Education is not about the filling of a bucket but the lighting of a fire!

WILLIAM BUTLER YEATS

Let’s get into some questions:

WHY SQL? WHY NoSQL?

Here some perspectives on the issue **of SQL and NoSQL**. From the data management perspective, *conceptual database design* (p. 325) is the process of constructing a model of data used in an enterprise. The *logical database design* is the process of constructing a model of data used in an enterprise based on a specific data model (relational, OO, XML, NoSQL: key-value, document, column, graph). Logical model(s) is independent from a particular DBMS. The selection of a particular logical model (or combination of multiple models) depends on the data characteristics, some data are relational, some can be represented better in OO, some need mixture of relational and OO, some use documents, and some have to use very flexible and dynamic models. NoSQL stands for “Not Only SQL” and is it means both models can co-exist and have advantages. Not all data are relational. Not all data are OO. It is a misconception to think about the models using exclusive OR.

Relational model has strong mathematical basis and uses a well-developed standardized declarative language: SQL. NoSQL offers many advantages in performance (speed), flexibility, scalability, and replication/distribution. NoSQL databases are used often in big data and real-time web applications.

Review Questions:

The textbook Chapter 4, pp. 110-111 describes the DreamHome Case study (appendix A). The following is a schema of a relational database:

Branch(BranchNo, street, city, postalcode)

Staff (StaffNo, fName, lName, position, gender, DOB, BranchNo)

Client(ClientNo, fName, lName,address, telNo, MobNo, email)

Registration (ClientNo, BranchNo, StaffNo, dateJoint)

1. List the foreign keys in Registration:
2. Give an example of a composite key:
3. Give an example of a possible candidate key:
4. What is the degree of Branch relation?
5. Using the above schema list one referential integrity constraint:
6. Is it possible to have NULL for BranchNo in Staff relation? Explain why?
7. Is it possible to have NULL for BranchNo in Registration relation? Explain why?

**Review Questions for the midterm exam:**

1. Why dates should be stored using special data types for dates? Why dates should not be stored as a string of characters?
2. What is the difference between a candidate key and a primary key?
3. In 1970, E. Codd introduced a new data model for databases. What was the name of that model?
4. Why Oracle 12c can be called an ORDBMS, but not OODBMS?
5. What is the difference between these two data types: CHAR and VARCHAR?
6. The DDL language allows for creation of the database objects. The DML language allows for the following four operations: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. SQL is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(declarative/procedural) language, because SQL states what the data is needed rather than how it is to be retrieved.
8. The relational data model is based on the concept of mathematical relations. In the relational model, the relationships between entities are represented by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
9. In the relational mode, each attribute must have a domain, and more than one attribute may use the same domain\_\_\_\_\_\_(True/False)
10. In relational model, when a key consists of more than one attribute, it is called a \_\_\_\_\_\_\_\_\_\_\_key.
11. Why Nulls are needed in the databases?

**Chapter 5 Relational Algebra:**

Given two relations (tables) **R**  and **S:**

**R S**

|  |  |  |  |
| --- | --- | --- | --- |
| **A** | **B** | **C** | **D** |
| a1 | b1 | c2 | d1 |
| a5 | b2 | c4 | d5 |
| a4 | b1 | c1 | d2 |
| a2 | b2 | c4 | d5 |

|  |  |
| --- | --- |
| **E** | **A** |
| e1 | a4 |
| e2 | a4 |
| e3 | a2 |

Answer the following questions:

1. What is the result of a Projection, **π,** over **R**: **π** C (**R**) ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is the result of the **Intersection** **S ∩ R** ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What is the **cardinality** of the result (Cartesian Product) **R x S** ? \_\_\_\_\_\_\_\_\_
4. What is the **degree** of the result (Cartesian Product) **R x S** ? \_\_\_\_\_\_\_\_\_\_
5. What is the **degree** of **R**? \_\_\_\_\_\_\_\_\_\_
6. Is the **order of tuples** in R significant? \_\_\_\_\_\_\_\_\_\_\_(YES/NO).
7. Is the **order of attributes** in S significant? \_\_\_\_\_\_\_\_\_(YES/NO).
8. What is the **cardinality** of the result **R - S** ? \_\_\_\_\_\_\_\_\_
9. What is the result of R **NATURAL JOIN** S?