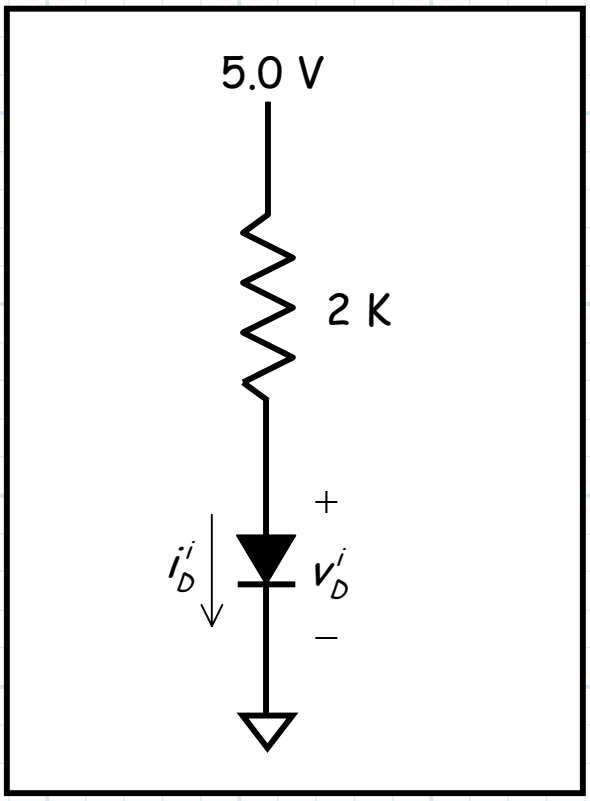
Example: A Simple Ideal Diode Circuit

Consider this simple circuit that includes an **ideal** diode:



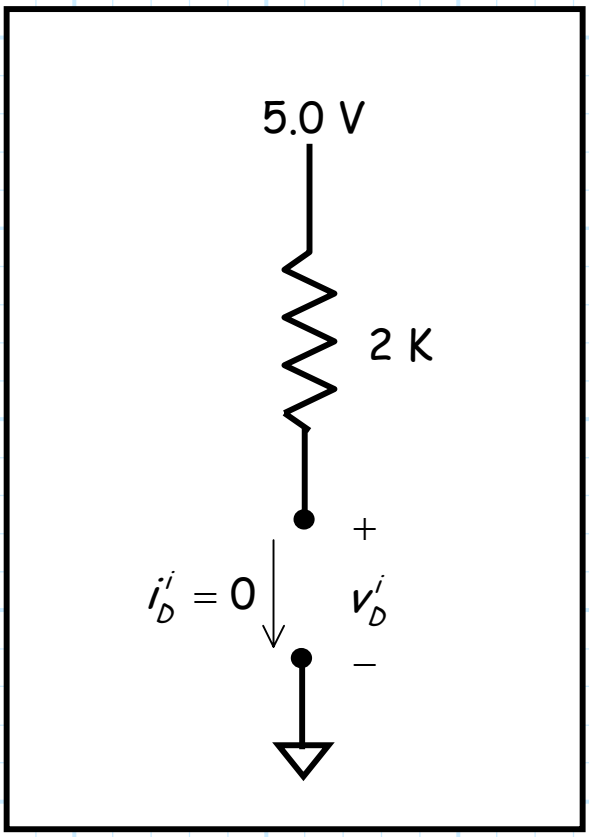
Q: *What are i_D^i and v_D^i?*

A: Follow the five easy analysis steps !

Step 1: Let's *ASSUME* the ideal diode is **reverse biased** (we're just guessing!).

Step 2: We therefore *ENFORCE* $i_D^i = 0$ by replacing the ideal diode with an **open** circuit.

Step 3: Now we *ANALYZE* the circuit; finding the value of v_D^i.



(KVL)

$\therefore$

(KCL)

(Ohm's)

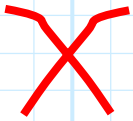
(enforced)

$\therefore \; i_R =$

$\therefore \quad v_R =$

$\therefore \quad v_D^i =$

Step 4: Now let's CHECK our result. ⇨ **Is** $v_D^i < 0$ **??**

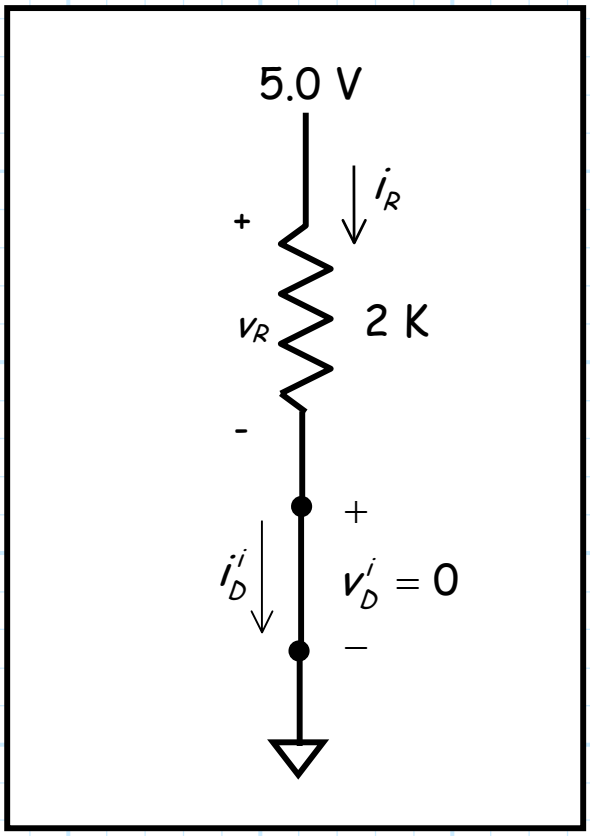
$v_D^i =$ 

We must change our assumption, and then **start over** (Doh!).

1) Now *ASSUME* the ideal diode is **forward biased** (what's left?).

2) We therefore *ENFORCE* $v_D^i = 0$ by replacing the ideal diode with an **short** circuit.

3) Now we *ANALYZE* the circuit; finding the value of i_D^i.



(KVL)

$\therefore$

(KCL)

(Ohm's)

(enforced)

$\therefore v_R =$

$\therefore\ i_R =$

$\therefore\ i_D^i =$

4) Now, let's CHECK our result. ⇨ **Is** $i_D^i > 0$ **??**

$i_D^i =$ ✓

Our assumption is correct !

Therefore, in this circuit, we now **know** that:

$v_D^i = 0$ and $i_D^i =$