) data torrent.

b) LTO tasking.

c) data continuity.

d) data streaming.

17) In terms of the ability to see detail in a display, a more interesting measure of resolution is the

a) pixel count.

b) pixel density.

c) pixel intensity.

d) pixel concentration.

18) Displays that use 256 (Red) × 256 (Green) × 256 (Blue) different colors on the screen is sometimes described as a

a) true color system.

b) virtual color system.

c) ultra high density system.

d) high density color system.

19) The number of bits used to represent colors in an image is known as

a) color depth.

b) color length.

c) color strength.

d) color intensity.

20) A proprietary standard, developed by Microsoft to render 2-D and 3-D objects is known as

a) OpenGL.

b) DirectX.

c) ActiveX.

d) OpenSource.

21) An International standard maintained by a non-profit consortium to render 2-D and 3-D objects is known as

a) OpenGL.

b) DirectX.

c) ActiveX.

d) OpenSource.

22) A key to the efficient operation of a GPU is the ability to dispatch instructions to the CPU cores in rapid succession, a process commonly called

a) flowing.

b) cramming.

c) smoothing.

d) streaming.

23) \_\_\_\_\_\_\_\_\_ is a standard GPU programming interface for general-purpose parallel programming that is implemented on a number of GPUs from different vendors.

a) OpenX

b) DirectX

c) OpenCL

d) ActiveX

24) With the exception of the Cell Engine, current GPUs are generally based on maximizing the number of operations that can take place at the same time, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

a) serialization

b) concurrency

c) parallelization

d) synchronization

25) One of the main disadvantages of active matrix LCDs is that they

a) consume a lot of power.

b) have poor viewing angles.

c) are expensive and difficult to manufacture.

d) are lower quality than a passive matrix display.

26) Which display technology consists of a thin display panel that contains red, green, and blue LEDs for each pixel with transistors for each LED that generate electrical current to light the LED?

a) CRT

b) LCD

c) FED

d) OLED

27) Which of the following printing technologies was derived from xerography?

a) LED printers

b) Laser printers

c) Ink-jet printers

d) Impact printers

28) Which of the following printing technologies boils ink in a nozzle to spray a tiny droplet onto the paper?

a) LED printers

b) Laser printers

c) Ink-jet printers

d) Impact printers

29) When a key is pressed on the keyboard, a binary code called a(n) \_\_\_\_\_\_ is sent to the controller.

a) octal code

b) scan code

c) check code

d) ASCII code

30) What kind of data is represented by a bar code?

a) BCD

b) Numeric

c) Alphabetic

d) Alphanumeric

31) How does Quick Response software isolate the Quick Response (QR) code from other parts of an image?

a) QR software compares images to a list of known images.

b) QR software uses 2D mapping technology to read the QR code.

c) QR software requires the image capture device be perpendicular to the QR code.

d) QR software positions and sizes the image with the aid of large squares in three corners and a smaller square set in from the fourth corner.

32) With voice input data, the translation process requires the conversion of voice data into sound patterns known as

a) phonemes.

b) sound bytes.

c) sound slices.

d) part-of-speech.

33) The technology necessary to interpret audio data as voice input and to translate the data into alphanumeric form has improved in recent years. The translation process is aided by

### a) Pulse Code Modulation (PCM) techniques that replace less precise analog modulation. b) Improvements in digitizing audio data that arose from advances in recorded music. c) Having the user pause between words to eliminate problems of continuous speech.

d) Pronunciation rules, grammar rules, and a dictionary of a particular language.

34) The capability of Smartphones to communicate with low power radio-frequency magnetic fields in close proximity with similar components is called

a) local field communications.

b) near field communications.

c) narrow field communications

d) close proximity communications.

35) It is impossible to overemphasize the fact that, from the perspective of a computer, a network is

a) simply another I/O device.

b) just another hardware component.

c) the only device without a controller.

d) handled differently than all other I/O devices.

36) Protocols that describe a computer’s communication with the physical layer network are called

a) LAN access control protocols

b) shared access control protocols

c) medium access control protocols

d) medium admission control protocols

Discussion questions

1) What two types of memory are referred to as primary memory? (A single sentence answer will suffice)  
  
Sol: From the text: "Both conventional and cache memory are referred to as primary memory."

2) List four or more benefits of flash memory compared to a hard drive.

Sol: From the text there are at least five benefits:  
1) Small size

2) Low power consumption

3) Light weight

4) Usable for tablets, smart phones, and other mobile devices (music players and digital cameras).

5) Convenient for moving files and data from one machine to another and also serve as an inexpensive and convenient backup medium.

3) What are the barriers that Solid-State Drives (SSD) must overcome in order to supplant magnetic disk drives as the long-term storage device of choice?

Sol: The barriers are cost and capacity. From the text, " Although magnetic disk storage offers huge storage capacity at extremely low cost, the capacity of SSDs is continually expanding, and the cost falling, suggesting that SSDs may replace magnetic disk storage for many, if not most, applications within the next few years."

4) Explain what is meant by wear-leveling in Flash drives?   
  
Sol: Wear-leveling is a technique that is designed to extend the life of a flash memory device. According to the text "most failures in flash memory result from erase operations." Furthermore, from the text: control logic, within the flash memory chip, manages memory space allocation and attempts to distribute the write operations evenly over the entire space to minimize the number of erasures required. 5) What is the capacity of a hard drive (in GB) consisting of 120,000 tracks, 4,000 sectors, and 4 surfaces? Assume each block has 512 bytes.

Sol: On one surface, the size is 120,000 x 4,000 x 512 bytes = 245,760,000,000 bytes

Convert to GB: 245,760,000,000 bytes per surface \*(1G / 2^30 bytes) = 228.9 GB per surface

Total capacity of drive is [4 surfaces] \* [228.9 GB / surface] = 916 GB

6) If three mirrored drives are used in a fault-tolerant system, describe how majority logic is used to decide if the integrity of the data is usable.

Sol: From the text: "If the data from all three disks is identical, then it is safe to assume that the integrity of the data is acceptable. If the data from one disk differs from the other two, then the majority data is used, and the third disk is flagged as an error."

7) What is the average rotational latency of a hard drive rotating at 7,200 RPM or 120 revolutions per second? (Give your answer in milliseconds)

1 1

Sol: Formula from text: average latency time = ---------- x ----------------------------

2 rotation speed

Change rotational speed to revolution per sec: 7200 rev/min x [1 min / 60 sec] = 120 rev/sec

1 1

Average latency time = ---------- x ------------------ = 0.004167 sec or 4.167 ms

2 120 rev/sec

8) What is the transfer time for a hard drive rotating at 7,200 RPM or 120 revolutions per second? Assume there are 30 sectors per track. (Give your answer in milliseconds)

1

Sol: From formula in text: Transfer time = --------------------------------------------

Number of sectors x rotational speed

1 1

Transfer time = --------------------- x ----------------------- = .000278 sec or .278 ms

30 sector/track 120 rev/sec

9) Label these definitions with the correct names:

a) The time it takes the read/write head to move to the correct track is\_\_\_\_\_\_\_\_\_\_\_\_\_

b) Since the distance between the two tracks is variable, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is used as a specification for the disk.

c) Once the read/write head is over the correct track, the read/write head must wait for the disk to rotate to the beginning of the sector. This time is referred to as the\_\_\_\_\_\_\_\_\_\_\_

d) Since the time the read/write head waits for the correct block varies, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is used as a measure.

e) Once the read/write head is over the correct sector, the time required to transfer the block is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Sol:  
a) seek time

b) average seek time

c) rotational latency or rotational delay or latency time

d) average rotational latency

e) transfer time

10) Explain how a mirrored array, consisting of 4 disk drives, would be approximately 4 times faster during a multiblock read.

Sol: From the text: "In a mirrored array, each disk stores exactly the same data. During reads, alternate blocks of the data are read from different drives, then combined to reassemble the original data. Thus, the access time for a multiblock read is reduced approximately by a factor equal to the number of disk drives in the array."

11) For a display of 1920 pixels by 1080 pixels at 16 bits per pixel how much memory, in megabytes, is needed to store the image?

Sol: 1920 \* 1080 = 2,073,600 pixels

2,073,600 pixels \* 2bytes/pixel = 4,147,200 bytes

Convert to megabytes: 4,147,200 bytes (1 MB / 1048576 bytes) = 3.955MB

Where 1 MB = 2^20 B = 1,048,576

12) Describe the difference between active matrix display and passive matrix display in a liquid crystal display (LCD) monitor. Which results in a brighter picture?

Sol: From the text: "In an active matrix display, the display panel contains one transistor for each cell in the matrix. This guarantees that each cell will receive a strong charge, but is also expensive and difficult to manufacture."

In a passive matrix display, a single transistor is used for each row and column of the matrix and activates each cell, one at a time, repetitively, using a scan pattern.

The active matrix display is brighter.

13) How do QR codes differ from a one-dimensional barcode?

Sol: From the text: "Bar codes are read optically using a device called a wand that converts a visual scan of the code into electrical binary signals that a bar code translation module can read. The module translates the binary input into a sequence of number codes, one code per digit, that can then be input into the computer."

From the text: "QR (Quick Response) codes are two dimensional codes, similar to bar codes, but with larger data capacity. QR codes are read with a camera. They have achieved widespread use because they are readily captured with mobile devices."

14) Using the Internet as a research tool, give an overview of how pressure-sensitive (resistive film) touch screens work (about 50 to 100 words). Provide URL, Author (if available) and date accessed.

Sol: URLs will vary, but here is one description: (No Author, 2011), "How can a screen sense touch? A basic understanding of touch panels." Retrieved November 2, 2013 from <http://www.eizo.com/global/library/basics/basic_understanding_of_touch_panel/>

Touch screen monitors using pressure-sensitive technology use "a glass screen and a film screen separated by a narrow gap, each with a transparent electrode film (electrode layer) attached." As a finger or stylus touches the outer glass it comes into contact with the thin film below causing a flow of ||||||||||||||ZW2\current and the location is identified. "The point of contact is identified by detecting this change in voltage."

15) Commercial cloud services can be used as a storage provider for data and programs needed by a company. Use the Internet as a research tool and give three descriptions of personal or commercial cloud services that can be used as a storage provider. Provide the author (if possible), URL, and the date you accessed the website. The descriptions should be about 3 to 4 sentences each.

Sol: URLs will likely be different, but here are three examples:

1. Google Cloud Platform, <https://cloud.google.com/products/cloud-storage>, accessed November 2, 2013. No author given.

Description: Google's cloud storage advertises "Store, access and manage your data on Google’s storage infrastructure." Google offer's a) fast data access, b) reliable infrastructure and c) unlimited storage. The caveat about unlimited storage was that after an account was created, there was a step to enable 'billing.' It was undetermined how much the service costs.

2. Amazon Cloud Drive, [http://www.amazon.com/gp/feature.html/ref=cd\_def/184-8700987-4696248?ie=UTF8&\*Version\*=1&\*entries\*=0&docId=1000828861](http://www.amazon.com/gp/feature.html/ref=cd_def/184-8700987-4696248?ie=UTF8&*Version*=1&*entries*=0&docId=1000828861), accessed November 2, 2013. No author given.

Description: Amazon Cloud Drive, offers to "Put your important files in Cloud Drive and access them from any of your computers, your Kindle Fire, or online. Get started using your 5 GB of free storage by installing Cloud Drive for Windows and Mac." This interface looked easier than Google's cloud storage, with existing folders on left side of the page, and icons to upload files, documents, pictures and videos. Paid plans were available for 20GB to 1000 GB.

3. Box, <https://www.box.com/home/>, accessed November 2, 2013. No author given.  
Description: Free cloud storage for 5GB and additional storage of 25GB for $9.99/month; 50GB, $19.99/month. There were also business and enterprise level accounts. Box claims they provide SSL AES 256-bit encryption behind the firewall. There were some size limits for free accounts. And, Box says they "[allow] document editing in the cloud through third-party apps, such as Zoho."

Solutions

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| --- | --- | --- |
| Problem | Answer | Section in text / comments |
| 1 | c | Section 10.0 Introduction |
| 2 | d | Section 10.1 The Hierarchy of Storage |
| 3 | a | Section 10.1 The Hierarchy of Storage |
| 4 | a | Section 10.1 The Hierarchy of Storage |
| 5 | c | Section 10.3 Magnetic Disks |
| 6 | c | Section 10.3 Magnetic Disks |
| 7 | d | Section 10.3 Magnetic Disks |
| 8 | b | Section 10.3 Magnetic Disks |
| 9 | b | Section 10.3 Magnetic Disks |
| 10 | d | Section 10.3 Magnetic Disks |
| 11 | c | Section 10.3 Magnetic Disks |
| 12 | a | Section 10.3 Magnetic Disks |
| 13 | b | Section 10.3 Magnetic Disks |
| 14 | b | Section 10.3 Magnetic Disks |
| 15 | a | Section 10.3 Magnetic Disks |
| 16 | d | Section 10.5 Magnetic Tape |
| 17 | b | Section 10.6 Displays |
| 18 | a | Section 10.6 Displays |
| 19 | a | Section 10.6 Displays |
| 20 | b | Section 10.6 Displays |
| 21 | a | Section 10.6 Displays |
| 22 | d | Section 10.6 Displays |
| 23 | c | Section 10.6 Displays |
| 24 | c | Section 10.6 Displays |
| 25 | c | Section 10.6 Displays |
| 26 | d | Section 10.6 Displays |
| 27 | b | Section 10.7 Printers |
| 28 | c | Section 10.7 Printers |
| 29 | b | Section 10.8 User Input Devices |
| 30 | d | Section 10.8 User Input Devices |
| 31 | d | Section 10.8 User Input Devices |
| 32 | a | Section 10.8 User Input Devices |
| 33 | d | Section 10.8 User Input Devices |
| 34 | b | Section 10.8 User Input Devices |
| 35 | a | Section 10.8 User Input Devices |
| 36 | c | Section 10.9 Network Communication Devices |