

Computational Models for Embedded Systems

Laboratory Assignment 03a

Assignment 3a: FSM+ Nucleo-F401RE



Assignment Objectives:

- Using Nucleo-F401RE.
- Modeling an embedded system using FSM



Theoretical aspects

Modeling an embedded system using FSM



Assignments

Problem description:

- Implement the problem described in Assignment 1 using FSM.
- Create your own Problem Statement - related to UBB-Goes-Green or GreenMetrics – but this time model the behavior using FSM.
- Work in teams of 5-6 members.

Remark: Work in team of 5-6 members. (8 teams in total per lab)

Prerequisite

- Study examples from
 - Lecture 7
 - Study the existing systems with the subjects (led, led+pb, traffic-pedestrian, air humidifier, gardener, conveyor object detection, intruder detection).
 - Smart Air Humidifier (temperature, photodiode, etc)
 - Smart Gardner (soil moisture, temperature, photodiode, etc)
 - Smart Intruder Detection (pir motion, photodiode, etc) (?)
 - Smart Conveyor Object Detection (distance, buzzer, etc) (?)

What to do



1. Implement one of the problems stated above using Nucleo-F401RE.
 - 1.a. Without FSM model
 - 1.b. With FSM model

Turn in:

- Zip archive containing:
 - Project files for Problem description
 - The project created in Nucleo-F401RE containing the results from steps 1, 1.a and 1.b. a readme file with necessary comments/explanations. Specifically, the submitted archive should include:
 - Problem description in natural language
 - Electronic circuit – design
 - Description of the mapping of the problem elements to the electronic circuit elements.
 - The Nucleo-F401RE projects (noFSM and withFSM)
 - 2 screen captures (red led on and green led on, etc) of the running implemented system (your project using the Nucleo-F401RE board).

Assignment and Delivery date:

1. Assignment date: laboratory 4

2. Delivery date (first): laboratory 6 (maximal grade 300XP: 50 XP for noFSM, 250XP for with FSM)

3. Delivery date (last): laboratory 7 (maximal grade 300: 50 XP for noFSM, 250 XP for with FSM) **if time available.**



Remark: The solutions must be presented in class.