

- N.B. (1) Question number 1 is compulsory.
 (2) Solve any 3 from remaining.
 (3) Assume suitable data where ever necessary.

Q.1. Attempt the following: 20
 a. compare amongst hard and soft links
 b. Explain Linux file access permissions
 c. List 5 Environment variables. Describe their role.
 d. Explain Activity Life-cycle using neat Labeled diagram

Q.2.
 (a) Explain role of /etc/passwd, /etc/shadow, /etc/group files with respect to user administration 10
 (b) Write short note on 'working with web using shell script' 10

Q3.
 (a) Explain use of grep command. Also give examples of use of c, i and v option with grep 10
 (b) Write a note on process management in linux along with the relevant command for process management. 10

Q4.
 (a) Explain File System Hierarchy (FHS) of Linux 10
 (b) Explain various pipes and redirects 10

Q5.
 (a) Explain role of Logical Volume Manager in Linux Kernel 10
 (b) Explain the use of following Networking commands: i) ping ii) arp iii) host iv) traceroute v) ifconfig 10

Q6
 (a) Publishing the Android application 5
 (b) What are different layouts possible for a view derived from ViewGroup base class 5
 (c) Describe role of Intent in Android Programming 5
 (d) What is the role of init.signal 5

(Time: 3 Hrs)

Marks: 80

- N.B. : 1. Question no. 1 is compulsory.
2. Solve any Three questions out of remaining Five questions.

- Q-1 a) Justify Write-Ahead Logging (WAL) protocol for a recovery algorithm that requires both UNDO and REDO. 5
b) What is a view? Discuss the difference between a view and a base relation. 5
c) Explain Factless Fact Table. 5
d) What is role of metadata in data warehouse? 5
- Q-2 a) What are the different types of SQL injection attacks? What risks are associated with it? Explain any one attack in detail. 10
b) Vaidehi Foods & Beverages is a new company which produces Dairy, Bread and Cookies products with production unit located at Kharghar, Navi Mumbai. These products are sold in selected regions of India. They have sales units at Mumbai, Pune, Satara, Sangli and Kolhapur. The President of the company wants sales information.
1. Find the dimensions of data warehouse for given problem statement and justify your answer.
2. State and represent the concept hierarchy for each dimension.
3. If the president of company wants the report: The number of items sold and income in each region for each product with time.
3.1. Explain at which concept hierarchy level the query will be?
3.2. Write ROLAP/MOLAP query.
4. Describe the Rollup or Drilldown OLAP operations.
- Q-3 a) What are the roles of the Analysis, Redo and Undo phases in ARIES? Explain with suitable example. 10
b) Consider the following database that has to be distributed: 10
PROJ (PNO, PNAME, BUDGET)
PAY (TITLE, SALARY)
EMP (ENO, ENAME, TITLE)
ASG (ENO, PNO, RESPONSIBILITY, DURATION)
1. Show 2 examples of horizontal fragmentation.
2. Show 1 example of derived fragmentation.
3. Show 1 example of vertical fragmentation.

- Q-4 a) Design a schema in SQL for a Library System. Show one example each for Primary key and Foreign Key constraint. Create one suitable ECA example to enforce the Library constraint. 10
- b) Explain different types of transparencies in distributed databases in detail. 10

- Q-5 a) Explain with suitable example object identity, object structure and type constructors in OODB's. 10

- b) 10

PERSON

SSN	Name	Income	Address	City	State	Zip	Sex	Last_Degree
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Query1: SELECT COUNT (*) FROM PERSON WHERE <condition>;

Query2: SELECT AVG (Income) FROM PERSON WHERE <condition>;

Consider the PERSON relation and two queries as shown:

1. Give <condition> so it is possible to infer the values of individual tuples.
2. State clearly the remedies by which the possibility of inferring individual information from statistical queries is reduced.
3. Explain in short Statistical Database Security with above relation and queries.

- Q-6 a) With suitable relational schema give at least two queries of 10
1. Simple Query,
 2. Complex Retrieval Queries using Group By,
 - 3) Recursive Queries and
 - 4) Nested Queries

- b) Attempt any Two of the following 10
- i) What is meant by granting and revoking a privilege?
 - ii) Explain in short the concurrency control in distributed databases.
 - iii) Explain in detail the *Information Delivery Component* of data warehouse architecture.

Note : Q1 is compulsory.
Attempt any THREE out of the remaining questions.

Q1. Attempt any 4 sub questions

- a) What are the characteristics of modern operating systems. (5 M)
- b) What is internal and external fragmentation? (5 M)
- c) What is a Process Control Block (PCB) ? (5 M)
- d) Define the terms critical section and race condition. (5 M)
- e) Draw and explain process state transition diagram. (5 M)

- Q2. a) Explain the conditions for deadlock. Also explain how the deadlock can be determined with the help of resource allocation graph. (10 M)
- b) Explain different kernel architectures in detail (10 M)

- Q3 a) On a disk with 1000 cylinders, number 0-999. Compute the number of tracks the disk arm must move to satisfy all request in the disk queue. (10 M)
Assume the last request received was at track 345 and the head is moving towards track 0. The queue in FIFO order contains request for the following tracks. 123, 874, 692, 475, 105, 376.
Perform the computation for the following scheduling algorithms.
i. FIFO ii. SSTF iii. SCAN.
- b) Explain different types of schedulers. (10 M)

- Q4 a) Explain File Allocation methods in detail. (10 M)
- b) Consider the following page reference string (10 M)
1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6
how many page faults would occur for the following replacement algorithms assuming three, five frames for LRU, FIFO and Optimal Replacement.

- Q5. a) Brief the evolution of an OS
- b) Consider the given snap of the system (10 M)

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	2	1	2	2	0	3	2	2	2	5	3	2
P1	1	1	0	2	2	7	5	2				
P2	2	2	5	4	2	3	7	6				
P3	0	3	1	2	1	6	4	2				
P4	2	4	1	4	3	6	5	8				

Answer the following questions using Banker's algorithm

- (i) What is the content of Matrix *need*?
- (ii) Is the system in safe state?
- (iii) If a request from process P1 arrives for (1,3,2,1) can the request be granted immediately?

Q6 Write notes on (any two)

(20 M)

- a) Multithreading
- b) Linux File system
- c) Producer Consumer Problem.
- d) RAID.

Computer Graphics & Virtual Reality

Q.P. Code : 5627

(3 Hours)

[Total Marks :80

N.B. : (1) Questions No 1. is compulsory.

(2) Attempt any three questions from the remaining questions.

(3) Assume suitable data wherever possible.

1. (a) Explain various image representation techniques. 5
- (b) Explain haptic rendering pipeline. 5
- (c) Explain different types of virtual reality systems. 5
- (d) Differentiate between Raster scan and Random scan display. 5

2. (a) Explain any computing architecture for virtual reality. 10
- (b) Explain sutherland Hodgeman polygon clipping algorithm. Clip polygon ABCDE against window PQRS. The coordinates of the polygon are A (80, 200), B (220,120), C (150,100), D (100, 30) and E (10,120). The coordinates of the window are P (200,50), Q (50,150), R (200,150) and S (200, 50). 10

3. (a) What is marphing and warping? Explain techniques used in morphine? 10
Warping
- (b) With respect to 3D transformations, describe the steps to be carried out when an object is to be rotated about an arbitrary axis. Specify all the required matrices. State your assumptions clearly. 10

4. (a) Consider a triangle ABC whose coordinates are A (10, 20) B (30, 40) and C (50, 20). Perform the following transformations : (Specify the matrices that are used) 8
 - (i) Translate the given triangle by 3 units in X direction and -2 units in Y direction.
 - (ii) Rotate the given triangle by 30.
 - (iii) Reflect the given triangle about $X = Y$
 - (iv) Scale the given triangle uniformly by 2 units.
- (b) Write a function to fill a region whose boundaries are specified by different colours. Explain the algorithm. 8
- (c) Explain the test (s) to determine whether the point is inside or outside of polygon. 4

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5. (a) State mathematical equation for Bezier curve. Find the Bezier curve which starts at $(x_0, y_0) = (20, 20)$ and ends at $(x_3, y_3) = (40, 10)$ and has control points given as $(x_1, y_1) = (0, 10)$ and $(x_2, y_2) = (30, -30)$ 10
- (b) What is the significance of modeling in virtual reality? Explain any modeling technique used in virtual reality. 10
6. Write short note on (any four) 20
- (a) Fractals
 - (b) Projections
 - (c) Aliasing and anti-aliasing techniques
 - (d) B- spline curve
 - (e) Application of Virtual reality

Note the following instructions.

1. Question no.1 is compulsory.
2. Solve any three questions out of remaining five questions.
3. Assume suitable data if necessary.
4. Draw neat diagrams wherever necessary.

1.
 - a) What are the specialties of Embedded Systems? (4)
 - b) What are the major components of 8051 microcontroller? (3)
 - c) Explain in brief Assembler Directives with respect to 8051 assembler. (3)
 - d) Explain in brief the principal features of the ARM architecture. (3)
 - e) Explain in brief Real Time Operating Systems. (4)
 - f) Explain in brief features of DSP and SOC. (3)
2.
 - (a) Explain in details pipelining in ARM7 processor? (10)
 - (b) What are the Addressing Modes of 8051 microcontroller? (10)
Explain with example in each addressing mode.
3.
 - (a) Explain functions of Program Status Word Register, Timer Control Register and Interrupt Priority Register in 8051 microcontroller. (10)
 - (b) Explain how Exceptions and Interrupts are handled in ARM 7. (10)
4.
 - (a) Assuming crystal frequency = 11.0592 MHz, write an Assembly Language Program for 8051 to generate square wave of 50 Hz at port pin P2.3. Draw circuit diagram to implement the same. (10)
 - (b) List Task scheduling algorithms. Explain operation of each of the algorithms. (10)
5.
 - (a) List the Kernel objects and explain functions of each of the objects. (10)
 - (b) Explain with block diagram design of Battery Operated Smart Card Reader. (10)
6. Write short note on the following
 - (a) Digital Clock as an embedded system. (7)
 - (b) Serial Port Communication in 8051. (6)
 - (c) Addressing Modes of ARM 7 processor. (7)