

Component 4: Introduction to Information and Computer Science

Unit 6a Databases and SQL

Topics In This Unit

- Topic I: Define and describe the purpose of databases
- Topic II: Define a relational database
- Topic III: Describe the SQL querying language
- Topic IV: Design a simple relational database using data modeling and normalization
- Topic V: Define the basic data operations for databases and how to implement them in SQL
- Topic VI: Create simple querying statements for the database

Topic I Define and Describe the Purpose of Databases

- Storage prior to databases
- Other forms of storing data
- Purposes of databases
- Database hierarchy and terminology
- Deletion anomaly

Data Storage Prior to Databases

Disk file storage

Lists stored on disk

Problems/shortcomings of disk file storage

Data was repeated in multiple disk files (each file needed to have customer identification data)

Only key data is repeated in a database.

Data Storage Prior to Databases Cont.

- A change to repeated data meant that all locations of the data had to be updated.
 - **A change to data in a database is usually only done in one place.**
- Security risks were relatively high
 - **Database security, while still being a problem provided less risk than disk files.**
- Conflicting data storage was relatively high
 - **Conflicting data in a database is rare**

Problems with Data Storage Prior to Databases Cont.

- If you kept more than one kind of data in a file and you deleted one type, you deleted the other type along with it
 - **Database provided a way to delete each kind of data without deleting any other types.**
- Required transaction fields for a new potential customer might mean that you couldn't add new customer information without there being a transaction.
 - **Database splits the information so that the new customer information can be added.**

Problems with Data Storage Prior to Databases Cont.

- All data on a disk file record had to be input even if you didn't need all the data. I/O is the slowest thing that the computer does.
 - **Data from a database can be input selectively**
- Data from a disk file often required special programming code to be processed.
 - **Databases require less special coding**

Other Methods of Data Storage

- Arrays are used in programs to store relatively small amounts of repetitive data
 - **Databases can store large amounts of repetitive data**
- Spreadsheets store data that must be visible all the time.
 - **Data in a database is not visible all the time.**
- **Conclusion: Databases are a powerful way to store data**

Spreadsheet Business Example

SSN	Name		Co Address					Phone	Email
	Last	First	Company	Street	City	State	Zip		
123456789	Leaf	Leticia	AAA Nursery	22 SW Barbur Blv	Portland	OR	97219 7186542	(503)	lleaf@anursery.com
135798642	Lace	Fancy	AAA Nursery	22 SW Barbur Blv	Portland	OR	97219 7186542	(503)	flace@anursery.com
148624862	Ulous	Redic	Amboy Const	14 S. Barney Rd.	Beaverton	OR	97318 3254871	(503)	ruulous@amboyc.com
159515951	Basse	Data	CD Software	405 NW Kinney	Portland	OR	97503 2423224	(503)	dbasse@cdsoft.com
172839405	Tose	Coma	Soda Works	55 N. Marion	Portland	OR	97503 4454447	(503)	ctose@sdawrks.com

Purpose of a Database

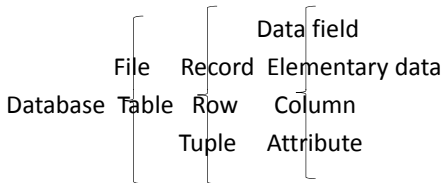
- Receive data
- Store data in a unique repetitive fashion
- Retrieve data on command
- Provide internal security

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Hierarchy and Terminology of a Database



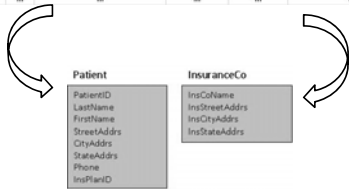
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Fixing the Deletion Anomaly

Patient ID	Last	First	Address	Phone	Insurance	Ins Addr	Ins plan ID
12345	Compose	Dee	12 S Umbrage St, Borling, OR	541.344.7774	Rely Ins Co	33 Dover Ave, Ontario, OR	A437b
54321	Licked	Derra	4 SE Madeye Blvd, Ptlid, OR	555.732.8888	BedRock Ins	1 S Broadway St, Salem, OR	4553891#
67890	Eye	Pop	35 Creature Ave, Ptlid, OR	777.888.9999	Depend Ins	33 NW Halsey St, Ptlid OR	77BC5F
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