



# Using Microsoft Access

## Advanced Queries

### Parameter Queries

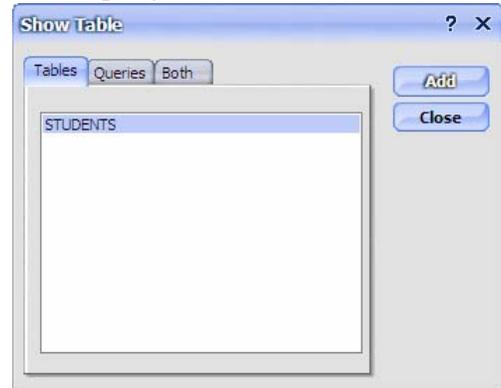
In the last section you created queries with various criteria. If you wanted to keep a query with specific criteria you could save it. For example, if you wanted a query that shows all students who live in Dianella, you could create a query with appropriate criteria and save it with a name such as *students in dianella*. It would get a little complicated, however, if you wanted a query for every suburb, especially if your database contained a dozen different suburbs. Parameter queries are a solution to this problem.

A parameter query allows you to create a query that prompts the user for the criteria when the query is run. You could set up a query so that when it is run, it asks the user to enter a suburb and uses whatever they enter as the criteria. You could use the same query repeatedly without having to modify the design if you want to change the criteria.

Creating a parameter query is like creating a regular select query. The only difference is that where you would normally enter your query criteria, you instead enter square brackets [ ]. This tells access that the user will be prompted for the criteria in this field. If you want to customise the message that is used to prompt the user you can type your own custom message between the square brackets.

### Exercise 1. Creating a Parameter Query

- 1) Make sure your *Student List* database is open and make sure you are in the queries section of the **Database Window** (your *test query* should be the only query in the query list).
- 2) Double-click the option which says **Create a query in Design view**.
- 3) Double-click, STUDENTS in the **Show Table** dialog to add it to the query design and then click **Close** to move to the design window.
- 4) Adjust your design window as shown in the previous section so that you have plenty of room for selecting fields from your table.
- 5) Add the following fields to the QBE grid:

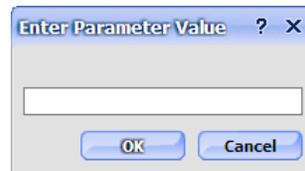


- Last Name
- First Name
- Address
- Suburb
- Postcode
- State

- 6) In the criteria row for the *Suburb* field, add two square brackets as shown.

ISS	Suburb	Postcode
ENTS	STUDENTS	STUDENTS
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	[ ]	

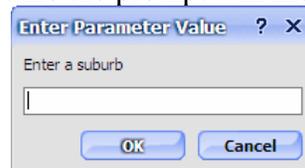
- 7) Click the **View** icon  to view the results of the query. A prompt will appear asking you to enter the criteria for the field.



- 8) Enter *Dianella* and click **OK**. The query results will show students from Dianella.
- 9) Click the **View** icon  to return to design view.

We will put a custom message in the criteria prompt. Enter a custom message between the square brackets so that it appears as the following. *[Enter a suburb]*

- 10) Click the **View** icon  again. This time the prompt will include your custom message.

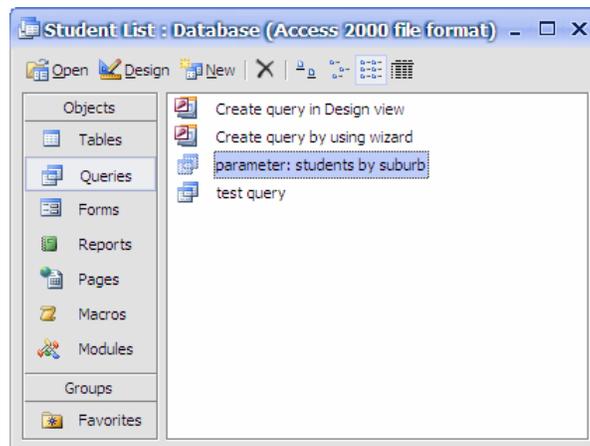


- 11) Enter *Yokine* and click **OK** (or press **[Enter]**). This time you will see all students from Yokine.
- 12) Return to design view.
- 13) Click the **Save** icon . Name the query *parameter: students by suburb*.
- 14) Close the query when done.

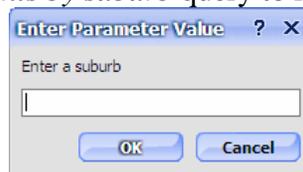
**Note** If you try running a parameter query and get a message about Replication IDs, it is probably because you uses curly brackets { } instead of square brackets [ ].

## Exercise 2. Using a Saved Parameter Query

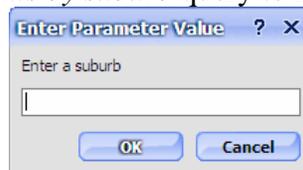
Your parameter query should now appear in the query list.



- 1) Double-click the *parameter: students by suburb* query to run it.



- 2) Enter *Bedford* as the suburb and click **OK**. You will see all of the students who live in Bedford.
- 3) Close the query. You should be returned to the **Database Window**.
- 4) Double-click the *parameter: students by suburb* query to run it again.



- 5) Enter *Morley* as the suburb and click **OK**. You will see all of the students who live in Morley.

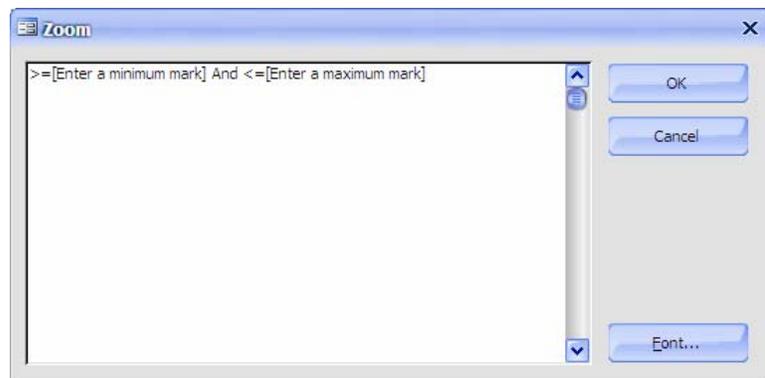
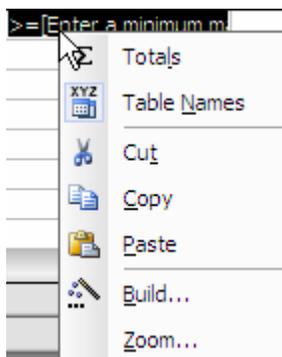
You can run the query with any suburb being used as the criteria without changing the design of the query.

### Exercise 3. Creating a Parameter Query with Multiple Criteria

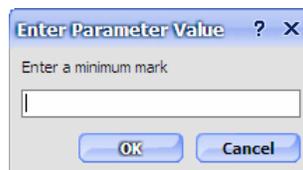
In regular select queries, you can have criteria on as many fields as you like. This applies for Parameter queries as well. If you have more than one parameter criteria in a query then a prompt will appear for each criterion, one after the other before the query results appear. You can also use parameters for range criteria as the following exercise demonstrates. We will create a query that allows the user to enter two amounts, and see all students with marks between those amounts.

- 1) Create a new query that uses the following fields:
  - Last Name
  - First Name
  - Gender
  - Mark
  - Comment
- 2) For the *Mark* field, enter the following for the criteria  
 $>=[Enter\ a\ minimum\ mark]$  and  $<=[Enter\ a\ maximum\ mark]$

**Tip** When you are working with long criteria like this, it can be difficult to edit because of the limited space. To make it easier, right-click on the criteria and click **Zoom**. You will then have a nice large window to edit your criteria. When you are done you can click **OK** to confirm the changes.



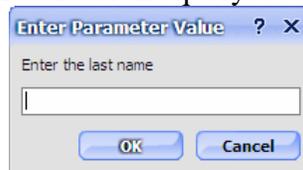
- 3) Click the **View** icon  to view the results of the query. A prompt will appear asking you to enter a minimum mark.



- 4) Enter *50* and click **OK**. A second prompt will appear asking you to enter a maximum mark.
- 5) Enter *70* and click **OK**. The results will show all students with marks from 50 to 70.
- 6) Click the **View** icon  to return to design view.
- 7) Save the query as *parameter: students marks between two amounts*.
- 8) Close the query when it is saved.

### Exercise 4. Using Wildcards with Parameters

- 1) Open the *parameter: students by suburb* query.
- 2) When the parameter prompt appears, enter *Dian\** for the criteria.  
If this criterion were used in a query design, it would result in all students where the suburb name begins with *dian*. This won't work with parameters though and you will get no results at all. For parameters, the wildcard needs to be built in to the query design along with the parameter.
- 3) Close the query to return to the **Database Window**.
- 4) Create a new query using the following fields.
  - Last Name
  - First Name
  - Date of Birth
  - Phone
  - Gender
  - Mark
- 5) For the *Last Name* field, enter the following for the criteria.  
*Like [Enter the last name] & \**  
The & symbol will join the user's typed criteria on to a \* wildcard. This will mean that the user will only need to enter the first few letters of a last name to get the results.
- 6) Click the **View** icon  to view the results of the query.



- 7) When the prompt appears enter *S* for the criteria and click **OK**. You will see all students with a last name beginning with the letter *S*. This makes the query easier for the user.
- 8) Click the **View** icon  to return to design view.
- 9) Save the query as *parameter: students by last name*.
- 10) Close the query when it is saved.

Some variations on the above method are shown below.

Field	Criteria	Result
Last Name	Like * & [Last Name] & *	Adds a wildcard before and after what the user types
Phone	Like * & [Phone number]	Phone numbers ending with the numbers the user types

- 11) Create queries to test each of the two examples shown.

## Calculated Fields

Queries can include additional fields which automatically calculate a result based on existing fields. The calculations in these fields are similar to the calculations in Excel formulae. In the following exercise we will create a basic calculated field to work out a student's age from their Date of Birth. The following guidelines apply to calculated fields.

- Like Excel, calculations in access follow the order of operations rules. I.e.
  - Brackets calculated first
  - Indices (^) calculated next E.g. 4^2 means 4 to the power of 2
  - Multiplication and division calculated next
  - Addition and subtraction calculated last.
- When you are referring to a field in your calculation, the field name must be enclosed in square brackets. E.g. [Mark].
- You can't combine different data types in a calculation. E.g. You can't add a number field to a text field.

### Exercise 5. Creating a Calculated Field

- 1) Create a new query with the following fields:
  - Last Name
  - First Name
  - Date of Birth
- 2) Click in the blank field after Date of Birth as shown.

Field:	Last Name	First Name	Date of Birth	
Table:	STUDENTS	STUDENTS	STUDENTS	
Sort:				
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

The calculation is typed where the field name would normally go. In an Excel calculation, you would begin with an equal sign. In a calculated field, you begin with a name for the calculated field followed by a colon. This calculated field is to calculate a student's age.

- 3) Enter the following in the **Field** row (you may like to use the Zoom option shown previously when you are editing the calculation).  
Age: (Date()-[Date of Birth])/365
- 4) This calculation will subtract their date of birth from the current date *date()* to calculate their age in days. The result is then divided by 365 to get the age in years.
- 5) Click the **View** icon  to view the results of the query.

	Last Name	First Name	Date of Birth	Age
▶	Robbins	Mark	17-06-89	14.97260274
	Stevens	Sarah	10-04-89	15.15890411
	Andrews	Claire	01-11-89	14.597260274
	McKay	Tim	02-08-89	14.846575342
	Dutton	Robert	28-03-89	15.194520548

The calculation will appear as an additional field, with the result appearing for each student.

- 6) Click the **View** icon  to return to design view.
- 7) Save the query as *student listing with age*.

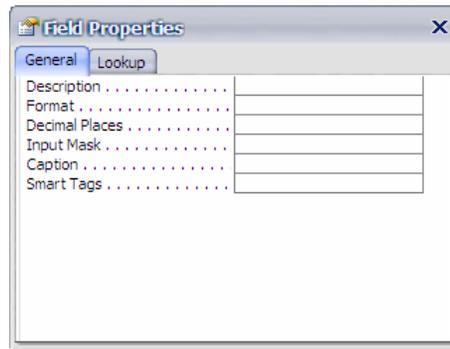
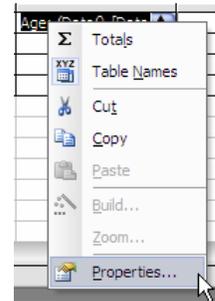
Field:	Last Name	First Name	Date of Birth	Age: (Date()-[Date
Table:	STUDENTS	STUDENTS	STUDENTS	
Sort:				
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

## Exercise 6. Formatting a Calculated Field

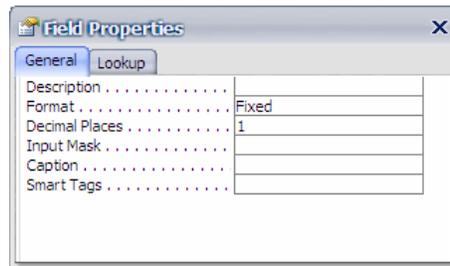
In the previous exercise, the resulting calculated field contained ages with a large number of decimal places. You can customise fields in a query by editing properties that are very similar to the ones found in table design.

- 1) Make sure you still have your *student listing with age* query open in design view.
- 2) Right-click on the *Age* field and choose **Properties** (you can also get to properties from the **View** menu, by clicking the properties icon  or by pressing **[Alt][Enter]**).

The **Properties** window will show properties for the age calculated field (you can also edit properties for any regular field in the same way).



- 3) Click in the **Format** property and change the format to Fixed.
- 4) Click in the **Decimal Places** property and enter 1.



- 5) Close the **Properties** window.
- 6) View the results of the query again. The ages will now be formatted with one decimal place.
- 7) Save and close the query.

### Exercise 7. Using a Function in a Query

Functions in Access are similar to functions in Excel and can be used to simplify complex calculations. The following example demonstrates the use of the **Immediate If** function which is similar to Excel's **If** function.

1) Create a new query with the following fields:

- Last Name
- First Name
- Mark

2) In the next blank field, enter the following.

*Pass: IIf([Mark]>=50,"Pass","Fail")*

The first part will be the name of the new field (Pass).

This is followed by the IIF. Like all functions, its components are enclosed in brackets. This type of function has three parts separated by commas.

The first part specifies the criteria. In this case *[Mark]>* meaning are the contents of the *Mark* field greater than or equal to 50.

The second part specifies what the answer will be when the condition is true (display the text "Pass"). When test is being referred to in a calculation it always need to be enclosed in "".

The third part specifies what the answer will be when the condition is false (display the text "fail").

3) Click the **View** icon  to view the results of the query.

Query1 : Select Query				
	Last Name	First Name	Mark	Pass
	Robbins	Mark	78	Pass
	Stevens	Sarah	62	Pass
	Andrews	Claire	58	Pass
	McKay	Tim	34	Fail
	Petersen	Robert	83	Pass
	Sanders	Jemma	91	Pass
	Hutch	Ian	67	Pass
	Springer	Louise	72	Pass
	Davies	Laura	48	Pass
	Carey	Ivan	67	Pass
	...	...	...	...

Any student with a mark less than 50 will have *Fail* in the *Pass* field.

4) Click on the mark for Laura Davies as shown above.

5) Change the mark to 48. As soon as you move on to a different record, the *Pass* column will update.

6) Make sure you are still in the *Mark* column and click the **Sort Descending** icon  so that the highest marks are at the top. Changes to the sort order will be saved as part of the query design.

7) Save the query as *student marks* and close the query when done.

**Note** when you are viewing the results of a query you are actually viewing a selection from the table. When you change data in a query's datasheet view those same changes are being made to the table data. Any formula depending on that data will automatically update.

## Summary Queries

Unlike other queries you have done, a summary query won't show individual records. It will only show a summary in the form of averages, totals and other available calculations. Summary Queries are useful for reporting where you are only interested in a summary of the information without the detail.

Field:	Mark
Table:	STUDENTS
Sort:	
Show:	<input checked="" type="checkbox"/>
Criteria:	

### Exercise 8. Creating a Query with a Total

- 1) Create a new query with only the *Mark* field.
- 2) To change to a Summary Query, select **Totals** from the **View** menu or click the  $\Sigma$  icon on the toolbar.
- 3) Your **QBE** grid will now include a **Total** row.
- 4) Change the **Total** figure for the *Mark* field from *Group By* to *Sum*.
- 5) View the results of the query. Because of this change the query result will now show the Sum of the Mark field instead of showing each record.

Field:	Mark
Table:	STUDENTS
Total:	Sum
Sort:	
Show:	<input checked="" type="checkbox"/>
Criteria:	

Query1 : Select Query	
SumOfMark	
	319

- 6) Return to **Design View**.
- 7) Add the *Mark* field to the QBE grid three more times. Change the total row for each one to *Avg*, *Min* and *Max* as shown below.

Field:	Mark	Mark	Mark	Mark
Table:	STUDENTS	STUDENTS	STUDENTS	STUDENTS
Total:	Sum	Avg	Min	Max
Sort:				
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:				

- 8) View the results of the query. The results will now show the *Sum* of the Mark field, the *Average* of the mark field, the *Minimum* amount in the Mark field and the *Maximum* amount in the Mark field.

Query1 : Select Query				
	SumOfMark	AvgOfMark	MinOfMark	MaxOfMark
	319	68.25	34	91

- 9) Return to Design View.
- 10) Save the query as *summary: student marks*.

### Exercise 9. Using Grouping in a Summary Query

When using Summary Queries it is common to group the results by a particular field instead of viewing the totals for the entire query.

- 1) Drag the Gender field on to the first Mark field. This will insert the Gender field to the left of the first Mark field.
- 2) Leave the Total row for the Gender field as Group By.

Field:	Gender	Mark	Mark	Mark	Mark
Table:	STUDENTS	STUDENTS	STUDENTS	STUDENTS	STUDENTS
Total:	Group By	Sum	Avg	Min	Max
Sort:					
Show:	<input checked="" type="checkbox"/>				

- 3) View the results of the Query. Now you will see totals for the Female students and totals for the Male students.

Gender	SumOfMark	AvgOfMark	MinOfMark	MaxOfMark
Female	414	69	48	91
Male	405	67.5	34	83

- 4) Return to Design View.
- 5) Add the Suburb field as shown below.

Field:	Gender	Suburb	Mark	Mark	Mark	Mark
Table:	STUDENTS	STUDENTS	STUDENTS	STUDENTS	STUDENTS	STUDENTS
Total:	Group By	Group By	Sum	Avg	Min	Max
Sort:						
Show:	<input checked="" type="checkbox"/>					

- 6) View the results of the query. The results will now show the totals grouped by Gender and grouped by Suburb.

Gender	Suburb	SumOfMark	AvgOfMark	MinOfMark	MaxOfMark
Female	Bedford	91	91	91	91
Female	Dianella	155	77.5	72	83
Female	Morley	106	53	48	58
Female	Yokine	62	62	62	62
Male	Dianella	246	61.5	34	78
Male	Morley	76	76	76	76
Male	Yokine	83	83	83	83

- 7) Save and close the query.