

# SASTRA UNIVERSITY

(A University under section 3 of the UGC Act, 1956)

## B.Tech. Degree Examinations

November 2017

End Semester

Course Code: BCSCCS 503R03 / BITCIT 503R03 / BICCIC 503R03

Course: OPERATING SYSTEMS

Question Paper No.: B0448

Duration: 3 hours

Max. Marks: 100

### PART - A

Answer all the questions

10 x 2 = 20 Marks

1. How are multiple interrupts dealt with?
2. List out the factors to be considered by a scheduling policy.
3. What is the role of a dispatcher?
4. When a process is said to be in a spin waiting state?
5. How does a monitor support synchronization?
6. Differentiate: Loosely coupled and tightly coupled multiprocessor.
7. What is the resident set for a process?
8. Every virtual memory reference can cause two physical memory accesses – Why?
9. Write the formula to compute the average access time.

10. Why is blended attach said to be more severe?

### PART - B

Answer all the questions

**4 x 15 = 60 Marks**

11. (a) With a neat diagram explain the steps involved in simple interrupt processing. (10)

(b) List out and briefly explain five storage management responsibilities of a typical operating system. (5)

(OR)

12. (a) Describe the five state process model along with the possible state transitions. (10)

(b) List out and briefly explain the contents of a process control block. (5)

13. (a) Consider the process table given below.

Process	Arrival Time	Service Time
P <sub>1</sub>	0	3
P <sub>2</sub>	2	6
P <sub>3</sub>	4	4
P <sub>4</sub>	6	5
P <sub>5</sub>	8	2

Compute the average turn around time under the scheduling policies of SRT, HRRN and RR with 1 ms time quantum. (6)

(b) Explain the design issues involved in multiprocessor scheduling. (9)

(OR)

14. Discuss the readers/writers problem and a possible solution to the problem using semaphores.

15. With a neat diagram explain the paging mechanism.

(OR)

I/O Buffering

16. Explain the concepts used in I/O Buffering in detail.

17. Discuss the different file allocation methods with a neat diagram.

(OR)

18. Explain the following

(a) classification of viruses.

(7)

(b) uses of Bots

(8)

(Combination of both) — make a rootkit.  
PART - C

what is a bot?  
hides in plain site  
steals data & removes  
accessing is possible.  
 $1 \times 20 = 20$  Marks

Answer the following

19. (a) Consider the following reference string (5, 4)

2, 3, 2, 1, 5, 2, 4, 5, 3, 2, 5, 2

With three page frames compute the number of page faults using FIFO, optimal and LRU page replacement algorithms after the frame allocation has been filled. (10)

(b) Assume a disk with 200 tracks. The requested tracks, in the order received by the disk scheduler are 98, 183, 37 122, 14, 124, 65, 67. Compute the average seek length under the FIFO, SSTF and SCAN scheduling algorithm. Assume disk head at track 53. (80, 37.375, 37.375) (10)

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TPV

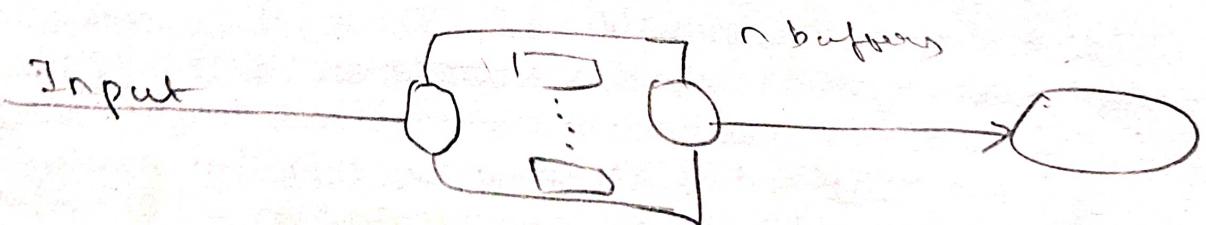
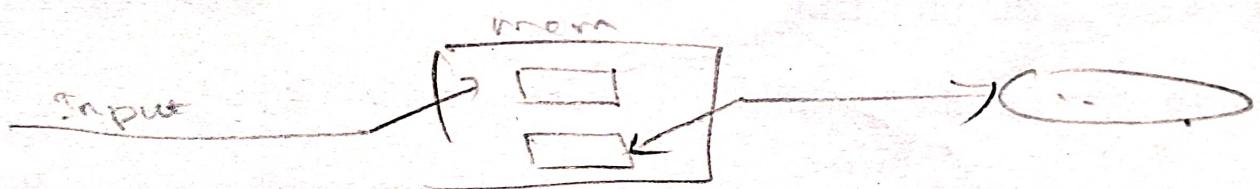
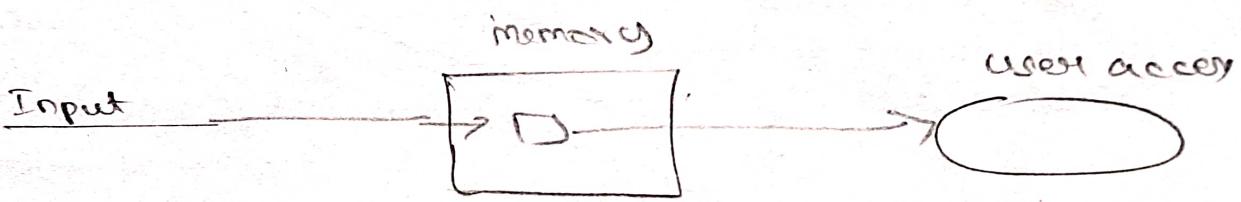
## I/O Buffering

meaning:

when is it used?

How is it implemented?

2 types.



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## **B.Tech. Degree Examinations**

**November 2016**

### **End Semester**

**Course Code: BCSCCS 503R02 / BITCIT 503R02 / BICCIC 503R02**

**Course: OPERATING SYSTEMS**

**Question Paper No. : B0482**

**Duration: 3 hours**

**Max. Marks: 100**

### **PART - A**

**Answer all the questions**

**$10 \times 2 = 20$  Marks**

1. Does timesharing differ from multiprogramming? If so, how?
2. Give two reasons why caches are useful.
3. Define threads.
4. What is the difference between pre-emptive and non pre-emptive scheduling?
5. What are binary semaphores?
6. What are the methods for handling deadlocks?
7. List out the steps needed to perform page replacement.
8. What is virtual memory?
9. What is the need for disk scheduling algorithm?

10. Enlist the various file attributes.

### PART – B

**Answer all the questions**

**$4 \times 15 = 60$  Marks**

11. Discuss the following:

- (a) Operating System service.
- (b) Cache Memory

(OR)

12. (a) Draw the state diagram of a process from its creation to termination, including ALL transitions, and briefly elaborate every state and every transition.

(b) Why are threads required? Discuss and differentiate kernel level and user level thread.

13. Explain in detail any three policies for process scheduling that uses resource consumption information. What is response ratio? Explain with suitable examples.

(OR)

14. (a) What are semaphores? How do they implement mutual exclusion?

(b) Give a solution for readers writers problem using conditional critical region.

15. Explain the Classical Synchronization problems – Dining – Philosophers in detail.

(OR)

16. Give the basic concepts about paging.

17. Suppose that a disk drive has 5,000 cylinders, numbered from 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending request in FIFO order, is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending request for each of the following disk-scheduling algorithms?

- (a) FCFS <sup>1081</sup> (b) SSTF <sup>1745</sup> (c) SCAN <sup>9769</sup> (d) LOOK <sup>3319</sup>  
(e) C-SCAN <sup>9985</sup> (f) C-LOOK <sup>3363</sup>

(OR)

18. What are files? Explain the access methods for files.

### PART - C

Answer the following

**1 x 20 = 20 Marks**

19. Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:

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 four Gantt charts illustrating the execution of these processes using FCFS, SJF, a nonpreemptive priority (a smaller priority number implies a higher priority), and RR(quantum = 1) scheduling.
- (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 the scheduling algorithms in part a?
- (d) Which of the schedules in part a results in the minimal average waiting time (over all processes)?

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# SASTRA UNIVERSITY

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## B.Tech. Degree Examinations

November 2015

### Fifth Semester

Course Code: BCSCCS 503R02 / BITCIT 503R02 / BICCIC 503R02

Course: OPERATING SYSTEMS

Question Paper No. : B0469

Duration: 3 hours

Max. Marks: 100

#### PART - A

Answer all the questions

**20 x 2 = 40 Marks**

1. What is virtual machine? *HW slow combination. HW is emulated in slow*
2. What is the principle of locality in cache memory? *Time, space*
3. What is the disadvantage of ULT in uniprocessor system? *Some process blocked*
4. Provide an example scenario of "Blocked/Suspend" to "Blocked" state. *anticipation of waiting event will be completed soon & the job → high priority*
5. What is the major difference between process scheduling and disk scheduling? *CPU util, seek time, return of R-time*
6. What is the motivation of providing interrupt service in O/S? *fair utilization of CPU resource, Power up, common, emergency*
7. What is the difference between binary and counting semaphore?
8. What is the advantage of monitor construct over semaphore? *code is readable*

9. How is priority calculated for Real Time priority driven scheduling algorithms?  
RM  $\rightarrow$  job release rate  
DM - deadline.
10. What is the concept of dynamic linking and shared libraries?  
ever changing not loaded in memory
11. What is thrashing?  
page replacement activity dominates the OS - "
12. What is virtual memory?  
CPU view. very large to accommodate multi user and threads
13. What is the role of dirty bit in page replacement algorithms?
14. Mention three record blocking strategies.  
fixed variable - spanned  
" " " an "
15. What is the concept of demand paging?  
secondary memory to main memory is referenced.
16. What is the utility of buffering in I/O communication?  
→ allows to handle variation of data rates  
assuming no overflow
17. Mention various file organizations.  
fix, sequential, indexed - seq, ind, hashed file
18. Define seek time and access time of a disk.  
place the head to correct track  $\rightarrow$  seek + rotational delay
19. What is the advantage of indexed file organization?  
access time is less
20. What is overlay?

## PART - B

Answer all the questions

$4 \times 15 = 60$  Marks

21. Draw process state transition diagram with seven states and explain the transition between each states with an example scenario.

(OR)

22. Discuss the advantages of user level threads over processes in uniprocessor system. Discuss the extra complexities introduced to the system with user level threads.

3.5 X 4 + 1

23. Discuss four uniprocessor scheduling algorithms with respect to preemption, throughput, response time, process overhead and starvation of some processes.

(OR)

24. Discuss the solution of Readers/Writers problem with semaphore where writers have priority. Mention the role of each semaphore separately.

25. Discuss the dining philosopher's problem and its significance. Provide a solution with semaphore and explain the role of each semaphore.

(OR)

26. Discuss inverted page table with a diagram and mention the advantages and disadvantages. What are the ways to overcome the disadvantages of inverted page table implementation while keeping the advantages?

TUR  
Topic

27. Discuss demand paging concepts and the detailed steps in handling a page fault with a diagram.

Page fault  
diagram

(OR)

28. Discuss various free space management algorithms for secondary storages and compare the performance of various algorithms.

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**B.Tech. Degree Examinations**

**November 2013**

**Fifth Semester**

**Course Code: BCSCCS 503R02 / BITCIT 503R02 / BICCIC 503R02**

**Course: OPERATING SYSTEMS**

**Question Paper No. : B0477**

**Duration: 3 hours**

**Max. Marks: 100**

**PART – A**

**Answer all the questions**

**$20 \times 2 = 40$  Marks**

1. Enumerate the objectives of operating system.
2. List out four major theoretical advances in the development of operating system.
3. List out the basic elements of the computer system
4. Draw the state transition diagram for two-state process model.
5. What are the two categories of thread implementation?
6. Define turnaround time and response time
7. Differentiate hard real time and soft real time.task.
8. Classify the degree of awareness in process interaction.
9. What will be the effect of incrementing and decrementing the semaphore?

10. Write the basic message passing primitives.
11. Define dead lock.
12. What are the two approaches used for deadlock avoidance?
13. List out the selection criteria to select a process to abort for deadlock recovery.
14. Distinguish between logical and physical address.
15. Give the schematic view of swapping.
16. What is the concept of copy-on-write?
17. Define Belady's anomaly.
18. Categorize the external devices to perform I/O operations.
19. Define seek time and rotational delay of disk accessing.
20. List out disk scheduling algorithms.

### **PART – B**

**Answer all the questions**

**$4 \times 15 = 60$  Marks**

21. Illustrate the program execution in step by step with the relevant portions of memory and processor registers for any instruction in a hypothetical machine considering fetch and execute stage.

**(OR)**

22. What is multithreading? Explain different windows thread states with diagram.

23. Briefly explain any five process scheduling algorithms.

-- FCFS, SJF, Priority, Round Robin

(OR)

24. Discuss readers/writers problem and solution using semaphore.

25. Analyze the dinning philosopher problem and write the two solutions with interpretation.

(OR)

26. What is the significance of segmentation in memory management? Explain with architecture.

27. Explain different algorithms for disk scheduling.

(OR)

28. Briefly explain different file organization.

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# **SASTRA UNIVERSITY**

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## **B.Tech. Degree Examinations**

*✓ ✓ November 2014*

### **Fifth Semester**

**Course Code: BCSCCS 503R02 / BITCIT 503R02 / BICCIC 503R02**

### **Course: OPERATING SYSTEMS**

**Question Paper No. : B0472**

**Duration: 3 hours**

**Max. Marks: 100**

#### **PART – A**

**Answer all the questions**

**$20 \times 2 = 40$  Marks**

1. Define process.
2. What is an interrupt?
3. List out the various kinds of operating system.
4. Discuss Program Counter [PC].
5. List out the types of threads.
6. What is a Semaphore?
7. What are the Functions of Scheduler?
8. Difference between User Level & Kernel Level Thread.
9. What are the various scheduling queues?
10. Differentiate between process and thread.

11. What is process spawning?
12. What is a deadlock?
13. Write about memory manager.
14. Define paging.
15. What is the difference between page and a frame?
16. What are the two types of I/O channel available?
17. What are the basic operations performed by file?
18. Write any two characteristics of magnetic disk.
19. List out the file attributes.
20. List out the three types of record blocking?

### **PART – B**

**Answer all the questions**

**$4 \times 15 = 60$  Marks**

21. What are the operating system components?

(OR)

22. Briefly explain five state models with diagram.

23. Explain different types of scheduling algorithms.

(OR)

24. Give a solution for readers-writers problem using conditional critical regions.

25. Describe the necessary conditions for Deadlock to occur.

(OR)

26. What are the requirements needed for memory management?  
Explain.

27. Briefly explain disk formatting.

(OR)

28. Explain Page Replacement Algorithm.

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