



# Index

## Unit 1

<b>Chapter 1 : Overview of Operating System</b>	<b>1-1 to 1-32</b>
1.1 Overview of operating system .....	1-2
1.1.1 Introduction .....	1-2
1.1.2 Evolution of operating system .....	1-3
1.1.3 Types of Operating System .....	1-7
1.1.4 Computer System Organization .....	1-8
1.1.5 Operating System Structure and Operations .....	1-8
1.1.6 System Call .....	1-9
1.2 Functionalities and Characteristics of OS .....	1-10
1.2.1 Functions of Operating System .....	1-10
1.2.2 Characteristics of Operating System .....	1-11
1.3 Hardware Concept Related to Operating System .....	1-12
1.3.1 Hardware Components .....	1-12
1.4 CPU States .....	1-12
1.5 I/O channels .....	1-13
1.5.1 Basic Idea .....	1-13
1.5.2 Types of I/O Channels .....	1-13
1.5.3 I/O Hardware .....	1-14
1.6 Memory Management .....	1-15
1.6.1 Memory Management Techniques .....	1-16
1.6.2 Contiguous and Non-Contiguous Allocation .....	1-16
1.6.3 Logical and Physical Memory Conversion of Logical to Physical Address .....	1-19
1.7 Paging .....	1-22
1.7.1 Demand Paging .....	1-23
1.7.2 Page Replacement Algorithms .....	1-25
1.8 Segmentation .....	1-28
1.9 Virtual Memory Concept .....	1-29
1.10 Thrashing .....	1-30

## Unit 2

<b>Chapter 2 : Process Management and synchronization</b>	<b>2-1 to 2-35</b>
2.1 PCB (Process Control Block) .....	2-2
2.1.1 Process .....	2-2
2.1.2 Process States .....	2-2
2.1.3 Process Control Block (PCB) .....	2-2



2.2	Scheduling Concepts.....	2-3
2.2.1	Basic Idea.....	2-3
2.2.2	Scheduling Queue.....	2-4
2.2.3	Scheduler.....	2-4
2.3	Job and Processor Scheduling (CPU Scheduling).....	2-5
2.3.1	Basic Concepts.....	2-5
2.3.2	Scheduling Criteria /Performance Criteria of CPU Scheduling.....	2-6
2.3.3	Scheduling Algorithms.....	2-6
2.4	Process Hierarchy.....	2-13
2.5	Problems of Concurrent Processes.....	2-13
2.5.1	Concurrent Processes.....	2-13
2.5.2	Problems in Concurrent Processes - Several problems are discussed below :.....	2-14
2.6	Critical Section.....	2-14
2.7	Mechanism to Solve Critical Section.....	2-15
2.7.1	Solution to the Critical Section Problem.....	2-15
2.8	Process Synchronization.....	2-20
2.8.1	Classic Problems of Process Synchronization.....	2-20
2.9	Deadlock.....	2-21
2.9.1	System Model.....	2-21
2.9.2	Deadlock Characteristics.....	2-22
2.9.3	Methods for Handling Deadlock.....	2-23
2.10	Device and File Management.....	2-29
2.10.1	Overview.....	2-29
2.10.2	Techniques to Access a Device.....	2-29
2.10.3	File System.....	2-32

<b>Unit 3</b>
---------------

---

<b>Chapter 3 : Multiprocessor And Multicore Operating System</b>	<b>3-1 to 3-17</b>
--	--------------------

---

3.1	Introduction.....	3-2
3.1.1	Advantages and Disadvantages.....	3-3
3.1.2	Multicore System Vs. Multiprocessor System.....	3-4
3.2	Types of Multiprocessors.....	3-4
3.2.1	Symmetric Multiprocessors.....	3-5
3.2.1	Asymmetric Multiprocessors.....	3-5



<b>3.3</b>	<b>Basic Multicore Concepts : Memory Sharing Styles .....</b>	<b>3-6</b>
3.3.1	Uniform Memory Access (UMA) .....	3-7
3.3.2	Non-Uniform Memory Access (NUMA) .....	3-7
3.3.3	No Remote Memory Access (NORMA) .....	3-8
<b>3.4</b>	<b>Mobile Operating Systems .....</b>	<b>3-8</b>
3.4.1	Concept Need and Features .....	3-8
3.4.2	Types Of Mobile Os .....	3-10
3.4.3	Overview Of Android Os .....	3-11
<b>3.5</b>	<b>Distributed Operating System .....</b>	<b>3-13</b>
3.5.1	Concept Need And Features .....	3-13
3.5.2	Examples Of Distributed Os With Brief Introduction .....	3-16
3.5.3	Applications of Distributed OS .....	3-16

<b>Unit 4</b>
---------------

---

<b>Chapter 4 : Real Time OS</b>	<b>4-1 to 4-8</b>
---------------------------------	-------------------

---

<b>4.1</b>	<b>Introduction and Use of RTOS .....</b>	<b>4-2</b>
4.1.2	Components of RTOS .....	4-2
4.1.3	Types of RTOS .....	4-3
4.1.4	Features Of RTOS .....	4-3
4.1.5	Factors for Selecting an RTOS .....	4-4
4.1.6	Applications of RTOS .....	4-4
4.1.7	Disadvantages of RTOS .....	4-4
<b>4.2</b>	<b>Embedded OS .....</b>	<b>4-5</b>
4.2.1	Concept Need and Features of Embedded OS .....	4-5
4.2.2	Examples of Embedded OS With Brief Introduction .....	4-6
4.2.3	Applications Of Embedded OS .....	4-7

<b>Unit 5</b>
---------------

---

<b>Chapter 5 : Windows OS and Windows Server Architecture</b>	<b>5-1 to 5-75</b>
---	--------------------

---

<b>5.1</b>	<b>Windows Operating System .....</b>	<b>5-2</b>
5.1.1	Introduction .....	5-2
5.1.1.1	Windows versions .....	5-2
5.1.1.2	How to check Windows versions .....	5-3
5.1.2	Windows OS Installation .....	5-4



---

5.1.2.1	Upgrade Existing Windows7 or Windows 8 to Windows 10.....	5-5
5.1.2.2	Install Complete New Windows 10 from Scratch .....	5-8
5.1.3	Windows Process Management.....	5-14
5.1.3.1	Fundamentals of Process and Thread .....	5-14
5.1.3.2	Overview of Windows Scheduling .....	5-15
5.1.4	Control Panel Overview.....	5-17
5.1.5	Users, Security and Privacy Settings .....	5-18
5.1.6	Identify Accessibility Settings .....	5-23
5.1.7	Service Management.....	5-26
5.1.7.1	Services.....	5-26
5.1.7.2	How to start services .....	5-27
5.1.8	Syncing Devices and File Sharing.....	5-29
5.1.9	Windows Utilities (Accessories, Disk Management, Resource Monitor, Backup and Recovery), Basic Troubleshooting (Networking, Security, Device Driver).....	5-32
5.1.9.1	Windows Accessories.....	5-32
5.1.9.2	Disk Management.....	5-32
5.1.9.3	Resource Monitor .....	5-33
5.1.9.4	Backup and Recovery .....	5-34
5.1.9.5	Basic Troubleshooting (Networking, Security, Device Driver).....	5-35
5.2	Introduction to Ubuntu .....	5-36
5.2.1	Introduction.....	5-36
5.2.1.1	Features of Ubuntu.....	5-37
5.2.1.2	Releases of Ubuntu .....	5-37
5.2.2	Overview of Kernel .....	5-38
5.2.3	Installation of Ubuntu.....	5-39
5.2.3.1	Ubuntu flavors .....	5-39
5.2.3.2	Hardware requirement for Ubuntu .....	5-39
5.2.3.3	Downloading Ubuntu .....	5-40
5.2.3.4	Installing Ubuntu.....	5-40
5.2.4	File System.....	5-45
5.2.5	Basic Commands of Linux.....	5-46
5.2.5.1	Is Command with Important Options .....	5-46
5.2.5.2	Creating and Viewing Files.....	5-49



5.2.5.4	Deleting files.....	5-50
5.2.5.5	Moving and renaming files .....	5-50
5.2.5.6	Directory Manipulating Commands .....	5-51
5.2.5.7	Other important commands.....	5-52
5.2.6	Managing Processes in Linux .....	5-54
5.2.6.1	Managing processes in Linux.....	5-54
5.2.7	Installing and deleting software packages .....	5-57
5.2.7.1	Installing software packages .....	5-57
5.2.7.2	Deleting Software Packages .....	5-59
5.2.8	User Management.....	5-59
5.2.8.1	Creation of user.....	5-59
5.2.8.2	List all users .....	5-60
5.2.8.3	To Change Password of user.....	5-61
5.2.8.4	Creation of Group.....	5-62
5.2.8.5	List all the groups .....	5-62
5.2.8.6	Addition of User in a Group.....	5-63
5.2.8.7	Show Group of User.....	5-63
5.2.8.8	List all the Users in a Single Group.....	5-63
5.2.8.9	Deletion of user from a group.....	5-63
5.2.8.10	Deletion of user .....	5-64
5.2.8.11	Deletion of group.....	5-64
5.2.9	File and Device Management .....	5-64
5.2.9.1	File Management.....	5-64
5.2.10	Backup and recovery.....	5-65
5.2.10.1	Installation of Time shift in Ubuntu .....	5-66
5.2.10.2	Timeshift for 64- bit Ubuntu.....	5-66
5.2.10.3	Timeshift for 64- bit Ubuntu.....	5-66
5.2.10.4	Restoring your backup .....	5-67
5.2.11	Introduction to Graphical Environment (GNOME), Ubuntu Utilities (VirtualBox, Evolution, Gimp, Bleach Bit, Unity Tweak Tool etc.), SAMBA Overview.....	5-68
5.2.11.1	Introduction to Graphical Environment (GNOME).....	5-68
5.2.11.1.2	(GNOME) Installation .....	5-68
5.2.11.2	Ubuntu Utilities (VirtualBox, Evolution, Gimp, Bleach Bit, Unity Tweak Tool etc.).....	5-68



5.2.11.2.1 VirtualBox .....	5-68
5.2.11.2.2 Evolution .....	5-69
5.2.11.2.3 Gimp .....	5-69
5.2.11.2.4 Bleach Bit.....	5-70
5.2.11.2.5 Unity Tweak Tool.....	5-70
5.2.11.3 SAMBA Overview .....	5-71
<hr/>	
<b>Chapter 6 : Linux Shell Scripting</b>	<b>1-1 to 1-35</b>
<hr/>	
6.1 Linux Shell Scripting .....	2
6.1.1 Introduction .....	2
6.1.2 Types of Shell .....	2
6.1.3 Responsibilities of the Shell.....	3
6.1.4 How to Determine Shell .....	3
6.1.5 Shell Script.....	3
6.1.6 Uses of Shell Script .....	3
6.1.7 How to Write Shell Script.....	4
6.1.8 Adding Shell comments.....	5
6.2 Variables.....	5
6.2.1 Rules for Naming Variables.....	6
6.2.2 Accessing Shell Variables .....	6
6.2.3 Read-only Variables .....	7
6.2.4 Unsetting Variables .....	7
6.3 Shell Operators.....	7
6.3.1 Arithmetic Operators.....	8
6.3.2 Relational Operators.....	9
6.3.3 Boolean Operators .....	9
6.4 Flow controls .....	10
6.4.1 Different forms of if...else .....	10
6.4.1.1 if...fi.....	10
6.4.1.2 if...else...fi .....	11
6.4.1.3 if...elif...else...fi .....	11
6.5 Loops.....	12
6.5.1 While Loop.....	13
6.5.2 for Loop.....	14



---

6.5.3	Until Loop .....	15
6.5.4	Select loop .....	16
6.6	Function .....	18
6.6.1	Advantages of function .....	18
6.6.2	Syntax of Function .....	18
6.7	Lists .....	20
6.7.1	Array Variables .....	20
6.7.2	Defining Array Values .....	20
6.7.3	Accessing Array Values .....	21
6.8	Manipulating Strings .....	22
6.8.1	Basic string operations .....	24
6.9	Reading and Writing Files .....	25
6.9.1	Creating File .....	25
6.9.2	Reading Content of File .....	26
6.9.3	Append to File .....	26
6.9.4	Reading and Writing to File .....	27
6.10	Positional Parameters .....	29
6.11	Case ...esac statement .....	30
6.12	Real Time Scripts for Different System Administration Activities .....	32
6.12.1	Check if the file Exists .....	32
6.12.2	Send mail from Bash Shell .....	32
6.12.3	Parsing of Date and Time .....	32
6.12.4	Log files Cleaning .....	33
6.12.5	Back up files using shell script .....	33

---