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## *Milestone 01 Description*

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## Milestone 01 Overview

The main aim of this milestone is to make sure that you can interface your microcontroller (Arduino Nano RP2040 / Pico RP2040 ), start to setup, and code it using basic C/C++ programs. Moreover, you are asked to brief your assigned project by elaborating on the functionality that meets the project minimum requirements.

## Deliverables

This milestone is divided into technical and non-technical tasks as shown below:

### Technical Task

- In this milestone, you are requested to purchase the main microcontroller with RP2040 as the core (Arduino Nano Rp2040 / RP2040).
- This milestone is a setup milestone to make sure that everything is working properly.
- On the CMS, you can find an upload zip file names: **“CSEN701\_MS\_00”**.
- You will find two setup manuals:

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- **MS\_00a:** Setup Arduino RP 2040 connect for C coding on VSCode on Windows
- **MS\_00b:** Build C code on VSCode and upload code to Arduino
- Additionally, you will find the main.c and CMakeLists.txt files mentioned in MS\_00a.
  
- **Write a functional Embedded-C code to control 3 LED colors R-G-B**
  - Purchase either 3 LEDs, **RED**, **BLUE**, **GREEN** or a single **RGB** LED.
- In case of the 3 LEDs:**
  - Connect the **Red** & **green** LED in a **Positive** logic manner ( *//hint:* add a series resistor to the **VCC** long pin for limiting the current ).
  - Connect the **BLUE** LED in a **Negative** Logic manner ( *//hint:* add an external pull-up resistor).
- In case of the single RGB LED check its datasheet for the connections.**
  - Do a complete implementation of the **LED Driver (led.c , led.h)** .
  - The 3 LEDs are Off for the first 5 seconds. **hint: use delays**
  - First sequence: Only The red LED turns ON for 1 second then turning it Off, followed by The Green LED turning on for 1 second then turning it off, followed by the Blue LED turning on for 1 Second then Turning it off.
  - Once the three LEDs are turned off again, turn on all the three LEDs together for 2 Seconds then Turn off all the LEDs.
  - Continuously Repeat this 10 Second-Cycle
  - You are allowed to use any libraries/functions needed to control these tasks as long as you provide the adequate explanation to the project steps.

The code should be well commented and written due to the standards taught in the Course.

## Evaluation

Submission only ☺

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### Submission Guidelines

- The deadline for submission is **Sunday 20<sup>th</sup> of October, 2024 at 11:59 PM**
- You are requested to submit the following documents:
  1. A 1-min video to demonstrate the working experiment (please narrate and comment on the results)
    - 🔗 name the Video (**MS\_01\_Team\_m\_Video.mp4**)
  2. The developed C code of the experiment and the CMakeLists.txt in a single zip folder
    - 🔗 name the Code (**MS\_01\_Team\_m\_Code.zip**)
- Please upload your milestone 2 documents to your drive as a .zip file with the following naming format:

(Ex.: CSEN701\_W24\_MS\_01\_Team\_m.zip)

where m is your team number
- You should Also upload your project source code and all other deliverable in a **GitHub** Repo named **MS\_01\_Team\_m\_Project** .
- The submission Link will be announced on the CMS announcements section and you will be requested to upload your zip folder as well as the link of your GitHub Repo.

### Helping Material

If you face any problems, please refer to:

1. A detailed helping tutorial with a step-by-step tutorial and a video.  
<https://www.digikey.com/en/maker/projects/raspberry-pi-pico-and-rp2040-cc-part-1-blinkandvs-code/7102fb8bca95452e9df6150f39ae8422>
2. A useful Playlist for interfacing with the Pico RP2040.  
<https://www.youtube.com/watch?v=B5rQSoOmR5w>

**Good Luck 😊**