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16CS/IS45

Fourth Semester B.E. Semester End Examination, May/June 2018-19

DATABASE MANAGEMENT SYSTEM

Time: 3 Hours

Max. Marks: 100

- Instructions:* 1. Unit III & V are compulsory.
2. Attempt any one full question from remaining units.

UNIT - I

1. a. What is DBMS? Explain the various characteristics of the Database Approach. (2) (1) (2) (07)
b. Identify and explain the roles of various actors on the scene in Database approach. (2) (1) (2) (06)
c. With a neat block diagram, explain the Three-schema architecture in DBMS. (2) (1) (2) (07)

OR

2. a. Suppose that you are a database designer and you have been approached to design a database for COLLEGE. Analyze the given scenario and model the same conceptually using an E-R diagram. Make appropriate assumptions and state the same.
1) Identify the various entities and their attributes,
2) Specify the key attributes of each entity type,
3) Identify the various relationships between the entities,
4) The structural constraints on each relationship type (3) (2) (4) (12)
b. Explain the different types of attributes with an example for each. (2) (2) (2) (08)

UNIT - II

3. a. Compute the resultant tables of the following set operations applied on tables in Fig.1.
(i) STUDENT U INSTRUCTOR (union)
(ii) STUDENT ∩ INSTRUCTOR (intersection)
(iii) STUDENT - INSTRUCTOR (minus)
(iv) INSTRUCTOR - STUDENT (minus)
(v)

STUDENT	
Fn	Ln
Susan	Yao
Ramesh	Shah
Johnny	Kohler
Barbara	Jones
Amy	Ford
Jimmy	Wang
Ernest	Gilbert

INSTRUCTOR	
Fname	Lname
John	Smith
Ricardo	Browne
Susan	Yao
Francis	Johnson
Ramesh	Shah

Fig.1.

(3) (4) (2) (08)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

- b. Given the schema
 EMP (Fname, Lname, SSN, Bdate, Address, Sex, Salary, SuperSSN, Dno)
 DEPT(Dname, Dnumber, MgrSSN, MGrstartdate)
 DEPT-LOC (Dnumber, Dloc)
 PROJECT(Pname, Pnumber, Ploc, Dnum)
 WORKS-ON (ESSN, PNo, Hours)

Write the relational algebra for the following queries.
 List the Fname, Lname of all the employees who work for Dname='Research'
 Retrieve the SSN of all the MALE employees who is also a manager.

Retrieve all female Employees of who work on Project="Construction"

List fname,lname,address,salary details of all managers

(3) (4) (3) (12)

OR

- 4 a. Explain the following with suitable examples. (i) Key Constraints (ii) Participation constraint (iii) Weak entity (iv) Recursive Relationship (2) (2) (02) (08)
- b. Consider the two tables T1 and T2 shown in Fig. 2. Find the results of the following operations:

- (i) T1 X T2
 (ii) T1 \bowtie T1.P = T2.A T2
 (iii) T1 \bowtie T1.Q = T2.B T2
 (iv) T1 \bowtie (T1.P = T2.A AND T1.R = T2.C) T2

TABLE T1			TABLE T2		
P	Q	R	A	B	C
10	a	5	10	b	6
15	b	8	25	c	3
25	a	6	10	b	5

Fig. 2

L	CO	PO	M
(3)	(4)	(2)	(12)
(2)	(3)	(2)	(12)
(2)	(5)	(2)	(08)
L	CO	PO	M

UNIT – III(Compulsory)

- 5 a. Explain the following with an example for each.
 1) First NF 2) Second NF 3) Third NF 4) BCNF

UNIT – IV

- 6 a. Explain the various schema change statements in SQL with an example for each.
 b. List and explain the various aggregate functions available in SQL.

(2) (4) (2) (07)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

- c. Consider the following table (STAFF)

FID	Fname	City	Dept	Salary
1	Dilip	Belgaum	CSE	5000
2	Samit	Mumbai	CSE	4000
3	Abhishek	Pune	EC	5000
4	Deepa	Belgaum	EC	10000
5	Sahil	Dharwad	MECH	9000
6	Mohit	Belgaum	CSE	12000

Write the SQL queries for the following statements along with the sample output.

- a. List all the faculties whose salary is more than 10000;
 b. Update the salary of all the employees to 30000 who belongs to department of CSE.
 c. Display all the details of the employee whose name's second alphabet is 'b' and fourth alphabet is 'i' and name should end with 'k' alphabet.
 d. Display the employee details in the order of their decreasing salary.
 e. Display the details of the employee who stays in 'Belgaum' and salary should be in the range of 5000 to 10000.

(5) (4) (4) (05)

OR

- a. Draw the Schema diagram and Write the SQL queries for the following Database Schema
FLIGHTS(no: integer, fromPlace: string, toPlace: string, distance: integer, Departs: date, arrives: date, price: real)
AIRCRAFT(aid: integer, aname: string, cruisingrange: integer)
CERTIFIED(cid: integer, aid: integer)
EMPLOYEES(cid: integer, ename: string, salary: integer)
 1) Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80,000.
 2) Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to Frankfurt.
 3) Find the names of pilots certified for some Boeing aircraft.
 4) Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.

(5) (4) (4) (10)

- b. Define the following with an example for each
 1) Primary key 2) Composite key 3) Foreign key 4) NULL Constraint 5) Weak Entity
 (1) (4) (2) (05)

- c. Explain the various DML commands in SQL.

(2) (4) (2) (05)

UNIT - V(Compulsory)

- 8 a. With a neat diagram, explain the PL/SQL Block structure. Also explain PL/SQL variables.
 b. Explain the various looping constructs in PL/SQL.

(2) (4) (2) (10)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

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16IS45

Fourth Semester B.E. Fast Track Semester End Examination, July/August 2019
DATABASE MANAGEMENT SYSTEMS

Time: 3 Hours

Max. Marks: 100

Instructions:
1. Unit - I and Unit V are compulsory.
2. Answer any one full question from remaining Units.**UNIT - I (Compulsory)**

L	CO	PO	M
(1)	(1)	(1)	(10)

1. a. List the any five characteristics of DBMS. Explain the various database users in brief. (1) (1) (1) (10)
b. Suppose that you are a database designer and you have been approached to design a database for College Admission Management website. Make appropriate assumptions and state the following.
1) Identify minimum 4 entities and their attributes,
2) List the attributes and specify the key attributes of each entity type,
3) Identify the various relationships between the entities,
4) The structural constraints on each relationship type
5) Analyze the given scenario and model the same conceptually using an E-R Diagram. (4) (3) (4) (10)

UNIT - II

L	CO	PO	M
(2)	(2)	(4)	(10)

2. a. Explain Unary Relational operations in relational algebra with suitable example. (2) (2) (4) (10)
b. Explain different types joins in relational algebra with examples. (2) (2) (2) (10)

OR

3. a. Demonstrate with suitable examples (i) UNION (ii) INTERSECTION and (iii) MINUS (2) (2) (4) (10)
b. Given the schema
EMP (Fname, Lname, SSN, Bdate, Address, Sex, Salary, SuperSSN, Dno)
DEPT(Dname, Dnumber, MgrSSN, MGrstartdate)
DEPT-LOC (Dnumber, Dloc)
PROJECT(Pname, Pnumber, Ploc,Dnum)
WORKS-ON (ESSN,PNo,Hours)

Give the relation algebra expression for the following:

1. List the Fname, SSN of all employees
2. List all male Employees of the Department
3. List the Dept details by managed by the manager "Mr.Suhas"
4. List names of Projects managed by Dnum=5
5. List the names of employees whose salary < 40000

(3)	(2)	(11)	(10)
L	CO	PO	M

UNIT - III

(2)	(3)	(4)	(12)
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4. a. Explain 1NF, 2NF and 3NF with an example.

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

b. What is BCNF? How it is different from 3NF? Illustrate with an example.

(3) (3) (3) (08)

OR

5 a. Explain the causes of transaction failure and List the ACID properties.

(2) (3) (1) (10)

b. Explain the following in relation with concurrency control with an example:

- i) The Lost update problem
- ii) The temporary update problem.

(2) (4) (4) (10)
L CO PO M

UNIT - IV

6 a. Explain the different Aggregate functions used in SQL, with examples.

(2) (2) (4) (08)

b.

Given the CAR schema

CAR(Serial_no, Model, Manufacturer, Price)

OPTION(Serial_no, Option_name, Price)

SALE(Salesperson_id, Serial_no, Date, Sale_price)

SALESPERSON(Salesperson_id, Name, Phone)

Write the SQL statements for following:

- (i) Find the list of car manufacturers and models who are quoting price less than Rs: 5,50,000/-
- (ii) Find the names of female salespersons who have sale price more than Rs:25,000/-
- (iii) List all the option names available for car model = "TATA"
- (iv) List the names and phone numbers of salesperson for manufacturer="FORD".

(3) (2) (11) (12)

OR

7 a. Write the following SQL Queries for the CAR schema :

CAR(Serial_no, Model, Manufacturer, Price)

OPTION(Serial_no, Option_name, Price)

SALE(Salesperson_id, Serial_no, Date, Sale_price)

SALESPERSON(Salesperson_id, Name, Phone)

- i) Write a SQL queries to create the all the tables and Populate one tuple into CAR table by insert
- ii) Write a SQL query to delete the specific row from CAR table
- iii) Write a SQL query to search for a specific car model from CAR table
- iv) Write a SQL query to update sale_price to 60000 into SALE table

(3) (2) (11) (12)

b. Explain various DDL commands with an example for each.

(2) (2) (1) (08)

UNIT -V (Compulsory)

L CO PO M

8 a. Explain the blocks of PL/SQL Block Structure . Also demonstrate PL/SQL variables declarations and usage.

(2) (2) (4) (12)

b. Explain PL/SQL looping statements with examples.

(2) (2) (4) (08)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

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Third Sem

Time: 3 Hours

Instructions: 1.
2.

1 a. Explain adva

b. Discuss how

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4 a. Demon

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5 a. Explai

b. What

6 a. Disc

b. Wha

c. Illu

7 a. Dis

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Fourth Semester B.E. Semester End Examination, May/June 2018-19
DATABASE MANAGEMENT SYSTEM

Max. Marks: 100

Time: 3 Hours

Instructions: 1. Unit III & V are compulsory.
2. Attempt any one full question from remaining units.

UNIT - I

- 1 a. What is DBMS? Explain the various characteristics of the Database Approach. (2) (1) (2) (07)
b. Identify and explain the roles of various actors on the scene in Database approach. (2) (1) (2) (06)
c. With a neat block diagram, explain the Three-schema architecture in DBMS. (2) (1) (2) (07)

OR

- 2 a. Suppose that you are a database designer and you have been approached to design a database for COLLEGE. Analyze the given scenario and model the same conceptually using an E-R diagram. Make appropriate assumptions and state the same.
1) Identify the various entities and their attributes,
2) Specify the key attributes of each entity type,
3) Identify the various relationships between the entities,
4) The structural constraints on each relationship type (3) (2) (4) (12)
b. Explain the different types of attributes with an example for each. (2) (2) (2) (08)

UNIT - II

- 3 a. Compute the resultant tables of the following set operations applied on tables in Fig.1.
(i) STUDENT U INSTRUCTOR (union)
(ii) STUDENT ∩ INSTRUCTOR (intersection)
(iii) STUDENT – INSTRUCTOR (minus)
(iv) INSTRUCTOR – STUDENT (minus)
(v)

STUDENT	
Fn	Ln
Susan	Yao
Ramesh	Shah
Johnny	Kohler
Barbara	Jones
Amy	Ford
Jimmy	Wang
Ernest	Gilbert

INSTRUCTOR	
Fname	Lname
John	Smith
Ricardo	Browne
Susan	Yao
Francis	Johnson
Ramesh	Shah

Fig.1.

(3) (4) (2) (08)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

b. Given the schema

EMP (Fname, Lname, SSN, Bdate, Address, Sex, Salary, SuperSSN, Dno)
 DEPT(Dname, Dnumber, MgrSSN, MGrstartdate)
 DEPT-LOC (Dnumber, Dloc)
 PROJECT(Pname, Pnumber, Ploc, Dnum)
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Write the relational algebra for the following queries.

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Retrieve all female Employees of who work on Project="Construction"

List fname, lname, address, salary details of all managers

(3) (4) (3) (12)

OR

4. a. Explain the following with suitable examples. (i) Key Constraints (ii) Participation constraint (iii) Weak entity (iv) Recursive Relationship

(2) (2) (02) (08)

- b. Consider the two tables T1 and T2 shown in Fig. 2. Find the results of the following operations:

- (i) T1 X T2
- (ii) $T1 \bowtie T1.P = T2.A \quad T2$
- (iii) $T1 \bowtie T1.Q = T2.B \quad T2$
- (iv) $T1 \bowtie (T1.P = T2.A \text{ AND } T1.R = T2.C) \quad T2$

TABLE T1

P	Q	R
10	a	5
15	b	8
25	a	6

TABLE T2

A	B	C
10	b	6
25	c	3
10	b	5

Fig. 2

(3) (4) (2) (12)

UNIT - III(Compulsory)

5. a. Explain the following with an example for each.
 1) First NF 2) Second NF 3) Third NF 4) BCNF

(2) (3) (2) (12)

- b. Explain the various reasons that cause a transaction to fail in the middle of execution.

(2) (5) (2) (08)

UNIT - IV

6. a. Explain the various schema change statements in SQL with an example for each.

(2) (4) (2) (08)

- b. List and explain the various aggregate functions available in SQL.

(2) (4) (2) (07)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

c. Consider the following table (STAFF)

FID	Fname	City	Dept	Salary
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3	Abhishek	Pune	EC	5000
4	Deepa	Belgaum	EC	10000
5	Sahil	Dharwad	MECH	9000
6	Mohit	Belgaum	CSE	12000

Write the SQL queries for the following statements along with the sample output.

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- b. Update the salary of all the employees to 30000 who belongs to department of CSE.
- c. Display all the details of the employee whose name's second alphabet is 'b' and fourth alphabet is 'i' and name should end with 'k' alphabet.
- d. Display the employee details in the order of their decreasing salary.
- e. Display the details of the employee who stays in "Belgaum" and salary should be in the range of 5000 to 10000.

(5) (4) (4) (05)

OR

7. a. Draw the Schema diagram and Write the SQL queries for the following Database Schema
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AIRCRAFT(aid: integer, aname: string, cruisingrange: integer)
CERTIFIED(cid: integer, aid: integer)
EMPLOYEES(eid: integer, ename: string, salary: integer)
- 1) Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80.000.
 - 2) Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to Frankfurt.
 - 3) Find the names of pilots certified for some Boeing aircraft.
 - 4) Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.

(5) (4) (4) (10)

- b. Define the following with an example for each
 1) Primary key 2) Composite key 3) Foreign key 4) NULL Constraint 5) Weak Entity

(1) (4) (2) (05)

- c. Explain the various DML commands in SQL.

(2) (4) (2) (05)

UNIT - V(Compulsory)

8. a. With a neat diagram, explain the PL/SQL Block structure. Also explain PL/SQL variables.

(2) (4) (2) (10)

- b. Explain the various looping constructs in PL/SQL.

(2) (4) (2) (10)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

Fourth Semester B.E. Semester End Examination, May/June 2018-19
OPERATING SYSTEM

3 Hours

Max. Marks: 100

- Instructions:*
1. Unit -I and Unit-III are compulsory
 2. Answer any one full question from each of the remaining units

UNIT - I (Compulsory)

L	CO	PO	M
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- a. Define an Operating system? List and explain the different services provided by an operating system
(2) (1) (1) (10)
- b. Construct a sequence of system calls to transfer contents from one file to another. Explain layered approach with a neat diagram
(2) (1) (2) (10)

UNIT - II

L	CO	PO	M
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- a. With a neat process state transition diagram, explain the different states of a process.
(3) (1) (1) (07)
- b. Consider the following set of processes with Arrival Time and CPU Burst Time in milliseconds.

Process	Arrival Time	Burst Time
P1	0	10
P2	1	5
P3	2	7
P4	3	6

Apply SJF and Round Robin algorithms. Consider time quantum for Round Robin algorithm is 4 milliseconds. Draw Gantt Chart. Compute and compare the Average Waiting Time and Average Turn Around Time.

(4) (2) (4) (10)

- c. Explain three requirements for critical section problem.
(2) (2) (1) (03)

OR

3. a. Explain any four Scheduling Criteria for CPU Scheduling Algorithms.
(2) (2) (1) (04)
- b. What is PCB? Explain its components.
(2) (2) (1) (08)
- c. Illustrate the Readers-Writers problem and provide a solution using semaphores.
(2) (2) (1) (08)

UNIT - III (Compulsory)

L	CO	PO	M
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4. a. Define deadlock. What are the necessary conditions for deadlock to occur? Indicate how many of these should occur for deadlock to happen?
(2) (3) (1) (10)
- b. Solve the following snapshot using Banker's algorithm.

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P ₀	0	0	2	0	0	4	1	0	2
P ₁	1	0	0	2	0	1			
P ₂	1	3	5	1	3	7			
P ₃	6	3	2	8	4	2			
P ₄	1	4	3	1	5	7			

i) Is the system in safe state?

ii) If a request from process P₂ arrives for (0,0,2), can the request be granted immediately?

(3) (3) (2) (10)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

UNIT - IV

L CO PO

(2) (3) (1)

- 5 a. What is Demand Paging? Explain the steps involved in handling page fault with diagram
 b. Given memory partitions of 100k, 500k, 200k and 600k (in order). Which algorithm from worst fit and first fit places processes with requirements 212k, 417k, 112k and 426 k in an efficient manner?

(3) (3) (2)

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4th Sem

3 Hours

- 6 a. Explain hc average ca

- 6 a. Discuss Paging with neat diagrams.

OR

- b. Explain v numbers

- b. Apply FIFO and LRU Page Replacement algorithms for page frames size 3 and find the page fault for the following string: 5, 4, 3, 2, 1, 4, 3, 5, 4, 3, 2, 1, 5

(2) (3) (1)

- 7 a. Compu

- b. Draw

- 7 a. What is a file? List and explain the various file attributes and file operations.
 b. Discuss Remote File Systems in detail.

UNIT - V

(3) (3) (2)

- 8 a. Expl disc

- b. Ex

- 8 a. Discuss the different access methods in detail.

OR

- b. Explain the following directory structures with an example.
 i) single-level directory
 ii) two-level directory
 iii) three-structured directories

(2) (3) (1)

(10)

a. Explai

b. Devel

i)

ii)

iii)

iv)

v)

a. Expl

b. Ex

c. Do

on al

(2) (3) (1)

(10)

a.

b.

c.

3 a.

b.

c.

4 a.

b.

c.

5 a.

b.

c.

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

Note: L (Level), CO (Course Outcome), PO

16CS1S43

Fourth Semester B.E. Makeup Examination, May/June 2018-19
DESIGN AND ANALYSIS OF ALGORITHMS

Max. Marks: 100

Instructions: 1. UNIT-I and UNIT-III are compulsory
2. Answer any one full question from remaining units

UNIT - I (Compulsory)

- a. Explain design and analysis process with a neat labeled diagram. (4) (1) (1) (07)
b. Explain with appropriate examples three asymptotic notations. (2) (1) (1) (09)
c. If $M(n)$ denotes the number of moves in tower of Hanoi puzzle when n disks are involved, give a recurrence relation for $M(n)$ and solve this recurrence relation. (4) (1) (1) (04)

UNIT - II

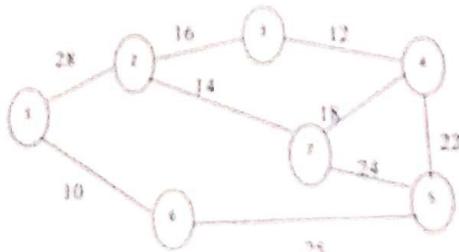
- a. Write an algorithm for insertion sort. Analyze its worst case efficiency. (4) (2) (2) (08)
b. Write Quick sort algorithm and apply the same on the following list and draw recursive call tree. 10, 89, 30, 90, 40, 50, 70. (3) (2) (2) (08)
c. Find the upper bound of recurrences given below by substitution method.
a) $T(n) = 2T(n/2) + 1$ b) $T(n) = T(n-1) + n$ (3) (2) (2) (04)

OR

- a. Outline the heapsort algorithm along with Heapsort function and apply the same for the following list 15, 18, 10, 7, 17, 16 using heap sort. Show all the steps for sorting the list. (3) (2) (2) (10)
b. Design an algorithm for binary search. Give an example. Show that the worst case efficiency of binary search is $O(\log n)$. (4) (2) (2) (06)
c. Write an algorithm for merge sort. Analyze its efficiency. (4) (2) (2) (04)

UNIT - III (compulsory)

- a. Write Prim's algorithm to find minimum cost spanning tree. (2) (3) (1) (06)
b. Write Dijkstra's algorithm to find single source shortest paths. (2) (3) (1) (06)
c. Determine minimum cost spanning tree for the graph using prim's algorithm. Show the steps in tabular form. (3) (3) (2) (08)

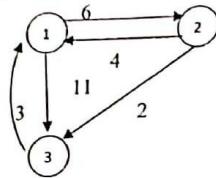


Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

UNIT - IV

5 a. Write Floyd's algorithm for all pairs shortest paths problem.

b. Apply Floyd's algorithm to the graph shown below.

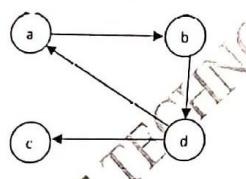


c. Define dynamic programming and show how it is applied to compute 5C3. Show the recurrence relation used and the computations in tabular form.

OR

6 a. Write Warshall's algorithm to construct the transitive closure of a given digraph.

b. Apply Warshall's algorithm to find the transitive closure for the digraph shown below.



UNIT - V

7 a. Describe Horspool's algorithm with pseudo code using input enhancement in string matching.

b. With necessary state space tree for N queens problem, explain the solving of 4 queens problem by backtracking.

OR

8 a. Explain Hamiltonian circuit problem. Apply backtracking method to solve subset sum problem for the instance $S = \{1, 2, 3, 5, 6, 7\}$ and $d = 15$.

b. Solve the following assignment problem.

$C =$

	job1	job2	job3	job4	
person a	9	2	7	8	
person b	6	4	3	7	
person c	5	8	4	8	
person d	3	9	9	4	

L CO PO

(2) (4)

PO

(1)

Fourth Semester B.E. Fast Track Semester
MICROPROCESSORS AND

3 Hours

Instructions:
1. Answer any two questions.
2. UNIT I and II
3. Assume any reasonable values.

UNIT - I (COMPULSORY)

Explain the significance of the following with suitable examples.

i. Instruction byte queue.

ii. Accumulator.

b. Identify the addressing mode and calculate the effective address for the following instruction.

DS=4000H, BX=0900H, SI=0C00H.

i. MOV AL,20H

ii. MOV AL,[SI]

iii. MOV AX,BX

iv. MOV AX,[BX][SI+90H]

c. Examine the effect on flag bits for the following instructions.

i. XOR DX,DX; Given DX=0F20H

ii. ROL AL,01; Given AL=20H

iii. AND AL,0FH;

UNIT - II

a. Illustrate the working of following 8 bit assembly language instructions.

i. MOV ii. MUL iii. SHL

b. Develop an Assembly Language Program to count the number of zero bits in a word.

i. To count the number of zero bits.

ii. To calculate sum and average of memory locations SUM and AVG.

c. Construct the machine code for the following assembly language program.

i. MOV AL,[SI]

ii. MOV AX,WORD PTR [SI]

3 a. Explain the significance of the following assembly language instructions.

i. DB ii. DUP iii. LEAVE

b. Organize 512KB of RAM starting from address 80000H.

RAM is 80000H.

c. Develop an Assembly Language program to find the product of two numbers.

i. To find the product of two numbers.

ii. To divide the product by 10.

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

Fourth Semester B.E. Makeup Examination, May/June 2018-19
DATABASE MANAGEMENT SYSTEM

Page No.

Mat. Marks: 100

- INSTRUCTIONS:**
1. UNIT III and UNIT V are compulsory.
 2. Answer one complete question from the remaining units.
 3. Make suitable assumptions if required.

UNIT - I

L CO PO M

List and explain in brief, any five advantages of using the DBMS approach. And explain the responsibilities of actors on the scene for database system environment.

(2) (10) (02) (10)

Suppose that you are a database designer and you have been approached to design a database for Bank system. Make appropriate assumptions to:

- 1) Identify minimum four entities and their attributes.
- 2) List the attributes and specify the key attributes of each entity type.
- 3) Identify the various relationships between the entities.
- 4) The structural constraints on each relationship type.
- 5) Analyze the given scenario and model the same conceptually using an E-R Diagram.

(3) (1) (2,3) (10)

OR

- a. Explain the three schema architecture of DBMS using neat diagram. (2) (1) (10) (05)
- b. A university database contains information about professors, courses, classes, department and books. Identify suitable relations. Justify cardinality and participation constraints for the same with examples. Sketch a neat ER diagram. (4) (2) (2,3) (10)

- c. Explain the responsibilities of actors behind the scene for database system environment. (2) (1) (2) (05)

UNIT - II

L CO PO M

a. Consider the following relational schema.

Emp(eid,ename, age, salary)
 Works_for(eid, pid, Hours)

Project(pid, pname).

Write the queries in relational algebra for the following:

- 1) Retrieve employee id and name of the employee who works for all the projects.
- 2) Retrieve name and age of employees whose salary > 10000.
- 3) For each employee, get the number of projects and number of hours worked on projects.
- 4) Retrieve names of employees working on 'CSE' project.
- 5) Retrieve name and age of the employees who works on project for more than 3 hours.

(5) (2) (3) (10)

- b. Explain the various Relational Algebra Operations from Set Theory with an example for each. (2) (2) (2) (10)

OR

- a. Explain SELECT, PROJECT and OPERATIONS from Set Theory in relational algebra with example. (2) (2) (2) (10)

- b. Explain the following with an example for each.

1) Inner join 2) Left join 3) Full join

(2) (2) (2) (10)

UNIT - III (Compulsory)

L CO PO

2	3	(2)
2	4	(2)
L	CO	PO

UNIT - IV

L CO PO

2	3	(2)
3	4	(2)
A	A	(2)

UNIT - V (Compulsory)

L CO PO

2	3	(2)
3	4	(2)
B	B	(2)

BUILD**UNIT - V (Compulsory)**

L

2	3	(2)
3	4	(2)
A	A	(2)

2	3	(2)
3	4	(2)
B	B	(2)

BUILD

2	3	(2)
3	4	(2)
B	B	(2)

BUILD**UNIT - V (Compulsory)**

L

2	3	(2)
3	4	(2)
B	B	(2)

BUILD

2	3	(2)
3	4	(2)
B	B	(2)

BUILD**UNIT - V (Compulsory)**

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BUILD**UNIT - V (Compulsory)**

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BUILD

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BUILD**UNIT - V (Compulsory)**

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BUILD**UNIT - V (Compulsory)**

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BUILD

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BUILD**UNIT - V (Compulsory)**

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BUILD

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BUILD**UNIT - V (Compulsory)**

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BUILD

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BUILD**UNIT - V (Compulsory)**

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3	4	(2)
B	B	(2)

BUILD

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B	B	(2)

BUILD**UNIT - V (Compulsory)**

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BUILD

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B	B	(2)

BUILD**UNIT - V (Compulsory)**

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B	B	(2)

BUILD

2	3	(2)
3	4	(2)
B	B	(2)

BUILD**UNIT - V (Compulsory)**

L

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3	4	(2)
B	B	(2)

BUILD

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3	4	(2)
B	B	(2)

BUILD**UNIT - V (Compulsory)**

L

2	3	(2)
3	4	(2)
B	B	(2)

BUILD

2	3	(2)
3	4	(2)
B	B	(2)

BUILD**UNIT - V (Compulsory)**

L

2	3	(2)
3	4	(2)
B	B	(2)

BUILD

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3	4	(2)
B	B	(2)

BUILD**UNIT - V (Compulsory)**

L

2	3	(2)
3	4	(2)
B	B	(2)

BUILD

2	3	(2)
3	4	(2)
B	B	(2)

BUILD**UNIT - V (Compulsory)**

L

2	3	(2)
3	4	(2)
B	B	(2)

BUILD

2	3	(2)
3	4	(2)
B	B	(2)

BUILD

Fourth Semester B.E. Semester End Examination, May/June 2018-19
DESIGN AND ANALYSIS OF ALGORITHMS

Max. Marks: 100

3 hours

- Instructions:** 1. Unit I and Unit III are compulsory
 2. Solve at least one question from remaining units.
 3. Diagrams if any must be drawn neatly.

UNIT - I

- Define the term algorithm and illustrate the notion of algorithm with an example.
- Prove that if $t_1(n) \in O(g_1(n))$ and $t_2(n) \in O(g_2(n))$ then $t_1(n) + t_2(n) \in O(\max\{g_1(n), g_2(n)\})$

- c. Consider the following algorithm:
- ```

Algorithm Mystery(n)
//Input:A non negative integer n
S<-0
for i<1 to n do
 S<-S+i*i
return S

```
- a) What does this algorithm compute? b) What is its basic operation?  
 c) How many times the basic operation is executed? d) What is the efficiency class of this algorithm?

**UNIT - II**

- a. Write algorithm for binary search. Analyze the algorithm's average case efficiency.
- b. Write algorithm for Merge-sort.
- c. Explain three variations of decrease and conquer approach. Write the algorithm for breadth first search.

- (2) (2) (1) (06)

- (4) (1) (1) (06)

- (2) (2) (1) (06)

- (2) (2) (1) (06)

- (2) (2) (1) (08)

- (2) (2) (1) (06)

- (3) (2) (1) (05)

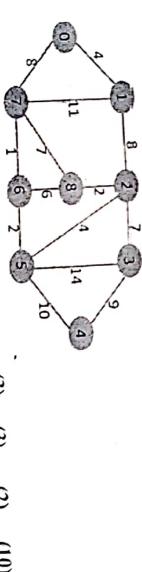
- (3) (2) (1) (05)

- (2) (2) (1) (10)

- (2) (2) (1) (10)

- (2) (2) (1) (10)

- a. Outline Prim's algorithm and find Min-Cost spanning tree for the following graph. Show all the steps in the tabular form.



b. Construct the Huffman tree and list the codes for the following alphabets

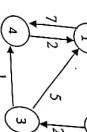
| Character | A   | B    | C    | D    | E    |
|-----------|-----|------|------|------|------|
| Frequency | 0.4 | 0.19 | 0.16 | 0.15 | 0.11 |

- 6 a. Expt  
avg

- b. E)  
m  
5 a. Write DFS and BF'S.

| Frequency | 0.6 | 0.3 | 0.2 | 0.05 |
|-----------|-----|-----|-----|------|
| Character | L   | CO  | PO  | M    |

- 6 b. E)  
m  
5 a. Write Floyd's algorithm and solve the all pair shortest path problem for the graph shown below



- 7 a. t  
b.

- 8 a. b. Write algorithm to find transitive closure of a graph and illustrate its working with an example.

- 6 a. Write algorithm for memory function knapsack ~~and~~ solve the knapsack instance  $n=7$ ,  $w_1, w_2, w_3, w_4, w_5, w_6, w_7 = \{2, 3, 5, 7, 1, 4, 1\}$  and  $M=15$  by dynamic programming.

- b. Define transitive closure of a graph.. Apply Warshall's algorithm on the graph defined by the following adjacency matrix

$$\begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

7

- a. Given a text  $txt[0..n-1]$  and a pattern  $pat[0..m-1]$ , write a function  $search(char pat[], char txt[])$  that prints all occurrences of  $pat[]$  in  $txt[]$ . You may assume that  $n > m$ , where  $n$  is no of characters in the text and  $m$  is the no of characters in the pattern.

Input:  $txt[] = "THIS IS A TEST TEXT"$   
 $pat[] = "TEST"$

- b. Solve the job assignment problem using branch and bound methodology.

(2) (5) (3) (10)

|   |   |   |   |          |
|---|---|---|---|----------|
| 9 | 2 | 7 | 8 |          |
| 6 | 4 | 3 | 7 | person a |
| 5 | 8 | 1 | 8 | person b |
| 7 | 6 | 9 | 4 | person c |
|   |   |   |   | person d |

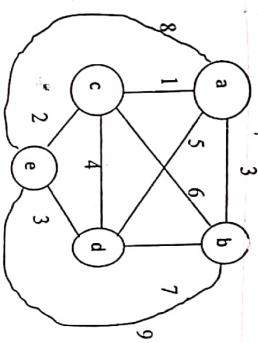
8 a. OR

- Apply backtracking to the following sum of subsets problem instance and find all the solutions by constructing the state space tree.  
 $S=\{3,2,6,4,1\}$   $d=7$

- Note: L [level], CO [course Outcome], PO [Programme Outcome], M [Marks]  
(3) (5) (3) (10)

With the help of a state space tree.  
technique.

With the help of a state space tree, solve the travelling salesman problem using branch and bound technique.



(3) (5) (3) (10)  
BELAGAVI

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CS42/16CS42

**Fourth Semester B.E. Fast Track Semester End Examination, July/August 2019**

**OPERATING SYSTEM**

Max. Marks: 100

Time: 3 Hours

*Instructions:* 1. UNIT I and UNIT III are compulsory.

2. Answer any three full questions from the remaining units

**UNIT - I (Compulsory)**

1. a. List and explain in brief the services of an operating system. (2) (1) (1) (10)  
 b. Discuss with diagram multithreading models. (2) (1) (1) (5)  
 c. List the activities of operating system with respect to process management and file management. (1) (1) (1) (1) (5)
2. a. With a neat process state transition diagram, explain the different states of a process. (3) (1) (1) (07)  
 b. Consider the following set of processes with Arrival Time and CPU Burst Time in milliseconds.

| Process | Arrival Time | Burst Time |
|---------|--------------|------------|
| P1      | 0            | 12         |
| P2      | 1            | 5          |
| P3      | 2            | 7          |
| P4      | 3            | 6          |
| P5      | 4            | 3          |

Apply SJF and Round Robin algorithms. Draw Gantt Chart. Compute the Average Waiting Time and Average Turn Around Time.

(4) (2) (4) (10)

- c. Discuss the different types of schedulers. (2) (2) (1) (03)

**OR**

3. a. Explain  
 a. CPU utilization b. Throughput c. Turnaround Time d. Waiting time e. Response time  
 (2) (2) (1) (05)
- b. Discuss with diagram multithreading models. (2) (2) (1) (07)
- c. Discuss the Dining Philosopher problem. (2) (2) (1) (08)

L CO PO M

**UNIT - III (Compulsory)**

4. a. What is deadlock. Explain the necessary conditions for deadlocks. (2) (3) (1) (06)
- b. A system consists of five processes and three resource types (A,B,C). The following snapshot of the system has been taken.

| Process | Allocation |   |   | Max |   |   | Available |   |   |
|---------|------------|---|---|-----|---|---|-----------|---|---|
|         | A          | B | C | A   | B | C | A         | B | C |
| P0      | 0          | 1 | 0 | 7   | 5 | 3 |           |   |   |
| P1      | 2          | 0 | 0 | 3   | 2 | 2 |           |   |   |
| P2      | 3          | 0 | 2 | 9   | 0 | 2 | 4         | 5 | 2 |
| P3      | 2          | 1 | 1 | 2   | 2 | 2 |           |   |   |
| P4      | 0          | 0 | 2 | 4   | 3 | 3 |           |   |   |

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

Find the need matrix , and analyze the system .  
Mention whether the above system is safe or not.

Instruccic

c. Draw the resource allocation diagram for the following resource instances of resource type R<sub>1</sub> and one instance of resource type R<sub>2</sub>

- One instance of resource type R<sub>1</sub>
- One instance of resource type R<sub>2</sub>

*Resource R<sub>1</sub> is an instance of resource type R<sub>1</sub>. Resource R<sub>2</sub> is an instance of resource type R<sub>2</sub>.*

- Two instances of resource type R1
- One instance of resource type R2 and is waiting for an instance
- Three instances

Process states:

process P1 is holding an instance of R1 and an instance of R2 and is waiting for an instance



- resource 'y'.
- Process p2 is holding an instance of R3.
- Process p3 is holding an instance of R3.
- Process p3 is holding an instance of R3.
- "..." occurred or not.

UNIT - IV

- 5 a. Explain the difference between nucleus and external fragmentation. (10) (22) address busses

- Explain with diagram the multistep processing of a user program.

W-LINI



Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)





L CO PO M

USN

Fifth Sem

**OR**

5 a. Explain the structure of a requirement document.

(2) (3) (2) (07)

Time: 3 Hours

b. Mention the different ways of writing system requirements specification? (08)

(3) (2) (2) (05)

M

c. Reliance is planning for an online shopping mart. List and briefly explain the attributes and requirements for the application?

**UNIT - IV**

6 a. Using the graphical notation for object classes, design the object classes, identifying the attributes, operations for a 'Library System'. Use your own experience to decide on the operations that should be associated with this.

(5) (3) (3) (07)

1 a. Define prot

communicat

b. Mention the different ways of writing system requirements specification? (08)

(3) (2) (2) (07)

b. Describe stc

c. Explain the weather station system along with its state diagram.

(5) (3) (3) (06)

c. Explain fur

M

L

CO

PO

M

**OR**

7 a. Explain the two goals of software testing and explain an input-output model for program testing.

(2) (4) (3) (06)

2 a. Discuss th

i. Be

ii. Tf

iii. L

iv. B

M

L

CO

PO

M

**UNIT - V**

8 a. Explain the ISO 9001 standard framework along with ISO 9001 core processes and its quality management diagram.

(2) (2) (3) (10)

3 a. What are

b. Identify

commu

M

L

CO

PO

M

**OR**

b. Explain the different types of interface errors and explain any three classes of interface errors.

(2) (4) (3) (08)

4 a. Derive

b. the syn

c. Explain

cyclic

M

L

CO

PO

M

**OR**

a. Explain CM (Configuration management) Terminology.

(2) (2) (2) (10)

5 a. Disc

b. Cor



|    |                                                                                                                                                                                                                       |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a. | Explain the various Relational Algebra Operations from Set Theory with an example.<br>UNIT - IV<br>08 M                                                                                                               |
| b. | Explain different types of JOIN operations in relational algebra with an example.<br>UNIT - V<br>08 M                                                                                                                 |
| a. | Explain the Informal Design Guidelines for Relation Schemas<br>(Level [2], CO [3], PO [1])<br>b. What is normalization? Explain the First, the Second and the Third normal forms, with example.<br>12 M               |
| b. | Explain the different constraints that can be applied during table creation in SQL with an example.<br>a. Explain the different constraints that can be applied during table creation in SQL with an example.<br>08 M |

- iii) Retrive the names of all persons who live in the city "Bangalore".  
ii) Retrive the names of all persons who live in the city "Mysore".  
iii) Find the names of all persons whose salary is between Rs 50,000 and Rs 90,000.  
iv) Find the names of all persons who lives and work in same city.  
v) List the names of the people who work for Tech M", alongwith the cities they live in.  
vi) Find the average salary of "Mysore" person  
OR  
Explain various DDL commands with an example for each  
(Level [2], CO [4], PO [1])  
Write the SQL query for the following Database Schema:  
Suppliers (sid : integer, name : string, address : string)  
Parts (pid : integer, name : string, color : string)  
Catalog (sid : integer, pid : integer, cost : real)  
i) Find the sides of suppliers who supply some red and some green parts.  
ii) Find the pairs of sides such that the supplier with first side charges more for some part than the supplier with second side.  
iii) Find the pairs of parts supplied by at least two different suppliers.  
(Level [5], CO [4], PO [12])

SOFTWARE ENGINEERING

**Instructions:** 1. Unit - II and Unit - III are compulsory.  
2. Answer any one full question from remaining Units.

Max. Marks: 100

Time: 3 Hours

15CS153

Max. Marks: 100

List and explain all attributes of good software. Write a note on key challenges for UNIT - I 10 M

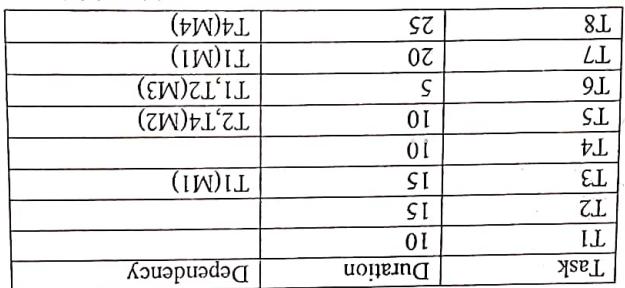
Explain software process. List all processes activities and explain them in the context of 95 M

List frequently asked questions about the software. Write five questions giving suitable solutions for each.

Elasticate the features of spiral model with a neat diagram. Which are the two ways to cope up with the changes in system requirements? Explain.

Draw the activity chart for the following project details given in terms of tasks.

For the set of tasks shown below, draw the project scheduling using Gantt chart duration and dependencies.



(Level [2], CO [3], PO [3])

Disinhibit, User Level, requirements with the System Level, requirements. Using an example show the change in requirement description at different levels of process

III - UNIT

(Level[2], CO[3], PO[3])

04M

Intermediate levels of process

scenario of your choice.

M90

e cost estimation for any

(Level [2], CO [3], PO [3])

## UNIT - III

example shows the change in requirement description at different levels of process

(Level [4], CO [2], PO [2])



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**Fifth Semester B.E. Degree Examination, Dec.2016/Jan.2017**  
**Operating Systems**

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting  
at least TWO questions from each part.

**PART - A**

1. a. Distinguish between the following pairs of terms :  
 i) Symmetric and asymmetric multiprocessor systems  
 ii) Cpu burst and I/O burst jobs  
 iii) User's view and systems view of OS  
 iv) Batch systems and time sharing systems  
 v) User mode and kernel mode operations. (10 Marks)
1. b. List the three main advantages of multiprocessor systems. Also bring out the difference between graceful degradation and fault tolerance in this context. (05 Marks)
1. c. What are virtual machines? How are they implemented? (05 Marks)
2. a. What is a process? What are the states a process can be in? Give the process state diagram clearly indicating the conditions for a process to shift from one state to another. (08 Marks)
2. b. What are the merits of inter process communication? Name the two major models of inter process communication. (06 Marks)
2. c. What is a thread? What is need for multithreaded processes? Indicate the four major categories of benefits derived from multi threaded programming. (06 Marks)
3. a. What is a critical section problem? What requirements should a solution to critical section problem satisfy? State Peterson's solution and indicate how it satisfies the above requirements. (10 Marks)
3. b. Explain the operation of semaphores. Bring out how their operation may lead to priority inversion. (10 Marks)
4. a. Define deadlock. What are the necessary conditions for deadlock to occur? Indicate how many of these should occur for dead lock to happen? (10 Marks)
4. b. State and explain banker's algorithm for deadlock avoidance. (10 Marks)

**PART - B**

5. a. What is the principle behind paging? Explain its operation, clearly indicating how the logical addresses are converted to physical addresses. (10 Marks)
5. b. A hypothetical main memory can store only 3 frames simultaneously. The sequence in which the pages will be required is given below:  
 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 (Twenty operations).  
 Indicate the sequence in which the three frames will be filled in i) FIFO ii) Optimal Page Replacement and iii) Least Recently used methods of page replacement. Indicate number of page faults in each case. (10 Marks)
6. a. List any five typical file attributes and any five file operations indicating their purpose in one line each. (10 Marks)
6. b. Briefly explain the methods of keeping track of free space on disks, (10 Marks)
7. a. What is disk scheduling? Discuss different disk scheduling techniques. (12 Marks)
7. b. Explain the capability lists methods of implementing access matrix. (08 Marks)
8. a. How does Linux achieve interprocess communication? (10 Marks)
8. b. How does Linux manage authentication and access control mechanisms? (10 Marks)

\* \* \* \*

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and / or equations written e.g.  $42 \times 8 = 50$ , will be treated as malpractice.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written e.g.  $42-8=50$ , will be treated as malpractice.

USN

**Fifth Semester B.E. Degree Examination, Dec.2016/Jan.2017**

Max. Marks: 100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

Time: 3 hrs.

Max. Marks: 100

**Database Management Systems**

10CS54

a. Explain with neat diagram the component modules of DBMS.

b. Discuss the concepts related to structural constraints of relationship type with suitable examples.

c. Write an ER diagram for hospital management considering at least four entities.

d. Consider the following algebraic operators along with their syntax and purpose.

e. Retrieve the number of dependents for an employee named "RAVI".

f. Retrieve the name of managers working in location "DELLHI" who has no female dependents.

g. Retrieve the name of employees whose salary is greater than all employees working in department 3.

h. Referring to the COMPANY database above, write SQL queries for the following:

i. Retrieve the name of employees whose salary is greater than all employees working in department 3.

j. What is a view? Explain how views are created and dropped.

k. Explain with example, how assertions are defined.

**PART - B**

l. What is a cursor? Explain with example, retrieving multiple tuples with embedded SQL.

m. Explain with example, how triggers are created and dropped.

n. What is a cursor? Explain with example, retrieving multiple tuples with embedded SQL.

o. Explain with example, how assertions are defined.

p. What is a view? Explain how views are created and dropped.

q. Explain with example, how assertions are defined.

r. What is a cursor? Explain with example, retrieving multiple tuples with embedded SQL.

s. Explain with example, how triggers are created and dropped.

t. What is a cursor? Explain with example, retrieving multiple tuples with embedded SQL.

u. Explain with example, how assertions are defined.

v. What is a cursor? Explain with example, retrieving multiple tuples with embedded SQL.

w. Explain with example, how triggers are created and dropped.

x. What is a cursor? Explain with example, retrieving multiple tuples with embedded SQL.

y. Explain with example, how assertions are defined.

z. What is a cursor? Explain with example, retrieving multiple tuples with embedded SQL.

- Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and / or equations written e.g. 42+8 = 50, will be treated as malpractice.
8. a. Explain what is a shock wave.  
 b. Explain what is a shock wave.
7. a. What are groups?  
 b. What is a group?
6. a. What is functional dependency? List the conditions for a set of functional dependencies.  
 b. What is a functional dependency? List the conditions for a set of functional dependencies. (05 Marks)
5. a. Explain the properties of relational decomposition.  
 b. Explain the properties of relational decomposition. (05 Marks)
4. a. Write a C/C++ program to explain the inclusion dependency.  
 b. Write a C/C++ program to explain the inclusion dependency.
3. a. Explain the normal form specifications multi-valued functional dependency? Explain it with examples.  
 b. Define inclusion dependency, and write the inference rules for it.
2. a. Explain the transaction diagram of a transaction.  
 b. Explain the transaction diagram of a transaction. (06 Marks)
1. a. Explain what is a schedule? Explain conflict serializable schedule with example.  
 b. Explain the principles used behind ARIES algorithm.  
 c. Mention any two options.

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Sixth Semester

Time: 3 hrs.

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6. a. Explain update anomalies with examples.  
 b. Consider the relation R(A, B, C, D, E, F). What is the primary key of this relation? What is its highest normal form? Preserving the dependency, decompose R into third normal form. (10 Marks)
7. a. Explain properties of relational decomposition.  
 b. Which normal form specifies multi-valued functional dependency? Explain it with examples.  
 c. Define inclusion dependency, and write the inference rules for it.
8. a. Explain transaction dependency.  
 b. Explain the principles used behind ARIES algorithm.  
 c. What is a schedule? Explain conflict serializable schedule with example.

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Fifth Semester B.E. Degree Examination, Dec.2015/Jan.2016

### Operating Systems

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

#### PART - A

1. a. Define an operating system? What is system's viewpoint of an operating system? Explain the dual mode operation of an operating system. (08 Marks)  
b. Explain the types of multiprocessor systems and the types of clustering. What are fault tolerant systems? (06 Marks)  
c. Explain the concept of virtual machines. (06 Marks)
2. a. What is a process? Draw and explain the state diagram of a process. Give a note on context switch. (08 Marks)  
b. Consider the following set of processes. Assume the length of the CPU burst time is given in milli seconds.

| Process        | Arrival Time | Burst Time | Priority |
|----------------|--------------|------------|----------|
| P <sub>1</sub> | 0            | 10         | 3        |
| P <sub>2</sub> | 0            | 1          | 1        |
| P <sub>3</sub> | 3            | 2          | 3        |
| P <sub>4</sub> | 5            | 1          | 4        |
| P <sub>5</sub> | 10           | 5          | 2        |

Draw Gantt charts illustrating the execution of these processes using FCFS and pre-emptive priority scheduling algorithms. Assume highest priority = 1 and lowest priority = 4. Also, calculate average waiting time and average turn around time of both the algorithms.

- c. Discuss any 3 threading issues that come with multithreaded programs. (06 Marks)
3. a. What are semaphores? Explain any three use cases of semaphores. (04 Marks)  
b. Describe an n-process solution to critical section problem which uses test and set ( ) hardware instruction. Prove how this algorithm satisfies all the requirements of critical section problem's solution. (08 Marks)  
c. Discuss how Readers – writers problem can be solved using semaphores. (08 Marks)
4. a. With the help of a system model, explain a deadlock and discuss the necessary conditions that must hold simultaneously in a system for a deadlock to occur. (06 Marks)  
b. Using Banker's algorithm determine whether the following system is in a safe state.

| Process        | Allocation |   |   | Max |   |   | Available |   |   |
|----------------|------------|---|---|-----|---|---|-----------|---|---|
|                | A          | B | C | A   | B | C | A         | B | C |
| P <sub>0</sub> | 0          | 0 | 2 | 0   | 0 | 4 | 1         | 0 | 2 |
| P <sub>1</sub> | 1          | 0 | 0 | 2   | 0 | 1 |           |   |   |
| P <sub>2</sub> | 1          | 3 | 5 | 1   | 3 | 7 |           |   |   |
| P <sub>3</sub> | 6          | 3 | 2 | 8   | 4 | 2 |           |   |   |
| P <sub>4</sub> | 1          | 4 | 3 | 1   | 5 | 7 |           |   |   |

If a request from process P<sub>2</sub> arrives for (0 0 2), can the request be granted immediately?

- c. How is a system recovered from deadlock? (10 Marks)

(04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written e.g.  $42-8 = 50$ , will be treated as malpractice.

**PART - B**

(08 Marks)

- 5 a. Discuss paging with an example.

- b. Consider the following page reference string

1, 2, 3, 5, 2, 3, 5, 7, 2, 1, 2, 3, 8, 6, 4, 3, 2, 2, 3, 6.

Assuming there are 3 memory frames, how many page faults would occur in the case of

- i) LRU ii) Optimal Algorithm.

Note that initially all frames are empty.

- c. What is thrashing? Explain.

- 6 a. Explain the different file access methods.

- b. Describe the various directory structures.

- c. Write a note on any four different methods for managing free space.

- 7 a. Suppose the position of cylinder is at 53. The disk drive has cylinders numbered from 0 to

199. The queue of pending request in FIFO order is : 98, 183, 37, 122, 14, 124, 65, 67.

Starting from the current head position, what is the total distance traveled (in cylinders) by the disk arm to satisfy the requests using algorithms FCFS, SSTF, SCAN and LOOK.

Illustrate with figures in each case.

- b. Describe the access matrix model used for protection purpose.

- 8 Write short notes on :

- a. Process Management in Linux

- b. Linux file system.

- c. Benefits of Multi threading

- d. Inter process communication.

(20 Marks)

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**Database Management System**

Time: 3 hrs. Max. Marks:100

- Note: Answer FIVE full questions, selecting at least TWO questions from each part.**
- PART - A**
1. a. Write a note on various types of end users who use DBMS. (08 Marks)
    - b. Explain the three level DBMS architecture, with a neat diagram. Why do we need mappings between schema levels? Explain mapping in DBMS architecture. (12 Marks)
  2. a. Explain the ER notations used for various constructs in database schema
    - i) Composite attributes
    - ii) Cardinality ratio
    - iii) Participation constraints
    - iv) Binary relationship
  3. a. Discuss the various type of JOIN operations. Why is theta join required?
    - b. Consider the following relational schema;
 

|                                                |
|------------------------------------------------|
| users (uid, uname, cost)                       |
| groups (gid, title, category, n, gsize, owner) |
| posts (pid, uid, gid, id, picext, plate)       |

 Write the following queries in relational algebra.
    - i) Show the text and number of all the posts made by user number 4 before March 1, 2007.
    - ii) Show the names of all the users who responded to post number 2.
    - iii) Show the uid and cost of all the users who are group owners and posted a thread on 1.1.2003.

- c. Explain the SELECT and PROJECT operations in relational algebra with example. (05 Marks)
4. a. Explain the following :
  - i) Primary key
  - ii) Foreign key
  - iii) Candidate key
- b. Consider the following relations:
 

|                                                      |
|------------------------------------------------------|
| Room (roomno, hotelno, type, price)                  |
| Booking (hotelno, guestno, datefrom, dateto, roomno) |
| Guest (guestno, name, address)                       |

- Important Note : 1. Only revealing of definite answers, appeal to calculator and/or computer will be rejected as malpractice.
2. Any revealing of your answers, completely draw diagonal lines on the remaining blank pages.
- Write the SQL statements for the following :
- i) List the names and addresses of all guest booked the hotel, which is located in Chandigarh, alphabetically ordered by name.
  - ii) List all family rooms with a price below Rs 400 per night, in ascending order of price in hotel "RVH".
  - iii) How many hotels are there? (09 Marks)

5. Explain with example in SQL  
 i) Drop command  
 ii) Delete command

**PART - B**

5. a. What is a view? Explain how to create the view and how view can be dropped?  
 b. Explain the following  
 i) Embedded SQL  
 ii) Database stored procedure

6. a. Explain informal design guidelines for relation schemas.  
 b. What is the need for normalization? Explain the first, second and third normal forms with examples.
7. a. Consider the schema  $R = (A, B, C, D, E)$ . Suppose the following functional dependencies hold

$$\begin{array}{l} E \rightarrow A \\ CD \rightarrow E \\ A \rightarrow BC \\ B \rightarrow D \end{array}$$

State whether the following decomposition of R are lossless join decomposition or not, justify.

- {(A, B, C), (A, D, E)}  
 {(A, B, C), (C, D, E)}

- b. Explain the following  
 i) Inclusion dependencies  
 ii) Domain key Normal Form

8. a. Explain why a transaction execution should be atomic? Explain ACID properties by considering the following transaction

T<sub>1</sub>: read(A);  
 A := A - 50;  
 write(A);  
 read(B);  
 B := B + 50;  
 write(B);

- b. Briefly discuss on the two phase locking protocol used in concurrency control.

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**Fifth Semester B.E. Degree Examination, June/July 2016**  
**Operating Systems**

Max. Marks: 100

Time: 3 hrs.

*Note: Answer FIVE full questions, selecting at least TWO questions from each part.*

**PART - A**

1. a. List and explain the functions and services of an operating system and OS operations. (08 Marks)  
 b. What are virtual machines? Explain VM-WARE architecture with a neat diagram. (08 Marks)  
 c. Differentiate between multiprogramming, multiprocessing and multitasking systems. (04 Marks)
  
2. a. Explain process states with state transition diagram. Also explain PCB with a neat diagram. (08 Marks)  
 b. What is IPC? Explain Direct and Indirect communication with respect to message passing systems. (05 Marks)  
 c. Consider the following set of process with arrival time and Burst time.  
 A LARGER priority number has a higher priority

| Jobs           | Arrival Time ms | Burst Time ms | Priority |
|----------------|-----------------|---------------|----------|
| J <sub>1</sub> | 0               | 6             | 4        |
| J <sub>2</sub> | 3               | 5             | 2        |
| J <sub>3</sub> | 3               | 3             | 6        |
| J <sub>4</sub> | 5               | 5             | 3        |

Draw the Gantt chart and calculate waiting time and turnaround time using

i) FCFS    ii) Pre-emptive priority scheduling algorithm. (07 Marks)

3. a. What are semaphores? Explain Binary and counting semaphores with an example. (05 Marks)  
 b. What do you mean by RACE? Explain Readers – writer’s problem with semaphore in detail. (08 Marks)  
 c. What are monitors? Explain with a neat diagram how monitors are used to solve bounded buffer problem. (07 Marks)
  
4. a. What is a deadlock? What are necessary conditions an OS must satisfy for a deadlock to occur? (05 Marks)  
 b. What are the different methods to handle deadlocks? Also explain Deadlock prevention and deadlock avoidance. (06 Marks)  
 c. For the following snapshot, Find the safe sequence using Banker’s algorithm.

|                | Allocation |   |   | Max |   |   | Available |   |   |
|----------------|------------|---|---|-----|---|---|-----------|---|---|
|                | A          | B | C | A   | B | C | A         | B | C |
| P <sub>0</sub> | 0          | 0 | 2 | 0   | 0 | 4 | 1         | 0 | 2 |
| P <sub>1</sub> | 1          | 0 | 0 | 2   | 0 | 1 |           |   |   |
| P <sub>2</sub> | 1          | 3 | 5 | 1   | 3 | 7 |           |   |   |
| P <sub>3</sub> | 6          | 3 | 2 | 8   | 4 | 2 |           |   |   |
| P <sub>4</sub> | 1          | 4 | 3 | 1   | 5 | 7 |           |   |   |

- i) Is the system in safe state?  
 ii) If a request from process P<sub>2</sub> arrives for (002), can the request be granted immediately?

(09 Marks)

**PART - B**

- 5 a. What are Translation look aside buffers (TLB)? Explain TLB in detail with a simple paging system with a neat diagram. (08 Marks)
- b. Given the memory partitions of 100K, 500K, 200K, 300K, and 600K apply First fit and Best fit algorithm to place 212K, 417K, 112K, 426K.
- c. Consider the following page reference string 70120304230321201701 for a memory with three (03) Frames. How many page faults occur for LRU and FIFO page replacement algorithms? Which is efficient among both? (08 Marks)
- 6 a. What is a file? Explain in detail different allocation methods. (08 Marks)
- b. What are directories? List different types of directory structures with examples. Mention their advantages and disadvantages. (08 Marks)
- c. Explain how free space is managed. (04 Marks)
- 7 a. Let a disk drive has 5000 cylinders from 0 to 4999. Currently drive is at 143<sup>rd</sup> cylinder, and the previous request was at cylinder 125. Queue of pending requests in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. What is the total distance the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms from current position i) FCFS ii) SCAN iii) LOOK. (12 Marks)
- b. What is protection? Distinguish between mechanism and policies. Explain briefly Access matrix with domains as objects. (08 Marks)
- 8 a. With a neat diagram explain in detail components of a Linux system. (07 Marks)
- b. Explain the different IPC mechanisms available in Linux in detail.
- c. Explain process scheduling and kernel synchronization in detail.

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Fifth Semester B.E. Degree Examination, June/July 2016  
**Database Management Systems**

Max. Marks: 100

Time: 3 hrs.

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART-A

1. a. What does defining, manipulating and sharing of a database mean? (06 Marks)  
 b. Discuss the main characteristics of the database approach and how it differs from traditional file systems. (08 Marks)  
 c. Describe the three - schema architecture. What is the difference between logical and physical data independence? (06 Marks)
2. a. Differentiate the following :  
 i) Entity and Attribute    ii) Entity type and Entity set    iii) Strong and weak Entity (08 Marks)  
 iv) Recursive relationship and Identifying relationship.  
 b. A database is being constructed to keep track of the teams and games of a sports league. A team has a number of players, not all of whom participate in each game. It is desired to keep track of the players participating in each game for each team, the positions they played in that game and the result of the game. Design an ER diagram for this application, stating any assumptions you make. Choose your favorite sport (e.g Cricket , Base ball , Football). (12 Marks)
3. a. Explain the entity integrity and referential integrity constraints. Why each is considered important? (06 Marks)  
 b. Briefly discuss the different types of update operations on a relation. (06 Marks)  
 c. Consider the following relational schema.  
 Emp (eid, ename, age, sal)  
 Works\_for (eid, pid, #hrs)  
 Proj (pid, pname)  
 Write the Queries in Relational algebra for the following :  
 i) Retrieve Employee Id and Name of the employees who work for all the projects.  
 ii) Retrieve Name and Age of employees whose salary > 10000.  
 iii) For each employee, get the number of projects and number of hours worked on projects. (08 Marks)  
 iv) Retrieve Names of employees working on "CSE" project.
4. a. Give the complete syntax of SELECT statement in SQL and discuss all the clauses with examples. (05 Marks)  
 b. What are Aggregate functions in SQL? Explain with examples. (05 Marks)  
 c. Consider the following Relational schema :  
 Lives (Name, Street, City)  
 Works (Name, Cname, Salary)  
 Located (Cname, City)  
 Manager (Name, MGR\_Name)  
 Write the Queries in SQL for the following :  
 i) Find the people who earn more than every employee of "Canara Bank".

- ii) Find the company employing the most people.  
 iii) Find the Name and city of all the people who work for "SBI" and earn more than 55000 rupees.  
 iv) Show 20% raise in salary of all managers.  
 v) Find the companies located in every city in which "ICICI" is located.

**PART-B**

- 5** a. Explain Insert, Delete and Update statements in SQL with examples. (06 Marks)  
 b. What are views in SQL? Show how views are specified in SQL. List the advantages of views. (06 Marks)  
 c. Differentiate : i) Trigger and Assertion ii) Embedded and Dynamic SQL (08 Marks)
- 6** a. Define 1NF, 2NF and 3NF with examples. (06 Marks)  
 b. What are the informal guidelines for relation schemas? Explain. (06 Marks)  
 c. What is BCNF? How it is different from 3NF? Prove that a relation with two attributes is always in BCNF. (08 Marks)
- 7** a. What do you mean by MVD? When does it arise? Define 4NF. (05 Marks)  
 b. Define Join Dependency and 5NF. (05 Marks)  
 c. Let  $R = \{SSN, Ename, Pnumber, Pname, Plocn, Hrs\}$  and  $D = \{R_1, R_2, R_3\}$  where  $R_1 = Emp = \{SSN, Ename\}$ ,  $R_2 = Proj = \{Pnumber, Pname, Plocn\}$ ,  $R_3 = Work\_ON = \{SSN, Pnumber, Hrs\}$ . The following functional dependencies hold on relation R.  
 $F = \{SSN \rightarrow Ename ; Pnumber \rightarrow \{Pname, Plocn\} ; \{SSN, Pnumber\} \rightarrow Hrs\}$ . Prove that above decomposition of relation 'R' has the lossless join property. (10 Marks)
- 8** a. What are the problems with concurrency? Explain each with an example. (06 Marks)  
 b. With a neat state transition diagram, discuss the different states of a transaction. (06 Marks)  
 c. Write and explain the Two - phase locking protocol for concurrency control. (08 Marks)

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2 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.

2. Any revealing of identification, appeal to evaluator and/or questions written e.g.,  $42+8=50$ , will be treated as malpractice.

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

**PART - A**

- 1 a. What is a software process model? Explain the types of software process models. (06 Marks)
- b. Explain the key challenges facing software engineering. (08 Marks)
- 2 a. With a neat block diagram, explain the systems engineering process activities. (08 Marks)
- b. With a neat block diagram, explain the spiral process model. (06 Marks)
- 3 a. Define dependability. Also explain briefly the four principle dimensions of dependability. (06 Marks)
- b. With appropriate block diagram explain briefly the requirement engineering process or software specification activities. (06 Marks)
- 4 a. For the set of tasks shown below draw the project scheduling using,
  - i) Activity chart.
  - ii) Gantt/ Bar chart.
  - iii) Staff allocation versus time chart.

Assuming start date of project as 01 Nov.2014. (10 Marks)

| Task           | Duration | Dependency                           |
|----------------|----------|--------------------------------------|
| T <sub>1</sub> | 8        | -                                    |
| T <sub>2</sub> | 15       | -                                    |
| T <sub>3</sub> | 15       | T <sub>1</sub> (m1)                  |
| T <sub>4</sub> | 10       | -                                    |
| T <sub>5</sub> | 10       | T <sub>2</sub> , T <sub>4</sub> (m2) |
| T <sub>6</sub> | 5        | T <sub>1</sub> , T <sub>2</sub> (m3) |
| T <sub>7</sub> | 20       | T <sub>1</sub> (m1)                  |
| T <sub>8</sub> | 25       | f <sub>4</sub> (m4)                  |
- b. Draw a state machine model of a simple microwave oven. (05 Marks)
- c. Draw a sequence diagram for withdrawing money from ATM. (05 Marks)
- 5 a. Write the IEEE format of writing SRS.
  - b. Differentiate between:
    - i) User requirements and system requirements.
    - ii) Functional requirements and non-functional requirements.
  - c. Explain briefly the techniques of requirements discovery. (10 Marks)

**PART - B**

1. List the system structuring styles and explain the repository model with a block diagram. (06 Marks)
2. With a neat block diagram, explain the object oriented decomposition for invoice processing sub-system.
  - c. Explain briefly:
    - i) Call-Return control model. (08 Marks)
    - ii) Broadcast control model. (08 Marks)

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- 6 a. With appropriate block diagram explain briefly extreme programming process model. (10 Marks)  
b. With appropriate block diagram, explain the system evolution process. (10 Marks)
- 7 a. Explain briefly the software inspection process. (6 Marks)  
b. With a neat block diagram explain the verification and validation process (V-model). (6 Marks)  
c. Perform the path testing for the following program flow graph by computing Cyclomatic complexity. (8 Marks)

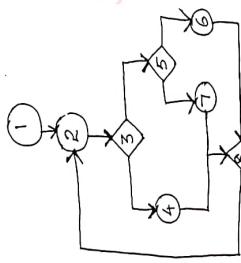


Fig. Q7 (c)

- 8 Write short notes on:  
a. Legacy system.  
b. Cocomo model.  
c. Capability maturity model.  
d. Software testing process. (20 Marks)

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**Fifth Semester B.E. Degree Examination, Dec.2014/Jan.2015  
Operating Systems**

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting atleast TWO questions from each part.

**PART - A**

1. a. Differentiate between multiprogramming and multiprocessing. (05 Marks)  
b. Explain the various functions of operating system with respect to process and memory management. (05 Marks)  
c. What are the different ways in which the Pthread terminates? (05 Marks)  
d. Explain any two facilities provided for implementing interacting process in programming language and operating system. (05 Marks)
  
2. a. Differentiate between :  
i) User level and kernel level threads  
ii) Process and thread. (06 Marks)  
b. Following is the snapshot of a cpu

| Process        | CPU Burst | Arrival time |
|----------------|-----------|--------------|
| P <sub>1</sub> | 10        | 0            |
| P <sub>2</sub> | 29        | 1            |
| P <sub>3</sub> | 03        | 2            |
| P <sub>4</sub> | 07        | 3            |

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written e.g.  $42 \div 8 = 50$ , will be treated as malpractice.

Draw Gantt charts and calculate the waiting and turnaround time using FCFS, SJF and RR with time quantum 10 scheduling algorithms. (09 Marks)

- c. Explain different scheduling criteria that must be kept in mind while choosing different scheduling algorithms. (05 Marks)
  
3. a. Explain critical section problem. What are the requirements that critical section problem must satisfy? (05 Marks)  
b. Explain Reader's - writers problem and provide a semaphore solution using semaphore's for reader's priority problem. (10 Marks)  
c. What are monitors? Compare with semaphores with their relative advantages and disadvantages. (05 Marks)

- 4 a. Consider a system containing  $m$  resources of the same type being shared by  $n$  processes. Resources can be requested and released by processes only one at a time. Show that the system is deadlock free if the following two conditions hold :
- The maximum need of each process is between 1 and  $m$  resources
  - The sum of all maximum needs is less than  $m + n$ .
- b. For the given snapshot :

| Allocation     |   |   |   | Max |   |   |   | Available |   |   |   |   |
|----------------|---|---|---|-----|---|---|---|-----------|---|---|---|---|
| P <sub>1</sub> | A | B | C | D   | A | B | C | D         | A | B | C | D |
| P <sub>1</sub> | 0 | 0 | 1 | 2   | 0 | 0 | 1 | 2         | 1 | 5 | 2 | 0 |
| P <sub>2</sub> | 1 | 0 | 0 | 0   | 1 | 7 | 5 | 0         |   |   |   |   |
| P <sub>3</sub> | 1 | 3 | 5 | 4   | 2 | 3 | 5 | 6         |   |   |   |   |
| P <sub>4</sub> | 0 | 6 | 3 | 2   | 0 | 6 | 5 | 2         |   |   |   |   |
| P <sub>5</sub> | 0 | 0 | 1 | 4   | 0 | 6 | 5 | 6         |   |   |   |   |

Using Banker's algorithm :

- What is the need matrix content?
- Is the system in safe state?
- If a request from process P<sub>2</sub>(0, 4, 2, 0) arrives, can it be granted?

(10 Marks)

## PART - B

- 5 a. What is locality of reference? Differentiate between paging and segmentation. (05 Marks)
- b. Explain the differences between :
- Logical and physical address space
  - Internal and external fragmentation.
- c. For the following page reference calculate the page faults that occur using FIFO and LRU for 3 and 4 page frames respectively , 5, 4, 3, 2, 1, 4, 3, 5, 4, 3, 2, 1, 5. (05 Marks)
- c. For the following page reference calculate the page faults that occur using FIFO and LRU for 3 and 4 page frames respectively , 5, 4, 3, 2, 1, 4, 3, 5, 4, 3, 2, 1, 5. (10 Marks)
- 6 a. What are the different techniques with which a file can be shared among users? (06 Marks)
- b. Given memory partitions of 100 k, 500 k, 200 k, 600 k (in order), which algorithm from best fit, worst fit and first fit places processes with requirements 212 k, 417 k, 112 k and 426 k in an efficient manner? (06 Marks)
- c. Explain the various storage mechanisms available to store files, with neat diagram.(08 Marks)
- 7 a. Given the following queue 95, 180, 34, 119, 11, 123, 62, 64 with head initially at track 50 and ending at track 199 calculate the number of moves using FCFS, SSTF, Elevator and C look algorithm.
- b. What are access matrices? Explain its implementation. (12 Marks)
- c. Differentiate between protection and security. (04 Marks)
- c. Differentiate between protection and security. (04 Marks)
- 8 a. Explain the different IPC mechanism available in Linux. (08 Marks)
- b. Explain how process is managed on Linux platform. (08 Marks)
- c. Write a brief note on the design principles of Linux. (04 Marks)

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2 of 2

- Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg.  $42+8 = 50$ , will be treated as malpractice.
- Time: 3 hrs.
- 1 a. What are  
b. With a r  
c. What is
- 2 a. Disting  
b. A netw  
with ea
- c. Compaa  
d. Explai  
examp
- 3 a. Explai  
i)  
ii)  
b. A mu  
with  
bit ra
- c. With
- 4 a. Expl  
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### Fifth Semester B.E. Degree Examination, June/July 2014

Max. Marks:100

*Note: Answer FIVE full questions, selecting*

*atleast TWO question from each part.*

Time: 3 hrs.

### **Operating System**

#### PART – A

1 a. Explain multiprogramming and time sharing operating systems.

b. List out the different services that an OS provides? Explain any two.

c. What are the different categories of system program? Explain.

2 a. With neat diagram, explain components of PCB.

b. Explain direct and indirect communication with respect to message passing systems.

c. Consider the following set of processes with CPU burst time (in m sec)

| Process        | Arrival time (m) | Burst time (m) |
|----------------|------------------|----------------|
| P <sub>0</sub> | 0                | 6              |
| P <sub>1</sub> | 1                | 3              |
| P <sub>2</sub> | 2                | 1              |
| P <sub>3</sub> | 3                | 4              |

i) Draw Gantt chart illustrating the execution of above processes using SRTF and non-preemptive SJF

ii) Find the turn around time for each processes for SRTF and SJF. Hence show that SRTF is faster than SJF.

3 a. What do you mean by a binary semaphore and counting semaphore? Explain the implementation of wait() and signal() semaphore operation.

b. What is race condition? List the requirements that a solution to critical section must satisfy.

c. Explain any one synchronization problem for testing newly proposed synchronization scheme.

4 a. Consider the following snapshot of resource allocation at time t<sub>1</sub>

|                | Allocation |   |   | Request |   |   | Available |   |   |
|----------------|------------|---|---|---------|---|---|-----------|---|---|
|                | A          | B | C | A       | B | C | A         | B | C |
| P <sub>0</sub> | 0          | 1 | 0 | 0       | 0 | 0 | 0         | 0 | 0 |
| P <sub>1</sub> | 2          | 0 | 0 | 2       | 0 | 0 | 2         | 0 | 0 |
| P <sub>2</sub> | 3          | 0 | 3 | 0       | 0 | 0 | 0         | 0 | 0 |
| P <sub>3</sub> | 2          | 1 | 1 | 1       | 0 | 0 | 0         | 0 | 0 |
| P <sub>4</sub> | 0          | 0 | 2 | 0       | 0 | 2 | 0         | 0 | 0 |

i) Show that the system is not deadlocked by generating one safe sequence

ii) At instance t<sub>2</sub>, P<sub>2</sub> makes one additional request for instance of type C. Show that the system is deadlocked if the request is granted. Write down the deadlocked processes.

b. Describe resource allocation graph.

i) With deadlock ii) With a cycle but no deadlock.

c. What is wait for graph? Explain how it is useful for detection of deadlock.

1 of 2

**PART - B**

(06 Marks)

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5. a. Explain internal and external fragmentation, with examples.

- b. Consider the following page reference string 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 page replacement algorithms assuming 3 and 5 frames. i) LRU ii) optimal.

c. What is the cause of thrashing? How does the system detect thrashing?

6. a. What do you mean by free space list? With suitable example, explain any two methods of implementation of free space list.

- b. What are the three methods for allocating disk space? Explain with suitable example.

(12 Marks)

7. a. Suppose that a disk has 50 cylinders named 0 to 49. The R/W head is currently serving at cylinder 15. The queue of pending requests are in order : 4 40 11 35 7 14 starting from the current head position, what is the total distance traveled (in cylinders) by the disk arm to satisfy the requests using algorithms FCFS, SSTF and LOOK. Illustrate with figure in each case.

- b. Write a note on :

- i) Domain of protection
- 
- ii) Access matrix.

(08 Marks)

8. a. With diagram, explain components of Linux system.

- b. Explain in detail, the components that the kernel module support under Linux.

(12 Marks)

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Time: \_\_\_\_\_  
Date: \_\_\_\_\_  
Page No.: \_\_\_\_\_  
Signature: \_\_\_\_\_Important Note : 1. In case of tie, choose the one which is closer to the origin.  
2. Any reworking of submitted question, appeal to evaluator and for examinations written in S.O. will be treated as malpractice.

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**Fifth Semester B.E. Degree Examination, June/July 2014**

**Database Management Systems**

Max. Marks: 100

Time: 3 hrs.

Note: Answer any **FIVE** full questions, selecting at least **TWO** questions from each part.

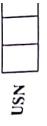
Important Note: 1. On completing your answers, compulsorily draw diagonal cross lines on the empty time blank papers.  
2. Any revealing of identification, appeal to evaluator and/or questions which are irrelevant will be treated as unfair practice.

**PART – A**

1. a. What is database? Explain the implicit properties of database.  
b. With neat diagram, explain "three schema architecture".  
c. Define the following terms:  
i) Data model      ii) Schema      iii) Metadata      iv) Snapshot. (08 Marks)
2. a. Explain with sketch the different phases of database design.  
b. Write an ER diagram of hospital management system. Assume your own entities (minimum 4), attributes and relations. (10 Marks)
3. a. What is constraint? Give the detailed explanation of key constraints.  
b. Consider the following schema and write the relational algebra expressions for the queries given below:  
Suppliers (sid : integer, sname : string, address : string)  
Parts (pid : integer, pname : string, color : string)  
Catalog (sid : integer, pid : integer, cost : real)
  - i) Find the names of suppliers who supply some red parts.
  - ii) Find the names of suppliers who supply some red parts or at 221 packer street.
  - iii) Find the names of suppliers who supply some red part and some green part.
4. a. Consider the same data given in question 3(b) and write the following queries in SQL:  
 i) Find the ids of suppliers who supply some red and some green parts.  
 ii) Find the pairs of ids such that the supplier with first id charges more for some part than the supplier with second id.  
 iii) Find the pids of parts supplied by at least two different suppliers.  
 b. Write a note on NULL and three valued logic. (10 Marks)

**PART – B**

5. a. Explain insert, delete and update statements in SQL, with example.  
b. How is a view created and dropped? What problems are associated with updating of views? (09 Marks)
6. a. State the informal guidelines for relational schema design. Illustrate how violation of these guidelines may be harmful.  
b. What is normalization? Explain third normal form with example. (11 Marks)

**R1****R2**

- 7 a. Define multi valued dependency. Explain 4NF with an example.  
 b. Let  $R = \{Ssn, Ename, Pnumber, Pname, Plocation, Hours\}$  and  $D = \{R_1, R_2, R_3\}$ , where  $R_1 = EMP = \{Ssn, Ename\}$   
 $R_2 = PROJ = \{Pnumber, Pname, Plocation\}$   
 $R_3 = WORKS\_ON = \{Ssn, Pnumber, Hours\}$ .

The following functional dependencies hold on relation  $R$ .  
 $F = \{Ssn \rightarrow Ename; Pnumber \rightarrow \{Pname, Plocation\}; (Ssn, Pnumber) \rightarrow Hours\}$ . Prove that the above decomposition of relation  $R$  has the lossless join property.

- 8 Write a short note on:

- a. Two phase locking protocol.
- b. Transaction support in SQL.
- c. Write ahead log protocol.
- d. Time stamp ordering algorithm.

(10 Marks)

Time: 3 hrs.

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