

COMPSCI 111 / 111G

*Mastering Cyberspace:
An introduction to practical computing*

**Databases
Queries**

Revision

Field

Record

Table

Primary key

Foreign key

Referential Integrity

Exercise

Exercises 01, 02, 03, 04

Learning outcomes

Define the terms QBE and SQL

Compare QBE with SQL

Use QBE to create simple queries

Write simple SQL queries

Interacting with a Database

Query the database

- Different DBMS use different methods to query

Structured Query Language (SQL)

- Standardised language used by most DBMS

Query by Example (QBE)

- Application specific

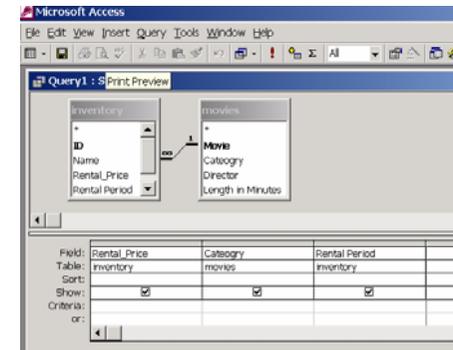
Natural Language

- Uncommon, but growing in popularity

Querying the Database

Query By Example (QBE):

- Use Query Design view in MS Access
- Graphical view of the database query
- Select fields in columns that you want to use



Types of Queries in Access

Select Query

- Does not change the data. Is a view of data already contained in database

Update Query

- Allows us to update tables. Modifies data permanently in database.

Make Table Query

- Makes a new table and fills it with the selected data. Adds new table permanently to database

Append Query

- Adds records to an already created table. Adds data permanently to database.

Delete Query

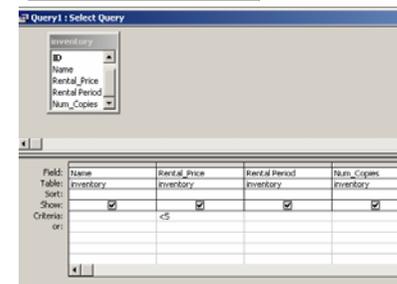
- Removes data from the database

Select Queries in Design View



First we need to select the tables that we want to add to the query.

Next we can choose the columns and add criteria for filtering the data

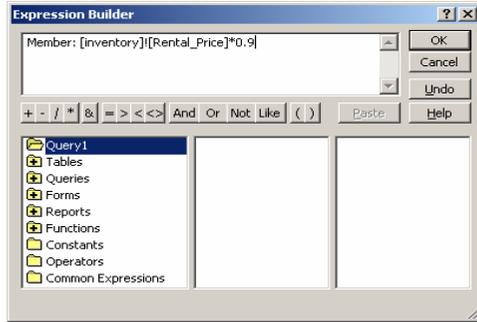


Name	Rental_Price	Rental_Period	Num_Copies
Lord of the Rings	\$3.00	1	5
Minority Report	\$4.00	1	2
	\$0.00	0	0

Results

The exclamation point runs our query. 

Adding Calculated Fields



We can use the expression builder to create a member discount field.

Name	Rental_Price	Member
Lord of the Rings	\$3.00	2.7
Lord of the Rings	\$7.00	6.3
Monsters, Inc.	\$5.00	4.5
Blade II	\$6.00	5.4
Minority Report	\$4.00	3.6
Minority Report	\$6.00	5.4
	\$0.00	

Results

Detail vs. Aggregate

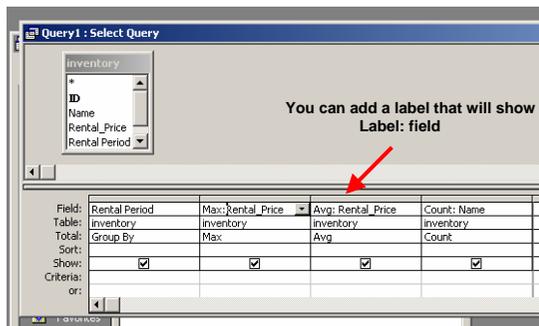
Detail

- Default in Access
- Gives individual, detailed results

Aggregate

- Group data
- E.g. sums, averages, counts
- Selecting the Sigma : Σ
- Access calls this a "Totals Query"

Aggregate Queries (Σ)



You can add a label that will show up on the resulting query
Label: field

Results:

Rental_Period	Max	Avg	Count
1	\$4.00	\$3.50	2
2	\$6.00	\$5.50	2
3	\$7.00	\$6.50	2

Exercise

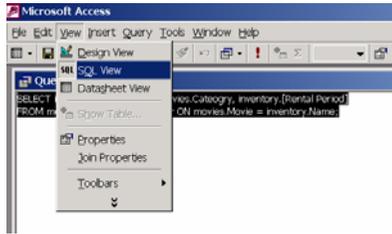
Exercise 05

SQL

SQL – Structured Query Language

- (pronounced “sequel”)
- Developed by IBM in the 1970s
- Standard language used for databases

Access QBE generates SQL



SQL

SELECT statement:

- Selects rows from a table.
- We can specify which table and which fields we want to select.
- We can also group or sort the data and do some calculations.

General syntax

```
SELECT [comma separated field list] FROM tableName;
```

Case sensitivity

- SQL is case insensitive.
- It only matters when comparing values in a textual field of the database

Examples

Select all

- `SELECT * FROM TableName;`

Selecting three fields

- `SELECT field1,field2, field3 FROM TableName;`

Sorting

- `SELECT field1, field2 FROM TableName ORDER BY field2;`

More Examples

Constraining

- *Numeric fields do not need quotations*
- *Text fields use a single quote*
- `SELECT field1, field2, field3 FROM TableName WHERE field1>3;`
- `SELECT field1, field2, field3 FROM TableName WHERE field2='Myra';`

Aggregate query

- `SELECT field1 FROM TableName GROUP BY field1;`

Using SQL in Access

Movie	Category	Director	Length in Minutes
Blade II	ACTION	Guillermo del Toro	116
Lord of the Rings	FANTASY	Peter Jackson	178
Minority Report	ACTION	Steven Spielberg	145
Monsters, Inc.	COMEDY	Peter Docter	92
The Graduate	COMEDY	Mike Nichols	105

This table is called **movies**

```
SELECT movie,category from movies where category='ACTION';
```

movie	category
Blade II	ACTION
Minority Report	ACTION

```
SELECT movie,category from movies where [Length in Minutes]<110;
```

movie	category
Monsters, Inc.	COMEDY
The Graduate	COMEDY

Note: A field name with spaces must be inside square brackets.

SQL in Access

Adding a table name

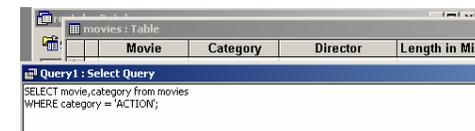
- Used as a qualifier when we have multiple tables
- Avoids confusion

Format

- tableName . tableField

Example

- `SELECT movies.movie,movies.category from movies WHERE movies.category = 'ACTION';`



Exercise

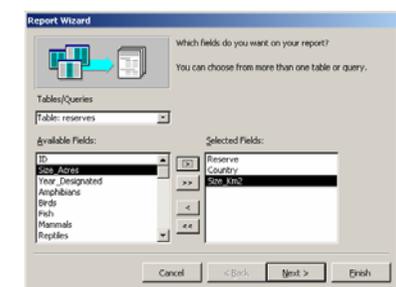
Exercise 06, 07

Creating Reports using Access

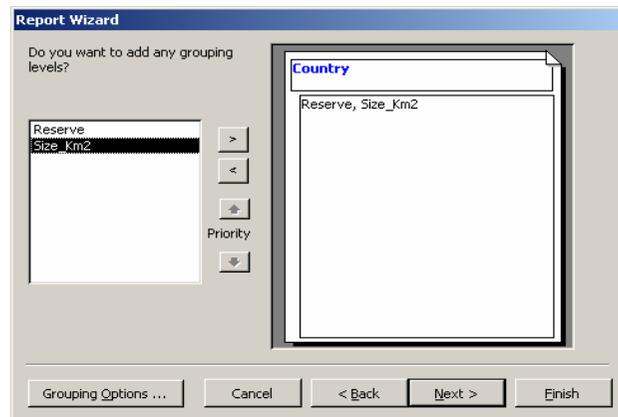
Report Wizard

- Create reports from data in our database.
- Fastest way to create a report.

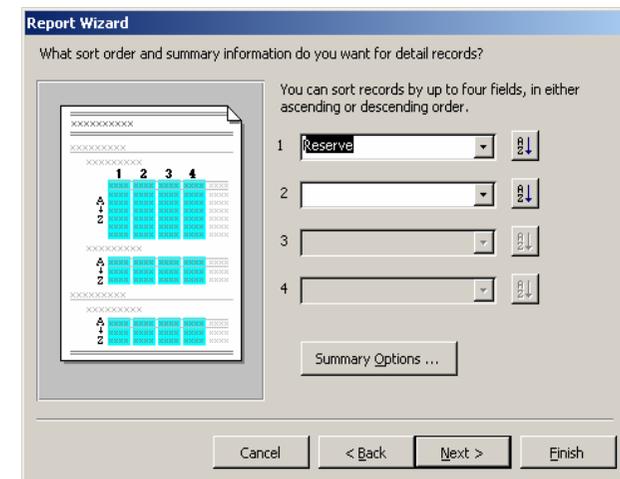
From there we can modify the results in design view.



Grouping the Data



Sorting



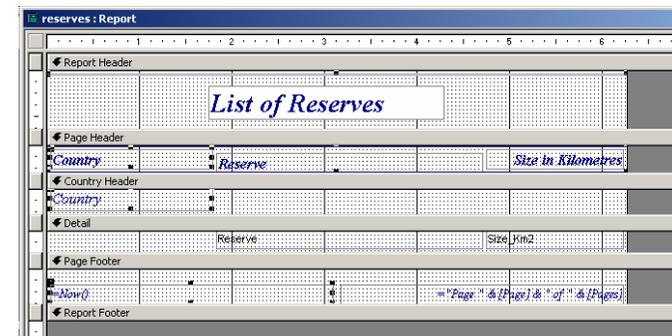
Report

reserves

Country	Reserve	Size_Km2
Australia	Booderee National Park	0
	Bookmark Biosphere Reserve	6033.42
	Christmas Island National Park	85
	Coorong National Park	4318.4
	Croajingolong	1010
	Currawinya Lakes National Park	0
	Fitzgerald River National Park	2427.27
	Flinders Chase National Park	738.41
	Girraween National Park	117
	Grampians National Park	1672
	Hattah-Kulkyne NP and Murray-Kulkyne Park	495

Modifying the Report

We can use Design Mode to modify the reports layout:



Modified Report

List of Reserves

<i>Country</i>	<i>Reserve</i>	<i>Size in Kilometres</i>
<i>Australia</i>		
	Booderee National Park	0
	Bookmark Biosphere Reserve	6033.42
	Christmas Island National Park	85
	Corong National Park	4318.4
	Croajingolong	1010
	Currawinya Lakes National Park	0
	Fitzgerald River National Park	2427.27