

Third Semester Examination – 2006

OPERATING SYSTEMS

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory
and any five from the rest.

The figures in the right-hand margin
indicate marks.

1. Answer the following questions : 2x10

(i) How many processes will be created ?

```
main()
{
    fork( );
    fork( );
    fork();
}
```

P.T.O.

(ii) With segmentation, if there are 64 segments and the maximum segment size is 512 words, the length of the logical address in bits is

- (a) 12
- (b) 14
- (c) 15
- (d) 16.

(iii) A high paging rate

- (a) will create high I/O rate
- (b) keeps the system running well
- (c) too much processor activity
- (d) creates a slow system.

(iv) A disk scheduling algorithm in an OS causes the disk arm to seek back and forth across the disk surface servicing all requests in its path. This is

- (a) FCFS
- (b) SSTF
- (c) SCAN
- (d) Elevator scheme.

(v) Block caches or buffer caches are used

- (a) to improve the disk performance
- (b) to handle interrupts
- (c) to increase the capacity of the main memory
- (d) to speed up main memory read operation.

(vi) Which of the following is false ?

- (a) segmentation suffers from external fragmentation
- (b) paging suffers from internal fragmentation
- (c) virtual memory is used in only multi user systems
- (d) segmented memory can be paged.

(vii) The term aging refers to

- (a) keeping track of the time a page has been in memory for LRU replacement

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2. (a) Solve the Reader-writer problem using semaphores having priority to the writer. 5
(b) Specify the characteristics of real-time OS. 5
3. (a) Write the Lamport's bakery algorithm to solve Producer-Consumer problem (finite buffer). 5
(b) Specify the Dijkstra's conditions for a solution to critical section problem. 5
4. (a) Draw the block diagram for segmented-paging memory management and explain its operations. 5
(b) Deadlock prevention is not possible, explain. 5
5. Write notes on : 2.5x4
(a) Distributed OS
(b) UNIX kernel system
(c) IPC in UNIX
(d) UNIX file system.

6. (a) What is critical section (CS) ? Why it has to be handled properly by OS ? Sketch the hardware solutions available to solve CS problem. 5
(b) Stack algorithms for page replacement do not suffer from Belady's anomaly, justify. 5
7. (a) Consider the following sequence of memory references from a 460-word program : 6
10, 11, 104, 170, 73, 309, 185, 245, 246, 434, 458, 364.
(i) show the page trace table assuming page size 100 words, 200 words of primary memory for FIFO and LRU page replacement schemes.
(ii) Repeat the same using a page size of 50 words.

- (b) Draw the block diagram of segmented paging scheme. 4
8. (a) What are the reasons for structuring the file system hierarchically? 5
- (b) Briefly discuss the process scheduling subsystems of UNIX. 5



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