

TEIT / sem-V / CBSGS / DT. 23/05/2017 QP Code:594303

(3 Hours)
CGVRold

[Total Marks : 80

N.B. : (1) Question 1 is compulsory.(2) Attempt any **three** from remaining Questions.(3) **Assume** suitable **data** wherever **necessary**.(4) **Figure** in **right** indicates **marks**.

1. (a) What are fractals? Derive an equation $D = \log N / \log S$. 20
 (b) Compare boundary fill and flood fill algorithm
 (c) Explain VR application in education domain
 (d) Differentiate between raster scan and Random scan display
2. (a) Explain Sutherland- Hodgeman polygon clipping algorithm with suitable **10**
 example. Discuss its advantages and disadvantages.
 (b) Derive the Bresenham's line drawing algorithm. What are its advantages? **10**
 Take suitable example and draw a line between two points
3. (a) Write a short note on Homogeneous co-ordinate system. 10
 (b) Explain graphical rendering pipeline. 10
4. (a) What are different types of projections? Derive the matrix representation **10**
 for Perspective transformation in XY - plane and on negative Z- axis.
 (b) Derive the matrix for Rotation about an arbitrary point for 2D Rotation. **10**
5. (a) Let ABCD be the rectangular window with A(20,20), B(90,20), C(90,70), **10**
 and D(20,70). Find region codes for endpoints and use Cohen Sutherland
 algorithm to clip the lines P1P2 with
 P1 (10,30), P2 (80,90) and
 q1q2 with q1(10,10), q2(70,60)
 (b) Explain B spline curve 10
6. (a) Show that transformation matrix for reflection about line $y=x$ is equivalent **10**
 to reflection to X axis followed by counter clockwise rotation of 90 degree.
 (b) Derive mathematical representation for Beziers curve and state their **10**
 property

Q.P. Code : 594200

(3 Hours)

[Total Marks : 80

- N.B.: (1) Question No. 1 is compulsory.
 (2) Solve any **three** questions out of remaining **five**.
 (3) Figures to **right** indicate **full** marks.
 (4) Assume suitable **data** where **necessary**.

1. (a) Describe the file systems of Windows. [5]
 (b) Write the deadlock detection algorithm [5]
 (c) What are the differences between user level-threads and kernel-level threads? Under what circumstances one better than the other? [5]
 (d) Describe how does critical section avoid race condition? What are the properties which data item should possess to implement critical section? [5]
- 2 (a) A page size of 4096 bytes and following page table [10]

Page No	In/out	Frame
0	out	333
1	in	300
2	in	1000
3	out	100
4	out	500
5	in	120
6	out	412
7	in	740

Which of the following virtual addresses would generate a page fault? For those that do not generate page fault, to what physical address would they translate?

- i) 21610 ii) 35410 iii) 27012 iv) 10234

- (b) What is semaphore? Explain the counting semaphore with the help of example. [10]
- 3 (a) Consider a system running 10 I/O bound tasks and one CPU bound task. Assume that I/O [10]
 bound task issues an I/O operation once for every millisecond of CPU computing and that each I/O operation takes 10 milliseconds to complete. Also assume that the context switching overhead is 0.1 millisecond and that all processes are long running tasks. What is the CPU utilization for a round robin scheduler when :
 i) The time quantum is 1 millisecond ii) The time quantum is 10 milliseconds
- (b) Show that Peterson's algorithm satisfies the requirements of a mechanism to control [10]
 access to a critical section

TURN OVER

- 4 (a) Consider the following snapshot of the process to be executed. Draw the Gantt chart and determine the average waiting time and average turnaround time for FCFS, SJF(pre-emptive), SJF(nonpreemptive) and round robin (quantum=2) scheduling algorithm. [10]

Process	Arrival Time	Burst Time
P1	0	7
P2	1	4
P3	3	3
P4	5	1
P5	7	5

- (b) What is a kernel? Describe briefly the approaches of designing kernel [10]
- 5 (a) On a simple paging system with 2^{24} bytes of physical memory, 256 pages of logical address space, and a page size of 2^{10} bytes. [10]
- How many bytes are in page frame?
 - How many bits in the physical address specify the page frame?
 - How many entries in the page table?
 - How many bits are in the logical address?

- (b) What criteria should be adopted for choosing type of file organization? Describe the implementation of file allocation techniques? [10]

- 6 (a) Consider the following snapshot of the system:- [10]

Process	Allocation			Max.			Available		
	A	B	C	A	B	C	A	B	C
P0	1	1	2	4	3	3	2	1	0
P1	2	1	2	3	2	2			
P2	0	2	0	4	4	2			
P3	0	6	3	2	6	3			
P4	1	1	2	2	2	3			

Answer the following questions using Banker's algorithm?

- Determine the total amount of resource of each type.
 - What is the content of need matrix?
 - Determine if the system is in safe state using safety algorithm.
 - If a request from process p1 arrives for (1,1,0) can the request be granted immediately.
- (b) Explain the Android operating system. [10]

T.E./IT/Sem-VI (CBSEGS)

Dt - 29/5/2017

Q.P. Code : 594401

(3 Hours)

[Total Marks: 80

N.B.:- (1) Question No. 1 is **Compulsory**.(2) Solve any **three** questions from the remaining **five** questions.(3) **Figures** to the **right** indicate **full** marks.(4) Make **suitable** assumptions wherever **necessary** and state them **clearly**.

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|----|---|----|
| 1. | (a) Define Embedded System. Explain classification of embedded system. | 5 |
| | (b) State the features of 8051 microcontroller. | 5 |
| | (c) Explain Semaphores and Mutex in RTOS. | 5 |
| | (d) Explain pipelining in ARM processor. | 5 |
| 2. | (a) Explain the Embedded System architecture in detail. | 10 |
| | (b) Explain the Timer/ Counter of IC 8051. | 10 |
| 3. | (a) Write an assembly language program for 8051 microcontroller to generate a square wave of 2KHz on pin 1.0 assuming crystal frequency of 12 MHz. Justify the mode of operation. | 10 |
| | (b) Explain the hardware and software interrupts of 8051 microcontroller. | 10 |
| 4. | (a) Explain the addressing modes of ARM 7 Processor | 10 |
| | (b) Explain the following instructions with suitable examples w.r.t ARM processor | 10 |
| | (i) BLX | |
| | (ii) CMN | |
| | (iii) SWP | |
| | (iv) MVN | |
| | (v) LDC | |
| 5. | (a) Explain the various methods to implement interprocess communication. | 10 |
| | (b) Explain the addressing modes of 8051 microcontroller. | 10 |
| 6. | Write note on (any two): | 20 |
| | (a) Battery operated smart card reader | |
| | (b) Digital clock as an Embedded system | |
| | (c) Serial communication of 8051 | |
| | (d) Assembler directives | |

