Roll No. 23090000022.

BCA–C401

Bachelor of Computer Applications

(Fourth Semester)

EXAMINATION, 2024-25

OPERATING SYSTEM AND LINUX

Time : $2\frac{1}{2}$ Hours

Maximum Marks : 60

Note : All questions have to attempted.

Section—A

1. Multiple Choice Questions : 1 each

   (a) Identify the system call that on termination does not return control to the calling point :

   (CO1, BL-2)

   (i) lxec

   (ii) fork

   (iii) longjmp

   (iv) ioctl

(b) The address of the text instruction to be executed by the current process is provided by the...........

(CO2, BL-5)

   (i)   CPU registers

   (ii) Program Counter

   (iii) Process Stack

   (iv) Pipe

(c) What is compaction refer to ?   (CO3, BL-2)

   (i)   A techniques for overcoming internal fragmentation

   (ii) A paging technique

   (iii) A technique for overcoming external fragmentation

   (iv) A techniques for compressing the data

(d) Which of the following commands is used to display and create files ?   (CO5, BL-5)

   (i)   Cat

   (ii) lynx

   (iii) ed

   (iv) vi

(e)   Evaluate with filter command (grep, awk, sed) is best for searching large log files efficiently.

(CO5, BL-5)

   (i)   grep

   (ii) awk

   (iii) sed

   (iv) cut

(f)   What is the role of a page table in virtual memory ?   (CO3, BL-2)

   (i)   Maps logical address to physical address

   (ii) Stores user data

   (iii) Words programs into PAN

   (iv) Hardles CPU scheduling

(g)   What is the significance of 'chrod +x scrupt sh'

(CO5, BL-2)

   (i)   Deletes the script

   (ii) Execute the script

   (iii) Grants excution permission

   (iv) Edits the script

(h) Analyse the difference between batch programming and time-sharing systems. Which on is more interactive ? (CO1, BL-4)

(i) Batch processing

(ii) Time-Sharing

(iii) Both are equally interactive

(iv) Neither is interactive

(i) Design as OS structure that minimizes CPU idle time and enhance resource utilization. Which approach all best ? (CO1, BL-6)

(i) Monolithis structure

(ii) Layered approach

(iii) Microkernel

(iv) None of the above

(j) The segment of code is which the process may change common variables, update tables, write into files is known as : (CO2, BL-3)

(i) program

(ii) critical Section

(iii) non-critical section

(iv) Synchronizing

(k) Which term refers to the number of process is memory ? (CO2, BL-2)

    (i) process count

    (ii) long-term scheduler

    (iii) degree of multiprogramming

    (iv) CPU scheduler

(l) Memory management technique is which system stores and retrieves data from secondary storage for use in main memory is called : (CO4, BL-2)

    (i) fragmentation

    (ii) paging

    (iii) mapping

    (iv) None of the mentioned

2. Attempt any *four* of the following. (Short Answer type question) : 3 each

(a) Explain the concept of a critical section in process synchronization. (CO2, BL-2)

(b) What is the process control block (PCB) ?

    (CO2, BL-1)

(c) Why does fragmentation occur in memory management ? (CO3, BL-4)

(d). Design a regex (regular expression) pattern to extract only email addresses from a text file.

(CO5, BL-6)

(e) What are the main objectives of an operating system ? Explain.   (CO1, BL-2)

Section—B

3. Attempt any *two* of the following :   6 each

(a) Consider the set of 5 processes whole arrival time and burst time are given below :   (CO2, BL-3)

Process	Burst Time	Arrival Time
P_1	4	3
P_2	3	5
P_3	2	0
P_4	1	5
P_5	3	4

If the CPU scheduling policy is FCFS, calculate the average waiting and turn around time :

(b) Analyze how the Banker's algorithm helps in deadlock avoidance with as example scenario :

(CO2, BL-4)

(c) Explain the following type of operating system is detail :   (CO1, BL-2)

(i) Distributed and network operating system

(ii) Real-Time System

(iii) Batch operating system

Attempt any *two* of the following :   6 each

(a) Explain various conditional statements used is shall scripting with suitable examples for each.

(CO5, BL-2)

(b) Consider the set of 5 process, wih the length of the CPU burnt time given in mileseconds and arrival time is also given below :   (CO2, BL-5)

Process	Arrival Time	Burnt Time	Priority Time
P_1	0	4	2
P_2	1	3	3
P_3	2	1	4
P_4	3	5	5
P_5	4	2	5

Draw Gantt chart that illustrate the execution of these process using priority scheduling (preemptive). Calculate average waiting and average turnaround time. (Higher number represent higher priority.)

(c) Write a shell script to accept a filename. Check if the file exists and display the number of lines, words, and characters in the file. Display as appropriate manage if the file is not present.

Attempt any *two* of the following :　　　　6 each

(a) What is a filter in Linux ? Explain its significance in command-line processing. Illustrate different types of filters with appropriate examples.

(CO5, BL-2)

(b) Differentiate between external fragmentation and internal fragmentation in memory management. Provide a suitable example for each. (CO3, BL-2)

(c) Consider a disk over with requests for i/0 to blocks on cylinder 98, 183, 41, 122, 14, 124, 65, 67. The FCFS scheduling alogrithm is used. The head is initially at cylinder number 53. The cylinders are numbered from 0 to 199. Calculate the total head movement (is number of cylinders) incurred while servicing these requests.

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