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OPERATING SYSTEM
CONCEPTS AND NETWORKING
MANAGEMENT

M.C.S.-22

Chapter Wise Reference Book
Including Solved Sample Papers

By: Sumeet Sharma, B.E. (Computer Science)

Based on

I.G.N.O.U.

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**Sample Preview
of the
Solved
Sample Question
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QUESTION PAPER

Exam Held in
February – 2021

(Solved)

OPERATING SYSTEM CONCEPTS
AND NETWORKING MANAGEMENT

M.C.S.-22

Time: 3 Hours]

[Maximum Marks: 100

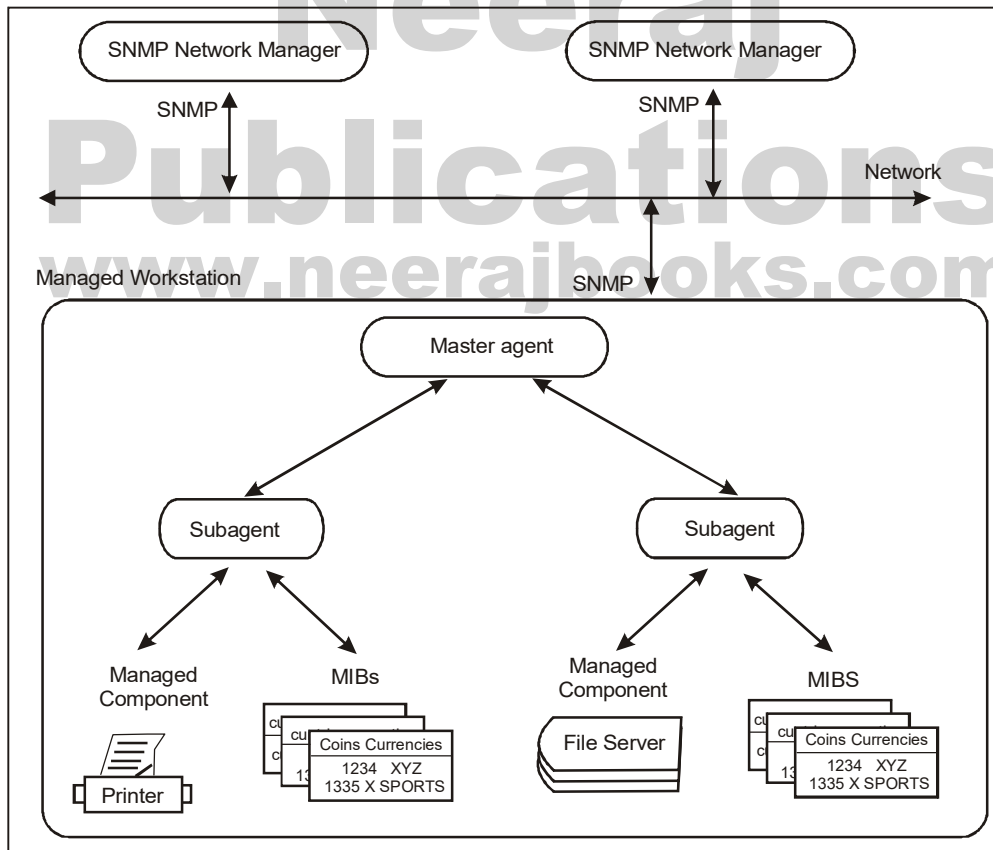
(Weightage 75%)

Note: Question No. 1 is compulsory. Attempt any three questions from the rest.

Q. 1. (a) Draw a diagram of Simple Network Management Protocol (SNMP) architecture and show how it is used to manage network devices.

- SNMP Network Managers
- Master agents
- Subagents
- Managed components

Ans. The SNMP Architecture: The Simple Network Management Protocol (SNMP) architecture includes four layers:



A network can have multiple SNMP Network Managers. Each workstation can have one master agent. The SNMP Network Managers and master agents use SNMP protocols to communicate with each other. Each managed component has a corresponding subagent and MIBs. SNMP does not specify the protocol for communications between master agents and subagents.

SNMP network managers

An SNMP Network Manager is a program that asks for information from master agents and displays that information. You can use most SNMP Network Managers to select the items to monitor and the form in which to display the information.

Master agents

A master agent is a software program that provides the interface between an SNMP Network Manager and a subagent.

Subagents

A subagent is a software program that provides information to a master agent.

Managed components

A managed component is hardware or software that provides a subagent. For example, database servers, operating systems, routers, and printers can be managed components if they provide subagents.

Management Information Bases

A Management Information Base (MIB) is a group of tables that specify the information that a subagent provides to a master agent. MIBs follow SNMP protocols.

(b) List and describe various security features in WINDOWS 2000 O/S.

Ans. Windows 2000 supports a new version of NTFS, i.e., NTFS version 5.0 that is better than in terms of reliability and better performance.

NTFS 5.0 includes the following features:

- All of the new features of Windows 2000 Active Directory Services.
- Storage features like reparse points.
- Features for Software Management.
- Enhanced security features for servers, which provides an authentication mechanism to users before they can actually gain access to network resources.
- It supports CDFS; In Windows 2000 two kinds of disk storage are possible:
- Basic storage: Basic disk is divided into partitions.
Disk partition can be primary or extended and they function as disks in their own entirety

Distributed Security

Windows 2000 has brought a new order to security services within the Windows platform in the guise of Windows 2000 Distributed Security Services. And Windows 2000's support for multiple security protocols has seen a movement away from proprietary protocols, not only to Kerberos, but also to the new Active Directory service, which is based on the Lightweight Directory Access Protocol (LDAP), making it compatible with other directory services such as Novell's NDS.

These security services that are distributed throughout the network and examine how they work together.

Active Directory Security

This includes the new concept of transitive trusts, which allows user account authentication to be distributed across an organization. This also provides the granular assignment of access rights and the ability to delegate administration below the domain level.

Multiple Security Protocols

This includes the implementation of the security protocol Kerberos, the support of Public Key Infrastructure (PKI), and the use of NTLM for backwards compatibility with Windows NT 4.0-based networks.

Security Support Provider Interface (SSPI)

This component of the security subsystem provides an application with access to a wider range of security protocols using a generic interface for the authentication systems.

Secure Sockets Layer (SSL)

This standard protocol is used for secure communication between the user and Internet-based services.

Microsoft Certificate Services

This service was originally included as part of IIS 4.0 within the Windows NT 4.0 Option Pack. Certificate Services have been upgraded and made part of Windows 2000. It is used to issue and manage public key certificates for applications, and for secure communication over the Internet as well as within an organization's intranet.

CryptoAPI (CAPI)

CryptoAPI is Microsoft's application programming interface, which allows the developer to access encryption services within the operating system. It also allows developers to provide their own encryption provider services with modules known as cryptographic service providers (CSPs).

Sample Preview of The Chapter

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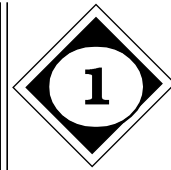


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Graphical User Interface



Since the human being came into existence, he has been expressing himself, his ideas, his opinions, his accomplishments in various different methods available to him. He has not only invented different languages, but used his ability to draw different pictures to portray his expressions. Sometimes even one thousand or more words can't describe an illustration that an image can do. Since this field has emerged as a separate field of study — it finds its applications in the IT industry too. In fact, *computer graphics* has emerged as a powerful field of study and research.

Various *business graphics software* allow you to draw different graphs and charts to represent the variations in the data. It assists the management to make decision-making a very handy process, hence becoming an additional management tool. Apart from being helpful in decision-making, it is easier for the management and the working level people to analyze the graphs quickly than the tabular reports.

Another form of computer graphics is — *Interactive Graphics*, that supports decision-making to a great extent. These graphic programs facilitate flexibility and easy alteration of the input data. In other words, 'What if' analysis is a form of interactive graphics where you can see the effect of one variable in the final result.

The most innovative transformations to occur in computer industry was the advent of **Graphical User**

Interface (GUI). The recent times have changed the human requirements from the character oriented systems to the Graphics oriented systems. This graphic revolution has increased the user-friendliness and functionality of computer systems to the general public.

What is a User Interface?

The term "USER INTERFACE" came into existence when people other than engineers and programmers needed to interact with a computer system. However, when these users reacted negatively to those working traits and practices of engineers and programmers, a new stream with a new formats, new interfaces and reports were desired. This gave rise to the concepts of **user interface**.

A user interface is basically a method or a style of interaction between the end user and the computer system.

Character User Interface (CUI)

An interface refers to the technique of interaction between the end user and the computer system, in earlier systems, a user used to specify certain commands which were keyed in through the input device keyboard, in order to make the computer understand the various instructions. This exercise required a lot of character typing, therefore those interfaces were known as *Character User Interface*. An excellent example of a CUI is DOS Environment system, where we required to

specify a proper path of source and destination for simply copying the contents of the source directory to the destination directory. In the absence of any of those, it could not perform a COPY command.

C:\> COPY SOURCE DESTINATION

The primary means of communication with computers earlier had been through command based interfaces. In command interfaces, users have to learn a large set of commands to get their job(s) done. In earlier computer systems paper tapes, cards and batch jobs were the primary means of communicating these commands to the computers. Later time-sharing systems allowed the use of CRT terminals to interact with the computer. These early systems were heavily burdened by users trying to share precious computer resources such as CPU and peripherals. The batch systems and time-sharing led to command-driven user interfaces. Users had to memorize commands and options or consult a large set of user manuals. The early mainframe and mini-computer systems required a large set of instruction manuals on how to use the system. In some systems, meaningful terms were used for command names to help the end-user. But in other systems the end user had memorize several sequence of keystrokes to accomplish certain tasks.

To make life easier for the end-user, a large collection of devices have been invented to control, monitor and display information. The early peripherals are the keyboard and the video terminal. But it was not until the late 70s, that research projects at some universities led to the invention of pointing devices and windowing systems. The mouse and joystick were among some of the few pointing devices that were invented in this period. Also, research pioneers invented the notion of splitting the screen to allow multiple windows and direct manipulation of object.

Graphical User Interface (GUI)

To a great relief of remembering the commands by heart and then typing them for end-users, then came an interface which could avoid mugging up the commands and occurrence of typing mistakes. This need gave rise to a new interface that emphasized more upon knowing “what is required” — rather than “How to be done”. This was achieved by the user of one or more mouse clicks rather than typing of the command. This interface was more graphic oriented and was known as *Graphical User Interface (GUI)*.

A visual computer environment that represents programs, files and options with graphical images, such as icons, menus and dialog boxes on the screen. The user can select and activate these options by pointing

and clicking with a mouse or often with the keyboard. A particular item works the same way in all the applications, because the graphical user interface provides standard software routines to handle these elements and report the user’s actions; applications call these routines with specific parameters rather than attempting to reproduce them from scratch. The GUI becomes the standard way of how the users interact with a computer. The three major GUI’s are *Windows*, *Macintosh* and *Motif*. In a client server environment, the GUI resides in the user’s client machine.

QUESTION & ANSWERS

Q. 1. What is GUI and What are its features?

Ans. A **Graphical User Interface** may be defined as an interface which stresses on graphical entities which represent system resources and a set of commands which can initiate the actions and interactions with the user through these graphic entities.

Common Features of GUI

The first ever GUI was the Xerox’s Star workstation which was implemented commercially in 1981. Later on, in 1984, Macintosh was introduced by Apple Computers. Further, GUI became associated with a common feature available in a number of product offerings. These features include:

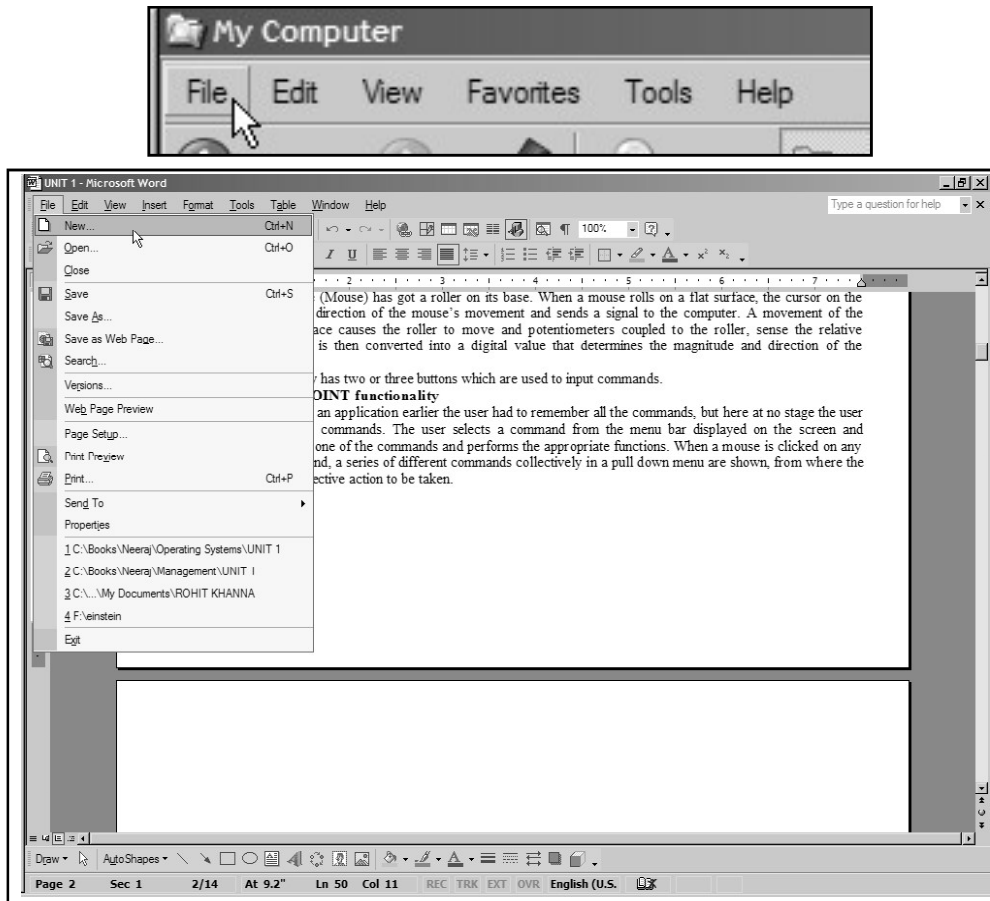
- *Secondary User Input devices* — a Pointing Device, a mouse.
- *See and Point functionality*—with screen menus that appear or disappear under pointing device control.
- *Metaphors*—to suggest the various concepts and features of the computer environment.
- *Direct Manipulation*—of operational commands.
- *WYSIWYG* (What you see is what you get) approach.
- *Feedback and Dialog boxes* are proper and efficient.
- *Quality of reversal* — ability to revert to the previous state of action.
- Well organized and consistent *artistic effect* with a proper *visual integrity*.
- *Graphical display* of the current action.
- *Icons* represent files, directories and other applications.
- *Dialog boxes, Buttons, Sliders, check boxes etc.*, that lets the programmer and user inform the computer what to do and how to do.

In today's time, GUI's have developed the basic features not only to support graphics, but to dimensions, color, height, video and the 3-D effects. The most imaginative application interfaces to be created was Shot of Bryce 2, a 3-D modelling program from Met Creations Corporation.

The SEE and POINT functionality

While working on an application earlier the user had to remember all the commands, but here at no stage

the user requires to memorize the commands. The user selects a command from the menu bar displayed on the screen and accordingly clicks on any one of the commands and performs the appropriate functions. When a mouse is clicked on any one of these menu command, a series of different commands collectively in a pull down menu are shown, from where the user again selects the respective action to be taken.



A user interacts directly with the options (icons, commands, menus) on screen, and selects objects and performs activities by using the pointing devices. A GUI works according to two fundamental presumptions:

- (a) The user can see on the screen what they are doing.
- (b) Users can point at what they see.

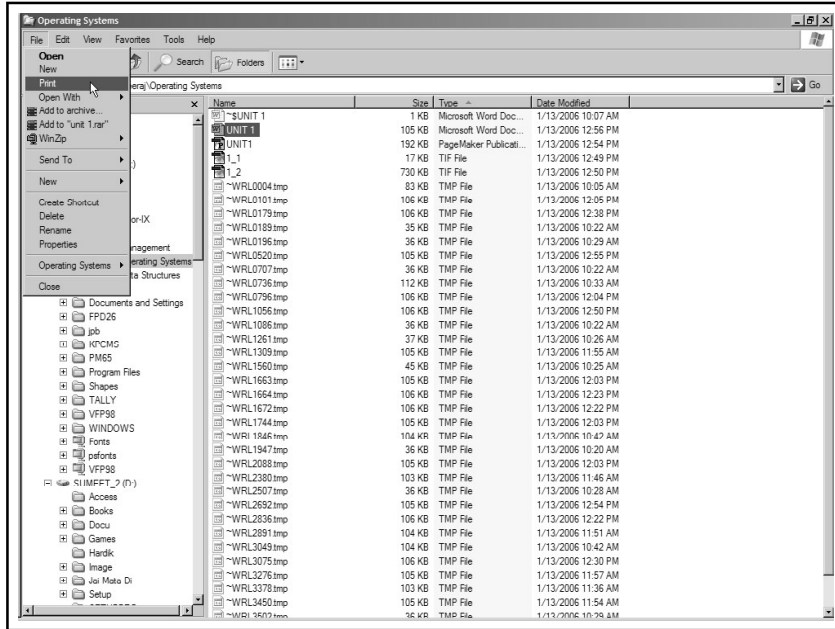
The basic assumption revolves around the fact that the user selects an object and then chooses the action to be performed on that object.

Depending upon, all the actions that can be performed on the object are, therefore, listed in the menus,

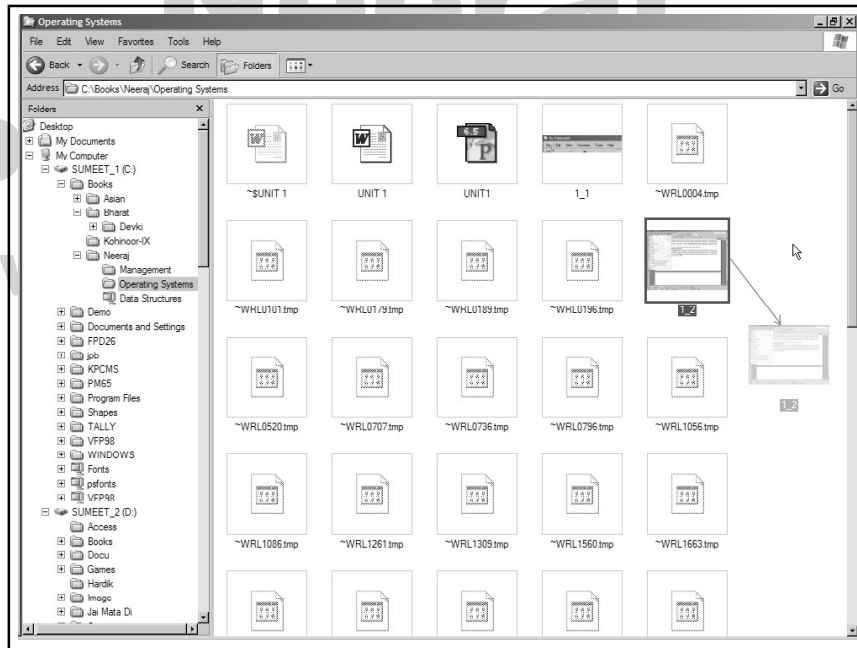
so that the users can choose any available actions without having to remember any particular command or name.

For example, if you need to print a document, you need not open an application first and give the print command from that application, you just need to select that document and issue a print command from the File menu. Only this action will automatically enable the system to open the appropriate application, open the document and issue a print command directed to the currently active printer.

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Lets take another example where you can drag the file icon to the destination folder icon to copy a file to a folder or a disk.



Metaphors

Metaphors suggest the various concepts and features of your applications. GUI's are normally used to indicate the various familiar ideas, items available in daily routine life and therefore, make the metaphors according to the users expectations. For example, in daily routine life, people use file folders to store paper documents in their offices.

Therefore, it makes a logical sense to represent the storage of computer documents in a computer generated folders. Accordingly, people organize their storage devices similar to the way they maintain their file cabinets.