|  |  |  |  |
| --- | --- | --- | --- |
| Team name: | *B7* | | |
| Homework number: | *HW06* | | |
| Due date: | *November 8th* | | |
|  |  |  |  |
| Contribution | NO | Partial | Full |
| 1 *Giampà Simone* |  |  | *x* |
| 2 *Massa Giacomo* |  |  | *x* |
| 3 *Raduzzi Lucafrancesco* |  |  | *x* |
| 4 *Micelli Johanna* |  |  | *x* |
| 5 *Galimberti Claudio* |  |  | *x* |
| Notes: | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Project name | HW06: Temperature sensor readout (11 bits value) | | |
| Not done | Partially done  (major problems) | Partially done  (minor problems) | Successfully completed |
|  |  |  | *x* |
| In the microcontroller configuration, we enabled the two pins PB8 for SCL and PB9 for SDA, and we enabled the TIM2 global interrupt in the NVIC section setting with the internal clock as the clock source. The interrupt expires every second, and the HAL\_TIM\_PeriodElapsedCallback() is called and changes a boolean flag used as a control variable.  In the main loop, the HAL\_I2C\_Master\_Receive() function collects the two bytes of temperature and saves them in an array composed of 2 bytes. The correct value of temperature is then retrieved by casting the two bytes into a 16bit unsigned integer variable: the eight most significant bits are the first value left shifted by 8 bits and the least significant bits are provided by the second value.  The unsigned value is then cast to a signed integer to account for negative readings. The signed 16bits variable is then divided by 256.0 (equivalent to the right shifting by 8bits) in order to provide a floating-point number. This way the first 8 bits are related to the integer part of the number, while the other 8 bits are to the decimal part. The resulting number is saved in a float variable and is transmitted via UART serial communication. The number is expressed in Celsius degrees.  We are sure that our code performs well even with negative numbers because the cast from a 16bits unsigned integer variable into a signed integer value, where the most significant bit expresses the sign of the number (1 for negative values, 0 for positive ones). This way the readouts are correct even for negative temperature readings. | | | |
| Professor comments: | | | |