

Lecture 1: Database and DBMS

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Introduction

Definition of a database and DBMS in Professor Notes.

Lecture 2: Relational Data Model

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Relational Data Model

Definition 1 *Relational data model is an approach to organizing collections of data*

- Relation
 - Relational Table \rightarrow **Name + Schema**
 - * Schema: List of attribute name + attribute type pairs
- Relational Database \rightarrow **Collection of Relations tables**
- **Table Instance**: set of records with instantiated values of the attributes
 - Finite
 - Records, rows, tuples

One unit of data is called a **datum**.

Object, entity, event: description of one object, entity, event

- **Records** consist of attributes or fields (rows in the table).
- **Attributes** is a named container for a value of a specific type.

Database Table Constraint

Definition 2 *Limitations of table instances*

- **Candidate Key**: set or lists of attributes that uniquely define a record in a table, **minimal such set of attributes**, made up of multiple attributes sometimes.
 - **Every attribute is necessary.**

Examples

CSC 365 Example

Course Object:

- Prefix: CSC \rightarrow **String**
- Course #: 365 \rightarrow **Integer**
- Name: Introduction to Database Systems \rightarrow **String**
- Description: Basic Principles, ... \rightarrow **String**
- Units: 4 \rightarrow **Integer**

Department Object:

- Name: Computer Science and Software Engineering
- Abbreviation: CSSE
- Building: 14
- Room: 245
- College: CENG

Stringing these objects together based on relationship would make a **network model**.

Schema Example

```
Course(Prefix String, Course# Integer, Name String, Description
String, Units Integer)
```

Prefix	Course#	Name	Description	Units
CSC	365	Introduction to Database Systems	Basic Principles, ...	4
CSC	357	Systems Programming	...	4

```
Department(Name, College, Building, Room): Department would also have a table as well.
```

CSC 365-07: Introduction to Database Systems

Spring 2023

Lecture 3: RDM Cont.

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Relational Data Model

What makes a record unique?

- **Superkey**: any set of attributes that uniquely defines a record in a table
- **Primary Key**: candidate key chosen by you

Lecture 4: SQL DDL and DML

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MySQL Access

1. Server Address = host: **mysql.labthreesixfive.com**
2. Port: 3306
3. username
4. password

MySQL Database

- Namespace
- Collection of Tables
- Set of Permissions

Data Definition Language (DDL)

Define a Relational Table

Aspects needed to define a table:

- Table Name
- Attributes: Name + Type
- Constraints

```
CREATE TABLE <table_name> (
    <attribute_name> <sql_type> [<single_line_constraints>],
    ...,
    <attribute_name> <sql_type> [<single_line_constraints>] [,
    <constraints>[,
    <constraints>]
]);
```

Types

- **Numeric Types**
 - **Integer Types**
 - * TINYINT
 - * SMALLINT
 - * MEDIUMINT
 - * INT
 - * BIGINT
 - **Floating Point Types**
 - * FLOAT
 - * DOUBLE
 - * DECIMAL
- **String Types**
 - **Character Types**
 - * CHAR → Fixed Length
 - * VARCHAR → Variable Length
 - * TINYTEXT
 - * TEXT → for storing large amounts of text
 - * MEDIUMTEXT
 - * LONGTEXT
- **Date and Time Types**
 - **Date Types**
 - * DATE
 - * DATETIME
 - * TIMESTAMP
 - * TIME
 - * YEAR

Data Manipulation Language (DML)

More on Constraints

Lab 2

MySQL Server

- LabThreeSixFive.com
- mysql command line client
- IDE (DatGrip)
- mysql connectivity from Python