**ORCHID INTERNATIONAL COLLEGE**

**SET A**

**Full Marks: 60**

**Time: 3 hrs**

**Bijaychowk, Gaushala-9, Kathmandu**

**Pre-Board Examination -2080**

**BIM /Fourth Semester / IT 241: Operating System**

***Candidates are required to answer the question in their own words as far as practicable.***

# Group "A"

**Brief Answer Questions: [10×1=10]**

1. What is virtual devices?
2. Explain disk access time.
3. What is malware?
4. Explain file allocation table (FAT).
5. Why access control list are important?
6. Explain Coalescing technique.
7. Explain shared memory technique in IPC.
8. What is deadlock?
9. Explain Address Binding.
10. What is microkernel?

**Group "B"**

**Exercise Problems: [5×3=15]**

1. Explain Distributed Operating system with its communication structure.
2. Why access control are important in security? And also explain one time password.
3. Explain RAID level with example.
4. How I-nodes are used in file allocation method?
5. Given the memory partitions of 200k, 500k, 200k, 300k and 600k (in order), how would each of the First-fit, Best-fit, Next-fit and worst-fit algorithm place processes of 212k, 417k, 112k, and 426k (in order)? Which algorithm makes the most efficient use memory?

**Group "C"**

**Comprehensive Answer Questions: (attempt any THREE) [3×5=15]**

1. if we consider reference string 1,2,1,7,0,1,7,8,2,3,6,7,1,0,5,6,5,6,5,6,7,8,9,7 and number of frames allocated = 4. Using optimal page replacement algorithm to find fault number and fault ration.
2. What is TSL(Test and Set lock) instruction? Explain mutual exclusion without busy waiting technique using wait and signal technique.
3. Consider an imaginary disk with 99 cylinders. A request come in to read a block on cylinder 21. While the seek to the cylinder 21 is in progress, new request come in for cylinders: 1,78,2,88,12,44,76,3,22,23,67,29,89, in the order. Calculate the total head movement with total cylinder moved using C-SCAN scheduling algorithm (using 6msec per cylinder moved)
4. What is paging hardware? Explain TLB-assisted translation with diagram.

**Group “D”**

**Long Answer Question: (attempt any TWO) [2×10=20]**

1. Explain Banker’s algorithm for multiple resources. Consider a system with five process P0 through P4 and three resources type A,B,C. Resource type A has 15 , B has 10 And type C has 12.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Process | Allocation | | | Max | | |
| A | B | C | A | B | C |
| P0 | 2 | 2 | 1 | 7 | 5 | 3 |
| P1 | 1 | 0 | 1 | 3 | 2 | 2 |
| P2 | 5 | 3 | 2 | 9 | 3 | 2 |
| P3 | 2 | 1 | 1 | 3 | 2 | 2 |
| P4 | 1 | 0 | 2 | 4 | 3 | 3 |

* + 1. What will be the content of the need Matrix?
    2. Is the system in safe state? If yes, then what is the safe sequence?

1. Consider the following set of processers, with the length of the CPU burst given in milliseconds, draw Gantt chart illustrating their execution and calculate average waiting time and turnaround time using:
2. Shortest Job First(Preemptive/Non Preemptive)
3. Priority (Preemptive/Non Preemptive)
4. Round Robin (quantum=3)

|  |  |  |  |
| --- | --- | --- | --- |
| Process | Burst Time | Priority | Arrival |
| P0 | 1 | 2 | 1 |
| P1 | 3 | 1 | 1 |
| P2 | 6 | 2 | 0 |
| P3 | 7 | 3 | 3 |
| P4 | 3 | 1 | 4 |

1. Why kernel is important in bootstrap? Explain monolithic structure with diagram and also explain the different process life cycle. And explain inter process communication.

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**SET B**

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**Full Marks: 60**

**Time: 3 hrs**

**Pre-Board Examination -2080**

**BIM /Fourth Semester / IT 241: Operating System**

***Candidates are required to answer the question in their own words as far as practicable.***

# Group "A"

**Brief Answer Questions: [10×1=10]**

1. What is shared devices?
2. Explain cylinder and sector of disk structure.
3. What is software vulnerabilities?
4. Explain New technology file system (NTFS)
5. Why access control matrix are important?
6. Explain Compaction technique.
7. Explain critical region in IPC.
8. Explain Real time operating system
9. Explain Program Relocation.
10. Explain Real time operating system

**Group "B"**

**Exercise Problems: [5×3=15]**

1. Explain Interprocess communication in Distributed system with example.
2. Explain the model of secure system of operating system with example.
3. Explain bad blocks with example.
4. Explain continuous allocation and non contiguous allocation method with example.
5. Given the memory partitions of 300k, 500k, 200k, 300k and 600k (in order), how would each of the First-fit, Best-fit, Next-fit and worst-fit algorithm place processes of 212k, 417k, 112k, and 426k (in order)? Which algorithm makes the most efficient use memory?

**Group "C"**

**Comprehensive Answer Questions: (attempt any THREE) [3×5=15]**

1. if we consider reference string 1,2,1,7,0,1,7,8,2,3,6,7,1,0,5,6,5,6,5,6,7,8,9,7 and number of frames allocated = 4. Using FIFO page replacement algorithm to find fault number and fault ration.
2. What is printer spooler? Explain mutual exclusion without busy waiting using sleep and wakeup technique.
3. Consider an imaginary disk with 99 cylinders. A request come in to read a block on cylinder 21. While the seek to the cylinder 21 is in progress, new request come in for cylinders: 1,78,2,88,12,44,76,3,22,23,67,29,89, in the order. Calculate the total head movement with total cylinder moved using C-LOOK scheduling algorithm (using 6msec per cylinder moved)
4. What is segment table? Explain the basic differences between paging and segmentation.

## Group “D”

**Long Answer Question: (attempt any TWO) [2×10=20]**

1. Explain safe/unsafe algorithm for multiple resources. Consider a system with five process P0 through P4 and three resources type A,B,C. Resource type A has 15 , B has 10 And type C has 12.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Process | Allocation | | | Max | | |
| A | B | C | A | B | C |
| P0 | 3 | 2 | 1 | 8 | 5 | 3 |
| P1 | 2 | 0 | 1 | 4 | 2 | 2 |
| P2 | 4 | 3 | 2 | 8 | 3 | 2 |
| P3 | 3 | 1 | 1 | 4 | 2 | 2 |
| P4 | 3 | 0 | 2 | 5 | 3 | 3 |

1. What will be the content of the need Matrix?
2. Is the system in safe state? If yes, then what is the safe sequence?
3. Consider the following set of processers, with the length of the CPU burst given in milliseconds, draw Gantt chart illustrating their execution and calculate average waiting time and turnaround time using:
4. Shortest Job First(Preemptive/Non Preemptive)
5. Priority (Preemptive/Non Preemptive)
6. Round Robin (quantum=3)

|  |  |  |  |
| --- | --- | --- | --- |
| Process | Burst Time | Priority | Arrival |
| P0 | 5 | 2 | 1 |
| P1 | 3 | 1 | 1 |
| P2 | 6 | 2 | 0 |
| P3 | 7 | 3 | 3 |
| P4 | 3 | 1 | 4 |

1. Why kernel is important in operating system? Explain layered structure with diagram and also explain the different process life cycle. And explain inter process communication (IPC).