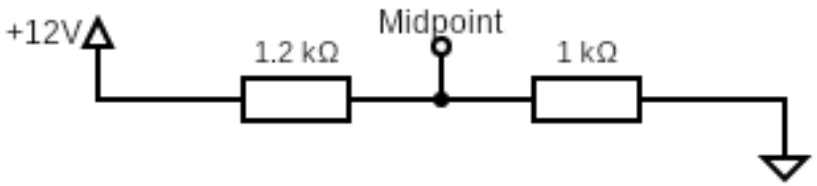
Basic Electronics Exercises - 02: Voltage Divider and Potentiometer

1. Voltage Divider

Setup:
- Build the voltage divider with two resistors in series (**1k2Ω** and **1kΩ**) connected to a **12V source**.



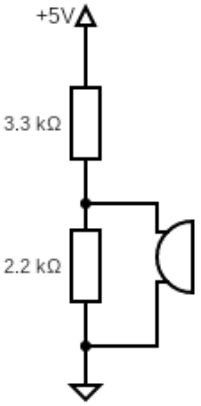
Tasks:
a) Calculate and measure the voltage from [+] to midpoint.
b) Calculate and measure the voltage from midpoint to [-].
c) Fill all the fields in the table below:

Points	Resistance (Ω)	Theoretical Voltage (V)	Measured Voltage (V)
[+] to Mid	*1.2K*		
Mid to [-]	*1K*		
[+] to [-]		*12*	

How is it used in practice?
In electronics, a lot of times you may end up using a few **components** in your circuit that work on a **voltage** that is **different** from the other components in the circuit, that's when the voltage divider comes handy.

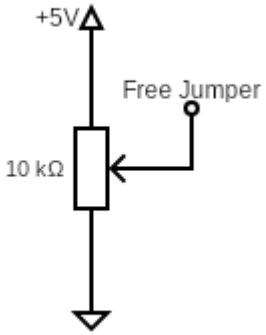
Example:

Let's say you're working on a project that uses an Arduino, and then you want to add a buzzer that rings a sound every time an error happens. Although, you notice that the buzzer you have needs 2V to work, but your Arduino provides 5V, so if you just connect it directly, you'll break the buzzer. Using a **voltage divider** though, you could easily solve this problem and make the buzzer work in your project.



2. Potentiometer

Setup:
- With a **5V** power supply, you will:
1. Connect **terminal 1** to **GND** (negative).
2. Connect **terminal 3** to **VCC** (positive).
3. **Terminal 2** is the variable output (leave a jumper for measurement).



Tasks:
i)
i)
i) Fill the table below with measured values:
(Once you set the position, don't change it until you have measured the whole line!)

Pot Position (Aprox.)	From terminal 1 to terminal 2		From terminal 2 to terminal 3	
	Resistance (Ω)	Voltage (V)	Resistance (Ω)	Voltage (V)
0%				
25%				
50%				
75%				
100%				

How is it used in practice?
You can use it like a button to adjust volume and brightness, as you can also use it as a sensor checking the angle or position of something.

Example:

In the InMoov Humanoid Robot, we use potentiometers to check the angle and current position of the arms. This way the controller knows exactly when to start and stop moving the arm motors.