Milestone 02 Description

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Milestone 02 Overview

The main aim of this milestone is to build the core of the project hardware. All hardware components must be bought and installed on your project body as stated in your proposal. Consequently, all pre-chosen sensors/actuators shall be wired to your microcontroller/s and installed on the project/Mechanism body. The structural design of the project along with the hardware connection must be relevant to your project functionality as well as a State flow Model of all your sub systems shall be designed.

Deliverables

This milestone is divided into Hardware tasks and modeling tasks as shown below:

1. Hardware Task

Minimum Design Requirements:

- **at least 3 different sensors (at least one of them is Analogue) . / teams that will apply communication between 2 Mcs or teams having Wifi interaction can have only 2 sensors.**
- **at least 3 different Actuators (At least one of them uses PWM) / teams who use a website or any UI to output the data can use only two actuators.**
- **you are required to add functionality and description to your basic project idea to make use of all your hardware components.**

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- **In this milestone, you are requested to purchase all the hardware components required and stated in your proposal (Sensors, Actuators, LCDs, LEDs, Motors, Servo motors, motor-drivers, pushbuttons, buzzers, car-chassis etc.)**

- **All sensors/actuators/ICs needed must be wired to your microcontroller according to their datasheet.**

- **You can either buy the project's core-body if available or design and manufacture it based on your project requirements.**

- **The hardware components must be fixed on the designed body/Mechanism.**

- **Implement the Structural design such that it is relevant to your project functionality.**

- **Write all the sensors/actuators Drivers using the best practices.**

- **Write a dummy main code to dummy-control and vary the performance of each of your actuators to verify their full functionality.**

- **Install any Serial monitor Extension as putty to print the values of the sensors to verify their functionality. (// check the uploaded Serial monitor file)**

Note: Feel free to Include/use any additional libraries to access the LCD display or any of the components. The code can include embedded **C / C++ .**

2. Modeling Task

❖ You are requested to provide a handwritten **state flow model** of your system and indicating the use of the following concepts in your state chart:

- **Concurrency**
- **Orthogonality**
- **Broadcasting**
- **Hierarchy**

Evaluation

Submission only ☺

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Submission Guidelines

- The deadline for submission is **Friday 22th of November, 2024 at 11:59 PM**
- You are requested to submit the following documents:
  1. up to 2-minute video showing the project body/mechanism and all the connected hardware components. Sensors and actuators should be activated during the video to guarantee the full grade.

     name the Video (MS_02_Team_m_Video.mp4)

  2. All developed project files (workspace folder) containing all the drivers and. uf2 files and any extra libraries/directives needed to run the developed code of all sensors/actuators.

     name the Code (MS_02_Team_m_Code.zip)

     Note: file names should be self-explanatory of the content for example Ultrasonic_sensor.C , servomotor.c, etc.…
  3. The required project description Proposal_Report

     name the report (MS_02_Team_m_Proposal_Report.pdf)

     Note: the report should include a scanned pdf document of the labelled State flow model, Your Hardware components List, the updated project idea description and any explanatory notes of your system.

- Please upload your milestone documents to your drive as a .zip file with the following naming format:

  (Ex.: CSEN701_W24_MS_02_Team_**m**.zip)

  where **m** is your team number

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The following Links may be useful to you :

Pico Datasheet :
https://datasheets.raspberrypi.com/rp2040/rp2040-datasheet.pdf

SDK :

https://www.raspberrypi.com/documentation/pico-sdk

Serial Monitor installation : (putty)

https://www.youtube.com/watch?v=BjGc60Mmwz8

useful playlist :
https://www.youtube.com/watch?v=B5rQSoOmR5w

Good Luck☺