UTS
INTERNET OF THINGS

Arranged By:

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PROGRAM STUDI D-IV TEKNIK INFORMATIKA

JURUSAN TEKNOLOGI INFORMASI

POLITEKNIK NEGERI MALANG

1. What do you know about IoT? (give a detailed and thorough explanation)
   Answer :
   Internet of things is a concept or program where an object has the ability to transmit or transmit data over a network without using the help of computers and humans.

   The development of IoT can be seen starting from the level of convergence of wireless technology, microelectromechanical (MEMS), internet, and QR (Quick Responses) Code. IoT is also often identified with RFID (Radio Frequency Identification) as a communication method.

   IoT elements
   - Sensor / Device
   - Connectivity
   - Data Processing
   - Dashboard / User Interface

2. Give an example of implementing IoT! (Give a thorough explanation covering the need for tools, IoT system design, and how the system works)
   Answer :

   ### APLIKASI INTERNET OF THINGS (IoT) UNTUK PEMANTAUAN DAN PENGENDALIAN BEBAN LISTRIK DI RUANGAN

   Explanation & Tools : Penelitian ini bertujuan untuk membuat desain, mengimplementasikan dan mengetahui unjuk kerja aplikasi internet things (IoT) untuk Pengawasan dan pengendalian beban listrik di ruangan. Penelitian dilakukan dengan membuat desain sistem dan mengimplemetasikannya dalam sebuah purwarupa (prototipe). Alat yang digunakan dalam penelitian ini, antara lain: laptop Intel Core i3, RAM 4 GB, Windows 7 64 bit, Perangkat lunak Arduino IDE dan Tools Set. bahan yang digunakan antara lain: Mikrokontroler NodeMCU E12 Wifi, Relay Driver, LED indicator, Sensor PIR.

   System Design :
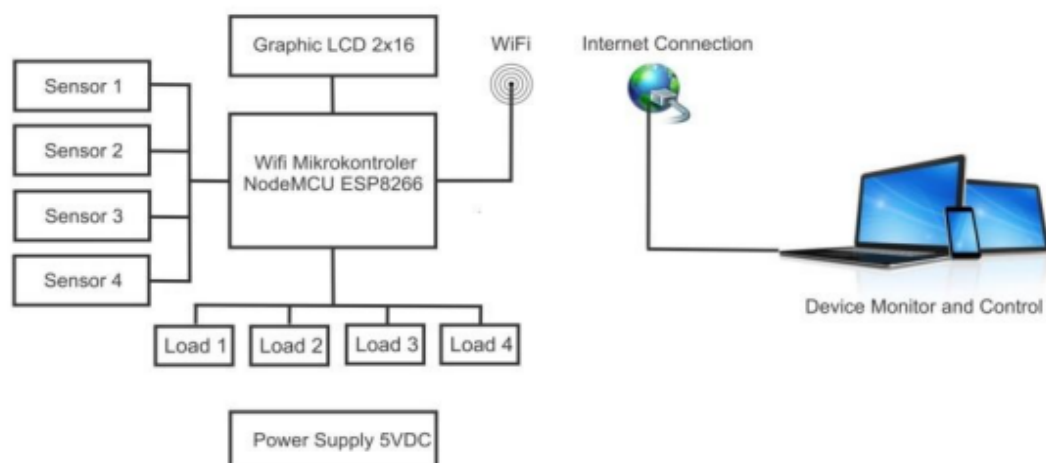
Hos System Works :

- **Implementasi dan Pengujian Pengendali Beban**

  Sistem pengendalian beban ini kemudian diuji kinerjanya sebagai pengendali jarak jauh menggunakan jaringan internet. Pengujian kinerja dilakukan dengan cara mengaktifkan perangkat keras berupa NodeMCU ESP 8266 sebagai pengendali utamanya. Setelah mengaktifkan perangkat NodeMCU ESP 8266, secara otomatis akan terkoneksi ke jaringan internet selama tersedia koneksi internetnya atau tersedia internet aksesnya

- **Implementasi dan Pengujian Sistem Pemantauan Ruangan**

  Implementasi desain sistem pemantauan ruangan untuk mendeteksi ada tidaknya orang di dalam ruangan menggunakan sensor PIR (Passive Infra Red). Sensor ini digunakan untuk mengetahui apakah di ruangan ada orangnya atau tidak. Jika tidak ada orang di dalam ruangan, maka sensor akan memberikan sinyal ke mikrokontroler untuk mematikan beban. Jika ada orang di dalam ruangan, maka sensor akan memberikan sinyal ke mikronkontroler untuk menghidupkan beban

- **Uji Unjuk Kerja Sistem Pemantauan dan Pengendalian Beban di Ruangan**

  Uji unjuk kerja dilakukan untuk mengetahui kinerja fungsi sistem pemantauan dan pengendalian beban. Apakah sistem yang telah diimplementasikan dapat berfungsi sesuai dengan rancangannya. Pengujian dilakukan dengan cara melihat kesesuaian antara konsep rancangan dengan fungsi kerja alat hasil implementasi pada prototype

3. Give an explanation of the big task of the IoT system that you created with your group? Explain your contribution to the group!

   For my group with Meuti,Ariono, and Me, we will make a Automatic plant sprinkler. this tool can automatically water the soil that has been installed with this tool. This tool works by knowing the existing soil moisture. The humidity can be known from the paired humidity sensor that can measure the existing soil moisture. This sensor will separate 2 categories later, namely which soil has dry moisture and which soil has wet moisture.

   This project was created to make it easier to water plants and to save water, because by knowing which soil has moisture that is in the dry or wet category, we don't need to water the soil in vain. Watering plants can also be done on an indirect schedule.

   For the Jobdesk in our group consists of 3 parts :
   - Interface Architecture Design (Meuti)
   - Frontend Dashboard Interface (Rajendra)
   - Backend System Developer (Ariono)

   I am in charge of developing android applications so that data can be connected to the android application and our plan is that this system will be connected to the android application
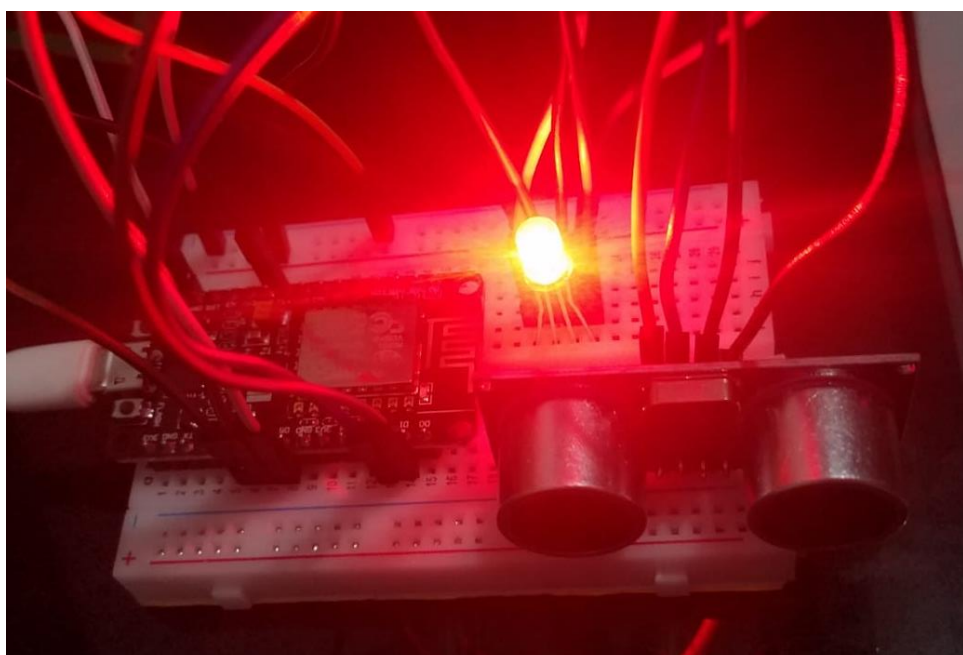
4. If there are LEDs and ultrasonic sensors, simulate physical distancing distance readings:
5. Make a circuit for the LED and ultrasonic sensor using fritzing, then make a program with the following scenario :
   - When the distance is <=1 meter, the Red LED will flash rapidly
   - When Distance >1 meter, Green LED will light continuously.
   - Please upload th e results of the simulation on youtube/Google Drive and insert the url in your report
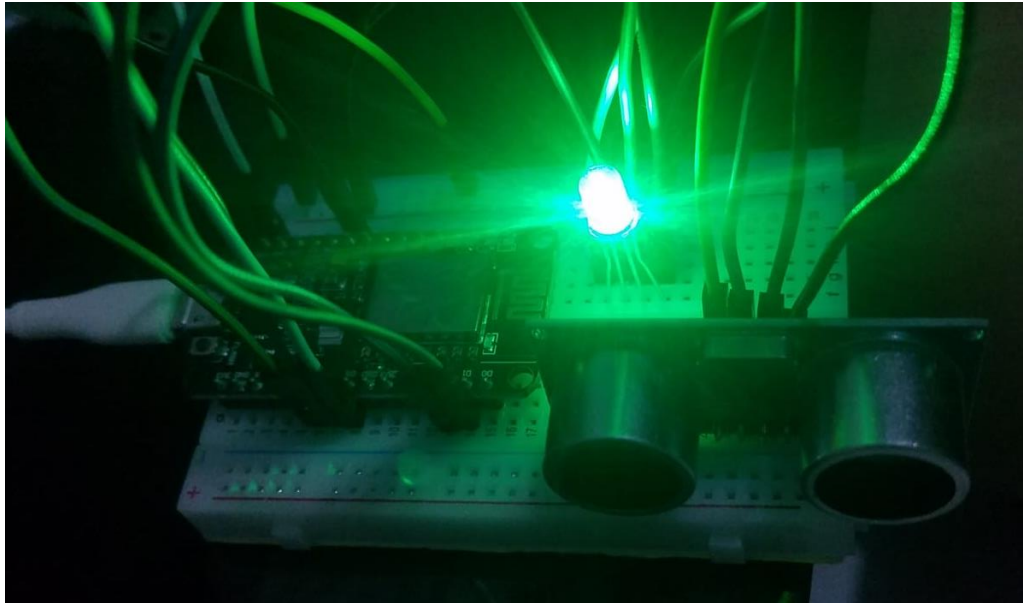
Answer :
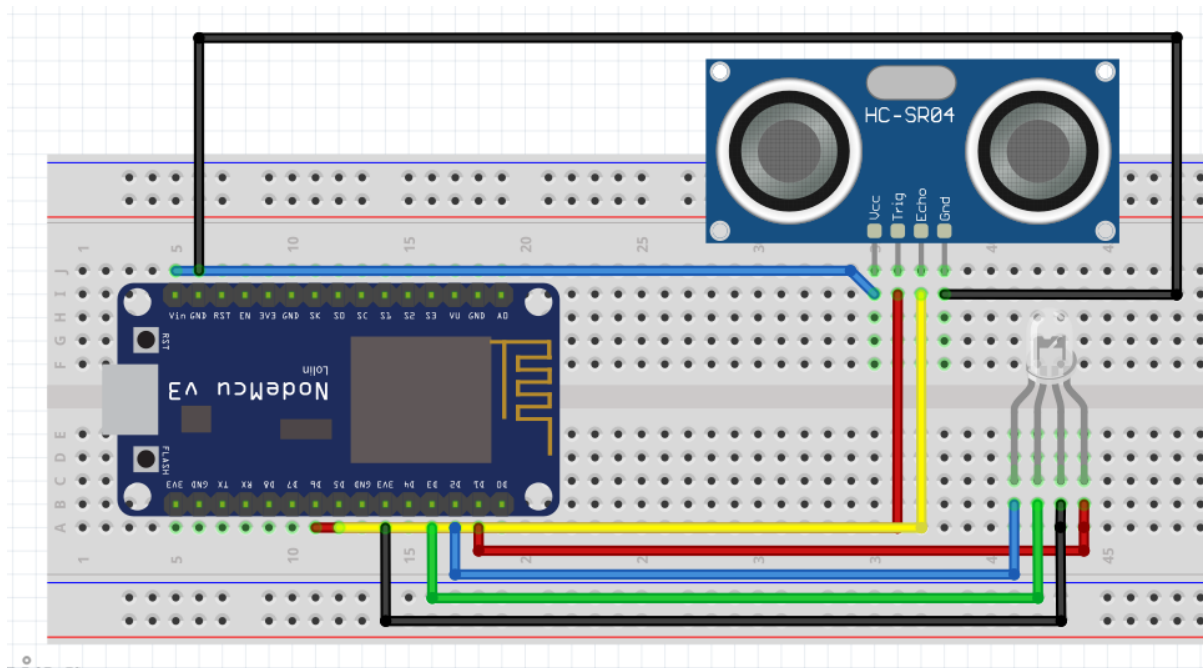
1 CM = 100 M
- **Distance is <=1 meter, the Red LED will flash rapidly**

- **Distance >1 meter, Green LED will light continuously.**

FULL LINK G-DRIVE
https://drive.google.com/drive/folders/1SmPG0NVLkYENNy6d7BeWbMN0_nETXEiZ?usp=sharing

6. Mention how the microcontroller can be connected to the internet!
   Answer :

   Microcontroller is an electronic device used to control or read sensor results. Microcontroller can be filled with a special program to run an electronic system as needed. Microcontroller programming can be done using an application on a PC or laptop, some even use a smartphone. Microcontrollers are designed to perform certain tasks. The microcontroller consists of a processor, memory (RAM and ROM) and input/output devices that can be programmed with a computer.

   In every Internet of Things project, additional devices such as WiFi are usually required to connect to the internet. IoT is an integrated system that can communicate using the IoT system. So when we use a microcontroller, then we need an internet connection to be able to connect it to the internet. One way is to use WiFi facilities. WiFi must be set to a client and connected to a router or hotspot that already has an internet connection.

7. What do you know about IoT Platforms?
   Answer :

   In simple terms, the Internet of Things platform is a set of technologies that provide the infrastructure to build applications according to the specific features required. The purpose of the IoT platform is to make applications unique and functional so that they have features that are suitable for the target consumer. IoT platforms help to reduce the risk and cost required to develop and launch products to

market.

Internet Of Things Market Strategy :
- Desirability
- Viability
- Feasibility

Example Iot Platform Dashboard :
- Thingspeak
- Thingsboard
- Thinger.io
- Grafana

8. Mention the types of IoT network protocols that you know!
Answer :

IoT network protocols or network protocols in IoT serve to connect devices over a network. And is a communication protocol used over the Internet. IoT network protocols use end-to-end data communication within a networked environment. The following are various IoT network protocols:

- **HTTP(HyperText Transfer Protocol)**
    HyperText Transfer Protocol is an example of an IoT network protocol. HTTP can send various types of data over the web. HTTP guarantees that data sent between devices will not be corrupted because it is built on top of TCP (Transmission Control Protocol). Most data is generated from IoT devices using HTTP as the most common protocol.

- **LoRaWan(Long Range Wide Area Network)**
    LoRaWAN is a media access control (MAC) protocol designed as a large-scale public network with a single operator. LoRaWan wirelessly connects anything running on battery to the Internet, both privately and globally. Internet of Things Protocols data rate is 0.3 – 50 kbps. In urban areas, LoRaWAN distances range from 2 km to 5 km. As for suburban areas, the LoRaWAN IoT protocol coverage is around 15 km.

- **Bluetooth**
    Bluetooth is one of the most widely used short-range wireless technologies in IoT. This protocol is highly secure for communication activities and is good at transmitting over short distances, resulting in low power, low cost, and wireless between electronic devices. The bluetooth protocol has a newly introduced version, namely BLE (Bluetooth Low Energy). This BLE provides a conventional Bluetooth combined circuit with the supremacy of lower power consumption. BLE is suitable for small data transfers.

- **Zigbee**
    ZigBee is a dedicated IoT (Internet of Things) protocol for industry players. Therefore, ZigBee is used for low-speed data transfer over short

distances. This protocol is ideal for industrial activities because it is able to operate at a frequency of 2.4 GHz, where data is transferred through small traffic between houses or buildings.

- **MQTT**

    There is a protocol that runs on top of the TCP/IP stack called MQTT (Message Queuing Telemetry Transport). And it's designed for machine to machine (M2M) that doesn't have a dedicated address. The MQTT work system implements Publish and Subscribe data. In practice, the device will connect to the Broker and have a Topic

9. Explain what you know about MQTT and HTTPS and explain the difference!
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DIFFERENCE

MQTT	HTTP
Can send data to database 152.2 data	Can send data to database 58,4 data
Designed for machine to machine (M2M) that doesn't have a dedicated address.	Can send various types of data over the web
Low resource usage	High resource usage
High delivery speed & Low usage resource	high delivery speed but not efficient like MQTT