Reykjavík University

Mechatronics I

T-411-MECH

Laboratory 9

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Contents

1 Main Tasks

This below is the GitHub link with all the code inside.

Link: GitHub Repo

1.1 Main Task 1

Task: Create a circuit that has 3 LEDs, red, yellow and green that are in a row.

Have the circuit have an electronic switch of some kind so it can be turned off by a GPIO pin.

Pictures: Those shown below are the picture of the circuit and the correspondent schematic.

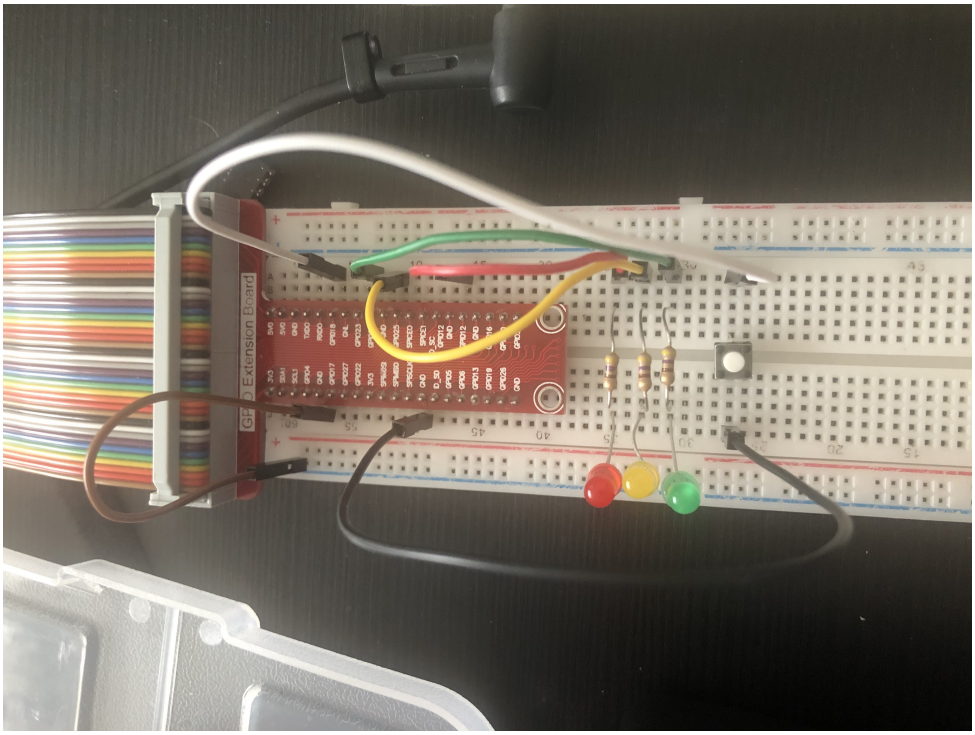

Figure 1: Picture of the circuit.

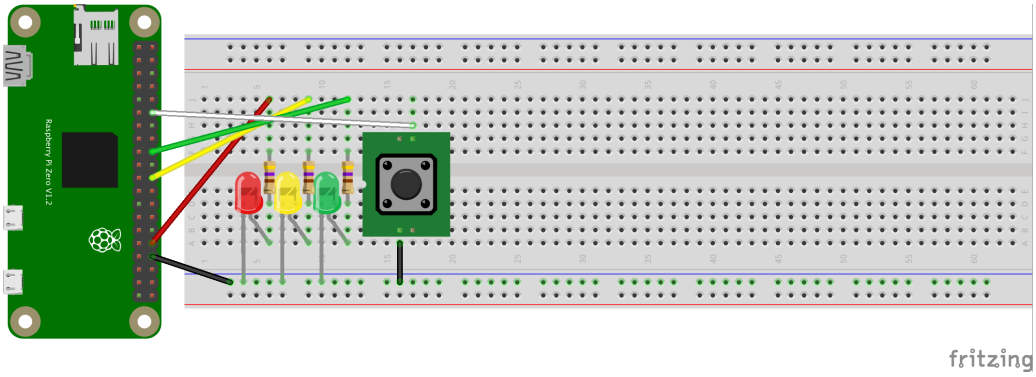

Figure 2: Circuit schematic.

1.2 Main Task 2

Task: Get data from the weather station and specify a threshold for maximum temperature:

1. Make the Green LED be lit only if the data is below some threshold
2. Have the yellow LED be lit only if it is close to the threshold
3. Have the red LED lit if it is over the chosen threshold
4. Have a function be able to turn off the circuit via the electronic switch.

HINT: modify the threshold to get different results

Video: In the following video we show the three leds which light up differently if we change threshold and execute the program again, as requested by the task (only one led is on at each execution/request). The button switches off all the leds if pressed and lights up the led that was lit before if pressed again.

Link: Video Link

1.3 Main Task 3

Task: Connect The Rpi to your phone/laptop via Bluetooth.

Video: Shown in the video below, we sent a message via Android terminal ("hi") and responded back using Rust ("Matteo").

Link: Video Link

1.4 Main Task 4

Task: Transmit the LED data to your phone and have the phone show which LED is lit.

Video: For this, we just sent the lit LED color to the Android phone and printed it out, as visible in the video (we said "red led is on" instead of green at some point, it was a mistake but we corrected ourselves immediately after).

Link: Video Link

1.5 Main Task 5

Task: Connect the app made in IA9 to the circuit show that the LED status and have the power-saving slider turn off the circuit.

Video: Using the app from IA9 (and changing the names of the labels to "red", "yellow" and "green"), we set it up to display the currently lit led name (in this video it is "red") and to make the Power-saving switch act as the button from task 2 (turns off all the circuit leds).

Link: Video Link

2 Hard Tasks

2.1 Hard Task 1

Task: Have the program send status updates to the phone in text format and displayed on the screen.

Video: As proof for this task completion, we sent two different status updates to the Android application: one when the weather API request is sent and another when the Power-saving mode is changed (activated or deactivated). As shown in the video below, those two are both sent from the Rust program to the Android app.

Link: Video Link

2.2 Hard Task 2

Task: Have the Phone be able to set the threshold for the weather station.

Video: As requested, I can use the phone to send a message containing the new threshold which is applied to the temperature value got from the internet and thus the leds lights are updated shortly after. To make Rust understand we are sending a threshold change command, we insert "THRESHOLD:" before the actual value and then terminate the string with a "!" (for example "THRESHOLD: 3.0!").

Link: Video Link

2.3 Hard Task 3

Task: Have the Phone make a sound if the Red led is on.

Video: We just added a sound to the application so that when the red led is turned on, it is also played (for some reason, we keep saying "red" instead of "green" in some videos, sorry about that).

Link: Video Link

3 Advanced Tasks

3.1 Advanced Task 1

Task: Be able to send text commands from the app in your phone to do a custom task

FX. when the command "DANCE" is written and sent then the LEDs do a light show.

Video: Last, we made some LEDs shows. By writing the "ONOFF!" command (once again, we decided that commands have to be written in capital letters and end with an exclamation point) all the LEDs blink rapidly three times, while writing the "DANCE!" command they rapidly turn on and then off in sequence (red, yellow, green).

Link: Video Link