Database Management System – cs422 DE

Assignment 2 – Week 2

This assignment is based on lecture 2 (chapters 4 & 5).

○ Submit your *own work* on time. No credit will be given if the assignment is submitted after the due date.
○ Note that the completed assignment should be submitted in .doc, .docx, .rtf or .pdf format only.
○ If you think that your answer needs explanation to get credit then please write it down.
○ You are encouraged to discuss these questions in the Sakai forum.

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(1) A relational database consists of a collection of

A. Tables
B. Fields
C. Records
D. Keys
ANS: A

(2) A _______ in a table represents a relationship among a set of values.

A. Column
B. Key
C. Row
D. Entry
ANS: C

(3) For each attribute of a relation, there is a set of permitted values, called the _______ of that attribute.

A. Domain
B. Relation
C. Set
D. Schema
ANS: A

(4) Course(course_id, sec_id, semester)
Here the course_id, sec_id and semester are _________ and course is a ________ .

A. Relations, Attribute
B. Attributes, Relation
C. Tuple, Relation
D. Tuple, Attributes
ANS: B

(5) Department (dept_name, building, budget) and
Employee (emp_id , name, dept_name, salary)
Here the dept_name attribute appears in both the relations.
Using the common attributes in relation schema is one way of relating _________ relations.

A. Attributes of common
B. Tuple of common

C. Tuple of distinct
D. Attributes of distinct
ANS: C

(6) Student (ID, name, dept_name, tot_pts)
In this query which attribute form the primary key?

A. name
B. dept_name
C. tot_pts
D. ID
ANS: D

(7) The____ operation allows the combining of two relations by merging pairs of tuples, one from each relation, into a single tuple.

A. Select
B. Join
C. Union
D. Intersection
ANS: B

(8) Discuss the differences between the five Join operations: Theta join, Equijoin, Natural join, Outer join (left), and Semijoin. Example of each is appreciated.

ANS:

SN	Operation	Description
1	Theta Join	Based on the condition specified if two tables are joined together then it is known as theta join. In this join we can define the operation like greater than, lower that but not equal to.
2	EquiJoin	Based on the equal condition specified (between the columns) if two tables are joined together then it is known as theta join. Here we only can apply equal to operation.
3	Natural Join	This is a kind of Equijoin over all data of different column of different table that have same name.
4	Outer Join (Left)	If we use this join, this will keep every tuples in the left side relations in the result.
5	Semijoin	The Semijoin operation defines a relation between R and S that contains the tuples of R that participate in the join of R with S satisfying the predicate F. By using a Semijoin we cab reduces the quantity of tuples that must be processed in order to create the join.

(9) A relational database contains details about journeys from Chicago to a variety of destinations and contains the following relations:

Operator (**opCode**, opName)
Journey (**opCode, destCode**, price)
Destination (**destCode**, destName, distance)

Each operator is assigned a unique code (opCode) and the relation *Operator* records the association between this code and the Operator's name (opName).

Each destination has a unique code (destCode) and the relation *Destination* records the association between this code and the destination name (destName), and the distance of the destination from Chicago.

The relation *Journey* records the price of an adult fare from Chicago to the given destination by a specified operator; several operators may operate over the same route.

Formulate the following queries using relational algebra.

1) List the details of journeys less than $100.
2) List the names of all destinations.
3) Find the names of all destinations within 20 miles.
4) List the names of all operators with at least one journey priced at under $5.
5) List the names of all operators and prices of journeys to 'Boston'.

ANS:

1. $\sigma_{\text{price<100}}$ (Journey)
2. Π_{destName} (Destination)
3. Π_{destName} ($\sigma_{\text{distance<20}}$) (Destination)
4. Π_{opName}(Operator

$\bowtie_{\text{Operator.opCode=Journey.opCode=Journey.opCode}}$($\sigma_{\text{price<5}}$(Journey)))

5. $\Pi_{\text{Operator.opName, Journey.price}}$ (Operator $\bowtie_{\text{Operator.opCode=Journey.opCode}}$ Journey $\bowtie_{\text{Journey.destCode=Destination.destCode}}$($\sigma$ destName="Boston")(Desination))

(10) Solve Q 5.8 (a-d) on page no. 130 from the course text book (5th edition).

a) Π_{hotelNo} ($\sigma_{\text{price > 50}}$ (Room))
ANS: Select those hotel number whose room price is greater that $50.

b) $\sigma_{\text{Hotel.hotelNo = Room.hotelNo}}$(Hotel × Room)
ANS: First get the cartesian product of hotel and room that have same hotel number and equijoin on hotel and room on hotelNumber.

c) $\Pi_{\text{hotelName}}$ (Hotel $\bowtie_{\text{Hotel.hotelNo = Room.hotelNo}}$ ($\sigma_{\text{price > 50}}$ (Room)))
ANS:List hotelName whose room price is greater than $50.

d) Guest ⟕ ($\sigma_{\text{dateTo} \geq \text{'1-Jan-2007'}}$ (Booking))
ANS: Left outer join, Guest having booking date later than or equal to 1st jan 2007. The list also contains all the guest information who does not match booking date.