DSO34AT NOTES

Differentiate between logical and physical independence?

- **Logical independence** exists when you can change the internal model without affecting the conceptual model.
- **physical independence** when you can change the *physical model* without affecting the *internal model*

Differentiate between a database and a table.

- **Database** is a structure that houses one or more tables
- **Table** a logical structure that represents an entity

Explain the difference between homogeneous and heterogeneous distributed database systems.

- **Homogeneous** DDBMSs integrate multiple instances of the same DBMS over a network
- **heterogeneous** DDBMSs integrate different types of DBMSs over a network

Differentiate between centralized and decentralized conceptual database design

- **the centralized** approach is best suited to relatively small and simple databases
- **decentralized** design requires that the design task be divided into multiple modules

Difference between partial completeness and total completeness

- **Partial completeness** means that not every supertype occurrence is a member of a subtype
- **Total completeness** means that every supertype occurrence must be a member of at least one subtype

Difference between remote request and remote transaction

- Remote request
- Remote transaction

What is the relationship between a database and an information system

- Basically, a database is a fact (data) repository that serves an information system. If the database is designed poorly, one can hardly expect that the data/information transformation will be successful, nor is it reasonable to expect efficient and capable management of data and information

Describe the use of SQL in relation to ROLAP -ROLAP extends the SQL so that it can differentiate between access requirements for data warehouse data and operational data.

Data cube -refers to three-dimensional range of values that are generally used to explain the time sequence of an image's data

star schema - separates business process data into facts which hold the measurable, quantitative data about a business and dimensions which are descriptive attributes related to fact data

business rules -Business rules are narrative descriptions of the business policies, procedures, or principles that are derived from a detailed description of operations.

Data modeling -Is the logical inter relationship and data flows involved between different data elements

Outline the importance of data modelling -The main function of data modeling is to help understand the complexity in the real world environment

Weak entity a weak entity is an entity that cannot be uniquely identified by its attributes alone

Virtualization is a technique that creates logical representations of computing resources that are independent of the underlying physical computing resources.

VMS/VSAM is an example of the file system data model

Constraints are normally expressed in the form of rules.

DATA dictrionary - contains at least all of the attribute names and characteristics for each table in the system.

Julian are date attributes that contain calendar dates stored in a special format

The process of creating an information system is known as systems development

Why are business rules important to a database designer? - They help define Entities, Attributes, Relationships, Constraints.

How do you translate business rules into data model components?

As a general rule, a noun in a business rule will translate into an entity in the model, and a verb (active or passive) associating nouns will translate into a relationship among the entities

Describe the use of SQL in relation to ROLAP.
- Most decision support data requests require the use of multiple-pass SQL queries or multiple nested SQL statements.
- ROLAP extends SQL so that it can differentiate between access requirements for data warehouse data and operational data.
- A ROLAP system therefore can generate the SQL code required to access the star schema data.
- Query performance is also improved because the query optimizer is modified to identify the SQL code's intended query targets.

Charecteristics of a relational table
- Values are atomic.
- Column values are of the same kind.
- Each row is unique.
- The sequence of columns is insignificant.
- The sequence of rows is insignificant.

A fully distributed database management system must perform all of the functions of a centralized DBMS. What are these functions?
- Application or end user request can be received.
- Request can be certified, investigated, and decomposed.
- Request can be mapped from logical-to-physical data components.
- Request can be decomposed into multiple disk Input/Output operations.
- Validate conditions.
- Ensure database integrity.
- Search, locate, read, and validate the data.
- Present the data in the required format.

OLAP systems share three main characteristics. What are they? [3] characteristics

- Multi-dimensional views of data
- Support for complex calculations
- Time intelligence

Breifly discuss performance transparency

- Performance transparency allows the system to perform as if it were a centralized DBMS.
- Performance transparency also ensures that the system will find the most cost-effective path to access remote data.

What factors are important in a DBMS software selection?

- Cost
- DBMS features and tools
- Underlying model

- Portability.
- DBMS hardware requirements

What is a relationship, and what three types of relationships exist?

A relationship is an association among (two or more) entities

Three types of relationships exist:

- one-to-one (1:1),
- one-to-many (1:M),
- and many-to-many (M:N or M:M.)

Briefly outline the 8 characteristics of a relation table

- a table is perceived as a two-dimensional structure composed of rows and columns
- each table row represents a single entity
- each table column represents an attribute and each column has a distinct name
- each row or column intersection represents a single data value
- all values in a column has a specific range of values know as attribute domain
- the order of rows and columns is immaterial to the DBMS
- each table must have an attribute

Practical examples

An amateur database designer came up with the following table design.

course(crs_code, dept_code, crs_description, crs_credit)
class(class_code, crs_code, class_section, class_time, class_room, prof_num)
enroll(class_code, stu_num, enroll_grade)
student(stu_num, stu_lname, stu_fname,stu,dob, stu_class, dept_code, stu_phone, prof_num)

Analyse the above table designs, and identify all possible business rules as reflected by the designs.

- COURSE generates CLASS. One course can generate many classes. Each class is generated by one course. √√
- CLASS is referenced in ENROLL. One class can be referenced in enrollment many times.Each individual enrollment references one class. √√
- Each entry in the ENROLL entity references one student and the class for which that student has enrolled