



4th Semester (Back-2008 & Prev. Batches)
OS CS-401
(CSE)

SPRING END SEMESTER EXAMINATION-2014

4th Semester B.Tech

OPERATING SYSTEM CE-401

(Back-2008 & Previous Admitted Batches)

Full Marks: 70

Time: 3 Hours

Answer any SIX questions including Question No.1 which is compulsory.
The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable
and all parts of a question should be answered at one place only.

1. Answer all the questions:- [2 × 10]
 - a) What is starvation in process scheduling? How this problem can be solved?
 - b) Why *wait & signal* operations in semaphore need to be atomic? Give an example.
 - c) SSTF is sometimes referred as cylinder oriented disk scheduling scheme, Explain Why?
 - d) Compare first fit, worst fit, and best fit algorithm.
 - e) Write the advantages of threads over process.
 - f) Consider the page sequence 4,3,2,1,4,3,5,4,3,2,1,5. If optimal page replacement algorithm is used and frame size is 3, then find out the percentage of page fault.
 - g) Consider a paging system with the page table in memory. Each memory reference access takes 150ns. The TLB has a hit ratio

(1)

of 75% and the time needed for access is almost negligible.
What is the average lookup time for a page through TLB?

- h) What is the relationship between quantum time and turn around time in Round Robin scheduling?
- i) Why does long term scheduler provides good mixture of CPU and I/O bound in processes?
- j) Suppose two processes P and Q are there.

P:

```
While(1)
{
    Wait(MUTEX);
    Print 'A'
    Signal(MUTEX);
}
```

Q:

```
While(1)
{
    Wait(MUTEX);
    Print 'B'
    Signal(MUTEX);
}
```

Assume that processes are executing only once and they share Semaphore variable MUTEX initialized to 1. If process Q executes after process P then, write the output of above code.

- 2. a) What is a process? Draw and Explain, how a process can be scheduled through different scheduling queues? [5]
- b) Use Round Robin, SRTF algorithm to calculate average wait time and average turnaround time of the processes as respective data given :— [5]

Process	CPU Burst	Arrival Time
P1	12	01
P2	04	02
P3	07	04
P4	04	00
P5	09	00

Note: Round Robin Scheduling Algorithm time slice is 3 unit of time.

(2)

Calculate average wait time and average turnaround time of the above two algorithms separately.

3. a) What is paging scheme? Describe the required paging hardware with TLB to map logical address to physical address in a paging scheme. [5]
- b) What is busy waiting in semaphore? Give a solution to avoid busy waiting can be solved. [5]
4. a) The logical address space in a computer system consists of 128 segments. Each segment can have up to 32 pages of 8KB each. Physical memory consists of 4K number of blocks of 8KB each. Find out the maximum page table size for each segment, if each page table entry consists of frame address? [5]
- b) Explain how Peterson's two process solution for satisfies three necessary requirements of critical section problem. [5]
5. What is Banker's algorithm? If there are five process like (P0, P1, P2, P3, P4) and three resource type like A [09 instances], B [05 instances], C [08 instances]. Suppose at time T0, the following snapshot of the system given below: - [10]

Process	Allocation			Max. Need		
	A	B	C	A	B	C
P0	0	1	1	5	2	3
P1	2	0	0	2	2	3
P2	3	1	3	4	2	3
P3	2	1	1	3	1	1
P4	1	0	2	2	0	2

- a) Use the safety algorithm to find weather the above system is in safe state or not.

(3)

- b) If a resource of type-A increased its allocation for process P4 by 1 (P4 process allocation becomes $\langle 2, 0, 2 \rangle$) then check whether the above system is in safe state or not.
6. a) What is belady's anomaly? Explain with example. [5]
b) The head of the moving hard disk with 300 tracks numbered from 0 to 299. Given request references are 34, 184, 98, 122, 14, 65, 200, 255, 234 and 168. If the head currently served position is 23 and its previously served positions 44 then, use FCFS and SSTF disc scheduling algorithm to, calculate maximum number of head movements for each one. [5]
7. a) What is monitor? How monitor can be used to solve bounded buffer problem? [5]
b) Explain about different CPU scheduling criteria in brief. [5]
8. Write short notes:- [Any two] [5 × 2]
a) File allocation table
b) Access Matrix
c) Wait For Graph

XXXXX