# COP3703 Intro to Databases
# Exam 1 Notes

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# 1. Week 1

## 1.1. Definitions

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| **Database** | a collection of related data with implicit meaning. |
| **DBMS** | Database management system. A software package/system to facilitate the creation and maintenance of a computerized database that takes care of storage, query execution, and database manipulation. |
| **DBA** | Database Administrator |
| **Database System** | The DBMS software together with the data itself. Sometimes, the applications are also included. |
| **Data Records** | Rows or columns of data with correlated data. |
| **Data Elements** | Elements within a database, like cells in Excel. |
| **Data Types** | Integer, Varchar(255), etc. |
| **Program-data Independence** | Insulation between programs and data. Allows changing data structures and storage organization without having to change the DBMS access programs. |
| **Data Abstraction** | Conceptual data representation different from data storage. Words and recognizable symbols rather than the raw ones and zeros of low level computation. |
| **Actors** | Everything interacting with the database system: DBMS designers, system admins, database admins, users, apps, data source, etc. |

## 1.2. Database Attributes

**Self-describing**

**Insulation**

**Support of multiple user views**

# 2. Week 2

## 2.1. Definitions

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| **Schemas/Schemata** | Data (record) structure, untyped, no constraints or relationships, and doesn't change frequently. *Description of data.* |
| **Schema Evolution** | the change of a schema (avoid it). Could indicate poor design if required. |
| **Schema Construct** | Specific names of schemata (table headers/titles). |
| **Database Snapshot** | Data of databases at a specific time. |
| **Empty State** | Only the schema, *no population.* |
| **Initial State** | When the database is first populated |
| **3-layer Architecture** | External views, conceptual schema, and internal schema. Recommended format. Also called 3-schema/ANSI architecture. |
| **External View** | External/Conceptual mapping. End users. Provides separate views to different users, Permits only certain operations: **submit form data**, **execute stored procedures**. |
| **Conceptual Schema** | Conceptual/Internal mapping. Hides the details of the physical storage structure. **Entities**, **Attributes**, and **Relationships**. |
| **Internal Schema** | Contains actual data, stored database. Describes the physical storage structure. Contains **access path** information. |
| **Logical data independece** | change the conceptual schema without having to change external schemata or application programs. |
| **Physical data independece** | change the internal schema without having to change the conceptual schema. |
| **Submit form data** | |
| **Stored Procedures** | |
| **Entities** | represent real world objects. Ex. Students, Courses |
| **Attributes** | Represent entity properties. Ex. Name, ID |
| **Relationships** | Represent entity associations. Ex. Is enrolled in |
| **Access paths** | Search structure that allows finding of records by attributes, uses indexing or hashing, may be optimized for different common-case queries. |
| **DBMS Languages** | **DDL**, **SDL**, **DML** all used in SQL. These languages are usually not considered distinct languages. |

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|---|---|
| **DDL** | Data definition language. Conceptual and internal schemata. |
| **SDL** | Storage definition language. Internal schema |
| **DML** | Data manipulation language. A means for users to manipulate the database. Retrieval, insertion, deletion, and modification of the data. |

**Concurency Control**

## 2.2. Database Creation

Every time the database is updated, we get another database state i.e. the current state (current snapshot)