

# Logical operators

## Teacher's Notes

## Lesson Plan

Length	60 mins	Specification Link	2.1.5/g	
Learning objective		Candidates should be able to: (a) understand the use of logical operators in framing database queries		
Time (min)	Activity	Further Notes		
5	<ul style="list-style-type: none"> <li>Remind the students that one of the advantages of a computer database over a paper-based one is that it can be searched very quickly.</li> <li>Mention the school system as an example – if a member of staff wants the names of all the students who live in a particular area they can write a query for the school database rather than having to look through lots of pieces of paper in folders within filing cabinets.</li> <li>But they must be able to write the exact search criteria for the database or they will get no information or incorrect information.</li> </ul>			
15	Watch the set of videos pausing to discuss the content.			
5	<p>Discuss the videos to assess learning. Ask questions such as:</p> <ul style="list-style-type: none"> <li>What is a parameter?</li> <li>List some comparison operators.</li> <li>List the logical operators.</li> </ul>	<p>A parameter specifies the value a particular field must contain when carrying out a query.</p> <p>=, &gt;, &lt;, &gt;=, &lt;=, &lt;&gt;</p> <p>AND, OR, NOT.</p>		
15	<p>Pupils to complete <b>Worksheet 1</b> either on paper or on a computer.</p> <p>Ask individual students for their responses and discuss with the class so that all students have the correct answers.</p>	<p>Answers provided.</p> <p>Ask students with the correct responses to explain to the class how they arrived at their answers.</p>		
10	The students use <b>Interactive Activity 1</b> .			
	<p><b>Extension Challenge/Homework</b></p> <p>Students to complete and submit <b>Worksheet 2</b> for homework.</p>			
10	<p><b>Plenary</b></p> <p>Use a projector to display the <b>Interactive Plenary Activity</b>.</p> <p>Ask the students to predict the outcomes of the search criteria and then run each one.</p> <p>Use the reset button to display all of the shapes.</p>			

## WORKSHEET 1 ANSWERS

**1** What is meant by a parameter?

A parameter specifies the value a particular field must contain when carrying out a query.

**2** Complete the following table by explaining the meaning of the following *comparison operators* which are used in queries.

=	Equal to
>	Greater than
<	Less than
>=	Greater than OR equal to
<=	Less than OR equal to
<>	Not equal to

**3** List the logical operators and what they are expected to return when used in queries.

AND Returns True when Expr1 and Expr2 are true.

OR Returns True when either Expr1 or Expr2 is true.

NOT Returns True when Expr is not true.

XOR Returns True when either Expr1 is true or Expr2 is true, but not both.

## WORKSHEET 1 ANSWERS

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The following diagram shows part of a membership database.

	Member ID	Surname	First Name	Gender	Age	City	Year Joined
	0001	Byrne	Catherine	F	16	London	2010
	0003	Smith	Alice	F	20	Manchester	2008
	0005	Brown	John	M	18	London	2011
	0009	Smith	Ann	F	17	London	2009
	0010	Green	Colin	M	18	Newcastle	2007
	0011	Cooper	Jack	M	16	Manchester	2013
	0012	Grantham	Oliver	M	16	London	2012
	0013	Cooper	Rosie	F	16	Birmingham	2013
	0015	Smith	William	M	18	Manchester	2009
	0017	Grantham	Sam	M	16	London	2013
	0020	Harris	Gina	F	17	Chelmsford	2012
	0021	Jones	Hannah	F	20	Ipswich	2009
	0022	Lorris	Ben	M	17	London	2008
	0025	Morris	Alison	F	19	Manchester	2009
	0030	Noble	David	M	20	London	2009

State the search criteria which would have been input to produce the following results.

(a)

	Member ID	Surname	First Name	Gender	Age	City	Year Joined
	0005	Brown	John	M	18	London	2011
	0010	Green	Colin	M	18	Newcastle	2007
	0015	Smith	William	M	18	Manchester	2009
	0030	Noble	David	M	20	London	2009

Gender = 'M' AND Age >= 18

(b)

	Member ID	Surname	First Name	Gender	Age	City	Year Joined
	0010	Green	Colin	M	18	Newcastle	2007
	0020	Harris	Gina	F	17	Chelmsford	2012

City = 'Newcastle' OR City = 'Chelmsford'

## WORKSHEET 1 ANSWERS

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(c)

	Member ID	Surname	First Name	Gender	Age	City	Year Joined
	0005	Brown	John	M	18	London	2011
	0011	Cooper	Jack	M	16	Manchester	2013
	0012	Grantham	Oliver	M	16	London	2012
	0017	Grantham	Sam	M	16	London	2013

Gender = 'M' AND Year\_Joined > 2009

(d)

	Member ID	Surname	First Name	Gender	Age	City	Year Joined
	0001	Byrne	Catherine	F	16	London	2010
	0009	Smith	Ann	F	17	London	2009

Gender = 'F' AND City = 'London'

(e)

	Member ID	Surname	First Name	Gender	Age	City	Year Joined
	0001	Byrne	Catherine	F	16	London	2010
	0009	Smith	Ann	F	17	London	2009
	0013	Cooper	Rosie	F	16	Birmingham	2013
	0020	Harris	Gina	F	17	Chelmsford	2012
	0021	Jones	Hannah	F	20	Ipswich	2009

Gender = 'F' City NOT 'Manchester'

## WORKSHEET 2 ANSWERS

**1** The following table shows some data stored in a school's database.

Student ID	Surname	First Name	Gender	Year	Tutorgroup	Transport	Detentions
00001	Byrne	Catherine	F	10	10WA	Walk	0
00100	Smith	Fred	M	8	7JB	Bus	3
00010	Jones	Hannah	F	9	9EW	Bike	1
00103	Cooper	Rosie	F	7	7MC	Car	5
00123	Symonds	Hannah	F	9	9EW	Walk	0
00101	Cooper	Jack	M	7	7JG	Bike	0
00102	Grantham	Oliver	M	7	7JG	Bus	1

**(a) State the Student IDs of the students who fit the following criteria. (5)**

**(i) Year = 7**

00101

00102

00103

**(ii) Year < 9 AND Transport = Bus**

00100

00102 (1 for each answer) **(5)**

**(b) Write the criteria which can be used to select all the students who are male and have had one or more detentions. (3)**

Gender = 'M'(1) AND (1) Detentions >= 1(1)