Uka Tarsadia University (Diwaliba Polytechnic)
Diploma in Computer Engineering/Information Technology
Assignment (Operating System)

Unit 1: Introduction to Operating System

1. What is operating system?
2. Explain operating system as resource manager?
3. Explain following terms:
    a. Processors
    b. Registers
    c. Bus
    d. The shell
    e. Files
4. Explain real time operating system.
5. Give the difference between user mode and kernel mode.
6. Enlist different operating systems.
7. Explain process of booting a computer.
8. What is a three-stage pipeline?
9. Describe the features of third generation operating systems.
10. Explain embedded operating systems.

Unit 2: Process Scheduling

1. What is process?
2. Explain process Hierarchies with example.
3. Enlist conditions for process termination.
4. Write down features of second generation of operating system.
5. Explain thread.
6. What is process state? Draw three state transition diagram.
7. Enlist four principal events for process creation.
8. Explain process control block (PCB) with diagram.
9. Draw the Gantt chart and calculate the average waiting time and average turnaround time according to FCFS scheduling algorithm for the following process.

Process	Arrival time	Burst time
P0	0	2
P1	1	6
P2	2	4
P3	3	9

10. Draw the Gantt chart and calculate the average waiting time and average turnaround time according to SRTN scheduling algorithm for the following process.

Process	Arrival time	Burst time
P0	0	10
P1	1	6
P2	3	2
P3	5	4

Unit 3: Interprocess Communication

1. Define race condition and critical section.
2. Explain the producer consumer problem with monitors.
3. What is reader writer problem?
4. Define wait() and signal() operations.
5. Explain Peterson's solution.
6. Explain barriers.
7. Describe monitors.
8. Explain TSL instruction.
9. Describe critical section.
10. Explain semaphore.

Unit 4: Deadlocks

1. Explain how mutual exclusion can be used to prevent deadlock.
2. What is wait-for graph?
3. Explain types of resources.
4. Discuss Banker's algorithm for single resource.
5. Explain ostrich algorithm.
6. Explain how deadlock can be prevented by avoiding hold and wait condition.
7. Enlist four strategies used for dealing with deadlock.

8. Explain the methods for deadlock recovery.
9. Define safe and an unsafe state.
10. Consider the given system with existing resources E= (4 2 3 1) and answer the following questions.
    a. Find out the available vector A.
    b. Is system in a safe state?
    c. If yes, write down the safe sequence else justify your answer.

Current Allocation Matrix =

A	0	0	1	0
B	2	0	0	1
C	0	1	2	0

Request Matrix =

A	2	0	0	1
B	1	0	1	0
C	2	1	0	0

11. Consider the given system with existing resources E = (6 3 4 2) and answer the following questions using banker's algorithm.
    a. Find out the possessed P and available vector A.
    b. Is system in a safe state?
    c. If yes, write down the safe sequence else justify your answer.
12. What are request edge and assignment edge?

Unit 5: Memory Management

1. Explain the role of memory manager.
2. Given page reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6 with frame size=4. Find out the number of page faults for least recently used page replacement algorithm.
3. Explain page fault.
4. Given page reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6 with frame size=4. Find out the number of page faults for first in first out page replacement algorithm.

5. What is memory compaction?
6. Differentiate internal fragmentation and external fragmentation.
7. Explain the following allocation algorithms with suitable example.
8. First-fit
9. Best-fit
10. Explain memory management with bitmap using suitable diagram.
11. Explain page table.
12. Explain memory management with linked list using suitable diagram.
13. Given five memory partitions of 100Kb, 500Kb, 200Kb, 300Kb, 600Kb (in order), how would the first-fit, best-fit, and worst-fit algorithms place processes of 212 Kb, 417 Kb, 112 Kb, and 426 Kb (in order)? Which algorithm makes the most efficient use of memory?

Unit 6: File Systems

1. Write down the file type for following extensions.
    a. .exe
    b. .obj
    c. .bat
    d. .mp3
2. Explain i-nodes.
3. Explain file system layout with diagram.
4. Describe hard link.
5. What is the purpose of file allocation table?
6. Explain file operations.
7. Explain directory operations.
8. Enlist different methods for implementing files.
9. Explain different ways of handling long file names in a directory.
10. Write a short note on shared files.
11. Explain different types of file structure.