# Group 6. Lab Exercise Report

## Lighting control

Abstract: Internet of Things is becoming emerging technology in terms of application. In our project, our aim was to control the intensity of light as per user demand for multiple users based on Arduino. We have a constraint that if someone is inside the room, it should be turned on and if no one is inside, it should be Off automatically. Here, Our user will give an input in terms of desired brightness and our Hardware which is Arduino(Receiver) in this case between the light and the Power Supply will take that values and give an input to Light to change the brightness accordingly. As per the objective of our Project, We need to have multiple users with the device which we will refer as remote consisting of Arduino and Potentiometer in our case. Different remotes will have different values as given by users and Arduino will select maximum from them and adjust the brightness according to that.

### Challenges to solve the problem:

The main challenge to solve the problem was establishing GUI of the system. As we have used two Pretzel Wi-Fi Board(Remote) and one Arduino UNO + ESP8266 Wi-Fi Shield(Receiver). They were not compatible with IoT Cloud Applications such as Arduino IoT Cloud,Blynk, it was difficult to provide GUI of the system. Moreover, maintaining the communication between all of them at the same time was difficult in the beginning, as we were trying to use our Receiver as Access point and Remote as Station, so that we can make it Stand-alone. It was hard to configure Receiver as given, we needed to use External AP and connect Remote and Receiver to the same network. In this case, it was also challenging, as we needed to specify IP addresses of our remote in the programming of Receiver. When we disconnect our system and reconnect it again with external AP, IP Addresses were changing every time and we needed to modify the code of Receiver every time.

### Architecture of the System:

Basically, we used two Remotes comprises of Pretzel board and Potentiometer. Here, We had connected Potentiometer to Analog pin of Pretzel board and write a code to connect it to External AP, get a Potentiometer output, put it into a string with IP address of particular remote as an identifier(so that receiver can differentiate between remote) and send it to Receiver.

Our Receiver which was made up of Arduino UNO with ESP8266 WiFi Shield. Then, we connected LED to Digital I/O of Arduino(in particularly PWM). So that, we can provide certain voltage to LED as per desired Brightness. We had programmed our receiver in such a way that, it will compare the desired values came from remotes and select the maximum value and then generate the particular voltage for LED. Here is the block diagram of our system.

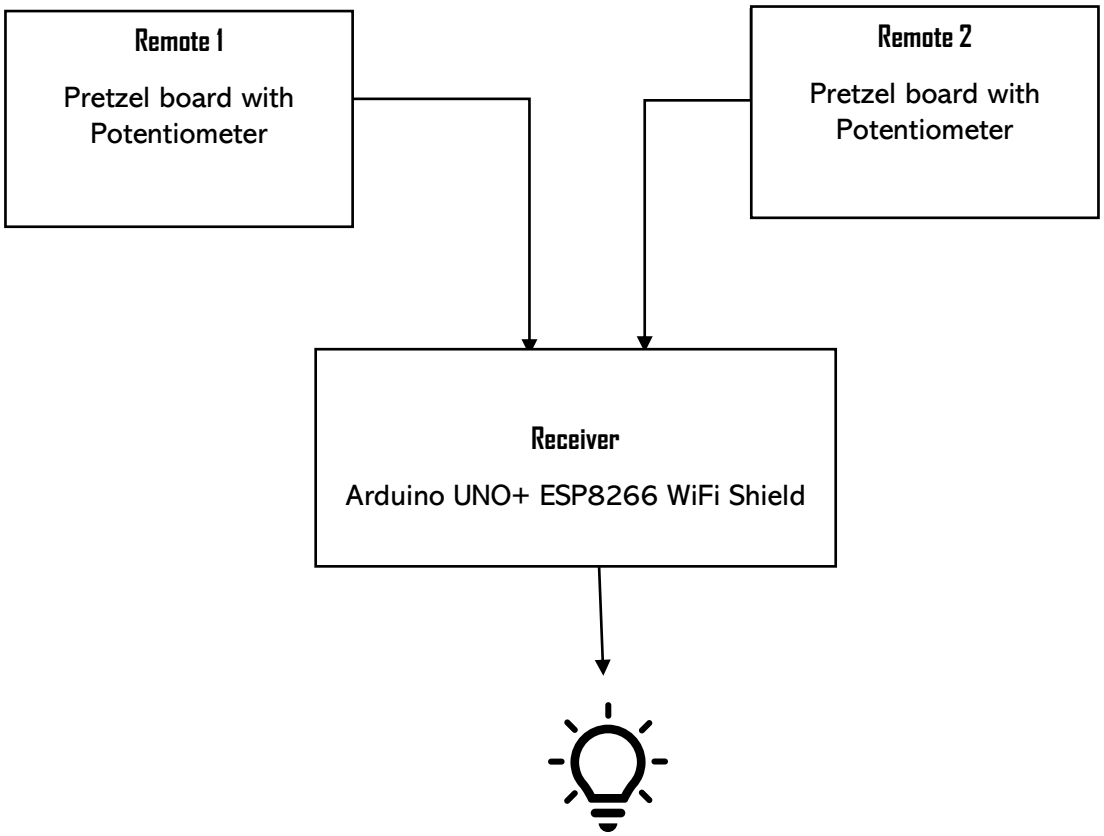


Fig.1 Block diagram of the system

## Hardware Implementation : As per the block diagram, our actual hardware setup looked as given in the figure 2.

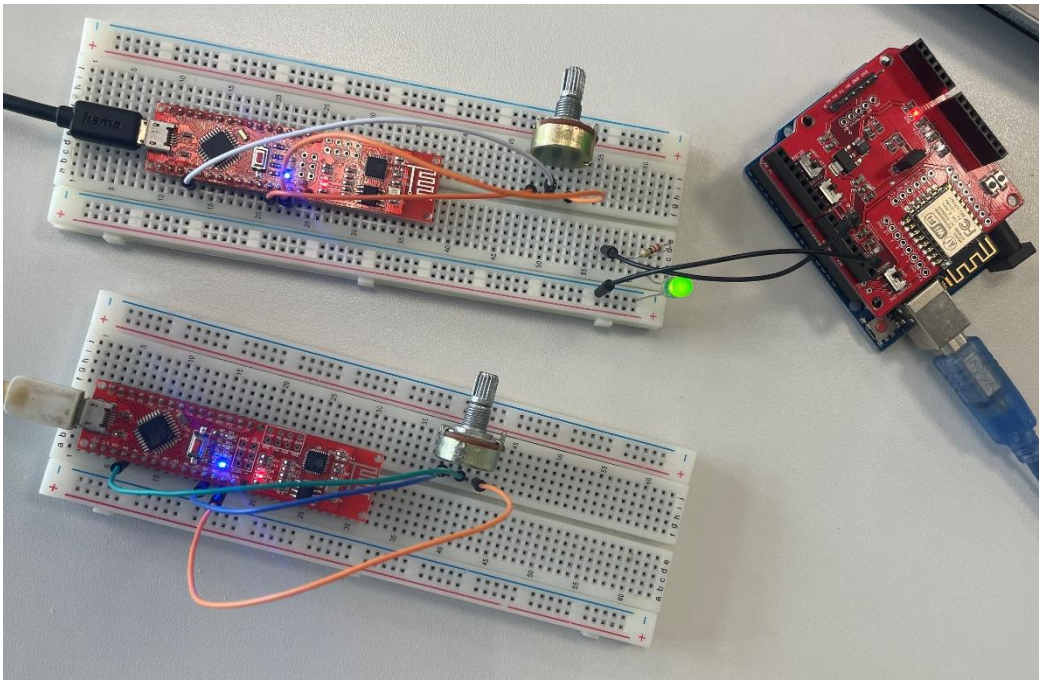

Fig.2 Actual Hardware Setup

## Conclusion:

After the completion of Hardware and software Implementation, our project was running successfully in terms of basic solution. When we change the value of Potentiometer to get desired brightness, receiver reacted to it, compared values of both remotes and observed maximum values at LED side.

## Future Scope:

In future, we can modify the program to achieve optimum solution. Moreover, we can use the hardware which is compatible with IoT Cloud applications, so we can take the whole system on Mobile device. By achieving this, we can have less complex hardware construction and sophisticated GUI.