

## Databases

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## Database Function

- Collection of data
- Examples
  - UH Carl Library Database
    - <http://www.lib2.hawaii.edu:1080/>
  - Monster.com
    - <http://www.monster.com/>

## Terms To RECOGNIZE

- 3-tier or n-tier architecture
- RDMS(Relational Database Management System)

## Basic Business Uses

- Collect business process information for companies
- Provide data reports For decision making
- Running end of month reports
- Processing ad-hoc sales analysis queries

## Online Uses for Databases

- Collecting information
- Providing information
- Logging information

## Collecting Information

- Critical customer data
- Market data
- Example
  - Cookies

## Providing Information

- Online database services
- By subscription or free
- Example:
  - Dun & Bradstreet
    - <http://www.dnb.com>
  - Medscape
    - <http://www.medscape.com/>

## Logging Information

- Business transactions
- Example
  - Online shopping sites
  - Amazon
    - <http://www.amazon.com>

## Database Design Issues

- Defining the problem or objective
- Researching the current database, system, and process
- Designing the data structures (tables)
- Constructing relationships
- Implementing rules and constraints
- Creating views and reports
- Implementing the design
- Testing
- Refining

## Database Design: Common Mistakes

- TOO MUCH DATA
- Keys: Missing Keys, Bad Keys, Compound Fields
- Relationships: Missing Relations, Unnecessary Relations, Incorrect Relations
- Cryptic field and table names
- Missing or incorrect business rules
- Referential Integrity
- Database Security

Sources: <http://webreview.com/pub/1999/03/26/feature/index3.html>

## Picking the right database platform: key factors

- Maximum # of users accessing the database at one time
- Level of uptime needed
- Types of programs you'll be using to access information on the database
- Server hardware and operating system for the database
- Cost and Complexity of data administration
- Level of in-house expertise

## Picking the right database platform: Key factors to consider (cont)

- Maximum performance load
- Speed and feature set of database server engine
- Security (field, record, table, application)
- Scalability
- Interoperability (ODBC, DAO)
- SQL (Structured Query Language) support
- Cost

Sources: <http://www.adnet.com/products/stories/reviews/0,4161,408644,00.html>

## Popular Databases

- ORACLE - <http://www.oracle.com>
- INFORMIX - <http://www.informix.com>
- SYBASE - <http://www.sybase.com>
- SQL Server - <http://www.microsoft.com/sql/default.htm>
- MySQL - <http://www.nysaes.cornell.edu/mysql/>
- Access - <http://www.microsoft.com/office/access/default.htm>

## Technologies and Trends

- Server hardware becomes cheaper
- Java support as part of their product / Java Beans Enterprise
- Data Warehousing
- <http://www.infoworld.com>

## SQL

- Structured Query Language
- Language to communicate with a database
  - Create
  - Update
  - Access
- Used by Oracle, Access, etc.

## CREATE

- Creates a new table.
- CREATE TABLE tablename  
(column1 dataType [constraint],  
column2 dataType [constraint],  
column3 dataType [constraint]);
- [] = optional
- constraint - a rule associated with a column that the data entered into that column must follow.
  - Ex) "not null"

## Data Types

- varchar(size) - Variable-length character string. Max size is specified in parenthesis.
- number(size) - Number value with a max number of column digits specified in parenthesis.
- date - Date value

## Create Example

```
CREATE TABLE STUDENTS  
(first varchar(25),  
last varchar(25),  
id number(3));
```

STUDENTS	first	last	id

## INSERT

- Inserts a new row into a table.
- `INSERT INTO tablename (first_column,...last_column) VALUES (first_value,...last_value);`

## INSERT Example

```
INSERT INTO STUDENTS (first, last, id)
VALUES ('John', 'Smith', 23);
```

STUDENTS	first	last	id
	John	Smith	23

## DROP

- Removes a table from a database.
- `DROP TABLE tablename;`
- Ex) `DROP TABLE STUDENTS;`

## SELECT

- Get information from a table.
- `SELECT column1[,column2,etc] FROM tablename [WHERE condition];`
- Conditions are made up of relational and logical operators.
  - Executed if condition is true.

## Relational Operators

Equal	=
Not Equal	<>
Less Than	<
Greater Than	>
Less Than or Equal To	<=
Greater Than or Equal To	>=

## Logical Operators

AND	True	False
True	True	False
False	False	False

OR	True	False
True	True	True
False	True	False

NOT	True	False
	False	True

### SELECT Example

STUDENTS	first	last	id
	Mark	Gray	7
	Greg	Jones	1
	John	Smith	23

SELECT first, id  
FROM STUDENTS

first	id
Mark	7
Greg	1
John	23

### SELECT Example

SELECT \*  
FROM STUDENTS;

STUDENTS	first	last	id
	Mark	Gray	7
	Greg	Jones	1
	John	Smith	23

### SELECT Example

STUDENTS	first	last	id
	Mark	Gray	7
	Greg	Jones	1
	John	Smith	23

SELECT last, id  
FROM STUDENTS  
WHERE id = 7;

last	id
Gray	7

### UPDATE

- Edit information in a table.
- UPDATE tablename  
SET columnname = newvalue  
[,nextcolumn = newvalue2...]  
WHERE condition;

### UPDATE Example

STUDENTS	first	last	id
	Mark	Gray	7
	Greg	Jones	1
	John	Smith	23

UPDATE STUDENTS  
SET id = 99  
WHERE last = Smith;

STUDENTS	first	last	id
	Mark	Gray	7
	Greg	Jones	1
	John	Smith	99

### DELETE

- Removes a row from a table.
- DELETE FROM tablename  
WHERE condition;
- **If the WHERE clause is left off, all rows will be deleted!!!!**

## Delete Example

STUDENTS	first	last	id
	Mark	Gray	7
	Greg	Jones	1
	John	Smith	23

DELETE FROM STUDENTS  
WHERE first = 'Greg';

STUDENTS	first	last	id
	Mark	Gray	7
	John	Smith	23

## Links

- <http://torresoft.netmegs.com/intro.html>
  - Intro to SQL
  - SQL Interpreter
- <http://w3.one.net/~jhoffman/sqltut.htm>
  - Advanced (Joins, Like, Union, etc.).

## Outsourcing - Advantages -

- Reduces internal resource constraints
- Reduces corporate expenditures
- Increases quality
- Cheaper for small businesses



## Outsourcing - Disadvantages / Risks -

- Lost revenue
- Added expenses:
  - Requires minimum 1 FT worker
  - Customization becomes more expensive
- Potential for litigation issues
- Less control in the design & implementation
- Higher risks of failures

## Outsourcing Strategy

- 1 Establish Requirements
  - Define the processes or functional requirements
  - Determine what level of service is acceptable
  - Outline business recovery strategies for the function

## Outsourcing Strategy

- 2 Locate Potential Providers
  - Find colleagues who have outsourced the same process or function
  - Check service-provider directories
  - Locate candidates that mostly closely match your needs & budget

## Outsourcing Strategy

- ③ Set up Pilot Programs
  - ☑ Establish a test environment for pilot programs
  - ☑ Test drive each potential service with a small group of users or customers
  - ☑ Evaluate & grade how well each service matches your requirements

## Outsourcing Strategy

- ④ Select Provider
  - ☑ Finalize how well the service provider can meet your needs
  - ☑ Negotiate the contract
  - ☑ Create the service-level agreement

## Outsourcing Strategy

- ⑤ Determine “go live” date
  - ☑ Choose the initial start date & users
  - ☑ Monitor service during initial start-up period
  - ☑ Provide final sign-off & expand service use

## Online Database Services

- Tools to create Web-ready database forms
- Vendors:
  - Bitlocker ([www.bitlocker.com](http://www.bitlocker.com))
  - Flashbase ([www.flashbase.com](http://www.flashbase.com))
  - Part of application service providers (ASPs)
  - Easier, cheaper, and less work than many other options

## Online Database Services - Advantages -

- Free service for basic service
- Perfect for occasional users
- Zero setup time
- User can:
  - Define what information is stored
  - Search for specific records
  - Set up security rules
- Custom URLs



## Online Database Services

- Disadvantages:
  - Can't do very complex tasks
  - Forms are too simple
  - Limited control
- Price:
  - Bitlocker Professional Package, \$100/yr.
  - Flashbase Premier Program, \$24.05/month

## E-mail Outsourcing Services

### Factors to consider:

- If small mailing lists:
  - Free products
  - Ad-supported products:
    - eGroups
    - Microsoft bCentral's ListBot
    - Topica
- If longer lists:
  - Service bureaus
    - EnvoyMail
    - ListPlex
    - SparkList
    - Post master General
    - Unitymail Express
  - E-mail campaign providers:
    - eGain communications
    - Exactis.com
    - Kana communications

## E-mail Outsourcing Services

### General Features:

- Let you give your list a name
- Give you little snippets or HTML code
- Let you ask demographic questions
- Let you use this information to target your message better
- Let subscribers participate via the web for discussion lists

## Web Data Analysis Outsourcing

- Analysis of Web sites' clickstream data
- Makes sense for .coms on limited budget
- Avoids:
  - Internal warehousing deployment
  - Staff with data warehousing expertise
- Companies:
  - NetAcumen Web Vision: \$4,000/month
  - WebSideStory Inc, HitBox Web traffic analysis.