SCHOOL OF THE WEST

Electronics

Chapter 3: Basic Circuit Practise

How to build a circuit

4 steps rule

- **Check** that you have the components with the values you need.
- **Design** your circuit on a piece of paper and calculate all the values you need.
- **Simulate** your circuit with some software to check that everything works as expected.
- **Build** your circuit and test it.

Word of caution

- Electricity can be dangerous. In this course we are dealing with very small voltages and currents, but always pay attention with what you are doing and do not experiment without a previous simulation.
- Do not touch the two terminals of the battery at the same time, or you will become part of the circuit.
- If you go over the maximum power of a component, it will break, burn or even explode, so be careful with your calculations.

Our First Circuit

Description of the problem

- We have a battery and a lightbulb.
- We want to connect the components to form a circuit so that the light bulb emits light, without burning it.

Check

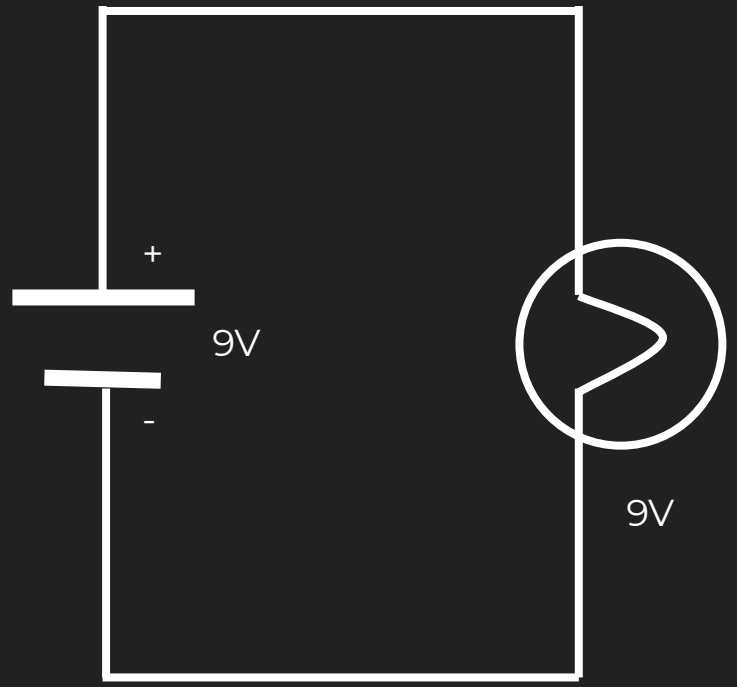
- The first step is to check the voltage of our battery. The voltage will be written on it. In our example, it’s 9 V.

- Then, for the light bulb, we need to know it’s voltage. In our example, we see written on it that it is 9 V.

- A light bulb voltage slightly higher than the battery voltage will also work (it will emit less light), but a lower light bulb voltage will result in the light bulb burning.

Design

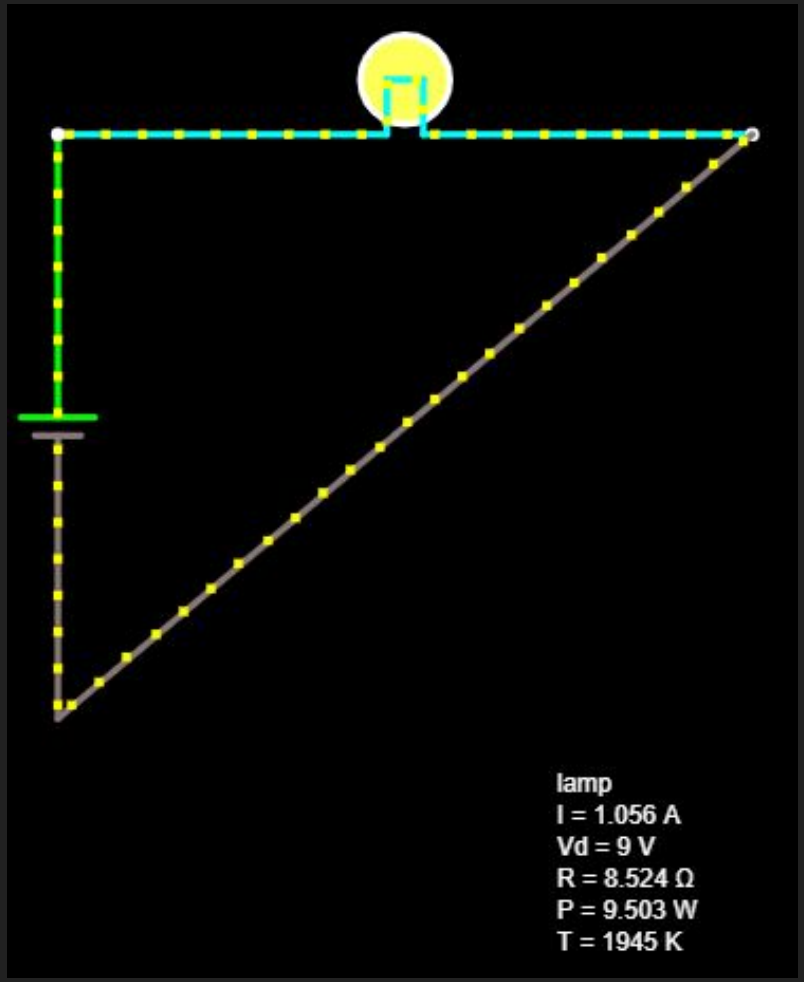
- Draw a schema with the correct symbols.
- Add the relevant values, in our case the voltage.
- Do all calculations needed. In this example, no calculations are needed.



Simulate

- You can use any simulation software you want. Our recommendation is http://www.falstad.com/circuit/circuitjs.html?lang=en

- Recreate your schema in the program and check that all components have the expected voltage value



Build

- There are many ways to build a circuit. Our suggestion is to use a piece of cardboard as a base.
- As a first step, we will draw the circuit on the cardboard. We will place the components on it and use wire to unite them.
- You will need a tool to cut wires, remove the insulator from their ends. It is usually done with pliers, but scissors can work too.
- In our case, since we want to reuse the components, we will unite wires with electrical tape instead of welding. Make sure the wires make full contact before taping them together

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Next lesson

Chapter 4: Ohm’s law