

LECTURE 1
Introduction to
Database design

IITU, ALMATY, 2014
DATABASE DESIGN

Lyudmila Kozina, senior lecturer

Course Outline

- **Objectives**

- Learn the steps of database design process.
- Learn to design a database based on the user's requirements.
- Learn the Structured Query Language.

By the end of this course the students will be able to:

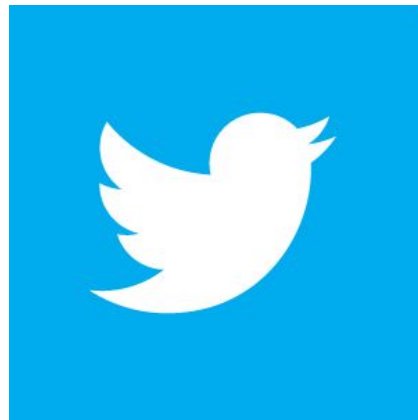
- design a database starting from the conceptual stage to the physical implementation of all the database objects;
- demonstrate the programming skills with SQL (Structured Query Language);
- use database management system (DBMS);
- think clearly and logically, as required for critical analysis of problems.

What are your association?



Today's world

Nowadays databases are everywhere, but we never see them. They are hidden behind the tools and services that we use everyday.



- Databases do most of the work in the information systems that we use every day
- Almost any business has a database
- So the need for database professionals in the IT job market will always stay strong



What is a database?

- Database is an organized collection of data
- Databases have a structure



Phone book's DB

| id | First name | Last name | Birth date | Phone number | Email |
|-----|------------|-----------|------------|--------------|-------|
| 001 | | | | | |
| 002 | | | | | |
| 003 | | | | | |
| 004 | | | | | |
| 005 | | | | | |
| 006 | | | | | |
| 007 | | | | | |
| 008 | | | | | |
| 009 | | | | | |

Ordinary phone book vs. the DB

- Kate's phone number
- Birthdays in January
- Who is owner of this number?
- Find all phone number of people with last name ...
- ...

Database management systems

Database management systems (DBMSs) are specially designed applications that interact with the user, other applications, and the database itself to capture and analyze data.

A general-purpose database management system (DBMS) is a software system designed to allow the definition, creation, querying, update, and administration of databases.

Database management systems

- **PostgreSQL**
- Microsoft SQL Server
- Oracle
- MySQL
- IBM DB2

Database Design

- Modelling (subject area analysis)
 - Decide which part of reality is represented in a database
 - Agree on structure of the database before deciding on a particular implementation
- Conceptual Modelling
 - ER diagram
 - Logical Modelling
- Physical Modelling (the physical organization of the data)

What's next?

Next week lessons introduce the entity-relational model and how to design the schema of a database.

Books

- **Connolly, Thomas M. Database Systems: A Practical Approach to Design, Implementation, and Management / Thomas M. Connolly, Carolyn E. Begg.- Fifth.- United States of America: Pearson Education, 2010**
- **Garcia-Molina, H. Database system: The Complete Book / Hector Garcia-Molina.- 2.- United States of America: Pearson Prentice Hall, 2009**
- **Sharma, N. Database Fundamentals: A book for the community by the community / Neeraj Sharma, Liviu Perniu.- First Edition.- Canada, 2010**