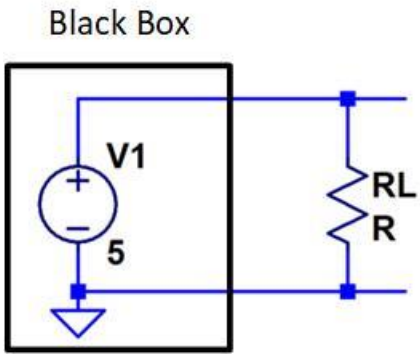
How can you understand Thevenin's and Norton's equivalent intuitively?

Thevenin's equivalent:

Think about a black box is going to perform as an ideal voltage source, which means whatever the load is, it is going to deliver the same voltage to the load:



So, the way to get this Vth is just to remove RL (since it does not matter what the load is) and get the voltage at the output terminals.

However, it is impossible, since the voltage source is not 'ideal' and it has an internal resistance. So the voltage being delivered to RL will be only part of the entire voltage.

So we need to know what is that internal resistance. The way to get it is looking from the output into the circuit, and short the voltage source and disconnect the current source.

Norton's equivalent:

Pretty similar to the explanation above. A black box will deliver a current to the load, no matter what the load is, the current shouldn't change. So we can assume the load the is super high (a short circuit), then just draw a wire at the output and remove RL. The current flows through this wire should be this 'ideal current source' (since the load shouldn't affect the current being delivered to the load). However, the current source is not ideal, and it has an internal resistance. Which means the internal resistance will divide the current that is going to be delivered to the load by part. That is why the RN should be modeled in parallel with the current source.