Question 1

1.a

In the master board, the pattern is round-robin. In the slave board, the pattern is round-robin with interrupts.

1.b

In the master board, the program will just read the values every iteration of the program, and send them over I2C to the slave board.

The slave board has a callback function that is ran every time it receives something over the I2C channel, and that function will read the data, and call functions to update the LEDs accordingly.

Question 2

(see file master.ino)

Question 3

(see file slave.ino)

Question 4

4.a

The mappings are all from [0, 1023] towards another domain, that is specified below:

Temperature sensor: [-50,450] (degrees Celsius).

Potentiometer: [0, 180] (degrees).

Light intensity sensor: [0, 255] (value for the analogWrite to the LED, using PWM).

4.b

Temperature sensor: none.

Potentiometer: none.

Light intensity sensor: 10 seconds before the start of the program, time just to read the intensity and from there, scale according to the maximum and minimum seen in those 10 seconds.

4.c

Temperature sensor: if the temperature goes over 24 degrees Celsius, turn the LED on (digitalWrite).

Potentiometer: 0 degrees (turned right) gives a period of 2 seconds for the blink; 180 degrees (turned left) gives a period of 0.2 seconds; scales according to the angle linearly.

Light intensity sensor: 255 (maximum intensity) turns the LED off; 0 (minimum intensity) turns the LED fully on; the intensity of the LED scales inversely with the light intensity (using analogWrite and PWM, as stated before).

4.d

All sensors have their values being outputted via serial, and the values do match. The system is responsive, which shows that it is working accordingly.

Question 5

Question 6

Question 7

Question 8