



Embedded Systems Professional Track
August Cohort 2022

On-demand Traffic Light Control

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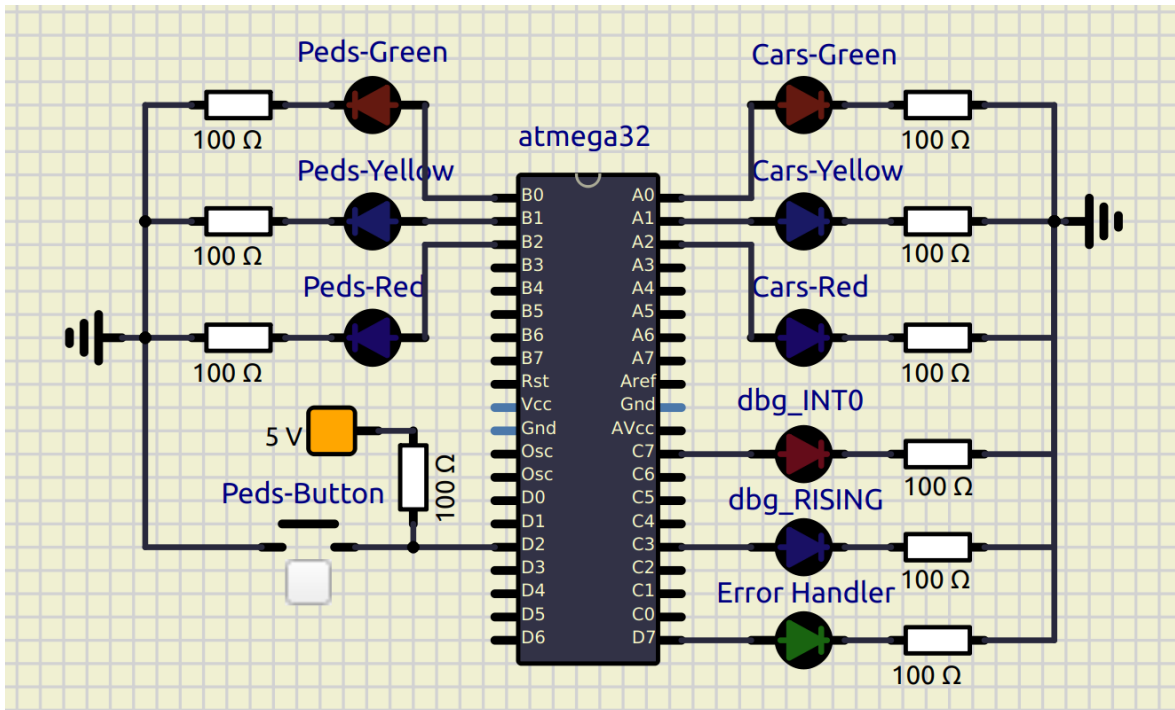
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1. System Description

a. System Overview



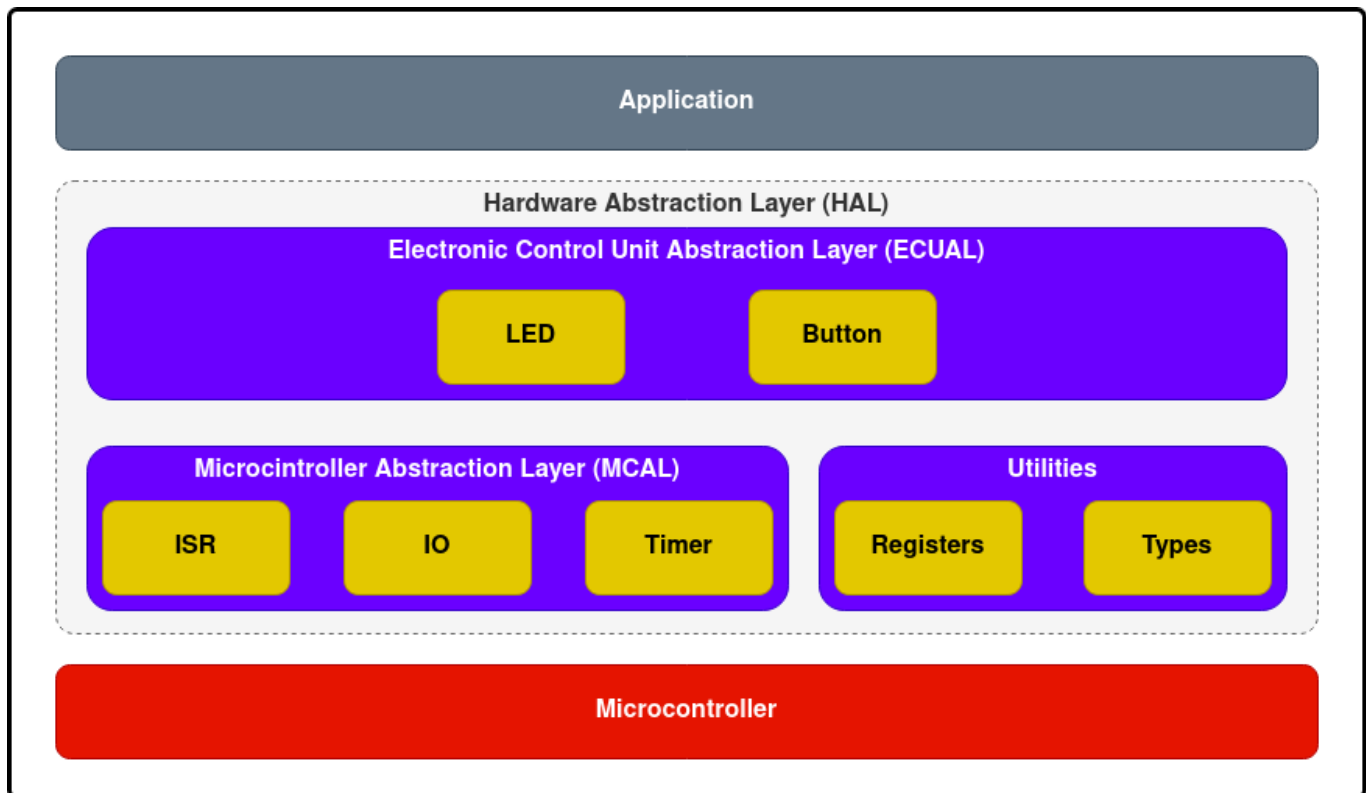
i. System Mission

The project aims to provide light traffic solutions for public streets, to help the government regulate traffic congestion.

ii. Folders Structure

```
ros2@desouky:~/udacity-es-pro/embeddedTutorials/trafficLightControl$ tree
.
├── application
│   ├── application.c
│   └── application.h
├── ecual
│   ├── button
│   │   ├── button.c
│   │   └── button.h
│   ├── led
│   │   ├── led.c
│   │   └── led.h
├── main.c
├── main.hex
├── main.o
├── Makefile
├── mcu
│   ├── io
│   │   ├── io.c
│   │   └── io.h
│   ├── isr
│   │   ├── isr.c
│   │   └── isr.h
│   └── timer
│       ├── timer.c
│       └── timer.h
├── service
│   ├── trafficLightControlSim_up_backup.simu
│   └── trafficLightControlSim_up.simu
├── util
│   ├── registers.h
│   └── types.h
```

iii. System High-Level Design



b. System Functionality

The application has two modes which are “**normal**” mode and “**pedestrian**” mode. The normal mode will take place as long as the pedestrian button is not pressed, following all the pre-defined user stories.

c. Hardware Design

#	Components	Quantity
1	AVR Atmega 32	1
2	Red Led	2
3	Yellow Led	2
4	Red Led	2
5	Push Button	1
6	100 Ohm Resistor	10

d. Design Constraints

- Implement your own Timer library.
- Do not use the AVR library Timer.
- Do not use for-loops as a Timer delay.

2. System Design

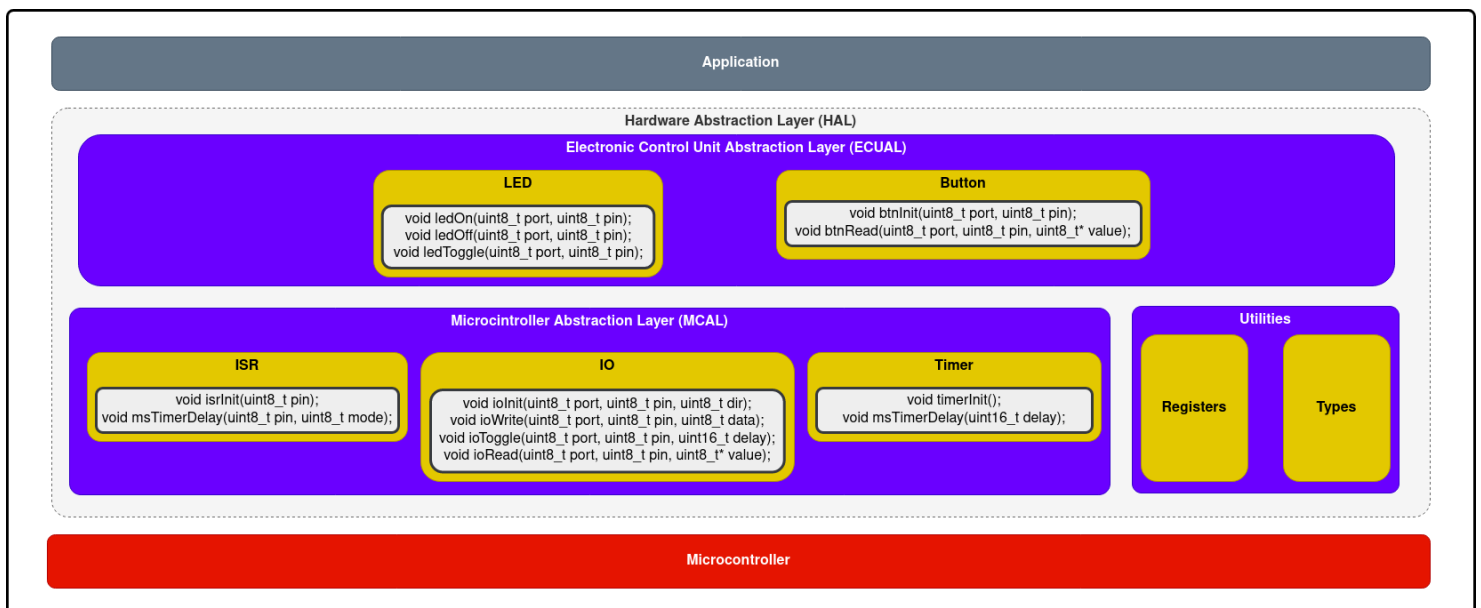
a. Developing Environment

- i. VScode as the system IDE.
- ii. Makefile for compiling c modules and programs.
- iii. Simulide for simulating the circuit.
- iv. Git & GitHub for version control and collaboration.

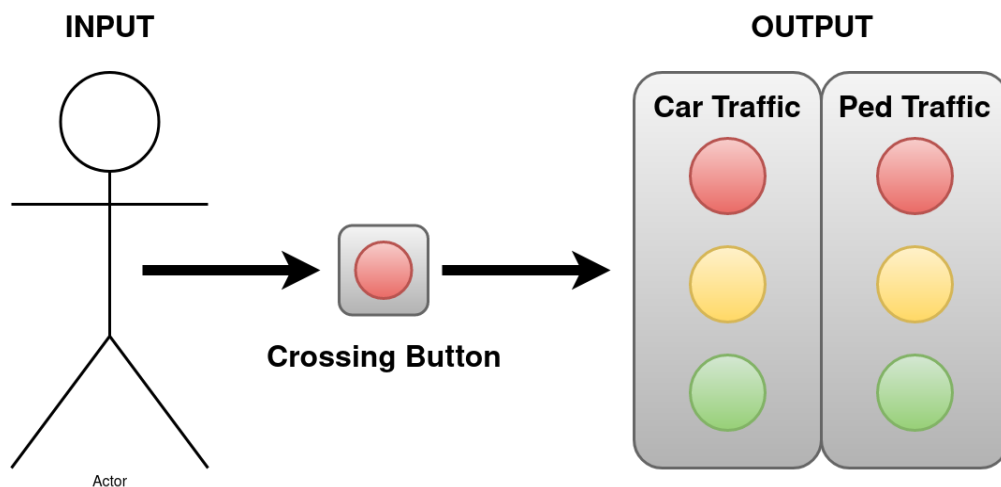
b. Coding Standards and Guidelines

- i. Folders and modules naming standards are in lowercase if it's composed of a single word, separated by an underscore if multiple words.
- ii. Variables are defined in camelCase standard.
- iii. Macros are defined in UPPERCASE standard.

c. Subsystem Architecture



d. Human Machine Interface



3. System Flow Chart

