ST. XAVIER’S COLLEGE

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**DATABASE MANAGEMENT SYSTEM**

**THEORY ASSIGNMENT#4**

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**Database Design:**

Database design is the process of producing a detailed data model of a database. This logical data model contains all the needed logical and physical design choices and physical storage parameters needed to generate a design in a data definition language, which can then be used to create a database.

**Conceptual Database design**: Once all the requirements have been collected and analyzed, the next step is to create a conceptual schema for the database, using a high level conceptual data model. This phase is called conceptual design.

The result of this phase is an Entity-Relationship (ER) diagram or UML class diagram. It is a high-level data model of the specific application area. It describes how different entities (objects, items) are related to each other. It also describes what attributes (features) each entity has. It includes the definitions of all the concepts (entities, attributes) of the application area.

During or after the conceptual schema design, the basic data model operations can be used to specify the high-level user operations identified during the functional analysis. This also serves to confirm that the conceptual schema meets all the undefined functional requirements.[2]

**Logical Database design**: The result of the logical design phase (or data model mapping phase) is a set of relation schemas. The ER diagram or class diagram is the basis for these relation schemas.

To create the relation schemas is quite a mechanical operation. There are rules how the ER model or class diagram is transferred to relation schemas.

The relation schemas are the basis for table definitions. In this phase (if not done in previous phase) the primary keys and foreign keys are defined.

**Physical database design:** The goal of the last phase of database design, physical design, is to implement the database. At this phase one must know which database management system (DBMS) is used. For example, different DBMS's have different names for data types and have different data types.

**Characteristics of Relation**

* Data within a column must be accessible by specifying the table name, the column name, and the value of the primary key of the row.
* The DBMS must support missing and inapplicable information in a systematic way, distinct from regular values and independent of data type.
* The DBMS must support an active on-line catalogue.
* The DBMS must support at least one language that can be used independently and from within programs, and supports data definition operations, data manipulation, constraints, and transaction management.
* Views must be updatable by the system.
* The DBMS must support insert, update, and delete operations on sets.
* The DBMS must support logical data independence.
* The DBMS must support physical data independence.
* Integrity constraints must be stored within the catalogue, separate from the application.
* The DBMS must support distribution independence. The existing application should run when the existing data is redistributed or when the DBMS is redistributed.