



SPRING END SEMESTER EXAMINATION-2018
6th Semester B.Tech & B.Tech Dual Degree (Open Elective-I)

INTRODUCTION TO OPERATING SYSTEM
CS-3048

[For 2016(L.E.) & 2015 Admitted Batches]

Time: 3 Hours

Full Marks: 60

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 questions. [2 × 10]
- (a) What are the differences between multiprocessing and multiprogramming?
 - (b) Mention various Operating System services.
 - (c) What are the applications of Real-Time Systems?
 - (d) What is meant by context switching?
 - (e) What is the difference between CPU bound process and I/O bound process?
 - (f) Does the presence of cycle guarantees the presence of deadlock in a system with multiple instances of resources? Justify the answer.
 - (g) What is the difference between external and internal fragmentation?
 - (h) What are the advantages and disadvantages of different allocation methods in file management systems?

- (i) What is the use of kernel in operating system?
- (j) What is thrashing and what are the various methods to avoid thrashing?
2. (a) What are different CPU scheduling criteria? Explain. [4]
- (b) What is process? Explain about different state transitions in process state diagram. [4]
3. Consider the following set of processes , with the length of CPU burst time given in milliseconds [8]

Process	Burst	Priority
P1	8	4
P2	6	1
P3	1	2
P4	9	2
P5	3	3

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5 all at time 0.

- Draw Gantt charts that illustrate the execution of these processes using FCFS, SJF, no preemptive priority (a smaller priority number implies a higher priority) and RR(quantum=1) scheduling algorithms.
- What is the turnaround time of each process for the scheduling algorithms mentioned at i ?
- What is the waiting time of each process for the scheduling algorithms mentioned at i ?
- Which of these algorithms results in minimum average waiting time?

4. (a) How paging is implemented with TLB(Translation look-aside buffer) ? What happens in case TLB miss occurs? Explain with a neat diagram. [4]
- (b) How is effective memory-access time calculated? Suppose in a system, main memory access time is 100 ns, TLB access time is 20 ns and hit ratio is 0.9. Calculate effective memory access time. [4]
5. (a) What is deadlock? Explain the necessary conditions for occurrence of deadlock. [4]
- (b) Consider the following snapshot of a system: [4]

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

Given: Available=(10,5,7). Using banker's algorithm, illustrate that the system is in a safe state by demonstrating an order in which the processes may complete.

6. (a) Compare first fit, worst fit and best fit algorithm for dynamic memory allocation. How these algorithms affect internal and external fragmentation? [4]
- (b) i. What is paging? What are the advantages of paging over segmentation memory management scheme? [2×2]
- ii. Explain swapping of two processes using disk as a backing store with the help of a neat diagram.

7. (a) Explain various page replacement algorithms. What is belady's anomaly? [4]

(b) Suppose a hard disk in a system is with 200 cylinders numbered from 0 to 199. Given request references are 95, 180, 34, 119, 11, 123, 62, 64. If the initial head position is at cylinder 50, calculate total head movement in each of the following disk scheduling algorithms: [4]

i. FCFS

ii. SSTF

iii. SCAN

8. Write short notes:-[any two] [4×2]

(a) Demand Paging

(b) Access Matrix

(c) Deadlock Prevention
