# Graduation Project

In this project we tackle the Smart Home-based Bluetooth where home appliance is controlled wirelessly. In this case the home appliance showed in the project are 2 LED lights.

For the project’s layered architecture:

Application

MAIN(Smart home based)

HAL

LCD.c --- LCD.h --- LCD\_CFG.h --- Bluetooth(Virtual terminal) --- LED.c --- LED.h

MCAL

DIO.c --- DIO.h --- UART.c --- UART.h --- SPI.c --- SPI.h --- UART.c --- UART.h

With DIO.h including all the utility files STD.h, BIT\_Math.h , MCU.h which are all needed in both microcontroller.

Now for modularity, the Micocontroller 1 contains DIO, LCD, SPI, UART modules in which we need UART communication protocol to receive information from user through Bluetooth (in our project virtual terminal) and thus high speed is required for MC1 to receive data as soon as user enters it, this data is then stored in the register UDR which will be then transferred to MC2 which is the slave in our project through SPI communication protocol where MC1 is the master who is always sending data after being received from user through Bluetooth using UART communication protocol and MC2 is the slave who will always receive data throughout the project run course time. The same data will be viewed on the LCD to see the input data are correctly viewed. Using SPI\_Master\_InitTrans(data). The data are sent from MC1 to MC2 which are then stored in SPDR. Upon receival of data by MC2, the data sent will be then analyzed in while loop initializing one of the switch cases and according to the input sent the LED0 or LED1 will either turn on or off. DIO module is responsible for initializing pins found in ports alongside each microcontroller including LED, SPI & UART communication protocols, whether it is a master initialize or a slave initialize in the case of SPI communication protocol.

# Flowchart

Master flowchart

start

Initialize UART&SPI&LCD

Write char

RX enabled?

NO

Yes

Input data is viewed on LCD

Read data from UART register

Repeat

Slave Flowchart

start

Initialize SPI&LED

TX enabled?

no

yes

Receive data& write it to SPI register

Switch (rx\_data)

rx\_data=1

Led0\_On

Break;

false

Rx\_data=2

Led0\_Off

Break;

false

Repeat

default

Break;

Led1\_Off

Break;

Led1\_On

Break;

Rx\_data=4

Rx\_data=3

false

false