NATIONAL INSTITUTE OF BUSINESS MANAGEMENT

Diploma in Software Engineering 21.3 FT
Diploma in Network Engineering 21.3FT

Operating Systems

Time allowed: Three hours **02nd December 2022, 9am - 12pm**

PART A – 80% out of 100 Marks

Question 01 (25 Marks)

a) List four different OS generations and explain one (01) of the generation by highlighting its features. (03 Marks)

b) Consider the following set of process with burst time given below;

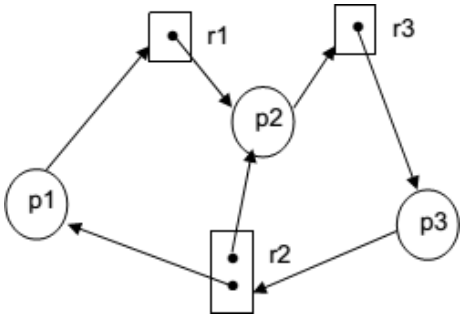
Process	Burst Time(ms)	Arrival Time	Priority
P0	10	0	3
P1	5	2	1
P2	2	4	2
P3	4	6	4
P4	2	8	0
P5	5	10	2

Draw Gantt charts and calculate the **average waiting time** and **average turnaround time** for the above processes using;

i. FCFS scheduling (02 Marks)
ii. SRTF scheduling (04 Marks)
iii. Priority with non-preemptive scheduling (03 Marks)
iv. Round Robin with time quantum 4ms. (03 Marks)

c) Explain the Process Control Block (PCB) and its usage with an example to switch between two processes. (05 marks)

d) Consider the following Resource allocation graph and check for a possibility of a deadlock by analyzing all the conditions to be satisfied for a deadlock. (05 Marks)



Question 02 (25 Marks)

a) What is internal fragmentation? Explain with an example. (04 Marks)

b) Assume that you are going to open a web browser application in a computer system where the operating system (OS) is already running. List the tasks to be completed by the OS to start the application. (04 Marks)

c) Given memory partitions of 80K, 350K, 150K, 420K, 250K and 50K (in Order) needs to map 75K, 320K, 225K, 30K, 380K and 125K (in Order). Draw the memory allocation diagrams using First Fit, Best Fit, and Worst Fit algorithms. (06 Marks)

d) Map the following logical memory to physical memory using the page table given below; Page size = 4 Bytes, Physical memory =48 Bytes (06 Marks)

0	A_0
.	
.	
7	A_7
8	B_0
.	
.	
15	B_7
16	C_0
.	
.	
23	C_7
24	D_0
.	
.	
31	D_7

logical memory

Page No	Frame No
0	2
1	4
2	10
3	8
4	0
5	7
6	3
7	1

e) Consider the following segment table and draw the possible memory diagram as per the segment mapping given. (05 Marks)

Segment No.	Base	Length
0	1219	700
1	2300	14
2	90	100
3	1327	580
4	1952	96

Question 03 (20 Marks)

a) Explain, how OS manages the secondary storage data efficiently? (04 Marks)

b) Explain three (03) disk allocation methods with examples. (06 Marks)

c) The read/write head of a hard disk with 300 tracks (0-299) is currently positioned over track no 100 and moving towards track no 200. The requested tracks in the order received are 75, 125, 12, 288, 32, 55, 158, 210, 64 and 176. Draw the head movement graphs for each of the following algorithms and calculate the head movement distance. (10 Marks)

i. First In First Out (FIFO)

ii. Shortest Seek Time First (SSTF)

iii. Scan

iv. C-Look

Question 04 (10 Marks)

b) Briefly explain the history of mobile operating systems (02 Marks)

c) Explain android framework and its layers (02 Marks)

d) List four (04) component of the Core Services layer of the iOS. (02 Marks)

e) What is Jailbreaking? (02 Marks)

f) Write down the main steps of Android boot process. (02 Marks)

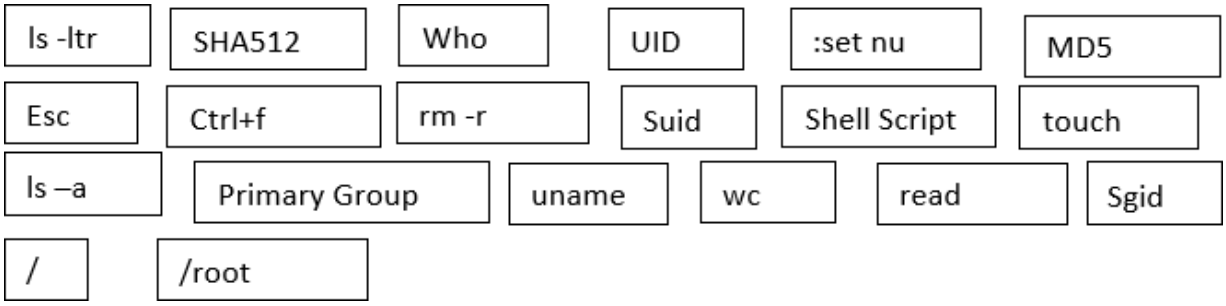
PART B – 20% out of 100 Marks

1. Explain the outputs of the following commands (08 Marks)
   A. chmod640/home/user/phase.txt
   B. usermod –c "AndrewSmith"smith
   C. tail -n 4/etc/shadow
   D. grep harry/etc/shadow

2. Briefly explain the following commands (02 Marks)

   A. chgrp
   B. chage

3. Match the items below to their counterparts in the table(10 Marks)



	Description	Keyword
01	Which command sets the number for all lines in vi text editor	
02	Which shell command accepts input from the user's keyboard	
03	Which command creates an empty file if the file does not exist?	
04	Which command will display the users that are currently logged in to the system	
05	Which command is used to display the operating system name	
06	Which command can be used to remove a directory along with any files or subdirectories?	
07	Order Files Based on Last Modified Time (In Reverse Order)	
08	Which command is used to display all the files including hidden files in your current and its subdirectories?	
09	6 - hashing algorithm- the number 6 indicate as	
10	Which directory is the root of the filesystem?	