Databases: Using MS-Access

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Concepts

- Database

- Relational Database
  - A database model that organizes data and the relationship among them into *tables*.

- Database Management System (DBMS)
  - The physical collection of files that contain data.
  - The software that allows users to interact with the database and make modifications.
  - The schema that specifies the logical structure of how the data is to be stored.

- Elements of a Database

Elements of a Database

- Tables

- Forms

- Queries

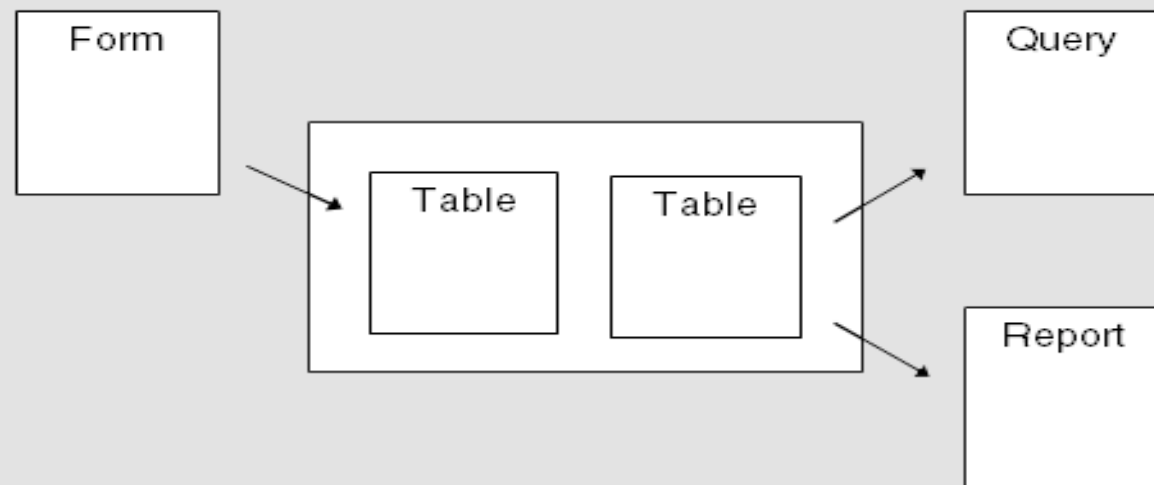- Reports

Elements of databases

A database stores information in an organized way, and makes it easy to get information in and out.

Tables store data within the database.

Forms make it easy to put data into tables.

Queries pull out specific data.

Reports put data in an easily-read format.

Form		Query
	Table Table	
		Report

Elements of a Relational Database

- Table: A collection of records

- Record: A collection of related fields

- Field: Column heading in a table

- Key: A field uniquely identifies a record in a table among other records in a table

Attributes and Tuples

STUDENT	Name	SSN	HomePhone	Address	OfficePhone	Age	GPA
	Benjamin Bayer	305-61-2435	373-1616	2918 Bluebonnet Lane	null	19	3.21
	Katherine Ashly	381-62-1245	375-4409	125 Kirby Road	null	18	2.89
	Dick Davidson	422-11-2320	null	3452 Elgin Road	749-1253	25	3.53
	Charles Cooper	489-22-1100	376-9821	265 Lark Lane	749-6492	28	3.93
	Barbara Benson	533-69-1238	839-8461	7384 Fontana Lane	null	19	3.25

Relation name — Attributes — Tuples

Keys

- Candidate Key
  - Possible primary key(s).

- Primary Key
  - A key that uniquely identifies a record in a table (relation).

- Foreign Key
  - An attribute which is a primary key in some other table (relation).

Schema

- The schema is an expression of the attributes of the records in a table.

Example:

Address Book (PersonID:key, Firstname, Lastname, Email, Birthday)

PersonID	Firstname	Lastname	email	birthday
101	Rick	Edwards	rick.edwards@email.com	7-Mar-68
102	Jimmy	Foster	jimmy.foster@email.com	28-Feb-87
103	Nathan	Garcia	nathan.garcia@email.com	2-Jun-82
104	Louise	Knight	louise.knight@email.com	12-Dec-67
105	Gary	Knox	gary.knox@email.com	1-Dec-92
106	Rafael	Lorenz	rafael.lorenz@email.com	9-Jul-78
107	Veronica	Page	veronica.page@email.com	9-Sep-45
108	Hector	Sanchez	hector.sanchez@email.com	1-Apr-00
109	Billy	Smith	billy.smith@email.com	30-Aug-99
110	Ricardo	Stuckey	ricardo.stuckey@email.com	17-Nov-55
111	Ken	Weaver	ken.weaver@email.com	13-May-45
112	Lorenzo	West	lorenzo.west@email.com	1-Jun-84

Relationships

PersonID	Firstname	Lastname	email	birthday	CityID	ProvinceID
101	Rick	Edwards	rick.edwards@email.com	7-Mar-68	1	2
102	Jimmy	Foster	jimmy.foster@email.com	28-Feb-87	3	1
103	Nathan	Garcia	nathan.garcia@email.com	2-Jun-82	9	2
104	Louise	Knight	louise.knight@email.com	12-Dec-67	2	5
105	Gary	Knox	gary.knox@email.com	1-Dec-92	6	3
106	Rafael	Lorenz	rafael.lorenz@email.com	9-Jul-78	5	1
107	Veronica	Page	veronica.page@email.com	9-Sep-45	4	1
108	Hector	Sanchez	hector.sanchez@email.com	1-Apr-00	7	5
109	Billy	Smith	billy.smith@email.com	30-Aug-99	11	4
110	Ricardo	Stuckey	ricardo.stuckey@email.com	17-Nov-55	10	5
111	Ken	Weaver	ken.weaver@email.com	13-May-45	8	5
112	Lorenzo	West	lorenzo.west@email.com	1-Jun-84	12	6

CityID	City
1	Calgary
2	Ottawa
3	Vancouver
4	Richmond
5	Surrey
6	Regina
7	Markham
8	Hamilton
9	Edmonton
10	Toronto
11	Winnipeg

ProvinceID	Province
1	British Columbia
2	Alberta
3	Saskatchewan
4	Manitoba
5	Ontario
6	Quebec