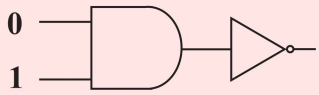
5 Physical Computing

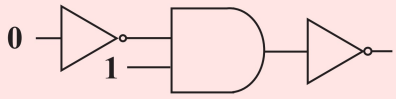
Activity 5.1

In the circuits given below, write the output for the given input.

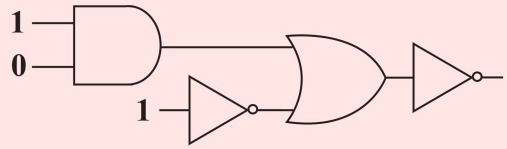
1.



2.



3.

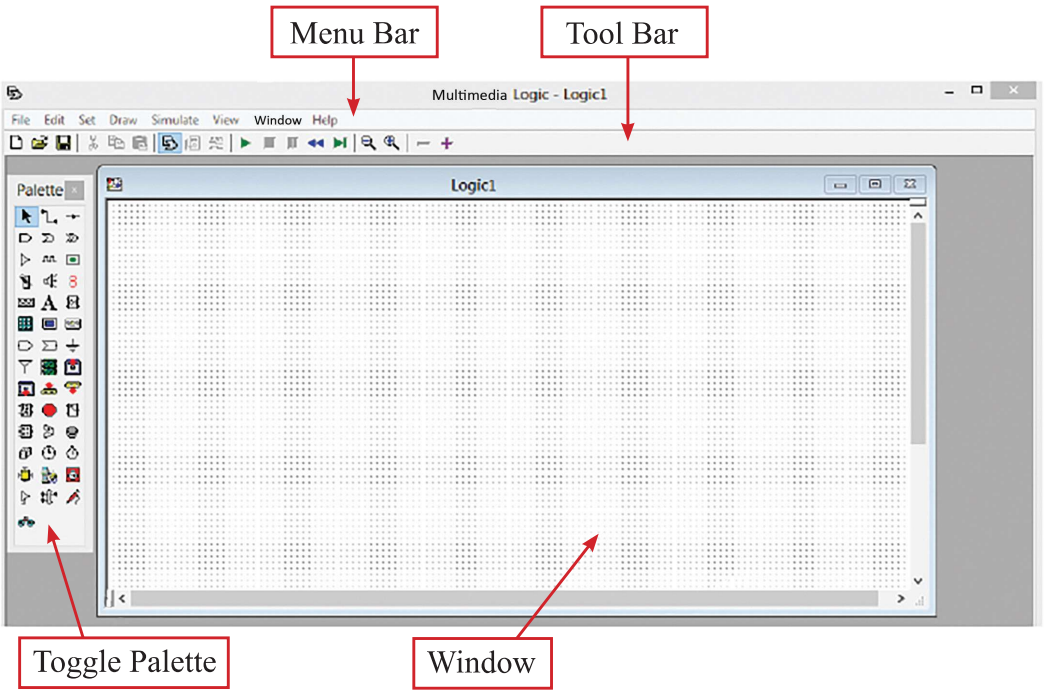


Identify the functions of logic gates using software

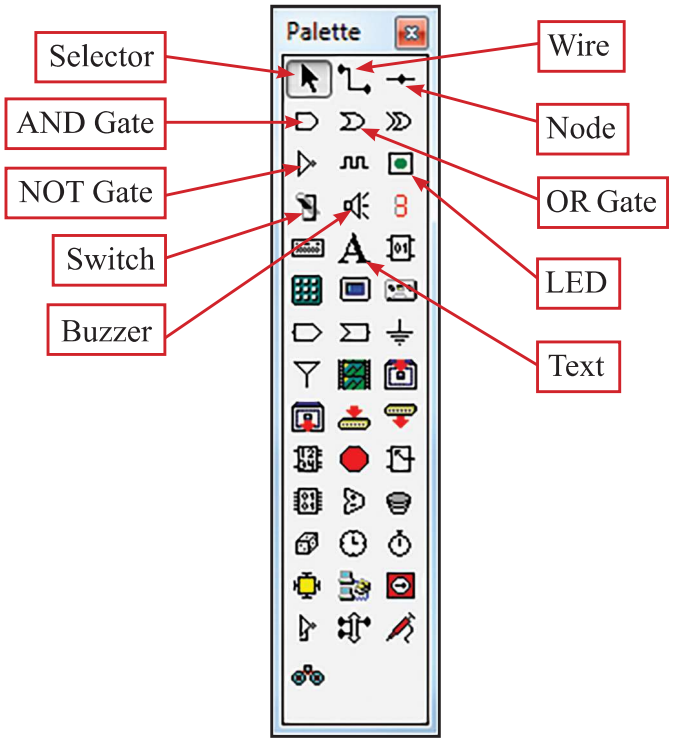
The function of logic gates that you learnt, can be identified using software. MM Logic is the software that is used for this purpose.

MultiMedia Logic Software

This software can be downloaded from the Internet, free of charge. The interface of it is as shown in the following page.



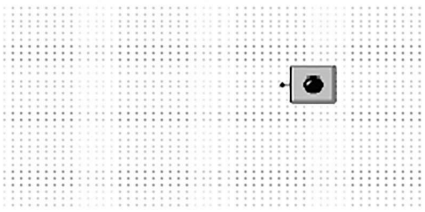
Toggle Palette



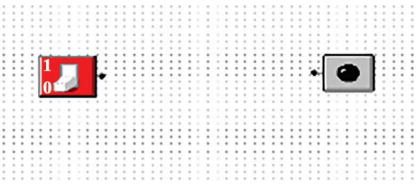
Obtain the Toggle Palette by a click on  symbol.

The way to use MM Logic software

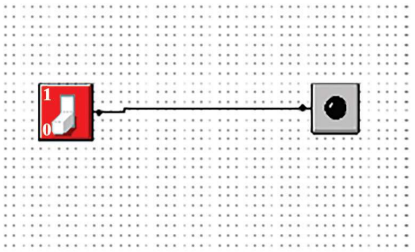
Let us build up a simple circuit using an LED bulb and a switch from the toggle palette.



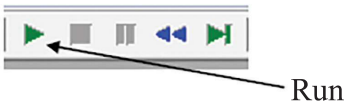
Bring an LED bulb to window.



Bring a switch to window.



Use a wire to connect the switch and the LED bulb.



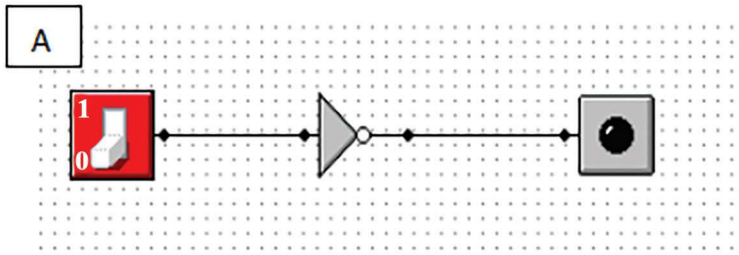
By clicking on 'Run' on the tool bar, the input for 'Switch' can be changed as follows;

The bulb does not light when switch is at 0.

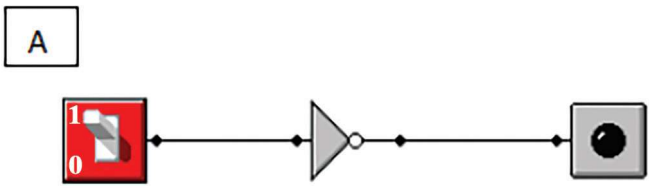
The bulb lights when switch is at 1.

Functions of basic logic gates with MM Logic software

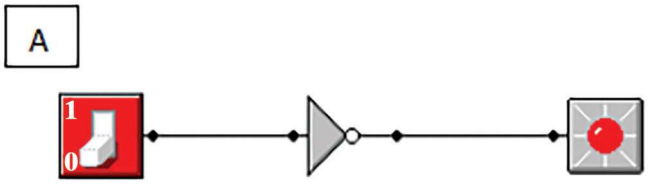
NOT Gate



When the circuit is arranged and run as above, the output can be observed.



When the switch is at '1' which means the electricity is supplied, the LED bulb does not light up.



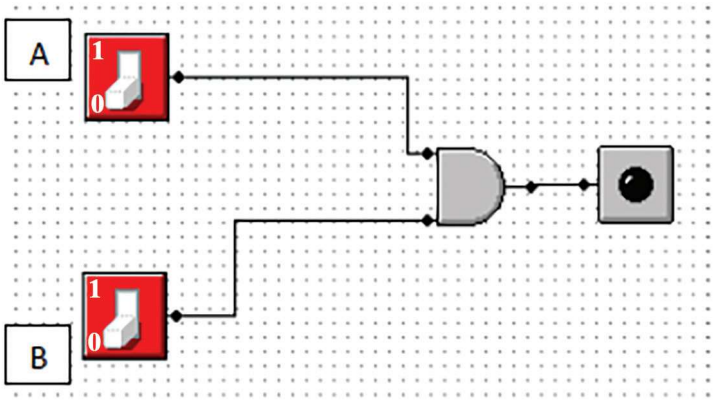
When the switch is at '0', which means the electricity is not supplied, the LED bulb lights up.

Activity 5.2

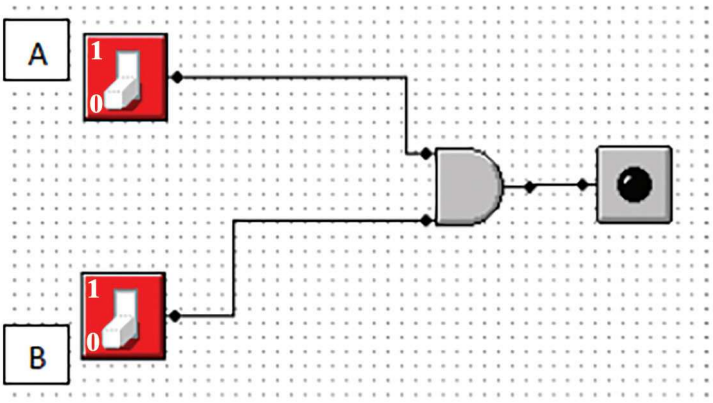
Tabulate the input and the output of NOT gate when using it with MM Logic software.

Input	Output

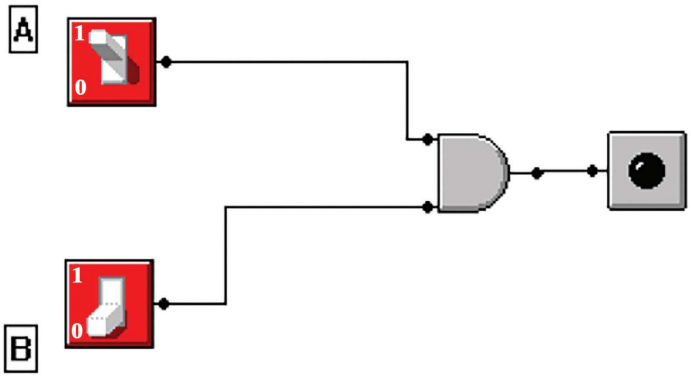
AND Gate



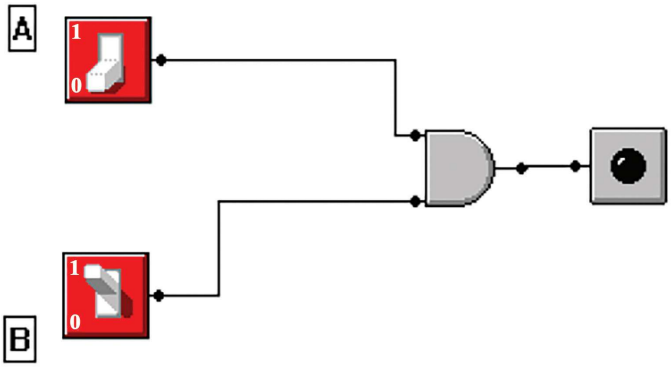
Arrange the circuit as shown above. Next, run it to observe the output shown below;



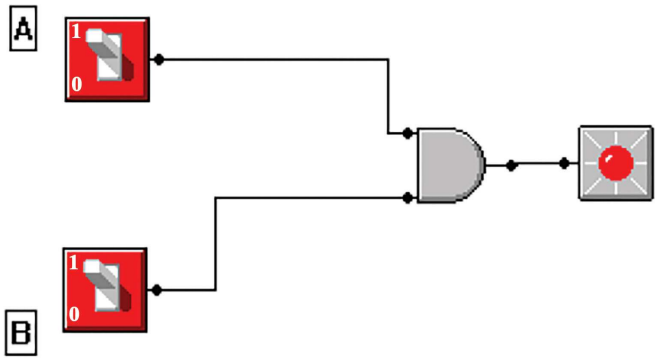
The bulb does not light up when both switches are not at '0'.



The bulb does not light when A is at '1' and B is at '0'.



The bulb does not light when switch A is not at '0' and switch B is at '1'.



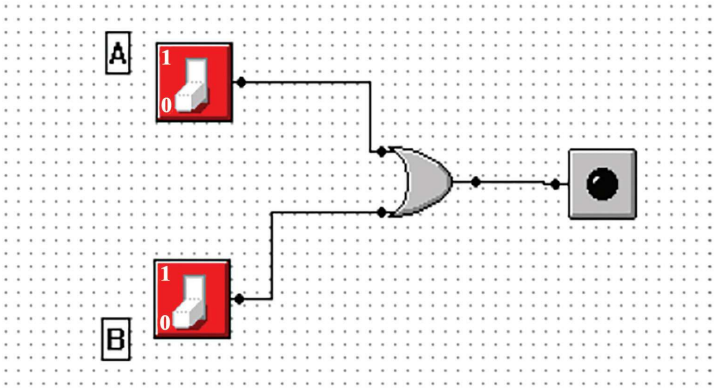
The bulb lights when both A and B switches remain at '1'.

Activity 5.3

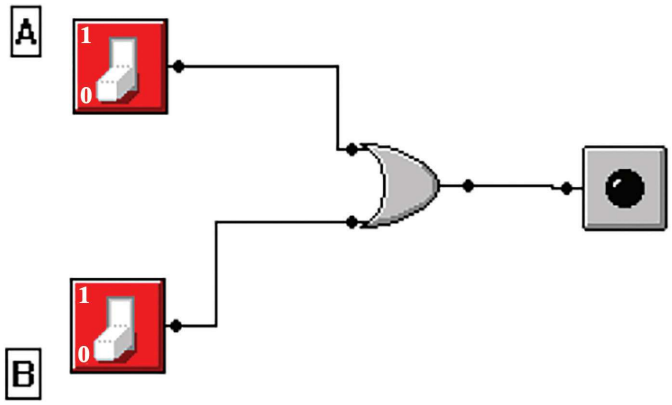
Tabulate input and output of the AND gate when it is used with MM Logic software.

Input A	Input B	Output

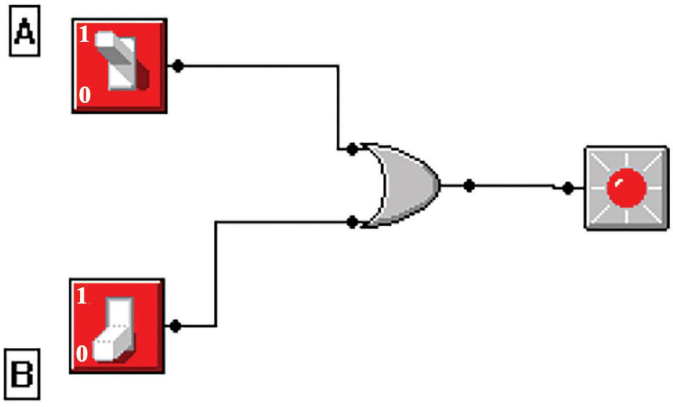
OR Gate



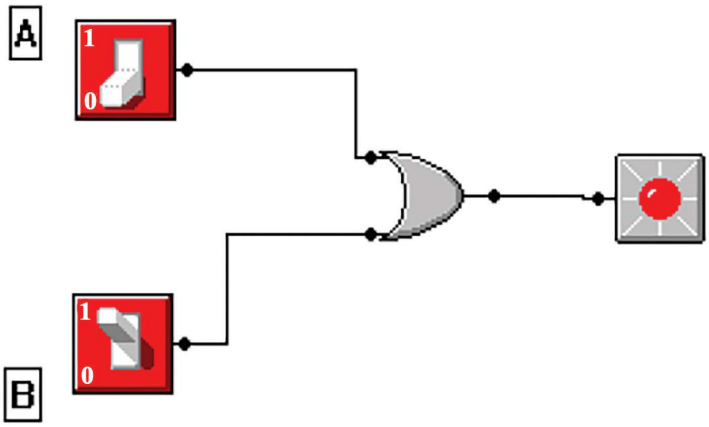
When the circuit is arranged as shown above and run, the following outputs can be obtained;



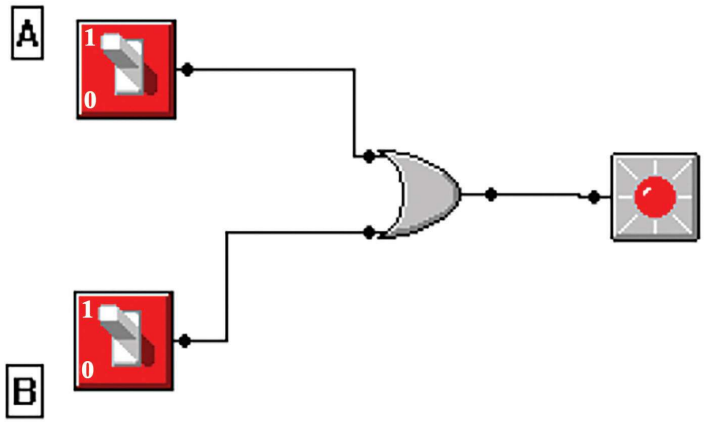
When both switches are at '0' the bulb does not light up.



When A is at '1' and B is at '0' the bulb lights up.



The bulb light up when A is at '0' and B is at '1'



When both A and B are at '1', the bulb lights up.

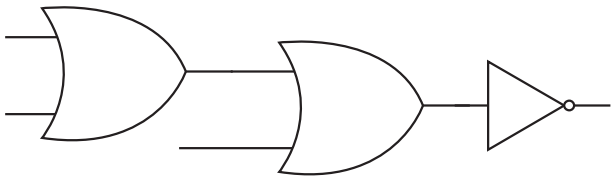
Activity 5.4

Tabulate the different input and output of OR gate using MM Logic software.

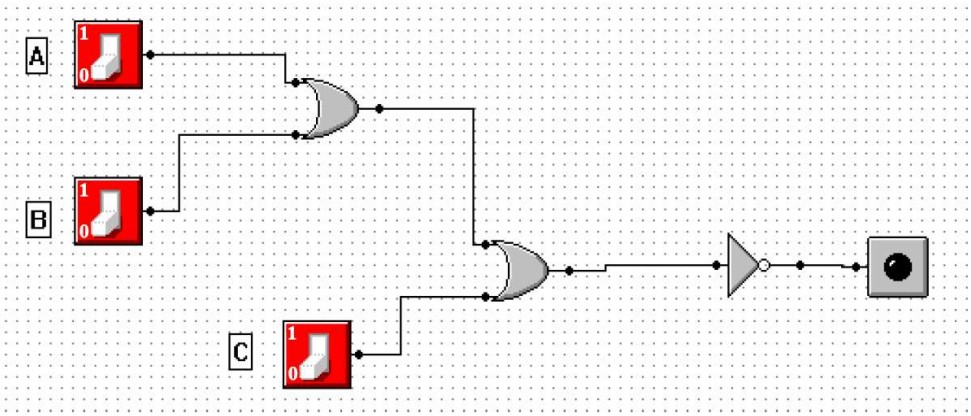
Input A	Input B	Output

Obtaining output of integrated Logic gates using MM Logic software

Let us build up the following circuit using MM Logic software.



It is shown as follows in MM Logic software.



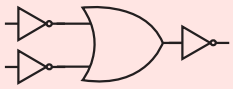
When the software is run changing the input, the output obtained is shown as in the following table; (Here the bulb lights is denoted by '1' and does not light up is by '0')

A	B	C	**output**
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

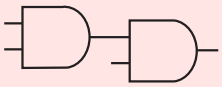
Activity 5.5

Arrange circuits as shown below using the MM Logic software. Tabulate the input and the output in the space provided.

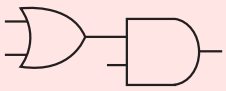
1.



2.



3.



4.

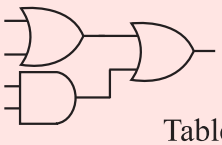


Table 1

Input A	Input B	Output

Table 2

Input A	Input B	Input C	Output

Table 3

Input A	Input B	Input C	Output

Table 4

Input A	Input B	Input C	Input D	Output