

Assignment: UART Communication using Polling Mode (STM32)

Subject: ARM Microcontroller

Topic: UART – Polling Based Communication

Question – 1: UART String Receive and Echo (Polling Mode)

Objective

To understand UART receive using polling and how to form a string from received characters.

Problem Statement

Write a program for STM32 using **USART2 in polling mode** to perform the following:

- Receive characters **one by one** from UART.
- Store the received characters into a **character array (string buffer)**.
- When the **ENTER key ('\\r')** is pressed:
 - Terminate the string using **null character ('\\0')**.
 - Transmit the complete received string back to the serial terminal.

Expected Output

You sent: embedded

Question – 2: UART Command-Based LED Control (Polling Mode)

Objective

To implement **command processing** using UART polling.

Problem Statement

Modify Assignment–1 to implement **command-based LED control** as follows:

- Receive a string using UART polling.
- Compare the received string using **strcmp()**.
- Perform actions based on the command:
 - **"LED_RED"** → Toggle **Red LED (PD14)**
 - **"LED_ORANGE"** → Toggle **Orange LED (PD13)**
- If the received command is invalid, transmit:
Invalid Command

Constraints

- Use **polling mode only**
- Use standard string functions (**strcmp, strlen**)

Question – 3: UART String Processing (Polling Mode)

Objective

To practice **string manipulation and data formatting** in embedded C.

Problem Statement

Extend Assignment–2 to perform the following operations:

- Receive a string using UART polling.
- Convert the received string to **UPPERCASE**.
- Transmit the following details on the serial terminal:
 - Original string
 - Uppercase string
 - Length of the string

Expected Output

You sent : embedded

Uppercase : EMBEDDED

Length : 8