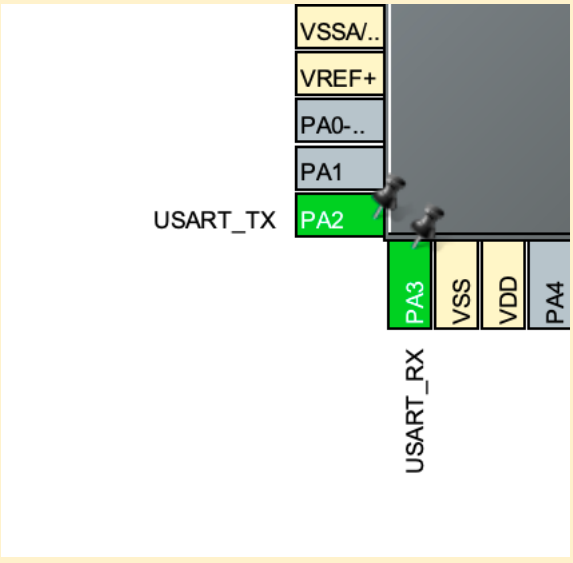
Mark	/11

Team name:	*A1*		
Homework number:	*HOMEWORK 04*		
Due date:	15/10/24		
Contribution	NO	Partial	Full
Piombo			*x*
Fumagalli			*x*
Pierfederici			*x*
Zenoni			*x*
Ferraro			*x*
Notes:			

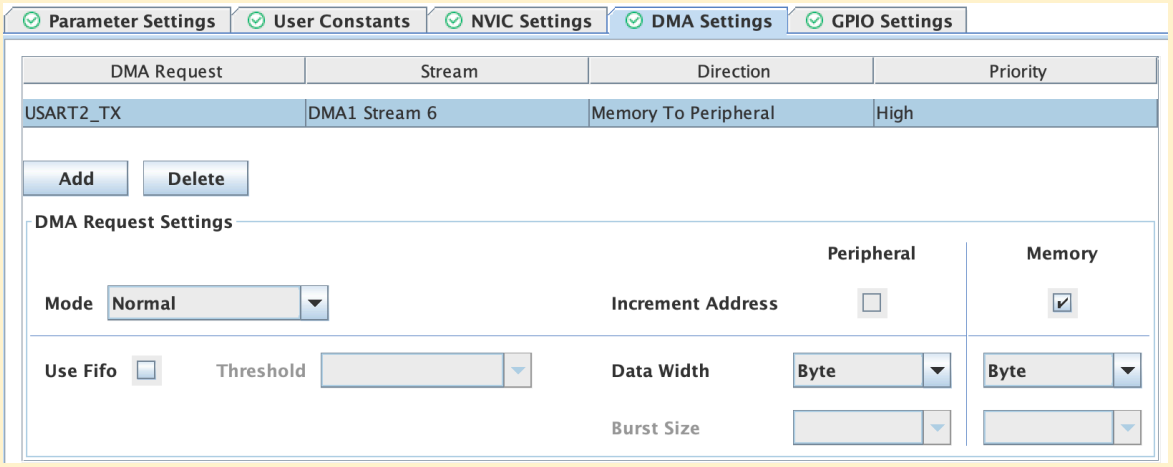
Project name	UART + LCD		
Not done	Partially done (major problems)	Partially done (minor problems)	Completed
			x

Part 1a:

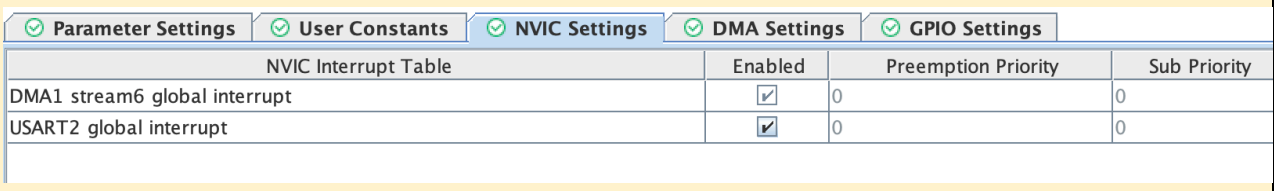
First of all, we checked the pins used for UART communication (PA2 as transmitter and PA3 as receiver)



In “connectivity” -> “USART2” we configured the DMA transmitter, as shown in the Laboratory slides:



Then we enabled the global interrupt of USART2 in order to perform the transmission:

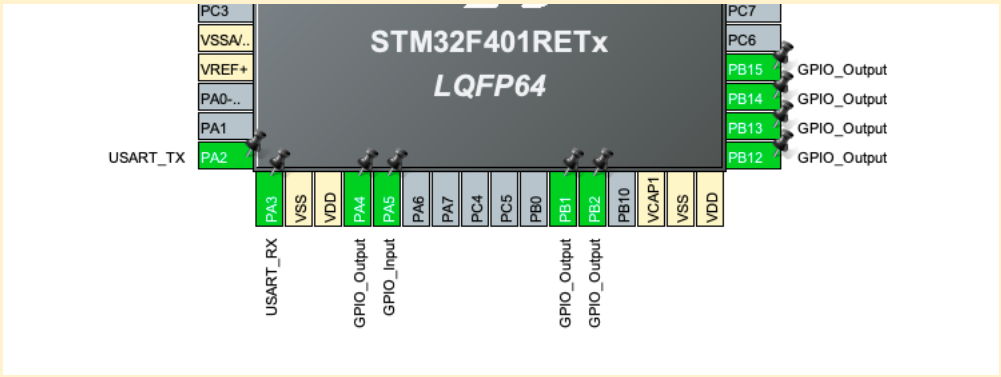


In main.c file we used the proper HAL functions to send the string to the PC:

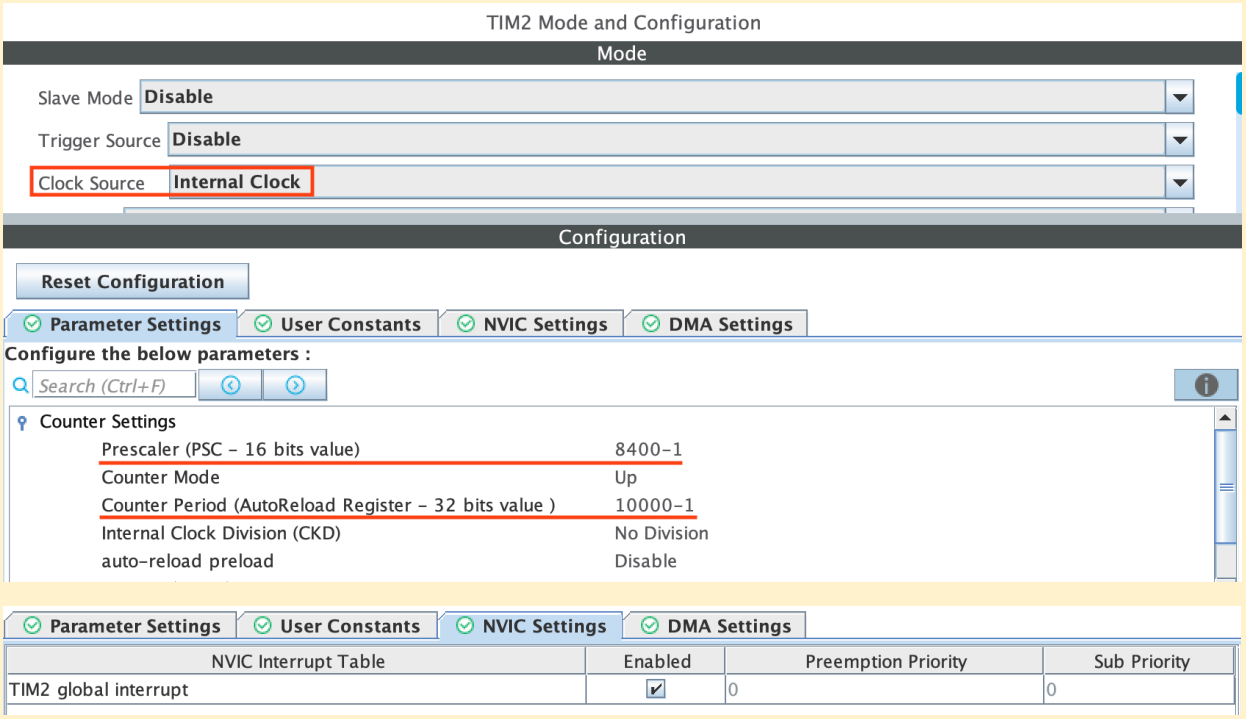
```
  while (1)
  {
    /* USER CODE END WHILE */

    /* USER CODE BEGIN 3 */

      HAL_UART_Transmit_DMA(&huart2, string, length);
      HAL_Delay(1000);
  }
  /* USER CODE END 3 */
}
```

Part 1b:

The configuration of the pin has been set to use the LCD, as shown in the slide:



Timer 2 has been used in interrupt mode to refresh the LCD every second:



In main.c file we included the given library for the LCD (**#include** "PMDB16_LCD.h").

We created an array of strings as a global variable to store the names.

In “int main” function we initialized the LCD, printed the first name and started the timer interrupt.

```
/* USER CODE BEGIN 2 */

  lcd_initialize();
  lcd_backlight_ON();

  lcd_println(names[indexx], 1);

  __HAL_TIM_SET_COUNTER(&htim2, 0);           // reset timer counter
  __HAL_TIM_CLEAR_IT(&htim2, TIM_IT_UPDATE);  // clear interrupt request BEFORE enabling tim interrupt
  HAL_TIM_Base_Start_IT(&htim2);              // start tim interrupt function

/* USER CODE END 2 */
```

The interrupt service routine changes the name printed on the display by increasing the index of the array.

```
void HAL_TIM_PeriodElapsedCallback (TIM_HandleTypeDef *htim) {
    if (htim == &htim2) {
        indexx++;
        lcd_println(names[indexx-1], 0);
        if (indexx == 5) {
            indexx = 0;
        };
        lcd_println(names[indexx], 1);
    };
}
```