|  |  |
| --- | --- |
| **Mark** |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Team name: | *A2* | | |
| Homework number: | *04* | | |
| Due date: | 13/10/2024 | | |
|  |  |  |  |
| Contribution | NO | Partial | Full |
| La Barbera Marco |  |  | *x* |
| Lotto Giulio |  |  | *x* |
| Majocchi Tommaso |  |  | *x* |
| Maffezzini Andrea |  |  | *x* |
| Pompilio Matteo |  |  | *x* |
| Notes: none | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Project name |  | | |
| Not done | Partially done  (major problems) | Partially done  (minor problems) | Completed |
|  |  |  | *x* |
| We successfully completed the homework.  **Part 1:**  Explanation:  We can state to have successfully accomplished our goals:   * To avoid the intervention of the CPU to retrieve data from the memory, instead performing DMA: this will also allow us to ignore the setting of a Timeout period during a normal transmission (with the *HAL\_UART\_Transmit\_DMA*function, which ensures that the CPU doesn't wait indefinitely); now, there’s no worry to block the CPU, hence no timeout is needed * To have a non-blocking behavior, by the usage of timers (instead of the *HAL\_Delay* function) * To finally successfully receive data to our UART receiver interface   Next, we explain all the steps for accomplishing our goals:  Firstly, we’ve configured the board pinouts and the DMA settings from the graphical interface of the CUBE IDE as follows, for the UART:  Immagine che contiene testo, schermata, Carattere, diagramma  Descrizione generata automaticamente    Secondly, for the Timer interrupt:    \*\*\*NVIC settings\*\*\*  Then we pass to the “main.c” file. We defined the constant TEMPO to personalize the speed of UART transmissions (TEMPO of 1000 results in a htim2.Init.Period of (TEMPO\*10) – 1, hence every second an interrupt is generated from the TIM). Also we initialize the TIM 2 base generation in interrupt mode with this function:    Two global variables: *buffer* will contain the final string to send, *voltage* will simulate an increasing behaviour of a float value:    We can now implement the timer callback function as follows:    Where the *snprintf* function, given *buffer* and its size, sets it to contain the value of our voltage increasing simulator (exponentially by factor 1.2), truncated by 3 decimal positions; *length* will contain the number of characters parsed in our buffer; finally, we transmit the buffer with Direct Memory Access through our *uart2* interface.  Switching to MATLAB, we can now run the script “UART\_plot\_data.m” to plot, in a window of 10 seconds and with baud rate 115200 bps (as set on our board), the received voltage values:    where a reset has been forced on the 5th second.  **Part 2:** | | | |
| Professor comments: | | | |