

CS 474 – Notes: 01/14/2014 – Intro to Databases

My intro

Intro to Canvas site

Survey notes – See PowerPoint 1

Introduction to database systems (current – history on Thursday)

Activity – In loose groups, come up with some definitions

What is a database?

Collection of related data used for data storage, retrieval, and update.
CJ Date, 1995 “A system whose purpose is to maintain information and make that information available on demand”

Properties

Models real world in some way

Data should be logically related

Should be built for a specific purpose (who is it serving?)

What is data? How is it different from information?

Data – the values

Information – the meaning

Database data

Integrated – the data is stored in “tables” that share data among them. Data is found in only one place.

Shared – data is available to multiple users at the same time.

Persistent – it exists over time

What is a database management system (DBMS)

Provides a safe repository for data

Provides a definition of the database (a schema)

Allows construction/maintenance of the database

Allows manipulation of the data

Programs can be written without concern about the underlying data (use the schema)

Provides security features to maintain the integrity of the data amongst multiple users (access, integrity, backup and recovery)

The database environment consists of: See PowerPoint 2

The database (the store)

The DBMS

Users who interact with the db

Applications who interact with the db

Users again who interact with the applications that interact with the db.

Who are these users?

Novice user (Naïve) – one who typically interacts with the applications

DB user (Casual) – one who may interact with applications but who may also access the dbms directly

Application programmers – interact with the db through their applications. Applications include queries to the dbms.

DB Administrator – responsible for the construction and maintenance of the database. Implements security policies.

Data Managers – people responsible for the data for their areas. They have an interest in maintaining access to the data for appropriate users. They may make policy in concert with the DB Administrator.

Advantages of a database system

Separation of layers permits changes at one layer to be made independently of another.

Schema provides for a data dictionary of sorts.

External views permit customization and security to the underlying data.

Proper design reduces data redundancy and data anomalies.

Maximizes the efficiency of accessing data (indexing, tuning)

Built in integrity checking provides for more accurate data

Use of system by many users at once – integrated system serving up many populations

Can support applications as well as ad hoc use of the data

An example of a terrible database....

Why is it bad?

Definitions