Week 3: LEDs, Phototransistors and Motor Control

It is *HIGHLY RECOMMENDED* that you read through this week's lab and familiarize yourself with all the material before attending the lab session—there is a lot of content in this week's lab and all these materials are closely related to the underlying control and sensing mechanism of your line-following robot project starting from the next lab!

Week 3 Prelab

1. Draw the circuit schematic symbol of a diode and label the anode and cathode.

2. When a diode is forward biased, the anode is at a (circle one) higher / lower voltage than the cathode.

3. When looking at the diode itself, what are the two methods for telling which side of an LED is the anode and which side is the cathode?

   1) longer leg is the positive, anode side
   2) flat edge or LED is negative, cathode

4. Fill in the blank: When a high voltage relative to the emitter is applied to the base of an NPN transistor, current is allowed to flow from the collector to the emitter.

5. What is the unit of the RC time constant (in SI unit)? Why? Show your reasoning below:

   1) $RC = \text{ohm} \cdot \text{farad} = \text{ohm} \cdot \frac{1s}{\text{ohm}} = \boxed{1sec}$
   2) t/RC in exp so t = sec thus RC: $\boxed{sec}$

Week 3 Prelab End