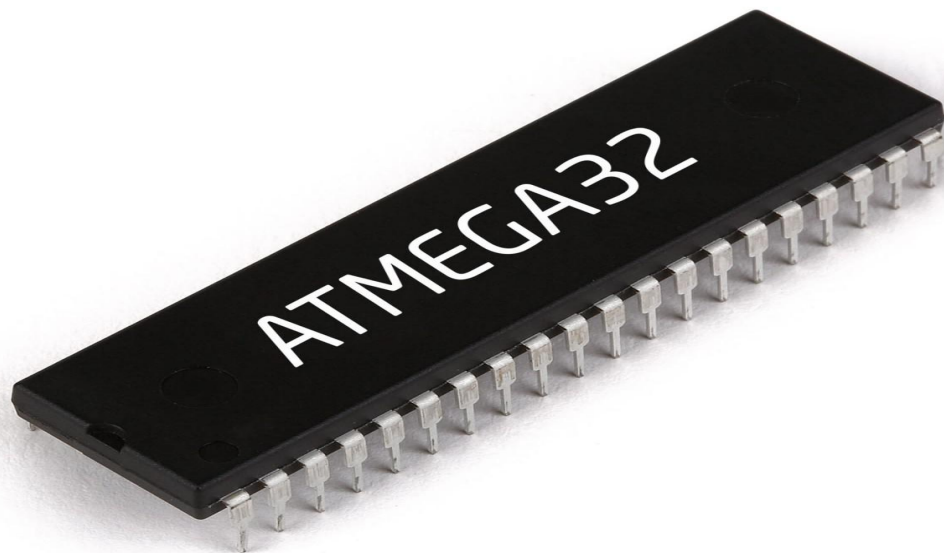


# Motor Speed controller project



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## Brief description:



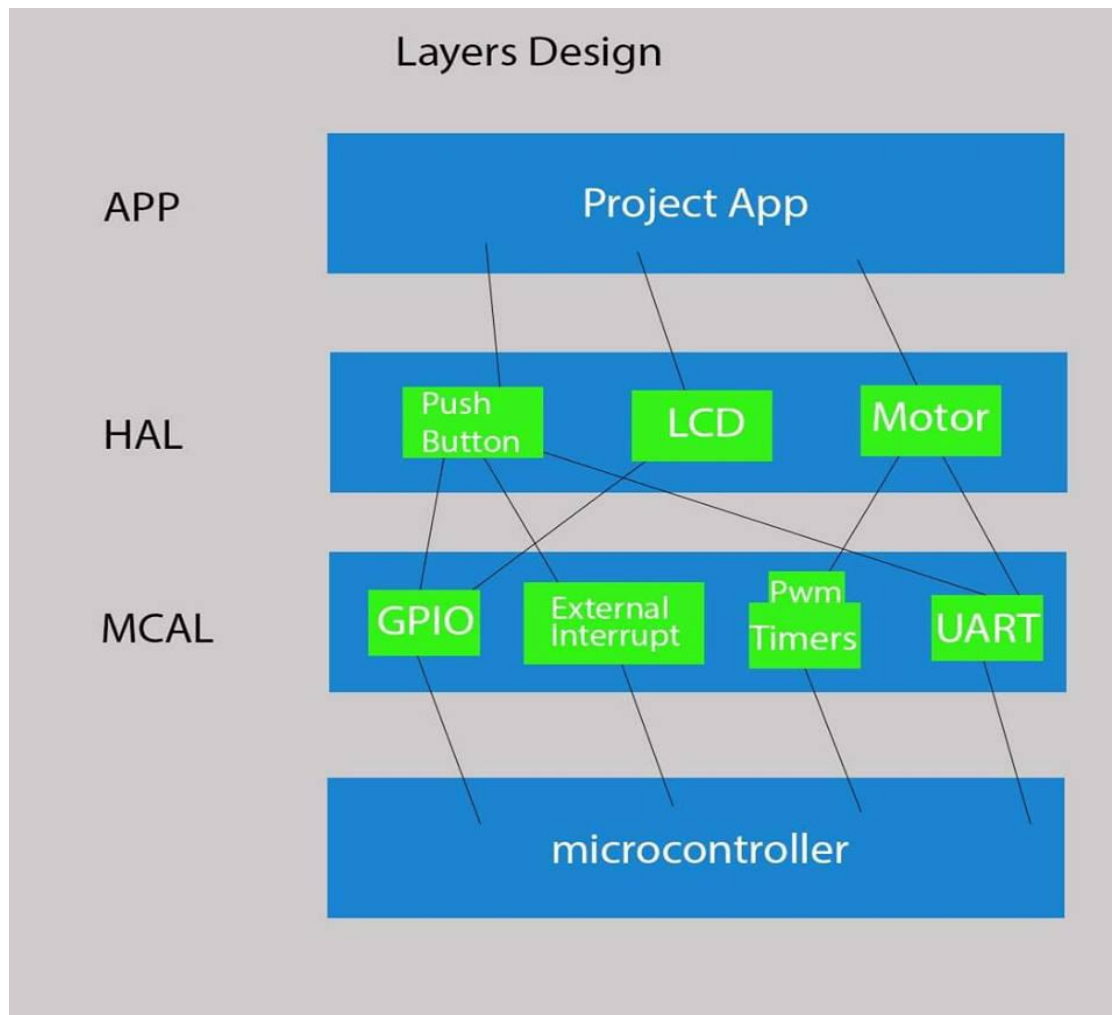
## Our project consists of:

- **External Sw1:** is responsible for incrementing the speed.
- **External Sw2:** is responsible for decrementing the speed.

These switches are connected to the first microcontroller (MCU1).

- **MCU1:** is responsible for saving the input speeds given by the two external switches then it will transfer them to the second microcontroller (MCU2).
- **MCU2:** is responsible for updating the motor speed after taking all the speed data from MCU1.
- **LCD :** is responsible for representing the current motor speed on the screen.
- **Motor:** The DC motor can be controlled to increase or decrease via a switch.

## Layers Design:



### MCAL layer :

- **GPIO:** driver responsible for input/outputs Microcontroller pins.
- **External interrupt:** it handles any external interrupt (such as external switches or push button interrupt).
- **Timers:** The time is calculated by the frequency of the CPU through the timer unit, and it is used in the delay calculation.
- **PWM:** PWM is a method through which we can generate variable voltage by turning on and off the power that's going to the electronic device at a fast rate. The average voltage depends on the duty cycle of the signal, or the amount of

time the signal is ON versus the amount of time the signal is OFF in a single period of time.

So its implemented functions include setting certain duty cycle needed to set certain value for the motor speed.

- **UART** : handles the communication between the two microcontrollers.(MCU1 &MCU2)

## **HAL layer :**

- **LCD**: driver handles showing the current motor speed on the screen.
- **Push button**: it generates interrupt to be handled by CPU by changing the speed value and transfer it to the UART.

**Motor** :We receive the value of the speed of the motor in the second MCU2 and the motor operates with it.

## **APP layer:**

It includes how project is handled in main.

# Detailed Proteus Design

