Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back/Scholarship Exam – 2081/2082 Chaitra/Baishakh

Program:	**Diploma in Information Technology/ Computer Engineering**	**Full Marks: 80**
Year/Part:	**III/I (2022)**	**Pass Marks: 32**
Subject:	**Operating System**	**Time: 3 hrs.**

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt any EIGHT questions.

1. What is operating system? Explain its functions in brief. [2+8]

2. Assuming a FIFO scheduling algorithm with following information:

Process	Arrival Time	Burst Time
P_1	4	10
P_2	0	5
P_3	1	4
P_4	2	3

   a. What is the waiting time for each process? [5]

   b. What is the average turnaround time? [5]

3. What is producer consumer problem? Write the solution of producer consumer problem. [4+6]

4. Define the term paging. Explain different memory allocation strategies. [2+8]

5. Differentiate between internal and external fragmentation. [10]

6. Explain deadlock in OS. Explain necessary conditions for deadlock in OS. [4+6]

Cont. .....

7. What is deadlock detection? Explain banker's algorithm with example. [2+8]

8. Explain different file allocation techniques in OS. [10]

9. Define cryptography. Explain different security attacks. [2+8]

10. Write short notes on: (any **TWO**) [2×5]

    a. Race condition

    b. Multi programming

    c. System call

Good Luck !

Council for Technical Education and Vocational Training
Office of the Controller of Examinations
Sanothimi, Bhaktapur

Back Exam – 2081/2082 Chaitra/Baishakh

Program: Diploma in Computer Engineering
Year/Part: III/I (2018)
Subject: Operating System

Full Marks: 80
Pass Marks: 32
Time: 3 hrs.

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt ALL questions.

1. What is operating system? What are functions of operating system? Explain. [2+6]
2. Define process and thread. Describe different process states with necessary diagram. [2+6]
3. What is inter-process communication? Explain Peterson's solution to mutual exclusion with busy waiting. [3+5]
4. Consider the set of 5 processes whose arrival time and burst time are given below: [8]

Process ID	Arrival Time	Burst Time
P1	3	1
P2	1	4
P3	4	2
P4	0	6
P5	2	3

Calculate average waiting time and average turnaround time using round robin scheduling with time quantum = 2.

5. What are the necessary conditions for deadlock? Differentiate between preemptive and non-preemptive scheduling. [3+5]
6. Explain about segmentation with its importance and drawbacks. [8]
7. What is page fault? Describe Not Recently Used Page replacement algorithm with suitable example. [2+6]
8. Explain contiguous and linked list allocation in file system. [4+4]

Cont. .....

9. Compare memory mapped IO and IO mapped IO. Explain first come first service disk scheduling algorithm with suitable example. [3+5]

10. Write short notes on: (any **TWO**) [2×4]

a. Banker's algorithm
b. Types of operating system
c. Memory hierarchy
d. FIFO scheduling

Good Luck !

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular Exam-2081 Jestha/Ashadh

Program: Diploma in Computer Engineering/ Information Technology

Full Marks: 80

Year/Part: III/I (2022)

Pass Marks: 32

Subject: Operating System

Time: 3 hrs.

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt any FIVE questions.

1. a. Define operating system. Explain the function of OS. [2+6]

   b. What are the types of operating system? Explain. [8]

2. a. Define process control block (PCB). Differentiate between process and program. [2+4]

   b. Define process scheduling. Consider following set of process having their burst time mentioned in millisecond. Calculate the average waiting time using round robin algorithm with quantum of 3 milliseconds. [2+8]

Process	Arrival Time	Burst Time
P0	0	5
P1	1	3
P2	2	8
P3	3	6

3. a. What is memory management? Explain different types of memory allocation with example. [2+8]

   b. Describe multiprogramming. Differentiate between internal and external fragmentation. [2+4]

4. a. What is file? Explain about file allocation methods. [2+8]

Cont. .....

b. Describe the terms: [3×2]

i. Disk formatting ii. Directory system

iii. Disk arm scheduling

5. a. Define deadlock. Explain deadlock handling strategies. [2+6]

b. Define banker's algorithm. Using banker's algorithm answer the following questions: [2+8]

i. How many resources of type A, B, C, D are there?

ii. What are the contents of need matrix?

iii. Find if the system is in safe state. If it is find the safe sequence.

	A	B	C	D
P0	2	0	1	1
P1	0	6	5	0
P2	1	1	0	2
P3	1	0	2	0
P4	1	4	4	4

6. a. What is security attack? Explain active and passive attacks. [2+8]

b. Write short notes on: [3+3]

i. FIFO

ii. Paging

Good Luck !

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Back Exam-2080, Magh/Phagun

Program: Diploma in Information Technology | **Full Marks:** 80

Year/Part: II/II (2016) | **Pass Marks:** 32

Subject: Operating System | **Time:** 3 hrs.

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt any EIGHT questions.

1. What is operating system? Explain types of operating system in detail. [2+8]
2. Define mutual exclusion. Consider a system with a set of process P_1, P_2 and P_3 and their CPU burst time priorities and arrival time being mentioned as below. Calculate average waiting time and average turnaround time using (a) priority (preemptive) (b) round robin algorithm (time quantum=4 ms) [2+8]

Process	Burst Time	Arrival Time	Priority
P_1	5	0	1
P_2	10	1	3
P_3	15	2	2

3. Using Banker's algorithm, explain if the state is in deadlock state or in safe state. [10]
4. What is segmentation? Why is it important? Write its advantages. [2+2+6]
5. What is thread? Differentiate between thread and process. [2+4+4]
6. Define file management. Explain file structure and file types. [4+6]
7. What are the goals of I/O software? Explain DMA operation. [10]
8. Define transaction. Describe transaction look aside buffer (TBL). [5+5]
9. Write short notes on **(any TWO)** [4×2.5]
   a) Interrupts
   b) Disk scheduling
   c) FIFO

Good Luck !

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2080 Bhadra

Program:	**Diploma in Computer Engineering**	**Full Marks: 80**
Year/Part:	**III/I (2018)**	**Pass Marks: 32**
Subject:	**Operating System**	**Time: 3 hrs.**

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt any EIGHT questions.

1. Define operating system. What are the function of operating system? Explain OS as resource manager. [2+2+6]
2. Define process, program and threads. Compare program and process. [6+4]
3. Define process model. Explain five state process model with states and transitions. [2+8]
4. What is virtual memory? Explain any two page replacement algorithms. [2+4+4]
5. Define deadlock. What are the condition for deadlock? Explain deadlock prevention. [2+4+4]
6. What is process scheduling? Explain RR scheduling with an example. [2+8]
7. Describe contiguous allocation. Explain how link list allocation helps to overcome problems of contiguous allocation. [5+5]
8. Define DMA. Explain DMA controller data transfer mode. Differentiate between programmed I/O and interrupt driven I/O. [1+4+5]

9. Write short notes on: (any **TWO**) [5×2]
   a. Peterson's Solution
   b. Importance of Segmentation
   c. FCFS Disk Scheduling

Good Luck !

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2079 Chaitra/2080 Baishakh

Program: Diploma in Information Technology | **Full Marks:** 80

Year/Part: II/II (2016) | **Pass Marks:** 32

Subject: Operating System | **Time:** 3 hrs.

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt Any Eight questions.

1. "Operating System Acts as Resource Manager" and "Operating System Acts as Extended Machine". Justify these statements. **[5+5]**
2. Define process scheduling. Explain first come first served and shortest remaining time next with example. **[2+4+4]**
3. Define IPC. What is mutual exclusion and race condition? Explain Peterson's solution. **[2+4+4]**
4. What is deadlock? Write down conditions for deadlock to occur and deadlock prevention techniques. **[2+4+4]**
5. Explain memory management with fixed and variable partition briefly. **[10]**
6. Explain contiguous and linked list allocation of file using FAT. **[10]**
7. What is DMA? Write differences between memory mapped IO and IO mapped IO. **[2+8]**
8. a. Write differences between random access and sequential access. **[5]**

   b. What is paging? Explain any one page replacement algorithm. **[1+4]**

9. Write shot notes on: (**Any TWO**) **[2×5]**

   a. Process States

   b. File System Layout

   c. Look Disk Scheduling Algorithm

Good Luck!

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2079, Bhadra/Ashwin

Program: Diploma in Computer Engineering | **Full Marks: 80**

Year/Part: III/I (2018) | **Pass Marks: 32**

Subject: Operating System | **Time: 3 hrs.**

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt any EIGHT questions.

1. Justify "Operating System as resource manager". Explain the types of operating system in brief. [4+6]
2. Why process need to be preemptive? Explain long and short term brust. [4+6]
3. Define process control block. Consider a system with a set of process A, B, C, D with their CPU brust time and arrival time being mentioned as below: [3+7]

Process	Brust Time	Arrival Time
A	6	1
B	10	3
C	2	5
D	4	7

4. How starvation differ dead lock? Explain deadlock handling policies. [4+6]
5. How safe state in achieved in banker algorithm? [10]
6. Define swapping. Differentiate between fixed and variable sized partitioning in multiprogramming. [3+7]
7. What is segmentation? Explain the importance and drawbacks of segmentation. [2+8]
8. What is semaphore? Describe Peterson's algorithm. [3+7]
9. Write short notes on: (any **TWO**) [2×5]
   a. Process Scheduling
   b. Virtual Memory
   c. Thread Vs Process
   d. Interrupt Handlers

Good Luck !

Council for Technical Education and Vocational Training
Office of the Controller of Examinations
Sanothimi, Bhaktapur
Regular/Back Exam-2078, Kartik/Mangsir

Program:	**Diploma in Computer Engineering**	**Full Marks: 80**
Year/Part:	**III/I (2018 New Course)**	**Pass Marks: 32**
Subject:	**Operating System**	**Time: 3 hrs**

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Attempt Any Eight questions.

1 Define operating system. Explain OS as a resource manager. [2+8]

2 What are process and thread? Explain inter process communication. [2+8]

3 What is mutual exclusion? Explain Dekker's or Peterson's algorithm. [2+8]

4 Define deadlock. Explain Ostrich algorithm for deadlock handling. Describe deadlock detection and recovery. [2+4+4]

5 Define process scheduling. Explain Round Robin Scheduling. [2+8]

6 Describe virtual memory. Differentiate between contiguous and noncontiguous memory allocation. [2+8]

7 What is segmentation. Write down the importance and drawbacks of segmentation. [2+8]

8 Explain DMA. Differentiate between memory mapped IO and IO mapped IO. [4+6]

9 Write short notes on : **(Any Two)** [2x5=10]

a) Disk scheduling

b) Optimal page replacement algorithm

c) Memory Hierarchy

d) File operations

Good Luck !

Council for Technical Education and Vocational Training
Office of the Controller of Examinations
Sanothimi, Bhaktapur

Regular/Back Exam-2076, Falgun/Chaitra

Program: Diploma in Computer Engineering | **Full Marks: 80**
Year/Part: III/I (2013) | **Pass Marks: 32**
Subject: Applied Operating System | ***Time:* 3 *hrs***

Candidates are required to give ... practicable. The figures in the m...

Attempt **Any Eight** Questions

1. Explain batch systems. Time sharing systems and real time systems in brief. [10]

2. Define preemptive and non-preemptive scheduling. Differentiate between process and thread. Explain the states of a process. [4+3+3]

3. Define mutual exclusion. Consider a system with a set of process P1, P2 and P3 and their CPU burst time priorities and arrival time being mentioned as below: [2+4+4]

Process	Burst Time	Arrival time	Priority
P1	5	0	2
P2	15	1	3
P3	10	2	1

Calculate average waiting time and average turn around time using (a) Priority (Preemptive)
(b) Round robin algorithm (Time quantum=4ms)

4. Explain deadlock and starvation. A system has 3 process and 4 allocation resources. The table 4 resource type exist in the amount as E = [4 2 3 1]. [3+3+4]
The current allocation matrix and request matrix are as follows:

Current Allocation Matrix

Process	R0	R1	R2	R3
PO	0	0	1	0
P1	2	0	0	1
P2	0	1	2	0

Current Allocation Matrix

Process	R0	R1	R2	R3
PO	2	0	0	1
P1	1	0	1	0
P2	2	1	0	0

Contd.....

Using Banker's algorithm explain if the state is in deadlock state or in safe state. [10]

5. Define logical and physical memory. Differentiate between fixed and variable partition multiprogramming. [4+6]
6. Define segmentation. Explain briefly segmentation with paging. [2+8]
7. Explain about file allocation methods. Describe tertiary storage structure. [6+4]
8. Explain disk structure, scheduling and management of mass-storage device. [10]
9. Explain Inter process communication (IPC) in brief. And Also explain classical IPC problems. [4+6]
10. Write short notes on: **(any Two)** [2x5=10]

a) Threads

b) Direct mapping

c) Swap-space management

Good Luck !

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2075, Falgun/Chaitra

Program: Diploma in Computer Engineering — **Full Marks: 80**

Year/Part: III/I (2010) — **Pass Marks:32**

Subject: Applied Operating System — **Time: 3 hrs**

Candidates are required to give ... in their own words as far as ... practicable. The figures in the ma...

Attempt (Any Eight) questions.

1. Describe operating system. Explain OS as virtual machine and resource manager. [2+4+4]

2. Differentiate between process and threads. Explain Dekker's Algorithm. [2+2+6]

3. Explain virtual exclusion, context switching, critical section, race condition with examples. [2.5+2.5+2.5+2.5]

4. Define preemptive and non- preemptive scheduling. Explain shortest job first algorithm with example. [2+2+6]

5. Explain classical IPC problems. Consider following set of process having their burst time mentioned in milliseconds. [4+6]

Process	Arrival Time	Burst Time
P_0	0	5
P_1	1	3
P_2	2	8
P_3	3	6

Calculate the average waiting time using round-robin algorithm with quantum of 3 millisecond.

6. Explain deadlock. Write short notes on starvation. [5+5]

7. Explain page replacement algorithm and its types. [10]

8. What do you mean by memory management? Explain contiguous and non-contiguous storage allocation in brief. [4+3+3]

9. Write Short Notes on **(Any Two)** [2x5=10)

a) Virtual Memory
b) Mass-storage device
c) Swap space management

Good Luck

COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING

Office of the Controller of Examinations

Sanaothimi, Bhaktapur

Regular/Back Exam – 2073, Falgun

Program: Diploma in Computer/ IT Engineering **Full Marks: 80**

Year/Part: III/I (New Course) **Pass Marks: 32**

Subject: Applied Operating System ***Time: 3 hrs***

Candidates are required to give their answers in their own words as far as practicable. The figures in the marain indicate full marks.

Attempt All questions.

1. a) What is operating system? Describe OS as "Extended Machine". [2+6]
   b) Describe: **Any Two** [2*4]
      i) Types of O.S ii) O.S structure
      iii) O.S as Resource Manager
2. a) Define process. Write the difference between process and thread. [6]
   b) Write Peterson's Algorithm [6]
   c) Explain following: Critical section, Mutual exclusion, Race condition, Semaphores, with simple example. [8]
3. a) Define process scheduling and process synchronization with example. Describe following algorithm: [6+6]
      i) Round Robin ii) FCFS
   b) Define system call and kernel. [4]
4. a) Define paging. Explain Fragmentation, Coalescing and Compaction. [8]
   b) What do you mean by Virtual Memory? [4]
5. a) Explain file-system structure. [5]
   b) Explain swap-space Management and Tertiary storage structure. [4]

6. Explain deadlock condition and deadlock Recover Process. [7]

Or

What is security? Write short notes on Linux.

"Good luck"

COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING

Office of the Controller of Examinations

Sanaothimi, Bhaktapur

Regular/Back Exam – 2073

Program: Diploma in Computer/ IT Engineering **Full Marks: 80**

Year/Part: III/I (New Course) **Pass Marks: 32**

Subject: Applied Operating System ***Time: 3 hrs***

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt Any Five questions.

1. a) Define OS. Describe Operating system as Resource Manager. [2+6=8]
   b) Describe Layered and client-server system. [2+6=8]
2. a) What is parallel processing? Describe PCB (Process Control Block). [2+6=8]
   b) Define system call. Describe type of system call. [2+6=8]
3. a) What is scheduling? Describe FCFS and round robin scheduling. [2+6=8]
   b) What is mutual exclusion? Describe Peterson's Algorithm. [2+6=8]
4. a) Define paging. Describe the page table. [3+5=8]
   b) Describe optimal page replacement and Clock page replacement Algorithm. [2+6=8]
5. a) What is thread? Difference between thread and process. [2+6=8]
   b) What is swap-space management? Describe Tertiary-storage structure. [4+4=8]

6. **Write short notes on: (Any Four)** [4*4=16]
   a) Virtual Memory
   b) IPC
   c) Fragmentation
   d) Deadlock Recovery
   e) Distributed OS

"The End"

COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING

Office of the Controller of Examinations

Sanaothimi, Bhaktapur

Regular/Back Exam Chaitra– 2071

Program: Diploma in Computer/ IT Engineering **Full Marks: 80**

Year/Part: III/I (New Course) **Pass Marks: 32**

Subject: Applied Operating System ***Time: 3 hrs***

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt Any Five questions.

1. a) Define applied OS. Describe OS as virtual machine. [2+6=8]
   b) Describe monolithic system and layered system of operating system. [8]
2. a) Define system call. Describe types of system call. [2+6=8]
   b) Define the term "process". Also explain process state and transitions. [2+6=8]
3. a) What is scheduling? Describe FCFS and round robin scheduling algorithm. [2+3+3=8]
   b) Define deadlock. Explain deadlock recovery techniques. [2+6=8]
4. a) Define the term virtual memory. Describe optimal page replacement algorithm. [2+6=8]
   b) Describe second chance page replacement algorithm and clock page replacement algorithm. [4+4=8]
5. a) What is segmentation? Describe segmentation with paging. [2+6=8]
   b) What is thread? What are benefits of using thread? [8]
6. Write short notes on: **(Any Four)** [4*4=16]
   a) Fragmentation
   b) Critical region, race condition
   c) Memory hierarchy
   d) Tertiary Storage Structure
   e) Kernel

"The End"

COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING

Office of the Controller of Examinations

Sanaothimi, Bhaktapur

Back Exam Chaitra– 2071

Program: Diploma in Computer/ IT Engineering **Full Marks: 40**

Year/Part: III/I (New Course) **Pass Marks: 16**

Subject: Applied Operating System ***Time: 1.3 hrs***

Candidates are required to give their answers in their own words as far as practicable. The figures in the marain indicate full marks.

Attempt Any Five questions.

1. What do you mean by applied operating system? Explain various operating system structure. [2+6=8]
2. Define parallel processing? Explain I/O software layer with diagram. [2+6=8]
3. What is deadlock? What are conditions for a deadlock to occur? Explain various deadlock prevention techniques. [2+3+3=8]
4. Explain paging and TLB. Briefly explain clock page replacement algorithm. [4+4=8]
5. Explain about FCFS, LRU and Round robin algorithm. [2+3+3=6]
6. Write short notes on: **(Any Two)** [2*4=8]
   a) Process control block (PCB)
   b) File system structure
   c) Segmentation

"The End"

COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING

Office of the Controller of Examinations

Sanaothimi, Bhaktapur

Regular/Back Exam Chaitra – 2070

Program: Diploma in Computer/ IT Engineering **Full Marks: 80**

Year/Part: III/I (New Course) **Pass Marks: 32**

Subject: Applied Operating System ***Time: 3 hrs***

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt <u>Any Eight</u> questions.

1. What is shell? Explain in detail OS as resources manager? [2+8=10]
2. Define real time system and distribute system? Explain about operating system structure. [4+6=10]
3. Define process? List the difference between process and threads? Explain critical region. [2+6+2=10]
4. What is mutual exclusion? Explain how we can achieve mutual exclusion with suitable algorithm? [2+8=10]
5. Define process scheduling? List the scheduling objectives. Explain FCFS algorithm. [2+5+3=10]
6. Define deadlock. List and explain the necessary condition of deadlock. Also explain the recovery form deadlock? [2+4+4=10]
7. What is memory management? Explain memory management on variable partition multi programming? [2+8=10]
8. Define virtual memory? Explain about least recently used replacement algorithm? What is thrashing? [2+6+2=10]
9. Explain about Input/output software layer with diagram? [10]
10. Write short notes on: [2*5=10]
    a) Disk structure
    b) Segmentation

"The End"

COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING

Office of the Controller of Examinations

Sanaothimi, Bhaktapur

Regular/Back Exam Chaitra – 2069

Program: Diploma in Computer/ IT Engineering **Full Marks: 40**

Year/Part: III/I (New Course) **Pass Marks: 16**

Subject: Applied Operating System ***Time: 1.3 hrs***

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt (Any Five) Questions.

1. Define Operating system. Why operating system is also called as resource manager? Justify. [3+5=8]
2. Define process and thread. Describe about round robin algorithm. [2+2+4=8]
3. Write Peterson's algorithm.
4. Describe used page replacement and first in first out algorithm. [8]
5. Describe transaction look aside buffers (TBL).
6. Write short note on: **(Any Two)** [4*2=8]
   a) I/O Request handling
   b) Swap space management
   c) Deadlock detection and recovery

"The End"