

## ***Guide to Operating Systems, 6e: Module 2 Solutions***

### **Review Questions**

1. What was the original Microsoft operating system for the IBM PC?
  - a. Windows 3.1
  - b. Windows 1.0
  - c. MS-DOS
  - d. Windows 95

Analysis:

- a. Incorrect. Windows 3.1 was introduced in 1992, more than 10 years after the IBM PC and MS-DOS were introduced in 1981.
- b. Incorrect. Windows 1.0 was released in 1985, four years after the IBM PC and MS-DOS were introduced in 1981.
- c. Correct. The IBM PC and MS-DOS were introduced in 1981.
- d. Incorrect. Windows 95 was introduced in 1995, almost 15 years after the IBM PC and MS-DOS were introduced in 1981.

2. Windows 2000 Server was the first Windows server to have the Active Directory service. True or False?
  - a. True
  - b. False

Analysis:

- a. Correct. True is correct because Windows 2000 Server introduced a directory service called Active Directory.
- b. Incorrect. False is incorrect because Windows 2000 Server introduced a directory service called Active Directory.

3. What does it mean if a driver is signed?
  - a. The driver file contains a digital certificate.
  - b. Only certified versions of the driver can be installed.
  - c. The driver can only work in Windows 10 and later versions.
  - d. The driver must be installed on a server.

Analysis:

- a. Incorrect. The driver file does not contain a digital certificate.
- b. Correct. Driver signing means that only certified versions of the driver can be installed.
- c. Incorrect. Signed drivers were introduced in Windows 2000.
- d. Incorrect. Both server and client versions of Windows support driver signing.

4. What is the default authentication protocol used by Windows 2000 Server and later versions?
  - a. Kerberos
  - b. MS-CHAP
  - c. PAP
  - d. IntelliMirror

Analysis:

- a. Correct. Kerberos is the default authentication protocol used in Windows 2000 Server and later versions.
- b. Incorrect. MS-CHAP is an older authentication protocol that can be used for remote access, but it is not used by default on Windows 2000 Server and later versions.
- c. Incorrect. PAP is an older, unsecure authentication protocol that can be used for remote access, but it is not used by default on Windows 2000 Server and later versions.
- d. Incorrect. IntelliMirror is not an authentication protocol. IntelliMirror enables features such as roaming user profiles, folder redirection, and offline files.

5. Which Windows feature, introduced in Windows 95, helped eliminate device resource conflicts and precluded manual device configuration with jumpers?

- a. Intellimirror
- b. Plug and Play
- c. Component Object Model
- d. ActiveX

Analysis:

- a. Incorrect. IntelliMirror enables features such as roaming user profiles, folder redirection, and offline files.
- b. Correct. Plug and Play enables the operating system to automatically detect and configure newly installed hardware, which helps eliminate device resource conflicts.
- c. Incorrect. Component Object Model is a standardized way for objects to communicate with each other.
- d. Incorrect. ActiveX works with COM to provide a standardized way for objects to communicate with each other.

6. With which client OS did Windows Server 2008 share the same code base?

- a. Windows Server 2003
- b. Windows 98
- c. Windows Vista
- d. Windows Server 2003 R2

Analysis:

- a. Incorrect. Windows Server 2003 did not share the same code base with Windows Server 2008.
- b. Incorrect. Windows 98 did not share the same code base with Windows Server 2008.
- c. Correct. Windows Vista shared the same code base with Windows Server 2008.
- d. Incorrect. Windows Server 2003 R2 did not share the same code base with Windows Server 2008.

7. Which Windows feature made the use of chkdsk.exe much less common?

- a. Active Directory
- b. Plug and Play
- c. Self-healing NTFS
- d. Storage Spaces

Analysis:

- a. Incorrect. Active Directory is a directory service and is not related to the file system.

- b. Incorrect. Plug and Play enables the operating system to automatically detect and configure newly installed hardware, which helps eliminate device resource conflicts.
- c. Correct. Self-healing NTFS can resolve some file system problems without taking the volume offline to use chkdsk.exe.
- d. Incorrect. Storage Spaces is a storage management and configuration tool; it does not resolve file system problems.

8. You have been asked to install Windows Server 2012 on a server that has limited memory and disk space. You need to ensure that the installation has as small a footprint as possible; also, the server will be managed using remote server administration tools or the command line. How can you accomplish this?

- a. Install Hyper-V Server with Windows Server 2012 as a VM.
- b. Install a compressed version of Windows Server 2012 R2.
- c. Install a Linux hypervisor and then install Windows Server 2012.
- d. Install Windows Server 2012 but choose the Server Core option.

Analysis:

- a. Incorrect. Hyper-V Server with a Windows Server 2012 VM requires more memory and disk space than Windows Server 2012 installed on bare metal.
- b. Incorrect. You cannot install a compressed version of Windows Server 2012 R2.
- c. Incorrect. A Linux hypervisor and Windows Server 2012 installation requires more memory and disk space than Windows Server 2012 installed on bare metal.
- d. Correct. Server Core is an installation option that provides a small footprint compared to the GUI installation of Windows Server 2012.

9. Which of the following best describes a virtual private network (VPN)?

- a. uses special IP addresses
- b. two devices connected point-to-point
- c. provides authentication and encryption
- d. runs only in a virtual machine

Analysis:

- a. Incorrect. Special IP addresses are not part of a VPN configuration.
- b. Incorrect. A VPN might include two devices connected point-to-point, but not necessarily.
- c. Correct. A VPN provides authentication and encryption across a public network.
- d. Incorrect. A VPN server can run in a virtual machine, but it can also run on a bare-metal computer.

10. You have a branch office with limited physical security for your servers. You want domain users in the office to be able to be authenticated by a local server, but you are concerned that the server might be compromised or stolen due to the lack of physical security. What should you do?

- a. Install an RODC.
- b. Use IntelliMirror.
- c. Configure Hyper-V.
- d. Install a VPN.

Analysis:

- a. Correct. A read-only domain controller (RODC) provides authentication services but provides more security in the event the computer is stolen or compromised.

- b. Incorrect. IntelliMirror does not provide authentication services.
- c. Incorrect. Hyper-V does not provide authentication services.
- d. Incorrect. A VPN provides a virtual private network but is not used to authenticate users in a branch office.

11. You have a Web server that contains primarily static data. The server is heavily used and response times are getting longer. What can you do to mitigate the increasing response times?

- a. Create a failover cluster.
- b. Use a hypervisor to increase performance.
- c. Configure self-healing NTFS.
- d. Create a network load-balancing cluster.

Analysis:

- a. Incorrect. A failover cluster is best used for dynamic data applications.
- b. Incorrect. A hypervisor provides virtualization and will not increase performance.
- c. Incorrect. Self-healing NTFS provides reliability for the file system but will not increase performance.
- d. Correct. A network load-balancing cluster is best for static data and can increase Web server performance.

12. What feature can you use starting in Windows Server 2012 if you want to be able to assign file and folder permissions based on user attributes and the contents of the file?

- a. Storage Spaces
- b. Dynamic Access Control
- c. Active Directory
- d. Resilient File System

Analysis:

- a. Incorrect. Storage Spaces is a storage management feature but does not provide file permissions features.
- b. Correct. Dynamic Access Control allows permissions to be set based on user attributes and file contents.
- c. Incorrect. Active Directory is a directory service but does not provide file permissions features.
- d. Incorrect. Resilient File System is a file system format that provides standard file and folder permissions, but it does not allow file and folder permissions assignment based on user attributes and file contents.

13. Your boss has informed you that three aging servers must be replaced with a single physical server. However, you have found that two of the servers are running 64-bit applications that conflict with one another and cannot be installed on the same OS. Do you have a solution for this problem?

- a. Install Windows Server 2016 with Hyper-V and create three VMs, each running Windows Server 2016.
- b. Install Windows Server Core on three hard disk partitions and create a multi-boot system.
- c. Install Windows Server 2019 and use WOW to run the conflicting applications.
- d. There is no good solution to this problem. You should inform your boss that a second server is required.

Analysis:

- a. Correct. Hyper-V is a hypervisor that allows you to run multiple virtual machines on one physical computer.
- b. Incorrect. A multi-boot system does not allow all three systems to run simultaneously.
- c. Incorrect. WOW allows 16-bit applications to be preemptively multitasked and would not allow the 64-bit applications to run.
- d. Incorrect. There is a solution, which is to use Hyper-V with three VMs.

14. Which of the following best describes Hyper-V?

- a. the fifth version of the overdrive section on the Intel chip
- b. a method to increase the speed of memory access on a personal computer
- c. the server virtualization service used to create multiple logical servers on one physical server
- d. extremely fast communication over the USB port

Analysis:

- a. Incorrect. Hyper-V is a server virtualization service and is not related to a computer chip.
- b. Incorrect. Hyper-V is a server virtualization service, but it does not increase memory access speed.
- c. Correct. Hyper-V is a server virtualization service used to create multiple logical servers on a physical server.
- d. Incorrect. Hyper-V is a server virtualization service that is not related to USB port communication.

15. Looking at Windows Server 2012 R2, which of the following statements is true?

- a. It was released in both a 32-bit and 64-bit version.
- b. It shares a core operating system with Windows Vista.
- c. It supports virtual machines with up to 32 GB of RAM.
- d. It has group policy features that only work with Windows XP clients.

Analysis:

- a. Incorrect. Windows Server 2012 R2 was released in only a 64-bit version.
- b. Incorrect. Windows Vista shares its core OS with Windows Server 2008.
- c. Correct. Windows Server 2012 R2 supports VMs with up to 32 GB of RAM.
- d. Incorrect. Windows Server 2012 R2 has group policy features that only work with Windows 8 and later clients.

16. What version of Windows Server should you use if you want to deploy a hyper-converged infrastructure?

- a. Windows Server 2019
- b. Windows Server 2016 R2
- c. Windows Enterprise Server
- d. Windows Server Core

Analysis:

- a. Correct. Windows Server 2019 supports features for a hyper-converged infrastructure.
- b. Incorrect. Windows Server 2016 does not have an R2 version.
- c. Incorrect. There is no Windows Enterprise Server version.
- d. Incorrect. Windows Server Core is not a separate Windows Server version; Server Core is an installation option for Windows Server that does not contain a GUI.

17. What are the two main design standards to which most versions of UNIX adhere? (Choose two.)

- a. BSD
- b. USB
- c. SVR4
- d. SCO

Analysis:

- a. Correct. BSD is one of the two main design standards to which most versions of UNIX adhere.
- b. Incorrect. USB is a serial interface specification, not a UNIX design standard.
- c. Correct. SVR4 is one of the two main design standards to which most versions of UNIX adhere.
- d. Incorrect. SCO UNIX is a UNIX distribution based on SVR4.

18. Which Debian-based distribution of Linux is ideal for learning about cybersecurity because of its wide collection of forensic and security tools?

- a. FreeBSD
- b. Kali
- c. Solaris
- d. openSUSE

Analysis:

- a. Incorrect. FreeBSD is a normal Linux distribution that does not come packaged with any special forensic or security tools.
- b. Correct. Kali Linux is a Linux distribution that comes packaged with a number of forensic and security tools.
- c. Incorrect. Solaris is a UNIX distribution that does not come packaged with any special forensic or security tools.
- d. Incorrect. openSUSE is a normal Linux distribution that does not come packaged with any special forensic or security tools.

19. What is the command-line interface called on a Linux system?

- a. cmd
- b. command window
- c. shell
- d. prompt

Analysis:

- a. Incorrect. cmd is the command-line interface on Windows systems.
- b. Incorrect. Command window is not the name of the command-line interface on a Linux system.
- c. Correct. Shell is the name of the command-line interface on a Linux system.
- d. Incorrect. Prompt is not the name of the command-line interface on a Linux system.

20. What technology was implemented on Apple computer printer ports to facilitate file and printer sharing?

- a. Multifinder
- b. LocalTalk
- c. PowerShell
- d. WiFi

Analysis:

- a. Incorrect. Multifinder was a tool used in Mac OS 8.0 versions to facilitate task switching.
- b. Correct. LocalTalk was a protocol used in Apple computers to facilitate file and printer sharing.
- c. Incorrect. PowerShell is a scripting language and command-line interface used on Windows systems.
- d. Incorrect. WiFi is a wireless networking technology, but it was not implemented on Apple printer ports.

## **Hands-On Projects**

The hands-on projects in this module contain no questions that require solutions.

## **Critical Thinking: Activities**

This module has no critical thinking activities.

## **Critical Thinking: Case Projects**

### **Case Project 2-1: Accounting Department Upgrade**

**Advantages**—Students should mention that virtual desktops are a new feature that can help users organize their working space and perform multitasking more efficiently. The Start button in Windows 10 will feel familiar to users and will provide them with access to a hybrid Start screen with live tiles. Other advantages include libraries, performance improvements, and substantial security improvements. In addition, with the upgrade to Windows Server 2016 or Windows Server 2019, the Windows 10 clients will be more manageable in a domain environment. The overriding concern here is security. Windows Vista no longer receives security updates and is considerably more vulnerable to attacks than Windows 10.

**Disadvantages**—Students should discuss the learning curve after updating to a new operating system, resistance from accounting personnel, and possible compatibility issues with older Windows Vista applications. In addition, Windows Vista requires a fresh installation of Windows 10 rather than an upgrade installation, which preserves applications and data, but the upgrade process is more time-consuming. However, the security issue overrides any disadvantages of upgrading.

**Grading Rubric**

<b>Category</b>	<b>Description</b>	<b>Points Possible</b>	<b>Points Earned</b>
Content of Posting	1. Advantages (this answer counts for 50 percent of the possible points, and should be up to 100 words) 2. Disadvantages (50 percent, 100 words)	30	
Format of Posting	Grammar, spelling, punctuation	5	
Total Points		35	

**Case Project 2-2: Legacy Billing System**

Yes, the department can run Windows Vista in a virtual machine using Client Hyper-V if the billing program is not compatible with Windows 10.

**Grading Rubric**

<b>Category</b>	<b>Description</b>	<b>Points Possible</b>	<b>Points Earned</b>
Content of Posting	Answer with explanation (one sentence)	9	
Format of Posting	Grammar, spelling, punctuation	1	
Total Points		10	

**Case Project 2-3: New Computers for the Marketing Department**

The latest operating system is 10.14 Mojave as of this writing. Users of the iPad or iPhone may find more familiarity with Mojave's user interface and can take advantage of new features like Siri, Desktop stacks, and Dynamic Desktop.

**Grading Rubric**

<b>Category</b>	<b>Description</b>	<b>Points Possible</b>	<b>Points Earned</b>
Content of Posting	Correct specification of newest macOS with advantages (50 words)	9	
Format of Posting	Grammar, spelling, punctuation	1	
Total Points		10	

**Case Project 2-4: President's Problem**

Students should mention checking Task Manager and Resource Monitor to see which applications or services are using a lot of CPU time.



**Grading Rubric**

<b>Category</b>	<b>Description</b>	<b>Points Possible</b>	<b>Points Earned</b>
Content of Posting	Correct identification of using Task Manager and/or Resource Monitor (one sentence)	9	
Format of Posting	Grammar, spelling, punctuation	1	
Total Points		10	

**Case Project 2-5: Chief Financial Officer's Concerns**

Students should mention that while Windows 7 is a fine and reliable operating system, Microsoft ended support for it in January 2020, which means security updates will no longer be available for Windows 7. Any vulnerabilities or bugs found will not be fixed and the OS will be more vulnerable to malware and attackers. In addition, no new features have been added to Windows 7 since 2015, so Windows 7 is unable to take advantage of new hardware and software innovations. Upgrading to Windows 10 is the only reasonable course of action because Windows 8/8.1 will also see its support end in the near future as well.

**Grading Rubric**

<b>Category</b>	<b>Description</b>	<b>Points Possible</b>	<b>Points Earned</b>
Content of Posting	Explanation of why the use of Windows 7 should not be continued and that Windows 10 is the best option (100 words)	18	
Format of Posting	Grammar, spelling, punctuation	2	
Total Points		20	

**Case Project 2-6: Server Upgrades**

Students should discuss that Windows Server 2016 and Windows Server 2019 have the Windows 10 user interface and will most tightly integrate with that client OS. Because most of the client computers are being upgraded to Windows 10, they can be better managed. In addition, both OSs have improved virtualization options, including Windows containers. Windows Server 2019 has features that focus on hybrid cloud datacenters and hyper-converged infrastructure. In addition, Windows Server 2019 has better Linux VM support, so consolidating the Linux servers into VMs would be easier. Windows Server 2016 and Windows Server 2019 are good options, but because Windows Server 2019 has better cloud and Linux support and is newer, and because Microsoft support will be available for a much longer period of time, Windows Server 2019 seems like the best option.

**Grading Rubric**

<b>Category</b>	<b>Description</b>	<b>Points Possible</b>	<b>Points Earned</b>
Content of Posting	<ol style="list-style-type: none"><li>1. Explanation of why Windows Server 2016 and 2019 are the best options—for example, tight integration with Windows 10 and Hyper-V virtualization (90 percent)</li><li>2. Add that Windows Server 2019 will have the longest support period going forward (10 percent)</li></ol> (150 words total)	25	
Format of Posting	Grammar, spelling, punctuation	5	
Total Points		30	