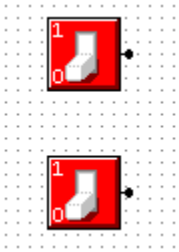
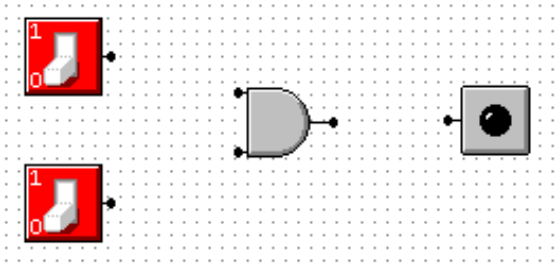
The AND Gate

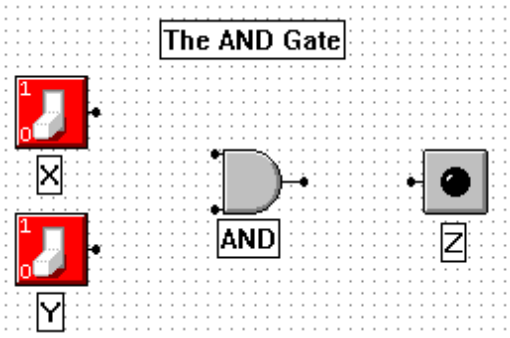
1. Open the program **Multimedia Logic**.
2. Select the **switch** button  from the palette and click on the screen twice to create two switches as shown below. You may need to use the selector tool  to move the switches into the right position.



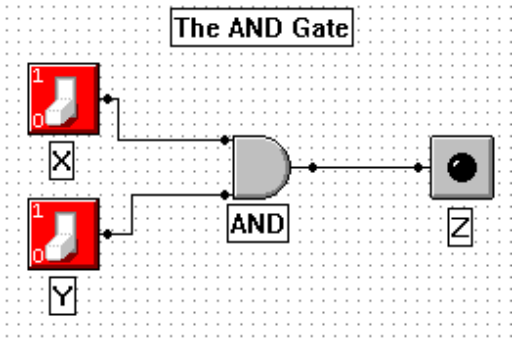
3. Select the **AND** gate  and click on the screen to place it to the right of the switches. Select the **LED** button  (LED stands for Light Emitting Diode – basically a light) and click to the right of the AND gate. Your circuit should look like this – use the selector tool  to move objects around if it doesn't.



4. Use the **text** tool  to label the circuit as shown below. Place five text boxes on the layout and move them to the appropriate positions. Double click on the text boxes so that the text can be changed.



5. The different components can be wired together using the **Wire** tool  . Connect the components together as shown in the diagram below.



6. Save the circuit naming it **AND**.
7. To switch power on, click on the **Play** button  on the top tool bar. The circuit should now change to an all white background. You should be able to click on the switches and experiment with what would happen when different combinations of switches are pressed.
8. It is important that you document what happens when the switches are ON (called 1 in binary) and OFF (called 0 in binary). The LED (Z) is the output of the AND gate. Complete the table below (called a **Truth Table**) by using your circuit to calculate what happens.

X	Y	Z
0	0	
0	1	
1	0	
1	1	

9. In your own words, describe how the **AND** gate works

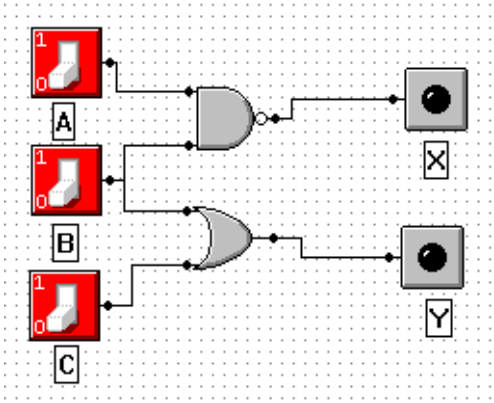
_____

_____

_____

Combination Circuit 1

1. Open the program called Multimedia Logic and construct the circuit shown below. Make sure that the switches and LED's are labelled as shown below



2. Test the circuit and complete the truth table below. Make sure all possible combinations of switches are tested.

A	B	C	X	Y
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

3. What combinations turn the **X LED** on?

_____

4. What combinations turn the **Y LED** on?

_____

5. Is it possible to have both the **X** and **Y** LED on at the same time? Explain how?

_____

_____

6. In your own words describe the purpose of this circuit?

_____

_____

Circuit Design 2

1. Study the following truth table

Input			Output	
A	**B**	**C**	**X**	**Y**
0	0	0	0	0
0	0	1	0	0
0	1	0	1	0
0	1	1	1	1
1	0	0	1	0
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

2. When is **X** on (has the value 1)? _____

_____

3. When is **X** off (has the value 0)? _____

_____

4. When is **Y** on (has the value 1)? _____

_____

5. When is **Y** off (has the value 0)? _____

_____

6. Sketch out a circuit on this sheet that would produce the truth table above.

Sketch your circuit design here