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Smart home project

I used layered architecture in this project to be modular and reusable in any microcontroller. The architecture consists of three layers: MCAL-HAL-APP and each layer consist of some modules.

1. MCAL:

Micro-Controller Abstraction layer, which is used to interface directly with the microcontroller, and its peripherals and this make the code more reusable with any microcontroller without affecting the other layers

 MCAL Modules: UART – DIO – SPI

1. UART Module used APIs:

1. void UART_Init();
   This API take no input and return no output, and used to initialize the ECU two pins to work as a TX and RX.

2. u8 UART_RecieveByte(void);
   This API take no input but return the data received by the other UART device.

2. DIO Module used APIs:

1. void Dio_SetPinDirection(u8 GroupNo, u8 PinNo, u8 Direction);

This API take the port name and the pin number and its direction whether it is input or output
and does not return any output, and used to determine if the pin is input or output.

3. SPI Module used APIs:

1. void SPI_InitMaster(void);
   This API take no input and return no output, and used to initialize the ECU to work as a master.

2. void SPI_InitSlave(void);
   This API take no input and return no output, and used to initialize the ECU to work as a slave.

3. void SPI_SendByte(u8 data);
   This API take the data that is required to be send by the master to the slave and does not return
   any output.

4. u8 SPI_RecieveByte(void);
   This API take no input but return the data received by the master or the slave.

2. HAL:

HAL Stands for Hardware Abstraction Layer, which is used to interface the MCAL layer to make
the driver whether it is a sensor, actuator or a graphical display in dependent on the micro
controller.

HAL: LED

1. **LED Module used APIs:**
   1. TOG_bIT(Port name, Pin number);

This API take the port name and the pin number of the provided LED, and is used to toggle the pin connected to the LED.

3. APP

APP is the highest layer and usually contain the main function, which call the HAL APIs to use it

in the application purpose.