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20MCA12

First Semester MCA Degree Examination, July/August 2021 Operating System with UNIX

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

- 1 a. What is an operating system? Explain with a neat diagram the component of operating system. (10 Marks)
- b. What is process, process state and Process Control Block (PCB)? Describe the contents of PCB. (10 Marks)
- 2 a. Consider the following set of processes with given length of CPU burst. Draw the Gantt chart for SJF (Preemptive) 2 SJF (Non Preemptive). Find the average waiting time for each scheduling algorithm.

Processes	P ₁	P ₂	P ₃	P ₄	P ₅
Burst time	6	2	8	3	4
Arrival time	2	5	1	0	4

- b. What do you mean by CPU scheduling? Explain the scheduling criteria of Algorithm. (10 Marks)
- 3 a. Write and explain Bankers Algorithm for deadlock avoidance. (10 Marks)
- b. With a neat diagram, explain Resource allocation graph. (10 Marks)
- 4 a. Explain the difference between internal and external fragmentation. (10 Marks)
- b. What is page fault? What action does the operating system take when a page fault occurs? Explain with the diagram. (10 Marks)
- 5 a. Explain UNIX file system with a neat diagram. (10 Marks)
- b. What is the use of ls command? In detail explain the output of ls-l. (10 Marks)
- 6 a. Explain the relative and absolute permission with examples. (10 Marks)
- b. Describe hard links and softlinks with suitable examples. (10 Marks)
- 7 a. Explain the process in UNIX and mechanism of process creation. (10 Marks)
- b. State the difference between internal and external commands in UNIX. (10 Marks)
- 8 a. Explain the use of set, set-x, test and IJ with example. (10 Marks)
- b. Explain : i) If conditional statement, case statement
ii) While and for looping with examples (10 Marks)
- 9 a. What is AWK? Explain the built-in variable and built-in function used by AWK. (10 Marks)
- b. Write an AWK script to compute gross salary of an employee accordingly to rule given below.
If a basic salary is < 10,000 then
HRG = 15% of basic 2 DA = 45% of basic
If basic salary is >= 10,000 then HRA = 20% of basic 2, DA = 50% of basic. (10 Marks)
- 10 a. Explain the following : i) Exec ii) export iii) eval. (10 Marks)
- b. Write an awk program the folds long lines into 40 columns. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 6 a. Explain the UNIX file system with a neat diagram. (10 Marks)
b. Write differences between absolute pathname and relative pathname along with necessary examples. (10 Marks)

Module-4

- 7 a. Write a shell script to count the number of uppercase, small case, digit or special symbol using case conditional statement by taking input string. (10 Marks)
b. What is a process? Explain the mechanism of process creation and states of a process. (10 Marks)

OR

- 8 a. Write short notes on :
(i) at (ii) batch (iii) crm (iv) test (v) expr (10 Marks)
b. Write a shell script to display the calendar for current month with current date replaced by * or ** depending on whether the date has one digit or two digits. (10 Marks)

Module-5

- 9 a. Write short notes on :
(i) export (ii) eval (iii) exec (10 Marks)
b. Write an awk script to delete duplicate line from text.file. The order of original lines must remain unchanged. (10 Marks)

OR

- 10 a. What is awk? Explain the built-in variables used by awk. (10 Marks)
b. Explain the associative array in awk with an example. Also explain environment array. (10 Marks)

CBCS SCHEME

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20MCA12

First Semester MCA Degree Examination, Jan./Feb. 2021 Operating System with Unix

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What are the various services of an operating system? Explain briefly. (10 Marks)
- b. Define process. Explain the five state process model with a neat diagram. (10 Marks)

OR

- 2 a. Calculate the average waiting time, turn around time for (i) SJF (ii) Priority scheduling and (iii) Round Robin [quantum = 2 ms] with the following set of processes.

Process	P ₁	P ₂	P ₃	P ₄	P ₅
Burst time	10	1	2	1	5
Priority	3	1	3	4	5

- b. Define System call. Classify the types of system calls. (15 Marks)

(05 Marks)

Module-2

- 3 a. What is demand paging? Explain how TLB improves the performance of demand paging with neat diagram. (10 Marks)

- b. Consider following page reference string :

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1

How many page fault would occur in the case (i) FIFO (ii) Optimal page replacement (iii) LRU. Assume there are 3 frames. (10 Marks)

(10 Marks)

OR

- 4 a. Consider the following snapshot of a system

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P ₀	0	0	1	2	0	0	1	2	1	5	2	0
P ₁	1	0	0	0	1	7	5	0				
P ₂	1	3	5	4	2	3	5	6				
P ₃	0	6	3	2	0	6	5	2				
P ₄	0	0	1	4	0	6	5	6				

Answer the following questions using Banker's algorithm.

- (i) What is the content of the matrix need? (07 Marks)
- (ii) If a request from process P₁ arrives for (0, 4, 2, 0) can the request be granted immediately? (08 Marks)
- b. What is deadlock? What are the necessary conditions for a deadlock to occur? (05 Marks)

Module-3

- 5 a. Differentiate hard link with soft link. (10 Marks)
- b. Explain the following in detail with example:
(i) chmod (ii) ls (iii) mkdir (iv) chgrp (04 Marks)
- c. Discuss the different modes of Vi editor. (06 Marks)