Welcome to:

EE353 Intro to Data Science and Machine Learning
EE769 Intro to Machine Learning

Intro to RDBMS and SQL

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Learning objectives

- List the key concepts of relational databases
- Define table, record, field, key
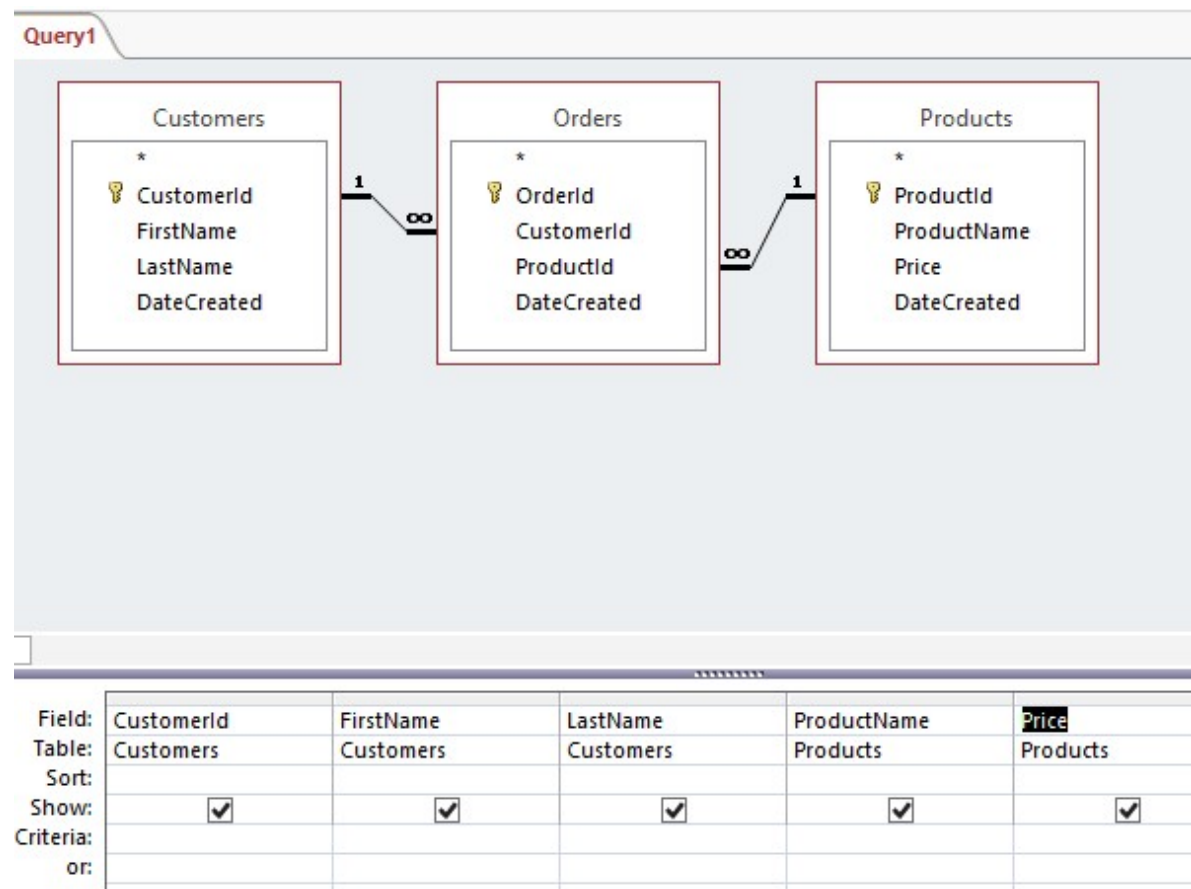- Define structure of basic SQL queries

Introduction to Databases

- ## What is a Database?
  - Organized collection of data
  - Stores information for efficient retrieval and management
  - Examples: Customer records, product inventory, financial data

- ## Why Databases?
  - Manage large amounts of data efficiently
  - Ensure data integrity and consistency
  - Facilitate data sharing and analysis

Relational Database Management System (RDBMS)

- Stores data in tables with rows and columns

- Relationships defined between tables

- Most widely used database system

Image source: https://techcommunity.microsoft.com/t5/access-blog

RDBMS Concepts

- Tables
  - Organized collection of data in rows and columns
  - Each row represents a record, each column a field
- Records
  - Represents a single instance of data (e.g., Customer records)
- Fields
  - Represents a specific piece of data in a record (e.g., Name, address, phone number)
- Keys
  - Unique identifiers for records
  - Primary key: Unique identifier for each row
  - Foreign key: References primary key in another table

Structured Query Language (SQL)

- Standard language for interacting with RDBMS
- Used for data definition, manipulation, and control
- E.g.
  - CREATE TABLE Enrolled (sid: CHAR(20), cid: CHAR(20), grade: CHAR(2))
  - INSERT INTO Students (sid, name, login, age, gpa) VALUES (53688, 'Smith', 'smith@ee', 18, 3.2)
  - DELETE FROM Students S WHERE S.name = 'Smith'

Example source: https://pages.cs.wisc.edu/~dbbook/openAccess/firstEdition/slides/pdfslides/mod1l2.pdf

Typical query structure in SQL

- FROM table(s)
- WHERE (records with following) conditions
- SELECT only the required fields

RDBMS Self-study

- Watch the following and practice in Colab:

- https://www.youtube.com/watch?v=h0nxCDiD-zg
- https://www.youtube.com/watch?v=v0gpCrPqJSs
- https://www.youtube.com/watch?v=pO-EeLn9IsU