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: B

(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: A

(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:
Theta Join: Theta join is a type of join operation that allows for the combination of rows from two tables based on a condition other than equality. This condition is specified using a theta (θ) symbol, hence the name. The condition can involve any comparison operator such as "=", ">", "<", etc. It is a generalization of equijoin.
Equijoin: Equijoin is a specific type of theta join where the condition involves equality between values in two columns from different tables. It's the most common type of join used in SQL.
Natural Join: Natural join is a type of join that automatically matches columns with the same name in both tables and combines rows where those values are equal. It's essentially an equijoin without explicitly specifying the join condition.
Outer Join (Left): Outer join retrieves all rows from the left table (the first table mentioned in the query) and the matching rows from the right table. If there's no match, NULL values are filled in for the columns from the right table.
Semijoin: Semijoin returns only the rows from the left table that have a matching row in the right table, but it doesn't actually return the matched rows from the right table. It's used when you only want to filter the rows from the left table based on the existence of matches in the right table.

(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. $\sigma_{price < 100}$ (Journey)
2. $\Pi_{destName}$ (Destination)
3. $\Pi_{destName}$ ($\sigma_{distance <= 20}$ (Destination))
4. Π_{opName} (Opertor $\bowtie_{Operator.opCode = Journey.opCode}$ ($\sigma_{price < 5}$ (Journey)))
5. $\Pi_{optName, price}$ (Operator$\bowtie_{Operator.opCode = opCode}$($\Pi_{optCode, price}$ (Journey $\bowtie_{Journey.destCode = Destination.destCode}$ ($\sigma_{destName = 'Boston'}$ (Destination)))))

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

a) $\Pi_{hotelNo}$ ($\sigma_{price > 50}$ (Room))
ANS: This is produces list of room, return hotelNo which price > 50

b) $\sigma_{Hotel.hotelNo = Room.hotelNo}$(Hotel × Room)
ANS: this is hotel and rool list where Hotel.hotelNo = Room.hotelNo

c) $\Pi_{hotelName}$ (Hotel $\bowtie_{Hotel.hotelNo = Room.hotelNo}$ ($\sigma_{price > 50}$ (Room)))
ANS: this is hotelName list which price of room > 50

d) Guest $\bowtie$ ($\sigma_{dateTo \geq '1\text{-}Jan\text{-}2007'}$ (Booking))
ANS: return the report for guest on booking date which booked >= 1-Jan-2007