PURBANCHAL UNIVERSITY
2008

Bachelor in Information Technology (B.I.T.)/Fifth Semester/Final
Time: 03:00 hrs.   Full Marks: 80 /Pass Marks: 32
BIT314CS, Operating System

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

Figure in the margin indicate full marks.

Group A: Long-answer Questions

Answer TWO questions.   2×12=24

1. What do you mean by critical-section problem? Illustrates the limitation of S/W solutions of critical section problem and show how semaphore overcomes this problem.

2. Define deadlock. Discuss 4 conditions for the occurrence of deadlock. What are the different approaches for handling deadlock? Explain Banker's algorithm for single resources.

3. What are the different process scheduling algorithm? Explain shortest job first and round robin scheduling with example.

Group B: Short-answer Questions

Answer EIGHT questions.   8×7=56

Explain operating system as a resource manager.

4. What is process? Explain different states of the process with diagram.

5. Explain different operations performed on directory. What is hierarchical directory system?

6. What are different memory management strategy. Explain memory management with Adaptive partitioning.

7. What are different page replacement algo.

(2)

8. Write short notes on any TWO:
 (a) Segmentation with paging
 (b) Memory Allocation
 (c) Process Control Block
 (d) Clocks

PURBANCHAL UNIVERSITY
2010

Bachelor in Information Technology (B.I.T.)/Fifth Semester/Final
Time: 03:00 hrs.   Full Marks: 80 /Pass Marks: 32
BIT314CS, Operating System

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

Figure in the margin indicate full marks.

Group A:

Answer TWO questions.   2×12=24

1. What do you mean by critical section problem? Illustrate the limitation of steep and wakeup solutions of critical section problem and show how semaphore overcomes this problem.

2. Discuss 4 conditions for the recurrence of deadlock. What are the different ways to avoid dead lock by careful resource allocation?

3. What is page fault? Find out the no. of page faults for the following reference string using FIFO and optical page replacement algorithm. Assume that there are three frames initially empty.

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

Group B:

Answer SEVEN questions.   7×8=56

4. Define process and its different states with diagram.

5. Discuss the five major activities of an operating system in regard to-file management.

6. What is an inter-process communication? Discuss how race condition is arised with producer consumer problem.

7. Describe the differences among short-term, medium-term and long-term scheduling.

8. What is partitions and mounting? Describe virtual file systems.

9. Describe advantages and disadvantages of distributed O.S. over centralized one.

10. Explain the principles of Input-Output software.

11. Under what circumstance do page fault occur? Describe the activities taken by the operating system when a page fault occurs.

12. Write short notes on any TWO:
 (a) Segmentation with paging
 (b) Memory Allocation
 (c) Process Control Block
 (d) Clocks

PURBANCHAL UNIVERSITY
2009

Bachelor in Information Technology (B.I.T.)/Fifth Semester/Final
Time: 03:00 hrs. Full Marks: 80 / Pass Marks: 32
BIT314CS: Operating System

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

Figure in the margin indicate full marks.

Group A: Long-answer Questions

Answer TWO questions. 2×12=24

4. (a) Why Memory Management is required in multi programming system?(When and how internal and external fragmentations occur? how will you remove external fragmentation?) 1+2+1

(b) What are the benefits resulted from virtual memory? When does page fault occur? What are the steps taken by O.S. on occurrence of page fault? Explain. 1+1+2

(c) Does paging eliminates internal fragmentation completely? How does paging eliminate external fragmentation completely? Explain your answer with suitable logical reasons. 1+3

2. Suppose that the following processes arrive for execution at the time indicated. Other parameters of the processes are also given.

Process	Arrival Time	CPU Burst Time (ms)	Priority
P1	4	16	2
P2	1	5	1
P3	0	11	2
P4	2	6	3

Which Scheduling algorithm among Non-Preemptive Priority Scheduling, Preemptive Shortest Job First Scheduling and Round Robin Scheduling with time slice of 3ms should be the best for the system? 12

(2)

3. Consider the following snapshot of a system:

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P	0	0	1	2	0	0	1	2	1	5	2	0
Q	1	0	0	0	1	7	5	0				
R	1	3	5	4	2	3	5	6				
S	0	6	3	2	0	6	5	2				
T	0	0	1	4	0	6	5	6				

Answer the following questions using the Banker's algorithm. 12
(a) What is the content of matrix Need?
(b) Is System in the Safe State?
(c) If a request from process Q arrives for (0, 4, 2, 0), can the request be granted immediately?

Group B: Short-answer Questions

Answer SEVEN questions. 7×8=56

4. Discuss I/O Devices, Device Controllers and Direct Memory Access (DMA) on the basis of the I/O hardware. 8

5. What are the necessary conditions for deadlock to occur in a system? Explain briefly how we can make use of Resource Allocation Graphs (RAG) to detect deadlock in our system. 4+4

6. Define File System. Explain the concept of File Sharing and Locking. 2+6

7. Explain OS as a resource manager. Discuss Batch processing system and multiprogramming with an example. 3+5

8. Define Mutual Exclusion. What is the main drawback associated with Strict Alternation Mechanism? How Peterson's Solution guarantees of achieving mutual exclusion? Explain. 2+2+4

9. Explain Belady's Anomaly through an example. Calculate the total no. of page faults for the following page reference strings if the size of page frame is 3. 3+5
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1.

10. Explain the concept of multiprogramming memory management taking virtual memory as reference. Explain paging technique with an example. 4+4

11. Write short notes on any TWO: 4+4
(a) Inter Process Communication (b) CPU Scheduling Mechanism
(c) Achieving mutual exclusion through Lock Variables.

PURBANCHAL UNIVERSITY
2014

Bachelor in Information Technology [B.I.T.]/Fifth Semester/Final
Time: 03:00 hrs.   Full Marks: 80 /Pass Marks: 32
BIT37CO: Operating System (New Course)

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

Figure in the margin indicate full marks.

Group A

Answer TWO questions.   2×12=24

1. What do you mean by deadlock? What are the conditions for it to occur? What algorithm will be considered to detect the deadlock situation? Explain with example.   2+4+6

2. What is Belady's Anomaly? Why it is needed to replace a page from memory? Find out the no. of pages faults in FIFO page replacement algorithm. Given reference string is 5, 7, 2, 1, 7, 5, 3, 2, 1, 4, 7, 5 with four page frames.   3+2+7

3. Describe inter-process communication? Discuss how race condition is arised in producer-consumer problem.   3+9

Group B

Answer SEVEN questions.   7×8=56

4. Define process control block (PCB). Explain process and its states.   3+5

5. Discuss the merits and demerits of several allocation methods for a file on a disk.   8

6. What are the different disk arm scheduling algorithms? Explain any one with example.   5+3

7. Discuss the evolution of operating system. Explain operating system as an extended machine.   5+3

8. What do you mean by Real-time operating system? Distinguish between soft and hard real time systems.   3+5

9. Explain the working of DMA with proper figure.   8

10. Discuss the differences between internal and external fragmentation with example.   8

11. What are different process scheduling algorithms? Explain FCFS and SJF scheduling with an example.   2+6

12. Write short notes on any TWO: 4+4
    (a) History of operating system
    (b) Terminals
    (c) Characteristics of Distribute processing

PURBANCHAL UNIVERSITY
2011

Bachelor in Information Technology [B.I.T.]/Fifth Semester/Final
Time: 03:00 hrs.   Full Marks: 80 /Pass Marks: 32
BIT314CS: Operating System

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

Figure in the margin indicate full marks.

Group A

Answer TWO questions.   2×12=24

1. Explain deadlock with necessary conditions. Explain different deadlock detective method in brief.   3+9

2. Why process scheduling is required? List all the scheduling algorithm and explain any two in brief.   12

3. Why is Memory Management an issue for an Operating System? Discuss different Memory Management Techniques with suitable diagrams.   3+9

Group B

Answer SEVEN questions.   7×8=56

4. Discuss operating system as an extended machine of resource manager.   5+3

5. How is a Page different from a Page Frame? Explain Belady's Anomaly.   3+5

6. Why page replacement algorithm is required? Discuss LRU Page replacement algorithm.   2+2+4

7. What is process? Discuss its possible state with example.   3+5

8. What is race condition? Explain Peterson solution to get mutual exclusion.   3+5

9. How are a File and a Directory implemented? Explain Contiguous File Allocation technique with its advantages and disadvantages.   3+1+4

10. Explain DMA. Discuss Block and Character I/O Devices with suitable examples of each.   5+3

11. What are the attributes of a File? Explain. Discuss Polling and Interrupt in context of I/O Management.   4+4

PURBANCHAL UNIVERSITY

2016

Bachelor in Information Technology (B.I.T.)/Fifth Semester / Final
Time: 03:00 hrs;   Full Marks: 80 /Pass Marks: 32
BIT377CO: Operating System (New Course)

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

Figure in the margin indicate full marks.

Group A

Answer TWO questions.   2×12=24

1(a) What are memory management techniques using swapping? Explain basics of virtual memory management.   4

(b) Explain FIFO and LRU page replacement algorithms. Compute the number of page faults for the given reference string with 3 page frames using FIFO and LRU page replacement algorithms.   8
Reference String: 3 7 5 3 4 2 5 7 3 5 7 2 3 5 4

2(a) What is process? Explain the process state diagram?   6

(b) Describe mutual exclusion with busy waiting. Explain any one proposal to achieve mutual exclusion.   6

3. What is deadlock and what are its necessary conditions? Explain with an example, how Banker's algorithm for single resource is modeled for deadlock avoidance.   6+6

Group B

Answer SEVEN questions.   7×8=56

4. State the functions of operating system. Explain why operating system is also considered as Resource Manager.

5. What are files and directories? Explain any one implementation of file system.

6. Consider a disk with 600 cylinders; the read requests to cylinders come in order 65, 250, 413, 217, 265, 45, 373, 469, 95 and 521 with current read on, cylinder 301. Compute total number of disk arm movements for the disk using SSTF, LOOK and SCAN disk scheduling algorithms.

7. Explain protection mechanisms and security systems developed in the current operating systems trend.

8. Briefly describe the characteristics of distributed systems. What is RPC?

9. What is the need of process scheduling algorithm. Explain SJF, Preemptive and non-preemptive scheduling algorithm with proper example.

10. What are the importance of clocks in operating system? Explain the types of terminals.

11. Write short notes on any TWO:

(a) Real time system
(b) Threads
(c) Fragmentation

(2)

Operating system:

2015   Board.

Group 'A'

1) Explain static and dynamic memory allocation techniques with example.   12

2) Differentiate between preemptive and non-preemptive scheduling algorithm. Consider the following set of process having their cpu-burst time (in ms) and having arrived at same time 6+6

process	cpu burst (ms)
P₁	10
P₂	5
P₃	5

find t avarage waiting time using

(a) non-preemptive fcfs scheduling
(b) fcfs scheduling.

3) Discuss deadlock with its condition. Explain Banker's algorithm for single resource with example.   4+8

Group 'B'

4) What is race condition? Why mutual exclusion is needed? How mutual exclusion can be achieved? describe any of them.   8

5) Briefly explain the disk arm scheduling algorithm. between FCFS and Shortest Seek first with example 8

6) What is distributed operating system? Explain briefly about its features.

7) Why page replacement algorithm is needed? Explain any one with example. 3+5

8) What is memory fragmentation and what are its types? and how does fragmentation can be minimized? 4+4

9) Define process and its different states. Differentiate between process & threads.   4+4

10) What are different process scheduling algorithms? Explain FCFS and SJF scheduling algorithm with example. 2+6

11) Write short notes on any two
(a) OS as a resource manager.
(b) Thread
(c) Context switch

PURBANCHAL UNIVERSITY
2018

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

Figure in the margin indicate full marks.

Group A
Answer TWO questions. 2×12=24

1. Explain Race condition with suitable example. Illustrate how semaphore overcomes the limitation of sleep and wake up. 3+9

2. Why page replacement algorithm is required? Use FIFO and LRU page replacement algorithm in the following reference string having three frames and calculate the no of page faults. 3+9
0 1 2 3 1 3 2 0 3 2

3. What is Deadlock? Write the necessary conditions for a deadlock. Explain Banker's algorithm for single resource with example. 2+4+6

Group B
Answer SEVEN questions. 7×8=56

4. What is operating system? Discuss operating system as resource manager. 2+6

5. Differentiate between process and thread. Describe 5-states process model in brief. 3+5

6. Consider the following processes having their CPU-burst time and having their arrival time given below. 8

Process	Burst Time
P_1	5
P_2	6
P_3	3

(2)

Calculate Average Turnaround time and Average waiting time using:
(a) Shortest Job First (Preemptive) scheduling algorithm.
(b) Round Robin scheduling algorithm. (Quantum = 3 ms)

7. Define file. Discuss different operations on file. 2+6

8. Explain DMA with appropriate figure. 8

9. What is Distributed System? Describe the advantages and disadvantages of distributed operating system over centralized one. 2+6

10. What are different types of disk scheduling algorithm? Explain FCFS and SSF algorithm with example. 1+7

11. Why memory management is required? Explain dynamic memory management techniques in brief. 3+5

12. Write short notes on any TWO: 4+4
(a) Preemptive Scheduling vs. non-preemptive scheduling
(b) Peterson's Algorithm
(c) History of operating system

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

Figure in the margin indicate full marks.

Group A
Answer TWO questions. 2×12=24

1. Define deadlock. What is safe and unsafe state? Explain banker's algorithm of single resource.

2. What is race condition? Discuss how race condition is raised with producer consumer problem.

3. Discus different disk scheduling algorithm with example.

Group B
Answer SEVEN questions. 7×8=56

4. What is operating system? Discuss operating system as resource manager.

5. Explain Banker's Algorithm for single resources in detail.

6. What is preemptive and non preemptive scheduling? Discuss different condition for deadlock.

7. What do you mean by memory management technique? Explain management with dynamic partition in detail.

8. Why process scheduling is necessary? List all the scheduling algorithm and describe any one in detail.

9. Explain directory hierarchy in detail.

10. Explain working of DMA with proper figure.

11. Discuss any two methods by which file can be implemented. 2×4=8

12. Write short notes on any TWO:
(a) Process state
(b) Distributed system
(c) History of operating system

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

Figure in the margin indicate full marks.

Group A

Answer TWO questions.   2×12=24

1. What is semaphore? How semaphore used to solve the critical section problem. Explain Producer consumer problem using semaphore.   2+2+8

2. Explain deadlock with its condition. Discuss Banker's algorithm with single resourcing with example.   4+8

3. What are different types of memory management technology? Explain dynamic portioning memory management techniques with example.   2+10

Group B

Answer SEVEN questions.   7×8=56

4. What is operating system? Explain OS as a resource manager.

5. What is IPC? Explain Petersion solution to obtain mutual exclusion.

6. Define PCB and context switch. Consider the following snapshot of the process and identify which scheduling algorithm among preemptive shortest job first and a round robin algorithm with time slice of 2ms would give minimum average waiting time.

Process	Arrival time	Burst Time
P0	0	10
P1	1	05
P2	2	07
P3	3	11

7. Explain different operations of directory. What are different file allocation methods? Explain any one example.

8. Suppose that a disk has 100 cylinders 0 to 99. The read write head is currently serving a request at 34 and previous request was at 17 and new requests come in for cylinder 50,40,75,33,90,3 and 20 in that order. Determine the total number of disk movements to satisfy all the pending request for FCFS disk scheduling algorithm.

9. What is distributed system? Explain different feature of distributed OS.

10. Define Real time operating system? Compare hard, soft and firm real-time operating system
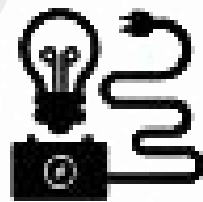
11. Write short notes on any TWO: 4+4
   (a) Segmentation
   (b) Clock
   (c) DMA

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PURBANCHAL UNIVERSITY
Time-bound Home Exam 2020

Bachelor in Information Technology (B.I.T.)/Fifth Semester/*Final*

Time: 03:00 hrs. (+2 Hrs. for Submission)   Full Marks: 80 /Pass Marks: 32

BIT377CO: Operating System *(New Course)*

Instructions:

Dear Students!

• *This model of examination is for you as the end of your current semester. This examination allows you to write answer from your own place of residence. Follow the following instructions without fail.*

• *Do not write your name in the answer-sheet(s).*

• *All the answer-sheets should be sent to college through your approved email in which you have received your question paper.*

• *Do not write questions in the answer-sheet but mention clearly the question number.*

• *All the scan/photos of answer-sheets should be clearly visible. Any blur scan/photo will not be considered for evaluation. Responsibility lies with the students to make sure that scan/photos of the answer-sheet are of readable quality.*

• *Leave 1 inch margin on each side of the answer-sheet.*

• *Clearly mention your Roll no, subject, program, semester, page number at the right-top of each page as instructed by the Office of the Examination Management.*

• *Make sure that you send your answer-sheets within the given time. Any email received after the given time will not be acceptable.*

• *You are strictly advised to write with your own handwriting and that you are not using any unfair means to answer the questions.*

• *Do not consult during the examination period to any other person in answering the questions.*

• *Do not post any pictures of taking examination or your answer-sheets in any social-media. Found that may be taken action from University.*

Figure in the margin indicate full marks.

Group A

Answer TWO questions.   **2×12=24**

1. Define deadlock. Explain the four necessary Conditions for Deadlock. Explain how the Principle of Banker's Algorithm can be used to avoid deadlock.   3+9

2. Explain Race Condition in context of inter process communication with example. What is critical region? Briefly discuss the methods of achieving mutual exclusion.   5+2+5

3. Define Disks. Discuss different disk scheduling Algorithms with example.   3+9

Group B

Answer SEVEN questions.   **7×8=56**

4. Define Operating system. Explain Operating system as a Resource Manager.   2+6

5. Define Process. Explain Different states of Process with diagram.   2+6

6. What are different Page Replacement Algorithms? Explain any two of them.   4+4

7. What do you mean by memory management technique? Explain management with dynamic partitions in detail.   3+5

8. Discuss file and directories with its operation.   3+5

9. What is distributed system? Explain the advantages of distributed system over personal computer.   3+5

10. What are the importance of clocks in operating system? Explain the types of terminals.   4+4

11. Write short notes on any TWO: 4+4

    (a) Virtual Memory

    (b) History of operating system

    (c) Real time system

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PURBANCHAL UNIVERSITY
2021

Bachelor in Information Technology (B.I.T.)/Fifth Semester/Final

Time: 03:00 hrs.   Full Marks: 80 /Pass Marks: 32

BIT377CO: Operating System (New Course)

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

Figure in the margin indicate full marks.

Group A

Answer TWO questions.   2×12=24

1. What is inter-process communication? Explain multiprocessing and parallel processing. Discuss Peterson method in detail. 2+4+6

2. Discuss the different performance criteria of process scheduling. Explain first come first serve and round-robin process scheduling method with example.   4+8

3. Why page replacement algorithm is required? Calculate the total page fault for the given reference string using FIFO and LRU with four page frames. Reference string: 2, 3, 5, 2, 1, 3, 4, 7, 5, 6, 2, 1, 3, 2, 5, 7, 6, 3, 2, 1.   2+10

Group B

Answer SEVEN questions.   7×8=56

4. Distinguish between fixed-size partitioning and variable-size partitioning with examples.

5. Discuss operating system as an extended machine.

6. What is DMA? Explain the mechanism of DMA with illustrations.

7. What is directory? Explain different directory operations in detail.

8. Explain different conditions of deadlock. Discuss Banker's algorithm for single resource with example.

9. What are different methods of deadlock detection and recovery? Explain any one in detail.

10. Explain any two disk scheduling algorithms with suitable examples.

11. Write short notes on any TWO: 4+4

    (a) Terminal   (b) File operation

    (c) Soft real time vs hard real time system.

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