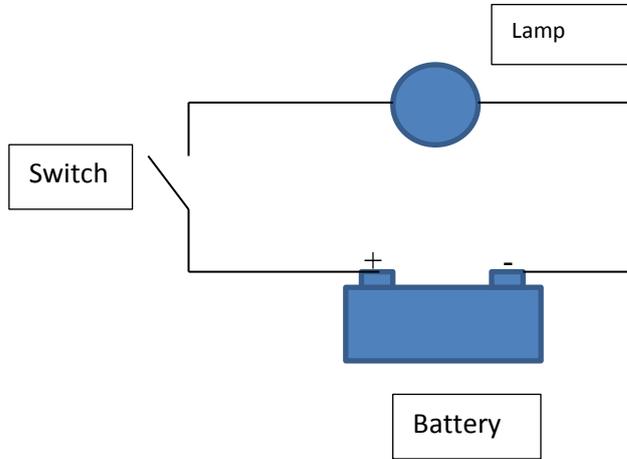
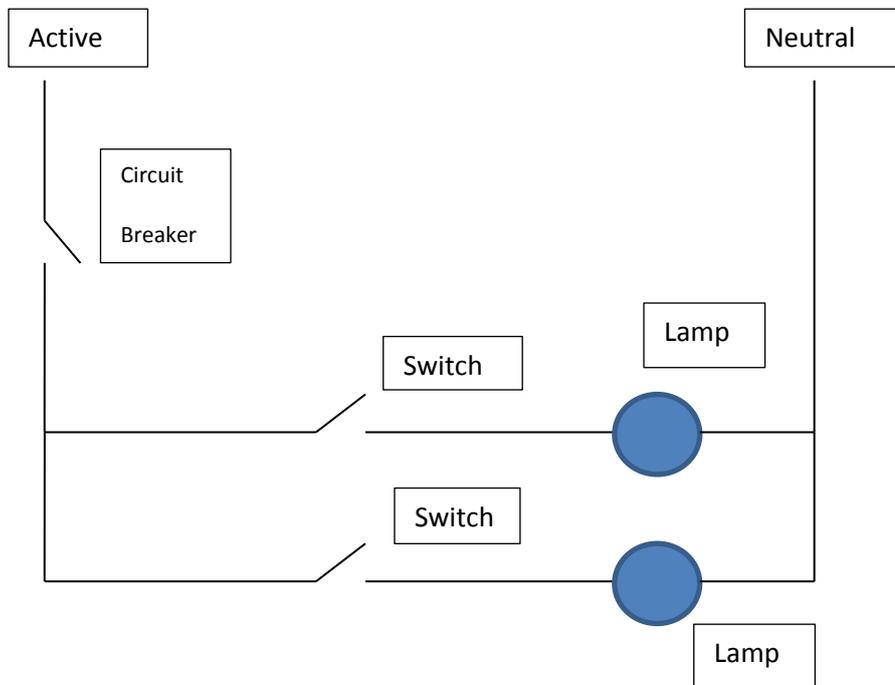


Basic Electrical Circuits: Light & Power

In order to understand how an electrical circuit works, let's start with the very basic concept of having a battery, switch and a lamp as with the following sketch:



You will note we have the negative terminal of the battery connected directly to the lamp and the positive terminal goes to the switch. The other side of the switch is then connected to the lamp. When we close the switch, we complete the circuit and the lamp will be on. Now what we will do is to use that exact principal to show a typical lighting circuit with 2 lamps, each one individually switched.

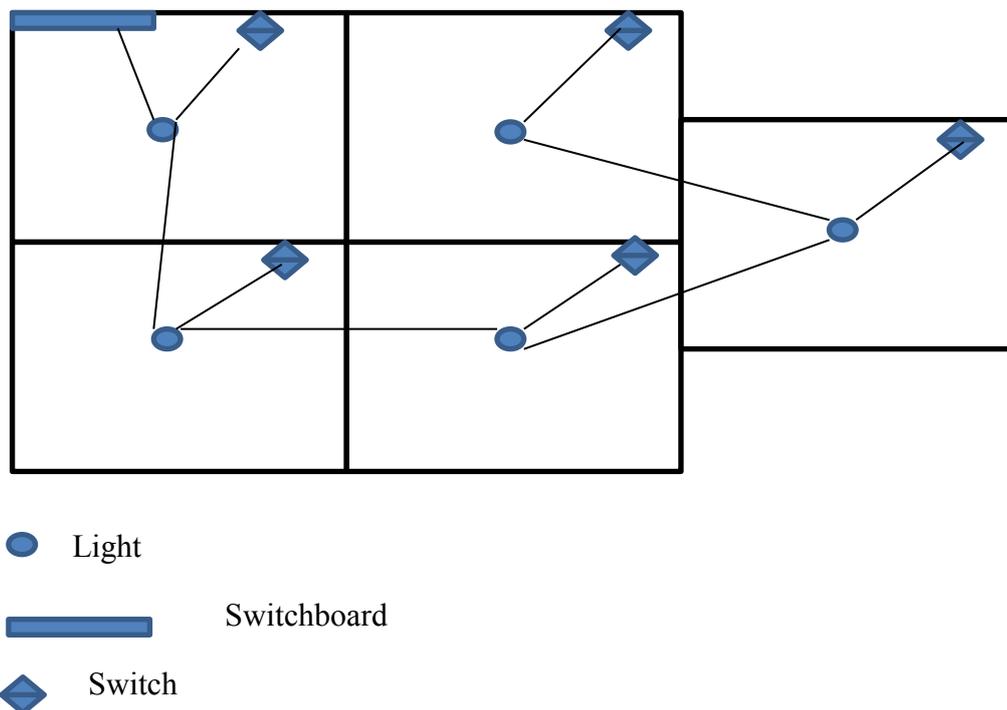


All we have done now is replaced the battery with an AC Power Source, the active conductor then connects to the Line Side of a Circuit Breaker. The reason for the circuit breaker is to protect our circuit against overcurrent. Typically what you will find is that we may have a 10A Circuit Breaker on a lighting circuit

Now do the usual walk through of the circuit. As before, I will not focus on the direction of current flow. We will merely do a snapshot of how the circuit operates.

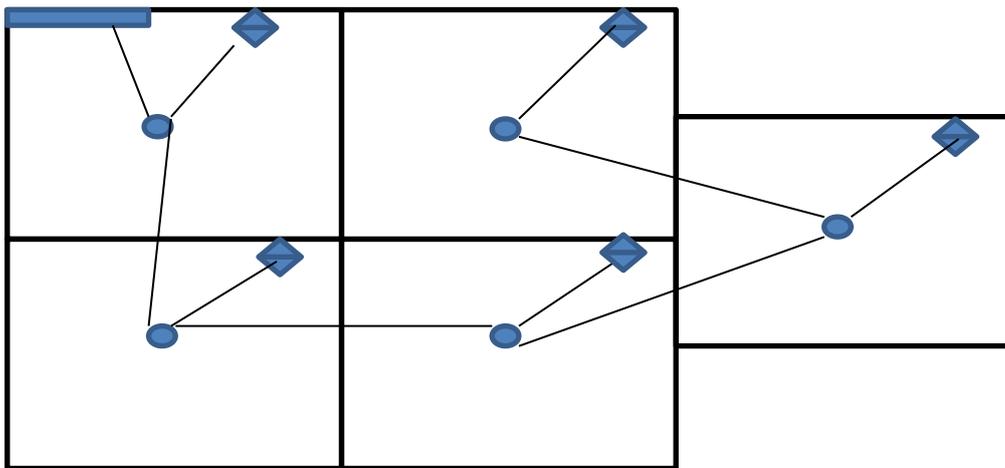
When the circuit breaker is in the ON Position, we will have voltage to the one side of both light switches. When we turn the first switch on, we complete the circuit to the lamp. Notice how we have the neutral connected directly to the lamp. This means with the switch closed, we will have the full applied voltage at the lamp which means it will be on. The same applies to the second switch. Notice how each switch only controls the one lamp connected to it.

The reason for showing it in this way is that you can see that we loop the Active conductor from one switch to the next and the Neutral conductor from one lamp to the next. This all looks very easy on the sketch but how do we “see” it in an actual installation? Lets take a look.

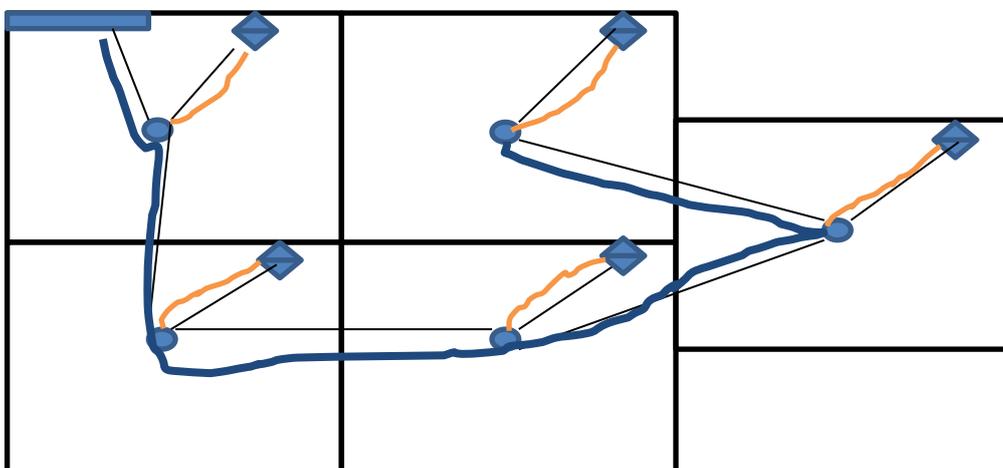


Looks a bit confusing doesn't it? Let's do the walk through again. From the switchboard we have a line to the first light. This line will have a Neutral and an Active conductor as well as the Earth conductor. From this same light we have a line to the switch. This is where it becomes interesting. The active conductor does not connect to the light. It goes down this second line to the switch and from the switch we have one wire coming back to the light. We

call this wire the Return. The earth wire loops onto the light and the switch where it is connected to the appropriate earth terminal. When you look at the switch, you will note it is no different than our sketch before. We still have the same configuration namely; the active conductor on one side and the return wire on the other. This return connects to the light. The active also loops from the switch all the way around to the next switch. I will draw a red line on the sketch to show the path of the Active conductor to make it a bit easier to understand.



Notice how the active does not connect to the light at all? Now have a look at the return wire. At every switch there will be a return to the light. I will draw that in on the next sketch in orange and the neutral in blue just to make it easier to see. Please note this does not reflect on the actual wire colours you may use as these are different in some countries. Please follow your local code.



If any of this does not make sense, please feel free to post any questions as a reply or send me an email and I will try to answer it for you. Next time we will have a look at some two way switching and also how the socket outlets are set up. So until then, please work safe and always make sure you perform all work according to your code/regulations.

And by the way, for those who have not had time to get a copy of the book Manual for Electricians Volume 1, please head to www.lulu.com/spotlight/SparkyHelp

And for everyone who has already got a copy, thanks for your support and I hope you find it useful

Regards

Frans