

4 Advanced Selection Queries

4.1 Ordering results

ORDER BY

In a table, the order of the records (rows) cannot be guaranteed – in fact as records are added (to the bottom of the table) and deleted (from the centre of the table) the order becomes even less predictable.

To view a set of ordered records SQL provides the `ORDER BY` keywords – to see all the records in the `PROPERTY` table ordered by `propertyno` use:

```
SELECT *  
FROM property  
ORDER BY propertyno;
```

A sort section in a `SELECT` statement is of the form:

```
ORDER BY object [DESC [object [DESC]...
```

Where `object` can be any valid select list object except `*`.

Numeric values will be shown lowest value first, date values will be shown earliest and character values will be sorted alphabetically. If the `DESC` keyword is used, sort order will be reversed e.g. highest value first. Note that empty `NULL` values will always be shown first. The opposite is `ASC` for ascending. The `ORDER BY` clause is the last statement of the `SELECT` command.

ORDER BY examples

Activity: In the SQL view of Microsoft Access type in these example queries and verify that they produce similar results.

Examples

```
Display property no, owner no and year income, ordered by year income
```

```
SELECT propertyno,ownerno, yearincome  
FROM property  
ORDER BY yearincome;
```

propertyno	ownerno	yearincome
PG21	CO40	9500
PG16	CO87	8000
PL94	CO93	15000
PG4	CO87	14050
PA14	CO46	12000
PG36	CO93	11075

Note that the order by clause can refer to a column not required in the output selection – hence display propertyno and ownerno, ordered by yearincome:

```
SELECT propertyno,ownerno
FROM property
ORDER BY yearincome;
```

propertyno	ownerno
PG21	CO40
PG16	CO87
PL94	CO93
PG4	CO87
PA14	CO46
PG36	CO93

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Display **all** the property information ordered by property number and rent, with rent in descending order.

```
SELECT *
FROM property
ORDER by propertyno, rent DESC;
```

propertyno	street	country	type	rooms	rent	yearincome	ownerno
PA14	16 Holhead	Barbados	Villa	6	500	12000	CO46
PG16	5 Novar Dr	Antigua	Apartment	2	400	8000	CO87
PG21	18 Dale Rd	St Kitts	Apartment	3	450	9500	CO40
PG36	2 Manor Rd	Barbados	Studio	1	475	11075	CO93
PG4	6 Lawrence St	Barbados	Villa	4	525	14050	CO87
PL94	6 Argyll St	Barbados	Villa	4	550	15000	CO93

Note the use of the comma inside the ORDER BY clause.

Display property no, country, rooms and monthly rental income – order by propertyno and country (the monthlyrent column is created by you)

```
SELECT propertyno, country, rooms, yearincome/12 AS monthlyrent
FROM property
ORDER BY propertyno, country;
```

propertyno	country	rooms	monthlyrent
PA14	Barbados	6	1000
PG16	Antigua	2	666.6666666666667
PG21	St Kitts	3	791.6666666666667
PG36	Barbados	1	922.9166666666667
PG4	Barbados	4	1170.8333333333333
PL94	Barbados	4	1250

4.2 Selecting Specific Rows

The Selection Operation

Projection can be visualised as providing specific columns in a table, Selection can be used to get specific rows.

A **Selection** operation uses a condition to specify the rows that will be displayed in the resulting table.

Example: Show every row in PROPERTY where Rent is greater than 400.

object operator object

Where the object can be any valid SELECT object except * or an aggregate function (discussed later). Operator can be a Boolean operator or a special SQL operator:

Boolean Operators

=	Equal to
!= or <>	Not equal to
<	Less than
>	Greater than
<=	Less than or equal to
>=	Greater than or equal to

Special operators

BETWEEN lowest AND highest (values inclusive)

IN (value, value, ...)

LIKE "FUZZY STRING"

IS NULL

NOT can negate any of the above

SELECTION examples using the WHERE clause

Activity: Type in these example queries and verify that they produce similar results

Examples

Display the property information for Villas

```
SELECT *
FROM property
WHERE type="Villa";
```

propertyno	street	country	type	rooms	rent	yearincome	ownerno
PA14	16 Holhead	Barbados	Villa	6	500	12000	CO46
PL94	6 Argyll St	Barbados	Villa	4	550	15000	CO93
PG4	6 Lawrence St	Barbados	Villa	4	525	14050	CO87
*							

Note that the text part of the condition must be enclosed in double quotes.

Display the properties that owner number CO87 has

```
SELECT *
FROM property
WHERE ownerno="CO87";
```

propertyno	street	country	type	rooms	rent	yearincome	ownerno
PG4	6 Lawrence St	Barbados	Villa		4 525	14050	CO87
PG16	5 Novar Dr	Antigua	Apartment		2 400	8000	CO87
*							

Display the properties that are Villas with a rental figure over £500

```
SELECT *
FROM property
WHERE type="Villa" and rent>500;
```

Note how number values do not have quotes (as long as the field is defined as Number).

propertyno	street	country	type	rooms	rent	yearincome	ownerno
PL94	6 Argyll St	Barbados	Villa		4 550	15000	CO93
PG4	6 Lawrence St	Barbados	Villa		4 525	14050	CO87



Display the details of all bookings on property PG4 where a comment has not been supplied

```
SELECT *
FROM booking
WHERE propertyno="PG4" AND comment IS NULL;
```

clientno	propertyno	bookingdate	comment
CR56	PG4	17/12/2007	

Note – null means empty, not null would mean bring up all the people who have values that are not blank

Display the properties that have the owner number CO46 or CO87

```
SELECT *
FROM property
WHERE ownerno in ("CO46", "CO87");
```

propertyno	street	country	type	rooms	rent	yearincome	ownerno
PA14	16 Holhead	Barbados	Villa	6	500	12000	CO46
PG4	6 Lawrence St	Barbados	Villa	4	525	14050	CO87
PG16	5 Novar Dr	Antigua	Apartment	2	400	8000	CO87

This could be done with the condition `ownerno="CO46" or ownerno="CO87"`.

You could use the `order by` clause to put in the above `ownerno` descending order:

```
SELECT *
FROM property
WHERE ownerno in ("CO46", "CO87")
ORDER by ownerno DESC;
```

4.3 Exercises – Order As and Selection

In the following exercises, a query must be specified to produce the suggested result. There are spaces for you to write SQL query statements. Use the `AS` command to get correct column headings in SQL.

-
1. Display the property number, street and country information ordered by country.
-

SQL:

propertyno	street	country
PG16	5 Novar Dr	Antigua
PG36	2 Manor Rd	Barbados
PG4	6 Lawrence St	Barbados
PL94	6 Argyll St	Barbados
PA14	16 Holhead	Barbados
PG21	18 Dale Rd	St Kitts
*		

-
2. Display the property number, street and country information ordered by country (descending) and property number (ascending).
-

SQL:

propertyno	street	country
PG21	18 Dale Rd	St Kitts
PA14	16 Holhead	Barbados
PG36	2 Manor Rd	Barbados
PG4	6 Lawrence St	Barbados
PL94	6 Argyll St	Barbados
PG16	5 Novar Dr	Antigua

-
3. Display the property information for properties that have less than 4 rooms.
-

SQL:

propertyno	street	country	type	rooms	rent	yearincome	ownerno
PG36	2 Manor Rd	Barbados	Studio	1	475	11075	CO93
PG21	18 Dale Rd	St Kitts	Apartment	3	450	9500	CO40
PG16	5 Novar Dr	Antigua	Apartment	2	400	8000	CO87
*							

4. Display all the properties with 4 rooms and rent of over £540.

SQL:

propertyno	street	country	type	rooms	rent	yearincome	ownerno
PL94	6 Argyll St	Barbados	Villa	4	550	15000	CO93

5. Display a list of client last names, preference type and the maximum rent figure with a preference of Villas ordered by their maximum rent figure ascending.

SQL:

Iname	preftype	maxrent
Kay	Villa	500
Tregear	Villa	550

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6. Show a list of clients who have made a comment ordered by property number descending.

SQL:

clientno	propertyno	bookingdate	comment
CR76	PG4	09/07/2007	special diet
CR62	PA14	03/09/2007	allergies
CR56	PA14	16/07/2007	Non smoking required

7. Display the property numbers, type, rent and owner number of those properties who have a yearly income figure more than £11,000 and have 4 rooms, ordered by property number and type ascending.

SQL:

propertyno	type	rent
PG4	Villa	525
PL94	Villa	550

4.4 Summary

The purpose of the SELECT statement in SQL is to retrieve data from one or more tables and display the result in a required format. It is possible to select specific records from a database according to a particular condition. Also, one may use ORDER BY to sort records after they have been selected. The general form for the complete SELECT statement is given below:

```
SELECT [DISTINCT | ALL] {*| column [AS new_name]} [, ...]
FROM TableName [alias] [,...]
[WHERE conditional statement]
[GROUP BY column_list] [HAVING condition]
[ORDER BY column_list]
```

ORDER BY determines the order of the data retrieval output. The order of the clauses in a SELECT statement cannot be changed, although some of the clauses are optional (enclosed in [] in the above syntax).