How to Intro project the crackbook

Dear students this document is meant to be a quick and dirty guide on how to survive or suggest the introduction project.

This document omits a lot of knowledge and gives an overview.

The LED

The LED is a light emitting diode. Basically, is signs if current is running the “correct” direction. It needs minimum voltage of around 0.6V in order to overcome its material property and emit light. Basics red LED has a voltage drop of 1,2 volts and 20mA. This means that the plus and the minus side of the LED needs at 1,2 volts in order to sing efficiently and the amount of current running through the diode needs to be 20mA.

The Resistor

The simples form of a resistor can be descripted as a “choker”. It chokes voltage down. The lost voltage is transmitted as heat. This component is used to protect others, normally.

Implementation

By connecting a resistor to a LEDs plus side (longer “leg”) and then connecting the plus side (anode) to your GPIO (general purpose input output, PIN) and the minus side (cathode) to the GND (Ground) you will get the LED to light up when the port is set up high. You can try this by using the GND and the Vcc (5 volts supply) of your PI.

Solder the resistor and the LED on some cables and test it out!

Testing

One very import aspect of electronics, or any other science or even engineering field is to test. To do so you need to know some basic equipment. The voltmeter and the oscilloscope are the two most basic and useful tools.

The voltmeter

There are four ways to test the voltmeter.

- As a test device for detecting short circuits.
- As a simple voltmeter
- As an amp meter
- Or to measure resistance.

Use the settings on the device to set it up.

The oscilloscope

This is slightly more complicated device, it can provide the same information as the voltmeter and much, much more. In the authors opinion, it is the most useful device for testing. We will do a class presentation of the device

Days exercise/task

Make an LED to blink with 1 second period. Use 190 ohm resistor and a LED of your choice. Use your R-PI

Why 150?

Simple Ohms law V/A = R V is voltage and it is the Vcc – voltage drop around the device 1,2, A is amps and in this case it is 20mA from the datasheet of the component. (5 – 1.2) volts / 0.02A = 190 Ohm. Th author has taken a red LED, you select bright white, you will have something like 1,6 voltage drop and 30mA so you will need to adjust the resistor. Do not connect the LED without a resistor it will work, and you will burn a)your fingers, b)the LED, c)your board.