POKHARA UNIVERSITY

Level: Bachelor | Semester – Fall | Year : 2018
Programme: BCIS | Full Marks: 100
Course: Operating Systems | Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Section "A"

Very Short Answer Questions

10×2

Attempt all the questions.

1. Define Threads and Multithreading system.
2. Define operating system .Also explain it as resource manager.
3. Differentiate interrupt driven I/O and DMA.
4. What is contiguous and non-contiguous memory allocation?
5. Describe CPU and I/O burst time.
6. Define file and directories.
7. Differentiate Multiprogramming with fixed number of task (MFT) and Multiprogramming with. Variable number of task (MVT).
8. What is Distributed system? Write the advantages over centralized system over point to point.
9. State sufficient and necessary conditions of Deadlock.
10. Write the goals of security system and threats to it.

Section "B"

Descriptive Answer Questions

6×10

Attempt all questions.

11. Suppose a head of moving head disk with 200 tracks, numbered 0 to 199 is currently serving request at track 133 and has finished a request at track 100. The queue it request is kept in the FIFO order 86 , 147 , 91 , 177 , 94 , 150 , 102 , 175 , 130 . What is the total head movement needed to satisfy these request for the following disk scheduling algorithm?
    a) FCFS
    b) SSTF
    c) SCAN
    d) LOOK
    e) C-LOOK
12. How semaphore is used to solve critical section problem? Do you think semaphore is best solution for solving critical section problem? Explain using it in a producer consumer problem.

13. Mention securities issues in implementation of OS. Also explain Cryptography process with help of diagram.
14. For the process listed in the following table, draw a Gantt chart and also calculate the Average Turnaround Time and Average Waiting Time using the following algorithm.
    a) FCFS
    b) SJF(preemptive)
    c) Round-robin(quantum=3)
    d) Priority Based
    e) SJF(non-preemptive)

Process	Arrival time	CPU time	Priority
A	0	4	2(L)
B	1	1	4
C	2	3	6
D	3	5	10
E	4	1	8
F	5	4	13(H)
G	6	6	9

15. Consider a following page reference string: 3,3,5,4,7,1,5,5,1,4,3,7,6,3,4,2. How many page faults would occur for each of the following page replacement algorithm, assuming 4 page frames?
    a) LRU Page replacement
    b) Optimal page replacement
    c) FIFO
    d) Second chance algorithm
16. Explain sufficient and necessary condition for elimination of deadlock with figure.
17. Why public and private key is important? Explain cryptography.
18. Section "C" 20

Case Analysis

Read the case situation given below and answer the questions that follow:

Case: Study on Memory Management

a) Given memory partition of 100k , 500k , 200k , 300k , and 600k in order. How would the FF, BF, WF, NF algorithms place process of 212k , 417k , 112k , and 426k in order.(solve for MVT only).
b) How can you analyze paging and segmentation as virtual memory management technique?
c) Give your opinion about fragmentation in memory management. How it affects different allocation technique.

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Section "A"

Very Short Answer Questions

10×2

Attempt all the questions.

1. What is system call? Define the major services of operating system.
2. Differentiate between multiprogramming and multiprocessing.
3. Differentiate between process and thread. List out process states.
4. Define CPU scheduling. List the various criteria for CPU scheduling.
5. Define race condition. List out some solution to race condition.
6. What do you mean by starvation?
7. What are logical and physical addresses?
8. Define Thrashing.
9. What is a file descriptor?
10. What is distributed system? Write the advantages over centralized system.

Section "B"

Descriptive Answer Questions

6×10

Attempt any **six** questions.

11. Define OS and list out its architecture. Explain the advantage of using virtual machine architecture for OS designer.
12. For the process listed in the following table draw a Gantt chart and also calculate the Average Turnaround Time and Average Waiting Time using the following algorithm.
    a) FCFS
    b) SJF(preemptive)
    c) SJF(non-preemptive)
    d) Priority Based
    e) Round-robin(quantum=3)

Process	Arrival Time	Burst Time	Priority
A	0	4	2(L)
B	2	1	4
C	5	3	3
D	7	6	5(H)

13. Why IPC and synchronization is necessary? Explain the solution of producer-consumer problem using semaphore. Does your solution have busy wait condition or not, explain.

14. a) What are the different File Operation? Explain any three **File Allocation Methods.**

    b) What do you mean by Page Replacement? Explain OPR and LRU Page Replacement algorithm with example of each.

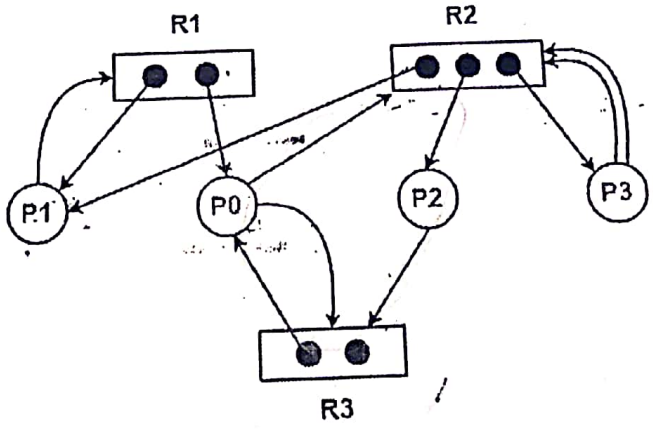
15. Consider a disk queue with requests for I/O to blocks on cylinders 98, 183, 41, 122, 14, 124, 65, 67. The FCFS scheduling algorithm is used. The head is initially at cylinder number 53. The cylinders are numbered from 0 to 199. What is the total head movement incurred while servicing these requests for the following disk scheduling algorithm?
    a) FCFS
    b) SSTF
    c) SCAN
    d) LOOK
    e) C-LOOK

16. What are the security issues related to operating system? Explain about protection mechanism and Access Control List (ACL) for access control in OS.

17. Explain some design issues related to distributed system. Explain Remote Procedure Call (RPC) mechanism in detail.

Section "C"

18. Consider the resource allocation graph in the figure: 20



a) Find if the system is in a deadlock state otherwise find a safe sequence.

b) Explain prevention method used in deadlock.