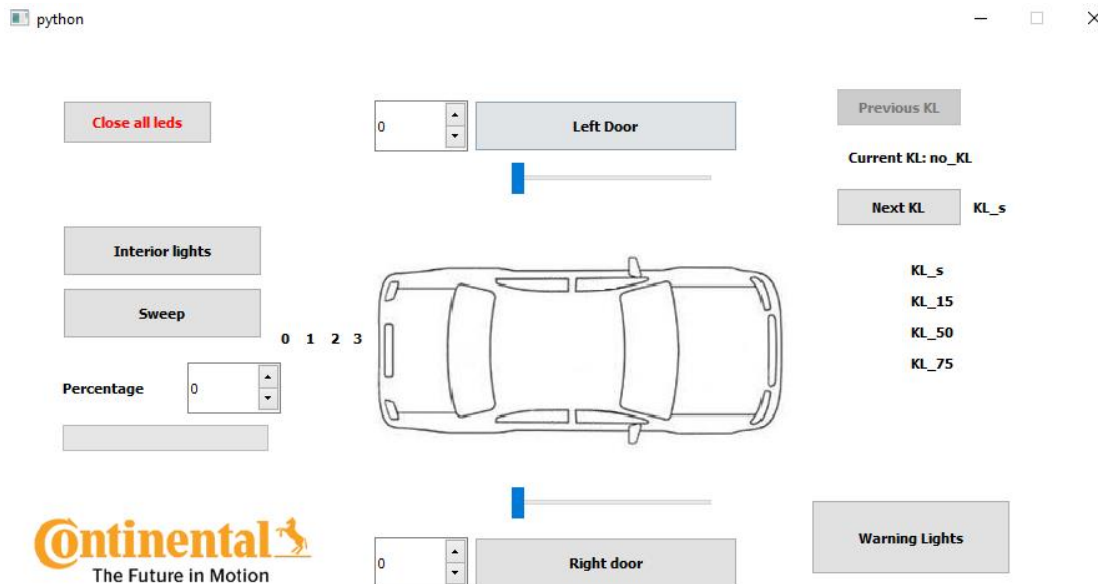# Laboratory 1 – Interior lights application

Interior lights interface

Exercise 1: Open and close one led

Close all leds button must clear all the leds when is pressed.

Complete the specific function to do this action.

Interior lights button must open and close 1 LED when is pressed using **set_interior_lights** function.
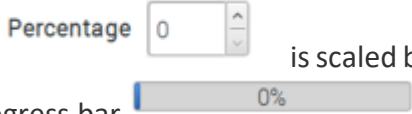
Complete the specific function to do this action.

Exercise 2: Sweep all leds

Sweep button must give "One led at a time" effect when is pressed, start with the 0 led and open each led till the 3'th led.

HINT: Use **set4leds** in **sweep_leds**(task of **sweep_threads** thread).

Exercise 3: Control led brightness

Percentage spinbox Percentage `0` is scaled between 0-100, this means the led brightness percentage. The progress bar `0%` is also scaled between 0-100 and must go through all the values until his value is equal with led brightness percentage, creating the fade event.

Progress bar value is stored in a variable. In the **valuechange** function is checked if it is bigger or less than spinbox value.

If progress bar value is **less** than spinbox value you should **fade out** from the actual brightness (meaning the progress bar percentage) to the next brightness (meaning the spin box percentage).

Change "**change_pb_down_value**" function to make this action work.

 If progress bar value is bigger than spinbox value you should **fade in** from the actual brightness (meaning the progress bar percentage) to the next brightness (meaning the spin box percentage).

Change "**change_pb_up_value**" function to make this action work.

HINT: Use **ENTER key** after setting the value you want for the spinbox.

Exercise 4: KL control

Kl is the abbreviation from 'klemme', which is the German term for connector/connection.
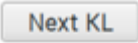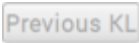
No KL – KL_s, KL_15, KL_50, KL_75 leds closed

KL_S – grey color (is the ignition switch position #1 - accessory)

KL_15 – green color (ignition switch position #2 – ON)

KL_50 – red color (ignition switch position #3 – start, CRANKING)

KL_75 – blue color (ENGINE RUNNING)

KL_list is a list that contain all the KL's. Using Next KL and Previous KL you have to go through all this list and set the following status for current KL:

no_KL = all 4 "eds closed

KL_S = just KL_S led open

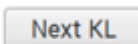KL_15 = KL_s, KL_15 leds open

KL_50 = KL_s, KL_15, KL_50 leds open

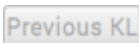KL_75 = KL_s, KL_15, KL_50, KL_75 leds open

Complete **KL_lights** function to make this application work.

Description of existing functions:

set_bg_colors – make the application running like the real leds, opening interface leds.

prev_kl_function - when Previous KL button is pressed it changes the current KL to the previous KL.

next_kl_function – when Next KL button is pressed it changes the current KL to the next KL.

set_enable – set Previous KL button to disable when current KL is no_KL and set the "Next KL" button to disable when current KL is KL_75.

Exercise 5: Warning Lights

Warning Lights

When the button is pressed for the first time 4 LEDs will flash until the button is pressed again.
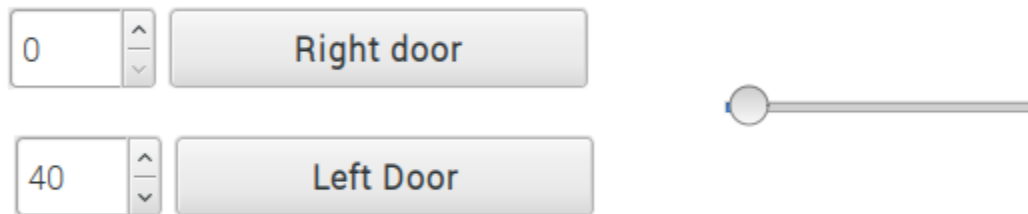
If **Right Signaling** or **Left Signaling** are on, they must be switched off during the operation of the

Warning Lights, after which they must resume their functionality.

Complete the specific function to do this action.

Attention! exercises 6 uses **setWarningLights** to set the color of the LEDs

Exercise 6: Obstacle detection (Optional, BONUS)

Let's start talking about the widgets that we use to make this exercise running. In left of the "Left Door"/ "Right door" button there is a spin box. This spinbox is actually the **obstacle**. The spinbox is scaled between 0-100 (meaning the distance in cm that a door can open). Setting a value between 0-100 we fix a obstacle at the given value.

There are also 2 sliders, those sliders are also scaled between 0-100.

The "Left Door"/ "Right door" button are making all the magic, because **after** we set the obstacle we just press one of these buttons to simulate an open door. Then a led has to **fade in** from 0 to the brightness equal with the **obstacle** value. When the obstacle value is reached, the led should change in a red colour and **stop fading in**.

In order to simulate closing of the door, you will use the sliders and **fade out** the leds.

 HINT: We can only fade out from the sliders, the buttons are used to fade in.

Complete specific function to make the obstacle detection work.