

DIPLOMA (COMPUTER SCIENCE) (DCSVI)

Term-End Examination

December, 2012

00291

BICS-037 : OPERATING SYSTEM

Time : 2 hours

Maximum Marks : 70

Note : Attempt any five questions. Question No. 1 is compulsory.

1. Choose the correct answer : **7x2=14**
- (a) Thrashing can be avoided if :
- (i) the pages belonging to the working set of the programs are in main memory
 - (ii) the speed of CPU is increased.
 - (iii) the speed of I/O processor is increased
 - (iv) all of the above
- (b) In virtual memory systems, dynamic address translation :
- (i) is the hardware necessary to implement paging.
 - (ii) stores pages at a specific location on disk
 - (iii) is useless when swapping is used.
 - (iv) is part of the operating system paging algorithm

- (c) The memory allocation scheme subject to external fragmentation is :
- (i) segmentation
 - (ii) indirect addressing
 - (iii) swapping
 - (iv) pure demand paging
- (d) Process is :
- (i) program in high level language kept on disk
 - (ii) contents of main memory
 - (iii) a program in execution
 - (iv) a job in secondary memory
- (e) The initial value of the semaphore that allows only one of the many processes to enter their critical sections is :
- (i) 8
 - (ii) 1
 - (iii) 16
 - (iv) 0
- (f) A page fault :
- (i) is an error in a specific page
 - (ii) occurs when a program access a page of memory
 - (iii) is an access to a page not currently in memory
 - (iv) is a reference to a page belonging to another program.

- (g) Operating system :
- (i) Links a program with the subroutines it references
 - (ii) provides a layered, user friendly interface
 - (iii) enables the programmer to draw a flow chart.
 - (iv) all of the above

2. (a) What is an operating system ? Write down the steps of memory management and process management functions of an operating system. 7
- (b) What is the main purposes of a system call and a system program ? Define Kernel and describe various operations performed by Kernel. 7

3. (a) Explain different states of a process with the help of a state transition diagram and also explain Process Control Block (PCB). 7
- (b) Consider following set of processes : 7

Process	Arrival time	Burst time
P ₁	0	8
P ₂	1	4
P ₃	2	9
P ₄	3	5

Calculate average waiting time in :

- (i) Pre-emptive SJF scheduling
- (ii) NON pre-emptive SJF scheduling and Draw Gantt Chart also.

4. (a) What are the objectives of CPU scheduling ? Differentiate between multi level queue and multilevel feedback queue scheduling with suitable examples. 7
- (b) What are the semaphore ? What is the usage of semaphore ? Define Race Conditions and describe the method used to prevent race condition. 7
5. (a) Describe Dining philosopher problem with its solution. 7
- (b) Considering a system with 5 processes P_0 through P_4 and three resources types A,B,C. Resource type A has 7, B has 2 and C has 6 instances. Suppose at t_0 time we have following state :

Process	Allocation			Request			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	0	0	0	0	0	0
P_1	2	0	0	2	0	2			
P_2	3	0	3	0	0	0			
P_3	2	1	1	1	0	0			
P_4	0	0	2	0	0	2			

Show that given system in deadlock state ?

6. (a) Describe the implementation of paging and segmentation with suitable example. 7
- (b) Compare the three page replacement algorithm : 7
- (i) FIFO (ii) LRU and (iii) optimal with examples

7. What is virtual memory ? Describe it working in detail. 14
8. Attempt *any four* parts of the following : 3.5x4=14
- (a) I/O management
 - (b) Disk Scheduling
 - (c) Shell and AWK programming
 - (d) File management
 - (e) Dead lock detection and avoidance
 - (f) RAID and disk Caches.
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