M.Tech. Computer Engineering – Ist Semester, 2018

First Sessional Test

Subject: ADBMS

Time: 1 Hour

Max. Marks: 15

Note: Attempt all questions.

Q1. What are the three necessary conditions for Canonical cover or Minimal Cover? Compute the minimal cover for the relation and set of functional dependency: 3

R= (A,B,C,D)

F= {A→BC, B→C, A→B, AB→C, AC→D}

Q2. What is Decomposition? What are the desirable features of a good decomposition? Is the decomposition of R (A, B, C, D, E) with Functional Dependencies F= {AB→C, C→E, B→D, E→A} in to R1 (BCD) and R2 (ACE) preserve lossless join. 3

Q3. What is trigger? Create an insert trigger which stores the values of employee table in to another table with additional details. Additional details include user information, time and operation like *insert, delete and update* and employee information entered by the user. 3

Q4. Consider the following SQL queries on online book database and transform these SQL queries into relational algebra expression. Draw the **initial query tree** for each of these expressions. 6

a) SELECT P.P-ID, Pname, Address, Phone
FROM BOOK B, PUBLISHER P
WHERE P.P-ID=B.P_ID AND Category='Language Book';

b) SELECT Book_Title, Pname, Aname
FROM BOOK B, PUBLISHER P, AUTHOR A, AUTHOR_BOOK AB
WHERE P.P_ID=B.P_ID AND AB.A_ID=A.A_ID
AND B.ISBN=AB.ISBN AND Category='Language Book';

c) SELECT ISBN, Book_Title, Year, Page_Count, Price
FROM BOOK B, AUTHOR A, AUTHOR_BOOK AB
WHERE B.ISBN=AB.ISBN AND AB.A_ID=A.A_ID
AND Aname="Charles Smith';

M.Tech Second Sessional Test 2018

Algorithm Design (MCEN-104)

MM:15 Time: 1 Hour

Note: Attempt any **three** questions. All questions carry equal marks

Q1. You are given a string of 2N characters consisting of N '[' brackets and N ']' brackets. A string is considered balanced if it can be represented in the for S2[S1] where S1 and S2 are balanced strings. We can make an unbalanced string balanced by swapping adjacent characters. Design a greedy algorithm to calculate the minimum number of swaps necessary to make a string balanced.

Examples:

```
Input  : ][][][
Output : 2
First swap: Position 3 and 4
[][][][
Second swap: Position 5 and 6
[][][]

Input  : [[][]]
Output : 0
String is already balanced.
```

Q2. Design a dynamic programming algorithm to solve the sum of subset problem (to detect if a subset from a given set of N positive integers that sums up to a given value.

Example: Input : set [ ] = {1, 3, 9, 2, 7}, sum = 6
Output : True

Q3. What is memoization technique in algorithm design? Design a memoized version of Longest common subsequence problem which is able to return the length and LCS as well.

Q4. Compare and contrast the algorithm paradigms such as divide-&-conquer, greedy algorithm, & dynamic programming techniques.

M. Tech. (Computer Engineering) I semester

Second Sessional test 2018

DATA COMMUNICATION AND COMPUTER NETWORKS

MM: 15 (6+5+4) Time: 1 Hour

Q1: In an M/M/C: N/∞ queuing model take N=8, μ=11, λ=7, C=3. Find the

i. Probability of occupying the system
ii. Probability of No queue
iii. Length of the system.
iv. Length of the queue
v. Waiting time in the system
vi. Waiting time in the queue

Q2: What is Twisted Pair Cable? Illustrate its characteristics and construction.

Q3: What is ALOHA? Classify and show the efficiencies.

M.Tech Computer Engineering 1st Semester Examinations 2018

Second Sessional

Advanced Computer Architecture

Max Marks: 15 Max Time: 1 hr

Note: Attempt all questions.

1. Define the cache performance metrics: hit time, miss rate and miss penalty. Write three cache performance optimizations and their effect on the metrics. [7]
2. Define sequential consistency. What is atomic memory access and non-atomic memory access? Give example of each. [5]
3. Draw the state transition diagram for a cache block using write invalidate snoopy protocols. [3]

M.Tech. (Computer Engg.) Ist Sem. , II Sessional Test- November 2018

Cryptography & Network Security (MCEN-101)

Time:1 Hr. **Attempt all questions.** **MM: 15[3+3+3+3+3]**

Note: Show all the steps of calculation clearly.

Q1. Show the results of the following hexadecimal data after passing it through the initial permutation of DES.

0 1 1 0 1 0 2 3 4 1 1 0 1 0 2 3

Q2. Write the value of Rcon constant for the round number 4, 8 and 10 of AES -128.

Q3. For a defined elliptical curve E_p (a,b) for p=23 and a=1, b=1. Let P = (3, 10) and Q = (9, 7), then find the value of P + Q = (x3, y3).

Q4. Show the function of creating W_{20} and W_{36} used in SHA-512.

Q5. Write procedure for signing and verifying a digital signature using ElGamal digital signature scheme.