KADI SARVA VISHWAVIDYALAYA
LDRP INSTITUTE OF TECHNOLOGY & RESEARCH, GANDHINAGAR

B.E. MID-SEMESTER (REG) EXAMINATION April-2024

Date : 01/04/2024	Branch : CE/IT
Subject Name & Code: Operating System (CT404-N)	Semester : IV
Time : 9:20 am to 10:50 am	Max. Marks : 30

Instructions:
1) All questions are **compulsory**.
2) Do not allow any **GADGET** with you during exam.
3) Indicate **clearly**, the options you attempt along with its respective question number.
4) Use the last page of main supplementary for **rough work**.

Marks

Q.1 **(A)** What is operating system? What are services of operating system? **[5]**

(B) What are semaphores? Explain solution to producer-consumer problem using semaphores **[5]**

Q.2 **(A)** What is Process? Explain different state of process passes in life cycle with necessary state transition chart. **[5]**

(B) Consider the following set of process arrival time and Burst time **[5]**

Jobs	Arrival Time	Burst Time
J1	1	3
J2	2	4
J3	1	2
J4	4	4

Draw the Gantt chart. Find average waiting time and average turnaround time using
i) FCFS ii) Shortest Time Job First (Preemptive and non-preemptive)

OR

Q.2 **(A)** What is thread? Explain different type of schedulers. **[5]**

(B) Suppose there are five process A,B,C,D,E and the CPU burst time is 22,18,9,10 and 4 the priority of the five process are 4,2,1,3 and 5. **[5]**
a. What is the average turnarcund time for these processes with the Priority scheduling algorithm?
b. What is the average turnaround time for these processes with the Round Robin scheduling algorithm with quantum time 5ms?

Q.3 **(A)** Write a script for accept a 3-digit number through keyword, and check whether it is palindrome or not. **[5]**

Seat No:-_____

KADI SARVA VISHWAVIDYALAYA

B.E SEMESTER IV EXAMINATION (Oct/Nov 2023)

SUBJECT CODE: **CT 404-N** SUBJECT NAME: **Operating Systems**

DATE: 02/11/2023 TIME:3 hours TOTAL MARKS: 70

Instructions:
1. Answer each section in separate Answer Sheet.
2. All questions are compulsory.
3. Indicate clearly, the options you attempted along with its respective question number.
4. Use the last page of main supplementary for rough work.

SECTION - 1

Q-1.	a)	Define operating system and list the basic services provided by operating system.	5
	b)	Explain Types of Operating Systems.	5
	c)	What are the types of System calls?	5
		OR	
	c)	Explain Concept of Virtual Machine.	5
Q-2.	a)	Explain Process Control Block.	5
	b)	What is a process? Explain state of Process.	5
		OR	
	a)	What is Dining Philosophers problem?	5
	b)	Explain: Pre-emptive scheduling and Non pre-emptive scheduling.	5
Q-3.	a)	List the main difference and similarities between threads and process.	5
	b)	Explain threads in detail.	5
		OR	
	a)	What are various criteria for a good process scheduling algorithm? Explain any two preemptive scheduling algorithms in brief.	5
	b)	What is semaphore? Discuss product-consumer problem with semaphore.	5

SECTION – 2

Q-4.	a)	What are the conditions for deadlock? Explain deadlock detection and recovery in detail.	5
	b)	Explain readers & writers problem?	5
	c)	Explain logical and Physical address map.	5
		OR	

	c)	Write short notes on: a) Critical section b) Race condition.	5
Q-5.	a)	What are the memory management requirements?	5
	b)	Explain memory management with bit maps in detail.	5
		OR	
Q-5.	a)	What are the differences of internal and external memory Fragmentation?	5
	b)	Discuss in details devices drivers.	5
Q-6.	a)	Explain Operating System Design Principles Of Security.	5
	b)	Explain Role & Function Of Kernel.	5
		OR	
Q-6.	a)	Explain deadlock avoidance using banker's algorithm in details.	5
	b)	Explain Directory Structure of Operating System.	5

********BEST OF LUCK********

Seat No:-_____

KADI SARVA VISHWAVIDYALAYA

B.E SEMESTER IV EXAMINATION (May/2023)

SUBJECT CODE: **CT 404-N** SUBJECT NAME: **Operating Systems**

DATE: 15/05/2023 TIME:3 hours TOTAL MARKS: 70

Instructions:
1. Answer each section in separate Answer Sheet.
2. All questions are compulsory.
3. Indicate clearly, the options you attempted along with its respective question number.
4. Use the last page of main supplementary for rough work.

SECTION - 1

Q-1. a) What is Operating System? Explain Batch Operating System with advantages and disadvantages. 5

b) What is process state? Explain the state transition diagram. 5

c) What is a process? Explain about various fields of Process Control Block. 5

OR

c) What is a Critical Section problem? Give the conditions that a solution to the critical section problem must satisfy. 5

Q-2. a) What is Readers-Writers Problem? 5

b) Consider the following set of processes, with the arrival times and the CPU-burst times and find out average waiting time and turnaround time by using FCFS Scheduling Algorithm in a Non Preemptive Approach. 5

Process	Arrival Time	Burst Time
P1	0	9
P2	1	3
P3	1	2
P4	1	4
P5	2	3
P6	3	2

OR

a) What is Dining Philosophers problem? 5

b) What is a deadlock? List the conditions that lead to deadlock. 5

Q-3. a) Differentiate Global and local allocation policies for paging. 5

b) List the different file implementation methods and explain them in detail. 5

OR

a) What is contiguous memory allocation in operating system? 5

b) Define a Thread? Give the benefits of multithreading. What resources are used when a thread is created? 5

SECTION – 2

Q-4. a) Explain Bankers' algorithm to avoid deadlock. 5

b) Consider the reference string 6, 1, 1, 2, 0, 3, 4, 6, 0, 2, 1, 2, 1, 2, 0, 3, 2, 1, 2, 0 for a memory with three frames and calculate number of page faults by using Least Recently Used (LRU) Page replacement algorithms. 5

c) Explain logical and Physical address map. 5

OR

c) Consider the following disk request sequence for a disk with 100 tracks. 98, 137, 122, 183, 14, 133, 65, 78.Head pointer starting at 54 and moving in left direction. Find the number of head movements in cylinders using SCAN scheduling. 5

Q-5. a) Explain Difference between Paging and Segmentation. 5

b) What is a hashed page table in OS? 5

OR

Q-5. a) Write short note: RAID levels. 5

b) What is a kernel? What is the purpose of the kernel? 5

Q-6. a) Explain the following UNIX commands 5
(i)grep (ii) cut (iii) chmod (iv) finger (v) mv

b) Explain following terms: 5
(i) Demand Paging (ii) Swapping

OR

Q-6. a) Explain the following allocation algorithms: 1) First-fit 2) Best-fit 5

b) Explain the goals of Operating System Security. 5

********BEST OF LUCK********

LDRP INSTITUTE OF TECHNOLOGY & RESEARCH, GANDHINAGAR

B.E. MID –SEMESTER EXAMINATION March 2023

Date: 29-03-2023 **Branch : CE-IT**
Subject Name &Code: **Semester : 4TH**
Time :1.30 hours **Max. Marks : 30**

Instructions: 1) All questions are **compulsory.**
2) Figures to the **right** indicate full marks.
3) Indicate **clearly,** the options you attempt along with its respective question number.
4) Use the last page of main supplementary for **rough work.**

Q.1 (A) **1) Which of the following does not interrupt a running process?**
(a)A device
(b) Timer
(c) Scheduler process
(d) Power failure

2. Consider the following statements with respect to user-level threads and kernel supported threads
i. context switch is faster with kernel-supported threads
ii. for user-level threads, a system call can block the entire process
iii. Kernel supported threads can be scheduled independently
iv. User level threads are transparent to the kernel
Which of the above statements are true?
a) (ii), (iii) and (iv) only
b) (ii) and (iii) only
c) (i) and (iii) only
d) (i) and (ii) only

3. Which of the following requires a device driver?
a) Register
b) Cache
c) Main memory
d) Disk

4. Bounded capacity and Unbounded capacity queues are referred to as _____
a) Programmed buffering
b) Automatic buffering
c) User defined buffering
d) No buffering

5. An OS utilizes the SRT or Shortest Remaining Time first process scheduling algorithm. Let us consider the execution time and arrival time for these processes:

Process Arrival time Execution time
P1 : 0 20
P2 : 15 25
P3 : 30 10

P4 : 45 15
The total waiting time for the P2 process would be:
a. 55 b. 40 c. 15 d. 5

(B) Explain following terms :- [5]
1) Turn Around Time 2) Starvation 3)Distributed Operating System 4) Race Conditions 5) Critical Section

(C) Consider the following set of processes, with the arrival times and the CPU-burst times and find out average waiting time and turnaround time by using FCFS Scheduling Algorithm. [5

Process	Arrival Time	Burst Time
P1	4	5
P2	6	4
P3	0	3
P4	6	2
P5	5	4

OR

(C) Explain Structure of an OS – Layered.

Q.2 (A) Explain the purpose of system calls and discuss the system calls related to process control and communication in brief.

(B) Describe the differences among long-term scheduling, short-term, and medium term scheduling.

OR

Q.2 (A) What is process state? Explain the state transition diagram. [5

(B) Explain Process Control Block with diagram. [5

Q.3 (A) Differentiate between synchronous and asynchronous communication? [5

(B) Explain Dining Philosophers Problem. [5

OR

Q.3 (A) Definition Deadlock with example and explain Necessary and sufficient conditions for Deadlock. [5]

(B) Explain Logical and Physical address map. [5

KADI SARVA VISHWAVIDYALAYA

GANDHINAGAR

B.E. CE/IT KSV EXAMINATION NOV 2022

Date : 11/11/22	Branch : CE/IT
Subject Name & Code: Operating Systems CT404-N	Semester : 4
Time : 10:00 TO 1:00 PM	Max. Marks : 70

Instructions:
1) All questions are **compulsory**.
2) Figures to the right indicate full marks.
3) Use of scientific calculator is permitted.
4) Indicate clearly, the options you attempt along with its respective question number.
5) Use the last page of main supplementary for **rough work**.

SECTION - 1

Q.1 (A) What is Operating System? Explain any one types of operating system [5]

(B) Explain the objectives and functions of operating systems. [5]

(C) What do you mean by scheduling? Discuss in brief types of scheduler.

OR

(C) What is thread? Why thread is called lightweight process? [5]

Q.2 (A) Explain different states of a process with a suitable diagram. [5]

(B) What Critical section Problem and list the requirements to solve it. Write Peterson's Solution for the same [5]

OR

Q.2 (A) What is Deadlock? Explain safe and unsafe state with example [5]

(B) What is Semaphore? Explain the implementation of Readers-Writers Problem using Semaphore. [5]

Q.3 (A) What is PCB? Discuss its major fields. [5]

(B) Consider the set of Processes with the length of the CPU burst time given in ms. [5]
Draw the Gruntt chart illustrating the execution of these processes using SJF,FCFS and Priority. Calculate TAT and WT for all process.

Process	Arrival Time	Burst Time	Priority
P1	0	8	3
P2	1	1	1
P3	2	3	2
P4	3	2	3
P5	4	6	4

OR

Q.3 (A) Explain Dining philosopher problem and its solution using semaphore. [5]

(B) Considering a system with five processes P_0 through P_4 and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. [5]

Process	Allocation	Max	Available
	A B C	A B C	A B C
P0	0 1 0	7 5 3	3 3 2
P1	2 0 0	3 2 2	
P2	3 0 2	9 0 2	

P3	211	222	
P4	002	433	

1. What will be the content of the Need matrix?
2. Is the system in a safe state? If Yes, then what is the safe sequence?
3. What will happen if process P_1 requests one additional instance of resource type A and two instances of resource type C?

SECTION-2

Q.4 (A) What are the differences between? a) Logical and physical address? b) Page table and segment table? [5]

(B) What is demand paging? Explain how it works. [5]

(C) Explain file attribute and file operation in brief.

OR

(C) Explain address translation in paging. [5]

Q.5 (A) What is address binding? Explain the concept of dynamic relocation of addresses. [5]

(B) Suppose a disk having 200 tracks(0-199) The request sequence (82,170,43,140,24,16,190,) of disk and the head start at 50. [5]
1). FCFS 2). C-SCAN 3).SCAN 4).SSTF

OR

Q.5 (A) What is paging? What is page table? Explain the conversion of virtual to physical address in paging with example [5]

(B) Consider the following reference string. Calculate the page fault rates for below page replacement algorithm. Assume the memory size is 3 page frame. [5]
4,7,6,1,7,6,1,2,7,2
1). FIFO 2). LRU 3). Optimal

Q.6 (A) Explain TLB and Virtual . [5]

(B) Explain the Unix Command [5]

1. Man
2. Cat
3. Sort
4. Grep
5. chmod

OR

Q.6 (A) Write a script for accept a five-digit number through keyword, then reverse this five-digit Number. [5]

(B) Which are the major goals of I/O software? Explain DMA. [5]

----------BEST OF LUCK----------

KADI SARVA VISHWAVIDYALAYA
GANDHINAGAR

B.E. CE/IT KSV EXAMINATION JUNE 2022

Date : 13/6/22	Branch : CE/IT
Subject Name & Code: Operating Systems CT404-N	Semester : 4
Time : 12:30 TO 3:30 PM	Max. Marks : 70

Instructions:
1) All questions are **compulsory**.
2) Figures to the **right** indicate full marks.
3) Use of scientific calculator is permitted.
4) Indicate **clearly**, the options you attempt along with its respective question number.
5) Use the last page of main supplementary for **rough work**.

SECTION - 1

Q.1 (A) Define Operating System. Give view of OS as a resource manager [5]

(B) What is system call? How it is handled by an OS? [5]

(C) What is PCB? Explain the significance of PCB

OR

(C) What is thread? Why thread is called lightweight process? [5]

Q.2 (A) What are the objectives of OS? How time sharing differ from multiprogramming? If so explain. [5]

(B) What Critical section Problem and list the requirements to solve it. Write Peterson's Solution for the same [5]

OR

Q.2 (A) What do you mean by scheduling? Discuss in brief types of scheduler. [5]

(B) What is Semaphore? Explain the implementation of Readers-Writers Problem using Semaphore. [5]

Q.3 (A) What is Deadlock? List the conditions that lead to deadlock. How Deadlock can be prevented? [5]

(B) Consider the following five processes with the length of the CPU burst time in milliseconds [5]

Process	Burst Time	Priority
P1	10	3
P2	1	1

P3	2	3
P4	1	4
P5	5	2

Processes are Assumed to have arrived at time 0. For the above set of processes find the average waiting time and average around time for each of the following scheduling algorithm using Gantt chart. Consider 1 is highest priority.

1. SJF
2. Non preemptive Priority
3. RR (Q = 2)

OR

Q.3 (A) Explain following Commands in UNIX with example. [5]

1. cat
2. grep
3. Pipe
4. Sort
5. Put

(B) Consider the snapshot of the system with Five Processes and Four types of resources [5]

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Currently Available set of resources is (1,5,2,0).
Answer the following Questions using banker's algorithm.
1) Find the content of Need Matrix.
2) Is the System in Safe State?
3) If request from Process P1 arrives for (0,4,2,0) can the request be granted immediately

SECTION-2

Q.4 (A) Compare multiprogramming with fixed partition and multiprogramming with variable partition with diagram. [5]

(B) Explain address translation in paging. [5]

(C) Explain file attribute and file operation in brief.

OR

(C) What is paging? What is page table? Explain the conversion of virtual to physical address in paging with example. [5]

Q.5 (A) What is fragmentation? Explain the difference between internal and external fragmentation. [5]

(B) A disk drive has 640 cylinders numbered 0-639. The drive is currently serving the request at cylinder 68. The queue of pending request in FIFO order is 84,153,32,128,10,133,61,69 [5]
Starting from the current head position what is the total distance that the disk arm moves to satisfy all the pending requests for the following disk scheduling algorithms
1). FCFS 2). C-SCAN 3).SCAN 4).SSTF

OR

Q.5 (A) Explain Belady's Anomaly and the measures to prevent it. [5]

(B) Consider the following reference string. Calculate the page fault rates for below page replacement algorithm. Assume the memory size is 3 page frame [5]
1,2,3,4,5,3,4,1,6,7,8,7,8,9,5,4,2,4,9
1). FIFO 2). LRU 3). Optimal

Q.6 (A) Explain all Accessing Methods of File. [5]

(B) Consider following diagram and place the memory blocks P1- 300K,P2 - 25K,P3 - 125K, P4 - 50K in order of first fit, best fit, worst fit. Also write which allocation is better. [5]

OR

Q.6 (A) Which are the major goals of I/O software? Explain DMA [5]

(B) Explain the design principles of security. [5]

----------BEST OF LUCK----------