

**Overview**

The ability to evaluate the needs of an organization and then design and implement network solutions is a valuable skill in today's connected workplace. This event provides recognition for FBLA members who demonstrate an understanding of and ability to apply these skills.

This is a team event composed of two or three members. This event consists of two parts: an objective test and a performance. The objective test is taken collaboratively by the team members and the top ten (10) teams scoring the highest on the objective test will advance to the final round and participate in the performance component.

**Competencies and Task Lists**

<http://www.fbla-pbl.org/docs/ct/FBLA/NETWORKDESIGN.pdf>

**Web Site Resources**

- Network Management Definitions  
<http://whatis.techtarget.com/glossary/network-management-definition-.html>

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**NETWORK DESIGN SAMPLE QUESTIONS**

1. Which layer of the OSI model has the important role of providing error checking?
  - a. presentation layer
  - b. session layer
  - c. application layer
  - d. transport layer
2. \_\_\_\_\_ is the type of media access method used by NICs that listen to or "sense" the cable to check for traffic and send only when they hear that no one else is transmitting.
  - a. CSMA/CD
  - b. Token passing
  - c. Demand priority
  - d. CSMA/CA
3. What part of an HP LaserJet printer is malfunctioning if you receive a "50 Service" error?
  - a. AC power supply
  - b. laser scanner assembly
  - c. fuser
  - d. toner cartridge
4. The message "missing operating system" appears when booting up the PC from the hard drive. To attempt a repair to the drive without losing data, you should first try which of the following?
  - a. boot to a bootable floppy disk and type SYSTEM C:
  - b. repartition the drive using FDISK
  - c. boot to a bootable floppy disk and type SYS C:
  - d. boot to a bootable floppy disk and type FORMAT C: /S
5. What equipment type limits network equipment, so it cannot send and receive at the same time?
  - a. half-duplex
  - b. muted
  - c. single-duplex
  - d. IEEE

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6. UTP network cable typically has what type of connectors at each end?
    - a. RJ-11
    - b. RJ-45
    - c. AUI
    - d. BNC
  7. Which one of the following authentication protocols supports the use of smart cards?
    - a. SPAP
    - b. MS-CHAP
    - c. EAP
    - d. MS-CHAP2
  8. Why would a network administrator want to limit the size of failure domains when designing a network?
    - a. reduces the impact of blocking broadcast packets at the edge of the local network
    - b. reduces the impact of a key device or service failure
    - c. reduces the impact of Internet congestion on critical traffic
    - d. reduces the effect of Ethernet collisions
  9. Domain Name Services on a UNIX or Linux system is referred to as what service?
    - a. NAME
    - b. DHCP
    - c. HOST
    - d. BIND
  10. What is the purpose of Spanning Tree Protocol?
    - a. create smaller collision domains
    - b. prevent routing loops on a router
    - c. create smaller broadcast domains
    - d. prevent loops at Layer 2
  11. What must be used to set IRQs on legacy ISA network interface cards with no jumpers?
    - a. Device manager
    - b. COMS
    - c. DIP switches
    - d. Configuration software
  12. Windows NT organizes user accounts into \_\_\_\_\_ that provide the same permissions to all members.
    - a. teams
    - b. groups
    - c. account headers
    - d. workgroups
  13. What does it mean if a network administrator can PING a resource server using its IP address, but **not** its Internet name?
    - a. The computer is not configured to use DNS.
    - b. The computer is not configured to use DHCP.
    - c. The computer is not configured to use WINS.
    - d. The computer is not configured to use ARP.
  14. \_\_\_\_\_ is immune to electromagnetic or radio-frequency interference.
    - a. Twisted-pair cabling
    - b. Fiber-optic cabling
    - c. CSMA/CD
    - d. Broadband coaxial cabling

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15. ACL statements operate in sequential, logical order. If a condition match is true, the rest of the ACL statements are **not** checked. If all of the ACL statements are unmatched, what happens to the packet?
- The implicit deny any statement placed at the end of the list will cause the packets to be dropped.
  - The implicit permit any statement placed at the end of the list will allow the packets to flow through uninhibited.
  - The packets will be placed in a buffer and forwarded when the ACL is removed.
  - The packets will be sent to the source with an error notification message.
16. Workgroup network switches typically function at what layer of the OSI model?
- Layer 4
  - Layer 2
  - Layer 3
  - Layer 1
17. What is the binary representation of 128.1.128.7?
- 10001111.00011111.10000111.00000111
  - 10001111.01100001.10001100.11000111
  - 11111111.11111111.11111111.11111001
  - 10000000.00000001.10000000.00000111
18. What TCP/IP utility would you use to check the pathways and status of network devices between two Internet paths/sites?
- NetStat
  - Tracert
  - Nslookup
  - Ping
19. Due to the drop in hard drive storage, a newer backup strategy is emerging that allows for very quick backup and recovery while still using older technologies for archival purposes and is called:
- tape backup
  - tape-to-disk-to-disk backup
  - disk-to-disk-to-tape backup
  - disk backup
20. What RAID format is considered the best by most administrators because it does **not** require the operating system to handle most of the data striping and parity calculations?
- Master RAID
  - Super RAID
  - Software RAID
  - Hardware RAID
21. The administrator has set a backup routine that includes differential backups Monday through Friday with a full (normal) backup on Sunday. Your system crashes Wednesday morning. What tapes will be needed for the restore?
- last Sunday and Tuesday
  - last Friday, Sunday, and Tuesday
  - all of last week's tapes, Monday-Friday, Sunday, and Monday the current
  - last Sunday, Monday, and Tuesday
22. When configuring DNS with a new Domain entry you create a new:
- network
  - zone
  - stub
  - host

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23. Your client reports that when they print their word processing document it appears on the printer as X!###\$DF()+— and continues to print numerous pages with random characters. What is most likely the problem?
- a. wrong printer cable
  - b. wrong printer driver
  - c. wrong font
  - d. wrong paper format
24. Given the IP address and subnet mask of 192.168.134.56 and 255.255.255.224, on which subnet does this address reside?
- a. 192.168.134.32
  - b. 192.168.0.0
  - c. 192.168.134.48
  - d. 192.168.134.0
25. FTP provides a reliable, connection-oriented service for transferring of files. Which transport layer protocol is used for data transfer when this service is being used?
- a. DNS
  - b. IP
  - c. TFTP
  - d. TCP
26. Which protocol is used by e-mail servers to communicate with each other?
- a. HTTP
  - b. FTP
  - c. SMTP
  - d. POP
27. What does a switch do when it receives a frame and the source address is unknown?
- a. The switch will issue an ARP request to confirm that the source exists.
  - b. The switch will map the source address to the port on which it was received.
  - c. The switch will discard the frame.
  - d. The switch will flood the frame to all attached devices.
28. Which one of the following start the test of destination reachability?
- a. echo reply issued by destination
  - b. echo request issued by source
  - c. echo request issued by destination
  - d. echo reply issued by source
29. What units are used to measure Internet bandwidth?
- a. bytes per second
  - b. bits per second
  - c. megabytes per second
  - d. hertz
30. Which port numbers are used by PAT to create unique global addresses?
- a. 1024 and below
  - b. 64,000 and above
  - c. 1025 and above
  - d. 255 and below

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## NETWORK DESIGN SAMPLE CASE STUDY

### PARTICIPANT INSTRUCTIONS

1. You have 20 minutes to review the case and may take notes on the two note cards that were provided. Note cards will be collected following the presentation.
2. Presentation time is seven minutes. At six and seven minutes the timekeeper will stand. Five points are deducted if presentation goes over seven minutes.
3. The judges will have a three-minute question and answer period following the presentation.
4. All members of the team must participate in the presentation, as well as answer the questions.

### CASE STUDY SITUATION

The GoodDay Toy Company currently has several production facilities throughout the United States, and corporate offices located in Memphis, Tennessee. Your team must participate in the design and partial implementation of three new production facilities that the company will be opening in the next 12 months.

The requirements follow:

- Each new site will have its own separate network that will connect to the company's central network.
- Every new network will be configured to support two subnets allowing for managers and employees to gain access to central corporate documents.
- An approved software list will be utilized. The allowed programs will be used to incorporate into already existing profiles set by job and function. (These profiles will include site default printers and intranet homepages.)
- There will be three noncolor and one color network-capable laser printers installed for each location.
- All of the printers' queues will be managed by a central print server that will be connected to and only have access from the managers' sub-network.
- One of the subnets will only have WYSE thin-clients connected (which will only be allowed to connect to the network via terminal services to a central server) and will also be configured to connect to a central router set with its own SNMP community ID and string.
- All servers will have a connection to a 10-gigabit switch that is located adjacent and/or nearby the central router in order to allow for production growth and server clustering.
- At least two subordinate managers will have backup dial-up connections via their offices' own separate phone lines.

The corporate guidelines currently allow for major changes of IT operation to occur during business nonworking hours. These can include web server upgrades, e-mail service administration, and new package roll-outs. A new Oracle database front-end will be utilized on at least one machine at every site beginning next year. One server and one new full desktop workstation will be required for this new project and some of its other business administration functions.

Interviews with company IT personnel indicate that administration may restrict the IT budget of the new production sites. Costs should be kept to a minimum, and most installations should be completed by existing personnel. The team should assume that local telecom companies exist in the location of the new production facilities and are able to provide a variety of connection options, including DSL, T1 and T3 lines, and standard dial-up.

The proposed solution should include the following:

- Necessary network infrastructure to accommodate the new production sites
- Consider budget restraints of The GoodDay Toy Company

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- Ensure that the upgrades do not interfere with production schedules
  - Consider security of the network and workstations at all times
  - Consider network operating systems that maintain high availability and scalability for future expansion
  - Create a diagram of your proposal including computers, servers, printers, and cabling
  - Also include a logical and physical topology with necessary network addressing, connecting all remote sites with the corporate offices

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**Management Decision Making Answer Key**

1) A	11) D	21) D
2) C	12) A	22) C
3) B	13) D	23) A
4) C	14) C	24) D
5) D	15) A	25) D
6) D	16) A	26) B
7) C	17) D	27) B
8) C	18) C	28) C
9) A	19) C	29) D
10) D	20) B	30) C

**Management Information Systems Answer Key**

1) B	11) A	21) A
2) B	12) C	22) A
3) C	13) B	23) D
4) D	14) B	24) B
5) B	15) B	25) D
6) C	16) C	26) A
7) C	17) B	27) A
8) D	18) D	28) D
9) B	19) A	29) B
10) D	20) D	30) D

**Marketing Answer Key**

1) A	11) B	21) B
2) A	12) B	22) C
3) B	13) C	23) B
4) A	14) D	24) C
5) B	15) C	25) B
6) C	16) B	26) C
7) B	17) B	27) B
8) D	18) D	28) B
9) B	19) B	29) A
10) A	20) A	30) C

**Network Design Answer Key**

1) D	11) D	21) A
2) A	12) B	22) B
3) C	13) A	23) B
4) C	14) B	24) A
5) A	15) A	25) D
6) B	16) B	26) C
7) C	17) D	27) B
8) B	18) B	28) B
9) D	19) C	29) B
10) D	20) D	30) C

**Networking Concepts Answer Key**

1) A	11) A	21) D
2) C	12) C	22) D
3) B	13) A	23) B
4) C	14) D	24) C
5) B	15) A	25) C
6) D	16) C	26) B
7) A	17) B	27) B
8) D	18) D	28) C
9) C	19) D	29) A
10) A	20) B	30) D