

Fluency With Information Technology

CSE100/IMT100

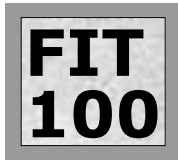


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Introduction to Relational Database

- ❖ Need to store information
- ❖ Files can store data
- ❖ Problems with flat files
- ❖ Relational databases
- ❖ Benefits of relational databases



Need to Store Information

- ❖ Your address book
 - ❑ Name, phone number, address
- ❖ Books available in UW bookstore
 - ❑ Title, author, availability
- ❖ Business
 - ❑ Employee information, product information
 - ❑ Accounting and financial data
- ❖ Hospital
 - ❑ Medical records and insurance information
- ❖ University of Washington
 - ❑ Student grades, tuition payments

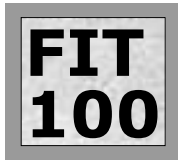
Data Storage Methods - Flat Files

- ❖ Early days of computing 1950's to 1980
 - ❑ File based data storage
 - ❑ Flat files
 - ❑ Programs were written to:
 - + read data from file on disk
 - + process data (change employee salary, enter course grade)
 - + Write data back to file

- ❖ But there are problems with file based data storage
- ❖ Where is my wallet ?

Problems with Flat Files

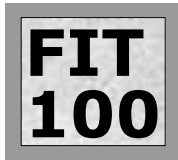
- ❖ Need to write a program to get at the data
 - ❑ Too hard to get to the data
 - + Time consuming and expensive, even for simple reports
 - ❑ Too easy to get to the data
 - + It was difficult to control access to the files
 - + People could change data if they could write a program
 - Salary data, grade data, bank account balances
 - ❑ Data dependency
 - + Changing data format means you need to change all programs that read the data
 - Zip code changed from 5 to 9 digits
 - ❑ Don't know which programs are using the data



Main Problem is Redundant Data

Name	Course	Room #	Instructor
Paul Go	FIT 100	EE1	Mel
Mary Hi	FIT 100	EE1	Mel
Peter Yi	IS 480	B209	Mel
Nancy Yo	IS 320	B309	Russ
Paul Go	IS 320	B309	Russ
Peter Yi	FIT 100	EE1	Mel

- ❖ Redundant data leads to data anomalies
- ❖ Bad decisions



Relational Database Technology

- ❖ Data is stored in tables
 - ❑ One table for each type of object or “entity”
 - ❑ Each of the following would have a table
 - + students table lists all students - one row for each student
 - + course table lists all courses - one row for each course
 - + instructor table lists all instructors - one row for each instructor
 - ❑ Each row has a unique identifier
 - + Primary key (PK)
 - + Primary key is never null and cannot be a duplicate
 - ❑ What is the primary key for a student in UW database?



Relational DB's Use Keys To Show Relationships

SID	Name
1	Mary Hi
2	Peter Yi
3	Paul Go
4	Nancy Yo

Instr.ID	Name
1	Mel
2	Russ

SID	CourseID	Instr ID
3	1	1
1	1	1
2	3	1
4	2	2
3	2	2
2	1	1

Course ID	Name	Room
1	FIT 100	EE1
2	IS 320	B309
3	IS 480	B209

Note: No Data Redundancies



Benefits of Relational Databases

- ❖ Controls data redundancy
 - ❑ Information about one entity per table
 - ❑ Relationships are stored using keys
- ❖ Database Management System (DBMS)
 - ❑ Application that restricts access to data tables
 - ❑ Maintains information about data types (metadata)
 - + Solves data dependency problem
- ❖ Provides query facilities
 - + Wednesday