



COLLEGE OF COMPUTING AND INFORMATICS

Course : IT241- Operating System Last Date : _____
Assignment Number : 2 Total Marks : 5

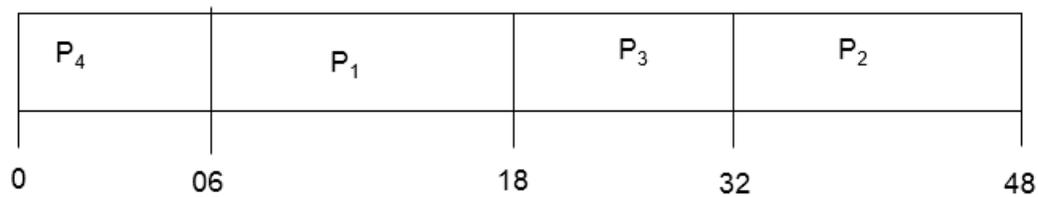
- Answer all questions.
 - All are asked to submit the assignment on or before _____ at 11.59 pm.
 - Total marks for this assignment-2 are 5.
 - Copied assignment will be graded as zero.
 - Late submission of assignment won't be accepted and it will be considered as zero.
 - This assignment has taken from the chapter 5, 6, 7 and 8.
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1. Find the average waiting time for the following processes using Shortest-Job-First (SJF) Scheduling. (1.5 Marks)

Process	Burst Time
P1	12
P2	16
P3	14
P4	06

Answer:

SJF scheduling chart



Waiting time:

Process	Waiting Time
P1	06
P2	32
P3	18
P4	08

$Average\ waiting\ time = (6 + 32 + 18 + 0) / 4 = 14.$

2. Write a short note about the following (1.5 Marks)
- a. Concurrent Transactions
 - b. Non-serial Schedule

Answer:

Concurrent Transactions

- Must be equivalent to serial execution – serializability
- Could perform all transactions in critical section
- Inefficient, too restrictive
- Concurrency-control algorithms provide serializability

Non-serial Schedule

- Non-serial schedule allows overlapped execute
 - Resulting execution not necessarily incorrect
- Consider schedule S, operations O_i, O_j

- Conflict if access same data item, with at least one write
 - If O_i, O_j consecutive and operations of different transactions & O_i and O_j don't conflict
 - Then S' with swapped order $O_j O_i$ equivalent to S
 - If S can become S' via swapping nonconflicting operations
 - S is conflict serializable
3. Discuss in detail about various deadlock characterization in operating system. (1 Mark)

Answer:

Deadlock Characterization

Deadlock can arise if four conditions hold simultaneously.

- **Mutual exclusion:** only one process at a time can use a resource
- **Hold and wait:** a process holding at least one resource is waiting to acquire additional resources held by other processes
- **No preemption:** a resource can be released only voluntarily by the process holding it, after that process has completed its task
- **Circular wait:** there exists a set $\{P_0, P_1, \dots, P_n\}$ of waiting processes such that P_0 is waiting for a resource that is held by P_1, P_1 is waiting for a resource that is held by P_2, \dots, P_{n-1} is waiting for a resource that is held by P_n , and P_n is waiting for a resource that is held by P_0 .

4. Describe about logical and physical address space. (1 Mark)

- The concept of a logical address space that is bound to a separate **physical address space** is central to proper memory management
 - **Logical address** – generated by the CPU; also referred to as **virtual address**
 - **Physical address** – address seen by the memory unit
 - Logical and physical addresses are the same in compile-time and load-time address-binding schemes; logical (virtual) and physical addresses differ in execution-time address-binding scheme
- **Logical address space** is the set of all logical addresses generated by a program
- **Physical address space** is the set of all physical addresses generated by a program