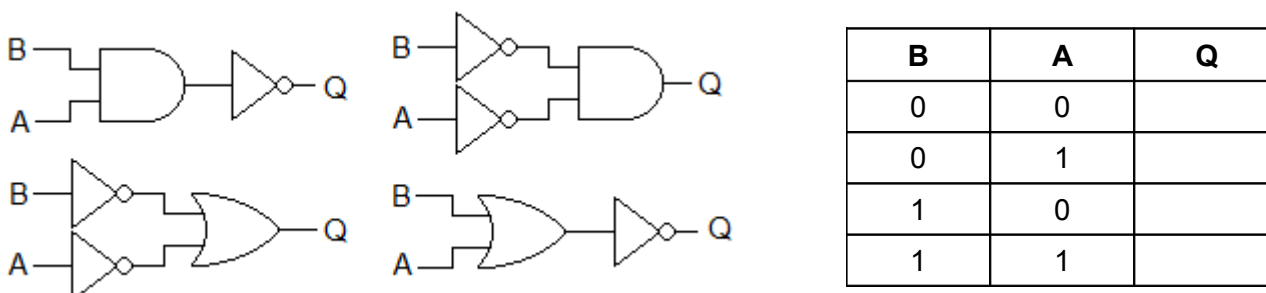


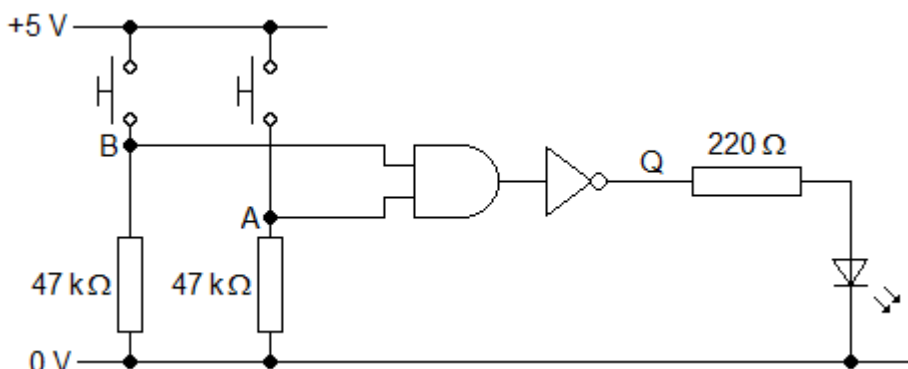
**NOT-AND-OR circuits**

You are going to find out the truth tables of four logic systems made from NOT, AND and OR gates.

- 1 Work out the truth tables for these four logic systems.



- 2 Assemble the circuit shown below to test the first logic system. Although you only need two integrated circuits between the switches and the LEDs, leave room for three.



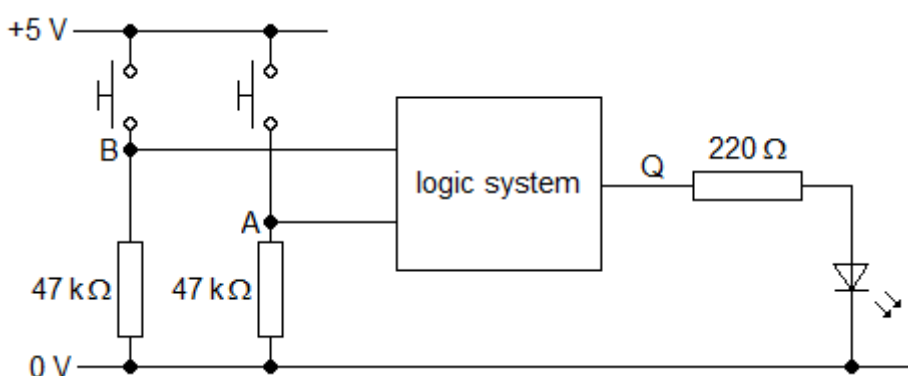
- 3 Use a voltmeter to verify that closing a switch pulls a logic system input high.
- 4 Check that connecting Q directly to the +5 V supply rail makes the LED glow.
- 5 By pressing the switches in four different combinations and observing the state of the LED, record a truth table for the logic system. Compare it with the one you worked out earlier.
- 6 Replace the logic system with the other three in turn. Use the switches and LED to record a truth table for each one.
- 7 Each logic system can be assembled from a single logic gate. Which one?

**Logic system design**

You are going to design, assemble and test a logic system made from NOT, AND and OR gates which has this truth table.

<b>B</b>	<b>A</b>	<b>Q</b>
0	0	1
0	1	0
1	0	0
1	1	1

- 1 Write out a Boolean expression for Q in terms of B and A.
- 2 Draw a logic system to implement the truth table. You will need one OR gate, two AND gates and two NOT gates.
- 3 Assemble the system, as shown below. The switches and LED should already be in place.



- 4 By pressing the switches and observing the LED, verify that the logic system has the correct truth table.
- 5 Now have a go at designing and testing a logic system with this truth table.

<b>B</b>	<b>A</b>	<b>Q</b>
0	0	1
0	1	1
1	0	0
1	1	1