**PRESENTATION**

Chapter 3:

So, thank you Minh for your really nice presentation part, now let’s move on to the third part which is Working Principle Detail.

**The first one is Living room**, As you can see in the slide, our design of smart home for the Living room includes some functions such as Turn on and off the light, fan, alarm sytem, open/close the main door by using the button. And we also have one DHT11 ( Digital Humidity Temperature 11 ) sensor for measuring the temperature and the humidity of the environment and then we also have the LCD for display the temperature and humidity and the alarm system. Let’s me talk a bit about the detail working principle of DHT11, so the DHT11 is a basis, ultra low-cost temperature and humidity, it uses a capacitive humidity sensor and a thermistor for measuring the surrounding air, and spits out a digital signal on the data pin which is the digital pin out. (The humidity sensing capacitor has two electrodes with a moisture holding substrate as a dielectric between them. Change in the capacitance value occours with the change in humidity levels. The IC measure, process the changed resistance values and change them into digital form). Besides the DHT11 sensor, we also use the Infrared sensor for turning on the light automatically when someone is going in the stair. There are two types of infrared sensors: active and pasive. Active infrared sensors both emit and detect infrared radiation. Active Infrared sensors have two parts: a light emitting diode (LED) and a receiver. When an object comes close to the sensor, the infrared light from the LED reflects off of the object and is detected by the receiver. ( When the Infrared transmitter emits radiation, it reaches the objet and some of the radiation reflects back to the Infrared receiver. Based on the intensity of the reception by the Infrared receiver, the output of the sensor defines). And one more important thing in the Living room is we can control the light, the fan, the door through our Blynk application just by clicking on the button. **That’s all for the Living room, so now let’s take a look at the Bedroom.** In our bedroom, We design the bedroom with one Led, the one you can turn on/off by the button or you can control it through the Blynk application. And we also want to measure the air condition of the bedroom so we use DHT11 for measuring temperature and humidity and one LCD for display it just like in the Living room. So, by the purpose is controlling the air, so we use the Thermoelectric Peltier cooling module for air-conditioning simulation. The working principle of Thermoelectric Peltier cooling module is The Peltier effect creates a temperature difference by transferring heat between two electrical junctions. A voltage applied across two conductors joined together creates an electrical current. When curren flows throughs the junctions of the conductors, heat is removed at one side and heat is deposited at the other. ( The current goes through the semiconductor then creates a temperature difference and then when have a temperature difference it will create a voltage difference between two metal layers – semiconductors ). So yeah, we also have a button to turn on and off the air conditioning mode. And besides that, we have the curtain automation system, we can control it by using the Blynk application or it can automatically close when the sun is rise or open when the light is dark thanks to the working priciple of the Light Sensor. The working principle of the light sensor is based on internal photoelectric effect, which states that when light energy or photons are bombarded on a metal surface than it can cause the free electrons from the metal to excite and jump out resulting in electron flow or electric current.

**And the next one is our Kitchen.** So based on the standard of the Kitchen is monitoring the security of itself. So we designed our Kitchen with one Gas sensor MQ2 for detecting gas in the surrounding air, one buzzer for alarm system. So the working of this security system is mostly based on the working principle of the Gas sensor. (In MQ2 gas sensor, when tin dioxide (semiconductor particles) is heated in air at high temperature, oxygen is adsordbed on the surface. In clean air, donor electrons in tin dioxide are attracted toward oxygen which is adsordbed on the surface of the sensing material. This prevents electric current flow. In the presence of reducing gases, the surface density of adsorbed oxygen decreases as it reacts with the reducing gases. Electrons are then released into the tin dioxide, allowing current to flow freely through the sensor.) The MQ2 has an electrochemical sensor, which changes its resistance for different concentrations of varied gasses. The sensor is connected in series with a variable resistor to form a voltage divider circuit, and the variable resistor is used to change sensitivity. When one of the above gaseous elements comes in contact with the sensor after heating, the sensors’s resistance change. The change in the resistance changes the voltages across the sensor, and this voltage can be read by a microcontroller. The voltage value can be used to find the resistance of the sensor by knowing the reference voltage and the other resistor’s resistance. The sensor has different sensitivity for different types of gasses (LPG, Smoke, Alcohol, Propane, Hydrogen, Methane, Carbon Monoxide,.. detect gasses range 200 to 10000ppm). So when MQ2 module detect gasses, the buzzer on the alarm system will sound. The buzzer will also sound when the Motion sensor detects the motion, this is come up by our anti-theft idea. The working principle of Motion sensor is the same with the Infrared sensor, it based on the PIR priciple so i’ll not talk about it again cuz we don’t have so much time. And by the way, We also have one Led, and one Ventilators which can control through the Blynk application or the button. One more the important system in the Kitchen is the clothesline automation system. This system will help us dry clothes automatically based on the weather. When the sun is rise, the clothesline system will automatically take our clothes out and hide our clothes in if the weather is rainy thanks to the effectiveness of the Rain Sensor. The working principle of Rain Sensor is pretty simple. The sensing pad includes a set of unconvered copper traces which mutually work like a variable resistor or a potentiometer. The sensing pad resistance will be changed based on the amount of water falling on its surface. So, here the resistance is inversely related to the amount of water. When the water on the sensing pad is more, the conductivity is better & gives less resistance. Similarly, when the water on the surface pad is less, the conductivity is poor & gives high resistance. So the output of this sensor mainly depends on the resistance. So that’s all for the Kitchen.

**The fourth room is the Entertainment room.** In this room, we design with the purpose for recreational activities, so in here we have one TV display by LCD for simulation, one LED, one curtain, and one fan. So, just by clicking on the button, we can turn on the “Movie Mode”, in this mode, the curtain is automatically close, the light is on, the fan is on, the LCD is also on, we can control the light, fan through the Blynk application if any needed. If you don’t want to enjoy the “Movie Mode” anymore, just click on the button again and the the “Movide Mode” is off, the curtain will open automatically. So that’s all for the entertainment room.

**Besides all the room in our Smart Home model, we also have some other system that we want to show you.** In front of our Smart Home, in front of the Living room for more specific, we have the security system, which is open the door by using password typing on the keyboard, so if you type in the wrong password, you will not able to open the door, and of course if you type in the right password, the door will open, you can now go into the Living room with the fan, and the light is automatically on when you’re in. And besides that, we have the Motion Sensor for detecting human stand in front of the door or walk through. We also have the main door’s light adjust light level according to the environment and the motion detected of motion sensor. And the last thing i want to show you is our garage, we can open or close the garage door by using Blynk application, this idea is for safety vehicle storage system.