**Introduction to Relational Databases and Tables**

* Information Models and Data Models
  + Advantage of Relational Model
    - Most used
    - Data Independence (Logical and Physical Independence)
    - Store in Tables
      * Entity-Relationship Model (ER Model)
  + Entity Name and Attribute map to relational DB Tables
    - Tables are combination of rows and column while mapping entities will become

tables.

* + - Attribute becomes columns.
  + Table

    Description automatically generatedDifference between and entity and attribute.
    - Entity are the physical objects (Book), while attributes are aspects of the object (Title, Description, Edition, Year, Price etc)
    - Like classes which have methods.
    - Entities map to Tables in RD and Attributes map to Columns.
  + Common Data Types
    - Character (Char), Numbers (int, Float) and date/times
  + Function of Primary Keys
    - Each table is assigned a primary key.
    - **Primary key are used to uniquely identify a particular entity and prevents duplication of data.**
    - Foreign keys are used to link the different tables together.
* How to create a database instance on cloud
  + Cloud Database Basics
    - Ease of use and Access from anywhere
    - Web Interface
    - Cloud or Remote Applications
    - Scalability and Economics (Expand/Shrink storage & Computer resources)
  + List some Cloud Databases (VM or Managed Service)
    - IBM Db2
    - Databases for PostgreSQL
    - Oracle Database Cloud Service
    - Microsoft Azure SQL Database
    - Amazon Relational Database Service (RDS)
  + Describe a Database Instance
    - DBaaS provides users with access to Database resources in cloud without setting up hardware etc
    - Databases service instance hold data in data object / tables
    - Once loaded it can be queried using web interfaces and apps.
  + Create and instance of IBM Db2 on Cloud

Types of SQL Statements (DDL vs. DML)

* DDL (Data Definition Language)
  + Define, Change or Drop Data (Tables)
    - CREATE
      * **CREATE TABLE provinces (**

**Id char(2) PRIMARY KEY NOT NULL**

**, name varchar(24)**

**Background pattern

Description automatically generated with medium confidence)**

* + - * **CREATE TABLE author (author\_id CHAR(2) PRIMARY KEY NOT NULL,**

**Lastname VARCHAR(15) NOT NULL,**

**Firstname VARCHAR(15) NOT NULL,**

**Email VARCHAR(40)**

**City VARCHAR(15),**

**Country CHAR(2)**

**)**

\*\*Note NOT NULL means must have a values, and we set author\_id as the primary key.

* + - ALTER
      * Add or remove columns
        + **ALTER TABLE <table\_name>**

**ALTER COLUMN <column\_name> SET DATA TYPE <datatype>;**

* + - * + **ALTER TABLE author**

**DROP COLUMN telephone\_number;**

* + - * + **ALTER TABLE author**

**ALTER COLUMN telephone\_number SET DATA TYPE CHAR(20);**

* + - * + **ALTER TABLE author**

**ADD COLUMN telephone\_number BIGINT;**

\*\*BIGINT can hold a number up to 19 digits long.

* + - * Modify the data type of columns
      * Add or remove keys
      * Add or remove constraints
    - TRUNCATE (DELETE DATA but not the table itself)
      * **TRUNCATE TABLE <table\_name> IMMEDIATE;**

**\*\*Immediate indicates that the process should be executed immediately and cannot be undone.**

* + - * **TRUNCATE TABLE author IMMEDIATE;**
    - DROP (Deleting Tables)
      * **DROP TABLE <table\_name>;**
      * **DROP TABLE author;**
* DML (Data Manipulation Language)
  + Read and Modify (Manipulating Tables)
    - CRUD
      * Create, Read, Update, & Delete Rows
    - INSERT
    - SELECT
    - UPDATE
    - DELETE