



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER VI [INFORMATION TECHNOLOGY]
SUBJECT: (IT 607) Applied Operating System

Examination : Second Sessional
Date : 12/02/2014
Time : 12:45 to 2:00

Seat No. :
Day : Wednesday
Max. Marks : 36

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed.

- (a) What is spin-lock? In which case it is beneficial to use spin-lock? [2]
- (b) Discuss blocking send and non blocking send. [2]
- (c) What mistakes a programmer may make while using semaphore operations? What will be the consequences of those mistakes? [2]
- (d) Consider Inverted Paging Scheme, In which physical memory is 1 GB. Page size is 4KB. Logical Address Space is 32 bit. Find out total entries in Inverted Page table. [2]
- (e) For two processes P1 and P2 segment table are as given below. [2]

Process P1		Process P2	
Limit	Base	Limit	Base
25286	43062	25286	43062
4425	68348	8050	90003

So, to successfully assign physical address to each logical address without generating trap minimum how many physical addresses needed in physical memory?

- (f) In hierarchical paging scheme, page size is 4KB. Primary Page table contains 2048 entries. Secondary page table contains 64 entries. Now, If we apply simple paging scheme on above logical address then how many entries will be there in page tables? [2]

Q.2 Attempt *Any TWO* of the following questions. [12]

- (a) Discuss transition look-aside buffer scheme with effect of Hit ratio using example. [6]
- (b) 1. Discuss two methods to resolve external fragmentation. [3]
2. If total physical memory available is 16 MB. Page size is 2KB. Consider each entry in page-table requires 2 bytes. Then how many frames are available in physical memory. If virtual address space is 32 bit then What is size of page table? [3]
- (c) Consider a paged virtual memory system with 32 bit virtual address space and 1KB page size. Each page table entry requires 32 bits. It is desirable to limit page table size to one page size. Now if we use hierarchical paging then Find out total number entries in each page table. [6]

Q.3 (a) Write Peterson's algorithm (Algorithm-3) of two-process synchronization using two Variables (turn and flag). Justify that the algorithm satisfies three requirements of a Solution of a critical section problem. [6]

- (b) There are five processes $P=\{P1, P2, P3, P4, P5\}$ and five resources $R=\{R1, R2, R3, R4, R5\}$ in a system. Each resource has single instance. Process P1 is holding R2 and is requesting for R1; process P2 is holding R1 and is requesting for R3, R4 and R5; process P3 is holding R4 and is requesting for R5; process P4 is holding R5 and is requesting for R2; and process P5 is holding R3. Draw Resource Allocation Graph for the given state of the system. Find out cycles that are present in the Graph and write answer about whether system is in deadlock state or not. [6]

OR

- Q.3**
- (a) What is the readers-writes problem? Explain it. Write its solution using semaphores. [4]
 - (b) Discuss Semaphore and its implementation having no busy waiting. [4]
 - (c) Discuss following terms in context of RPC: port-mapper, marshalling, XDR, and stub/skeleton.