

14. Producer Consumer problem is also known as Bounded-Buffer problem.

15. The rule “No two processes may be simultaneously inside the same critical section” is known as? Mutual Exclusion

Q.2 Answer the following questions. (Attempt any three) (15)

A) Enlist memory management Techniques.

B) Briefly explain Multiprogramming Operating System with its advantages & disadvantages.

C) Define process and Explain process states in details with diagram

D) What are the differences of internal and external memory Fragmentation?

Q.3 A) Consider the following page reference string. (07)

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

How many page faults would occur for the following replacement algorithm, assuming 3 frames respectively as well as State advantages and disadvantages of both methods.?

a. LRU page replacement. b. FIFO page replacement.

B) What is semaphore? Discuss product-consumer problem with semaphore. (08)

OR

B) What is Deadlock? Assume that there are 5 processes, P0 through P4, and 4 types of resources. At (08)

T0 we have the following system state:

	Allocation Matrix				Max Matrix				Available Matrix			
	A	B	C	D	A	B	C	D	A	B	C	D
P ₀	0	1	1	0	0	2	1	0	1	5	2	0
P ₁	1	2	3	1	1	6	5	2				
P ₂	1	3	6	5	2	3	6	6				
P ₃	0	6	3	2	0	6	5	2				
P ₄	0	0	1	4	0	6	5	6				
Total	2	12	14	12								

[1] Create the Need Matrix.

[2] Determine the state is safe or not using Banker's Algorithm. (If yes, safe state then what is the safe sequence).

[3] Process P1 request for (A, B, C, D) = (2, 1, 1, 0) additional resource. Can resource request be granted immediately?

Q.4 A) What is Race Condition? Explain Peterson's solution for the race condition with algorithm. (07)

OR

A) Consider the following set of processes, with the length of the CPU burst given in milliseconds: (07)

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5 all at time 0.

- a) Draw Gantt charts illustrating execution of these processes for FCFS and round robin (quantum=1)
- b) What is the turnaround time of each process for each of the scheduling algorithms in part a?
- c) What is the waiting time of each process for each of this scheduling algorithm?

B) Explain different Disk scheduling algorithms SCAN,CSCAN,LOOK,CLOOK with example. (08)

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech Summer 2018 - 19 Examination

Semester: 3
Subject Code: 03105202
Subject Name: Operating System

Date: 27/05/2019
Time: 02:00 pm to 04:30 pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Answer all the questions.**(15)**

1. Which one of the following is the address generated by CPU?
 - a) physical address
 - b) absolute address
 - c) **logical address**
 - d) none of the mentioned
2. Semaphore is a/an _____ to solve the critical section problem.
 - a) hardware for a system
 - b) special program for a system
 - c) **integer variable**
 - d) none of the mentioned
3. The Process Control Block is:
 - a) Process type variable
 - b) **Data Structure**
 - c) A secondary storage section
 - d) A Block in memory
4. RPC provides a(an) _____ on the client side, a separate one for each remote procedure.
 - a) **stub**
 - b) identifier
 - c) name
 - d) process identifier
5. A parent process calling _____ system call will be suspended until children processes terminate.
 - a) **wait**
 - b) fork
 - c) exit
 - d) exec
6. **belady's Anomaly** is the phenomenon associated with the FIFO page replacement algorithm.
7. **Response Time** is difference between first execution time and arrival time.
8. **Seek Time** the time taken by the R-W head to reach the desired track from it's current position.
9. Consider a hard disk with:4 surfaces,64 tracks/surface,128 sectors/track,256 bytes/sector.What is the capacity of the hard disk?
- 10.What is a page fault error?
11. Program is loaded into the main memory in linking phase. State (T/F).
12. What is RPC?
13. What is DMA?
14. What are the different types of schedulers?
15. What is a race condition?

Q.2 Answer the following questions. (Attempt any three)**(15)**

- A) Differentiate between paging and segmentation.
- B) What are the different types of kernel? Explain.
- C) Define a process? Explain the process state transition with a neat diagram.
- D) Consider the following processes with arrival time and burst time. Calculate average turnaround time, average waiting time and average response time using round robin with time quantum 3?

Process id	Arrival time	Burst time
P1	5	5
P2	4	6
P3	3	7
P4	1	9
P5	2	2
P6	6	3

Q.3 A) Given page reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 Find the number of page faults for LRU having 4 frames. **(07)**

B) Explain Banker's Algorithm with an example. **(08)**

OR

B) Explain IPC problem-Dinning Philosopher's problem. **(08)**

Q.4 A) Explain FCFS, SSTF, SCAN disk scheduling in detail. **(07)**

OR

A) What are the different disk space allocation methods? **(07)**

B) Explain the various directory structure with respect to the file system. **(08)**

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Summer 2022-23 Examination

Semester: 3/4

Subject Code: 203105203

Subject Name: Operating System

Date: 20/03/2023

Time: 02:00 pm to 04:30 pm

Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - (All are compulsory) (15)

1. The operating system is the interface between hardware and software.
2. A fork() system call is used to create a child process.
3. A process running in background is called background process or background job
4. Define: Race Condition and critical section.
5. Explain GREP command of Linux OS. for searching text patterns within files or streams
6. What is TLB? Translation Lookaside Buffer
7. Differentiate fragmentation and segmentation.
8. FAT stands for File Allocation Table
9. How files are protected in UNIX/LINUX file system?
10. Logical addresses are generated by CPU. (True / False)
11. Page size is always in power of 2. (True / False)
12. threads is called lightweight process.
13. Define: Starvation
14. Give the name of operation that can be performed on semaphore.
15. Give the name of technique used for overcoming external fragmentation.

Q.2 Answer the following questions. (Attempt any three) (15)

- A) What do you mean by scheduling? Explain types of scheduler and SJF scheduling algorithm.
- B) What is Operating System? Discuss role/functions of OS as a resource manager.
- C) What is Belady's anomaly? Explain with suitable example.
- D) Define and differentiate Process and thread.

Q.3 A) Explain process state transition with neat diagram. (07)

- B) What is Paging? Explain paging mechanism in MMU with example. (08)

OR

- B) Why we need page replacement? Consider the page reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, with 4 page frame. Find number of page fault using LRU page replacement algorithm. (08)

Q.4 A) What is deadlock? Describe in brief necessary conditions that should hold for deadlock to occur. (07)

OR

- A) What do you mean by mutual exclusion? Explain Peterson's solution for mutual exclusion problem. (07)
- B) Differentiate contiguous and linked file allocation methods. (08)

Seat No: _____

Enrollment No: _____

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech/Int. Btech Summer 2022 - 23 Examination

Semester: 4/8

Date: 20/03/2023

Subject Code: 203105213

Time: 02:00 pm to 04:30 pm

Subject Name: Operating System

Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - (Each of one mark)

(15)

1. In Operating Systems, which of the following is/are CPU scheduling algorithms?
a) Priority b) Round Robin c) Shortest Job First d) **All of the mentioned**
2. To access the services of the operating system, the interface is provided by the _____.
a) Library b) **System calls** c) Assembly instructions d) API
3. Which of the following condition is required for a deadlock to be possible?
a) mutual exclusion
b) **a process may hold allocated resources while awaiting assignment of other resources**
c) no resource can be forcibly removed from a process holding it
d) all of the mentioned
4. Out of these page replacement algorithms, which one suffers from Belady's anomaly?
a) LRU b) **FIFO** c) Both LRU and FIFO d) Optimal Page Replacement
5. Concurrent access to shared data may result in _____.
a) data consistency b) data insecurity
c) **data inconsistency** d) none of the mentioned
6. Physical memory is broken into fixed-sized blocks called _____.
a) **frames** b) pages c) backing store d) none of the mentioned
7. A system is in the safe state if _____.
a) the system can allocate resources to each process in some order and still avoid a deadlock
b) there exist a safe sequence
c) **all of the mentioned**
d) none of the mentioned
8. Which of the following conditions must be satisfied to solve the critical section problem?
a) Mutual Exclusion b) Progress c) Bounded Waiting d) **All of the mentioned**
9. Operating system
a) Enables the programmer to draw a flow chart b) Links a program with subroutine it references
c) **Provides a layer, user friendly interface** d) All of these
10. The code that changes the value of the semaphore is _____.
a) remainder section code b) non – critical section code
c) **critical section code** d) none of the mentioned
11. Multiprocessor is used because
a) Distributed capability b) They increase reliability
c) It saves money compared to multiple single systems d) **All of these**
12. Which one of the following is the deadlock avoidance algorithm?
a) **banker's algorithm** b) round-robin algorithm c) elevator algorithm d) karn's algorithm
13. The Virtual memory is:
a) **An illusion of a large main memory** b) A large main memory
c) A large secondary memory d) None of the above
14. Semaphore is a/an _____ to solve the critical section problem.
a) hardware for a system b) special program for a system
c) **integer variable** d) none of the mentioned
15. A critical section is a program segment
a) Which must be enclosed by a pair of semaphore operations, P and V
b) **Where shared resources are accessed**
c) Which avoids deadlocks
d) Which should run in a certain specified amount of time

Q.2 Answer the following questions. (Attempt any three)**(15)**

- A) What are the differences between multiprocessing and multiprogramming OS?
- B) Explain physical structure of hard disk with neat and clean diagram.
- C) What are the different disk space allocation methods?
- D) Consider the string: 1, 3, 2, 4, 2, 1, 5, 1, 3, 2, 6, 7, 5, 4, 3, 2, 4, 2, 3, 1, 4 Find the page faults for 3 frames using FIFO and LRU page replacement algorithms.

Q.3 A) Consider the following table of arrival time and burst time for five processes P1, P2, P3, P4 and P5. Apply Preemptive Shortest Job First CPU Scheduling Algorithm on given data. calculate average waiting time and turn around time:**(07)**

Process	Burst Time	Arrival Time
P1	6 ms	2 ms
P2	2 ms	5 ms
P3	8 ms	1 ms
P4	3 ms	0 ms
P5	4 ms	4 ms

- B) Draw the process state transition diagram and explain the transitions of following state.
- i) running to ready
 - ii) waiting to ready
 - iii) running to waiting
 - iv) blocked to ready
 - v) running to terminated

(08)**OR**

- B) Consider a system with Five Processes P0 through P4 and three resources A, B and C. Resource type A, B and C. Suppose at time T0 the following snapshot of the system has been taken.

(08)

- A) Find need matrix.
- B) Also find whether the system is in safe state or not?
- C) If system is in safe state then find out the safe sequence.
- D) Find out the total amount of resources.

Processes	Allocation A B C	Max A B C	Available A B C
P0	1 1 2	4 3 3	2 1 0
P1	2 1 2	3 2 2	
P2	4 0 1	9 0 2	
P3	0 2 0	7 5 3	
P4	1 1 2	1 1 2	

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Q.4 A) Explain IPC problem-Dinning Philosopher's problem with Algorithm.**(07)****OR**

- A) Write Difference Between Paging and Segmentation in OS.
- B) I) Suppose Disk drive has 200 cylinders (0-199). The current position of head is 50. The queue of pending request is 176, 79, 34, 60, 11, 41, 114. The Head pointer is at 50. Calculate head movement for the SCAN (Elevator) Disk Scheduling Algorithm. (Direction = left from current Head pointer).
- II) Write advantages and Disadvantages of SCAN algorithm.

(07)**(08)**