AMRITA SCHOOL OF ENGINEERING, BENGALURU
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

B. TECH. II SEMESTER(ECE/EAC) AY 2023-2024
23ECE184 INTRODUCTION TO INTERNET OF THING
LAB
SYSTEM DESIGN REPORT MAY 2024

Submitted by

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BATCH NUMBER:

Faculty Examiner Signature with Date

Comments (If any)

TITLE: Smart home automation.

OBJECTIVE: To Create an app which allows for Remote access over appliances in a household.

COMPONENTS REQUIRED ALONG WITH THEIR SPECIFICATIONS:

Sl.No	Name of component	Specifications	Quantity
1	LED Bulb	A normal LED Bulb	2
2	Servo Motor	Attached to a Gate on one end	1
3	ESP-32S	-	1

MOTIVATION/SOCIATAL/INDUSTRIAL IMPACT:

The use of home automation through IoT (Internet of Things) technology can have both motivational and societal impacts.
 Motivation:

1. Convenience: One of the primary motivations for adopting home automation is the convenience it offers. IoT devices can automate routine tasks such as adjusting the thermostat, turning off lights, or locking doors, freeing up time and mental energy for more important activities.

2. Efficiency: Home automation can lead to more efficient use of resources such as energy and water. Smart thermostats can learn your preferences and adjust heating and cooling accordingly, reducing energy waste. Smart irrigation systems can optimize watering schedules based on weather conditions, conserving water.

3. Safety and Security: IoT-enabled security systems provide homeowners with peace of mind by allowing remote monitoring and control of their homes. Cameras, motion sensors, and smart locks can deter intruders and provide alerts in case of suspicious activity.

4. Health and Well-being: Some IoT devices are designed to promote health and well-being by monitoring factors such as air quality, temperature, and sleep patterns. Smart lighting systems can adjust the color and intensity of lights to support circadian rhythms, potentially improving sleep quality.

Societal Impact:

1. Environmental Sustainability: The widespread adoption of home automation can contribute to environmental sustainability by reducing energy consumption and greenhouse gas emissions. This can have a positive impact on the environment and help mitigate climate change.

2. Aging in Place: Home automation technology can enable older adults to age in place by making their homes more accessible and safer. IoT devices such as smart pill dispensers, fall detection systems, and remote monitoring tools can enhance independence and quality of life for seniors.

3. Urban Development: The proliferation of IoT-enabled smart homes can influence urban development patterns. Cities may incorporate smart infrastructure and design principles to accommodate the needs and preferences of residents who rely on home automation technology.

4. Data Privacy and Security: The widespread deployment of IoT devices raises concerns about data privacy and security. Safeguarding personal information and securing IoT networks against cyber threats are critical societal challenges that need to be addressed to ensure the responsible use of home automation technology.

Overall, the motivation for using home automation through IoT lies in its ability to enhance convenience, efficiency, safety, and well-being for individuals, while its societal impact can extend to environmental sustainability, aging in place, urban development, and data privacy and security considerations.

BLOCK DIAGRAM/SYSTEM DESIGN:
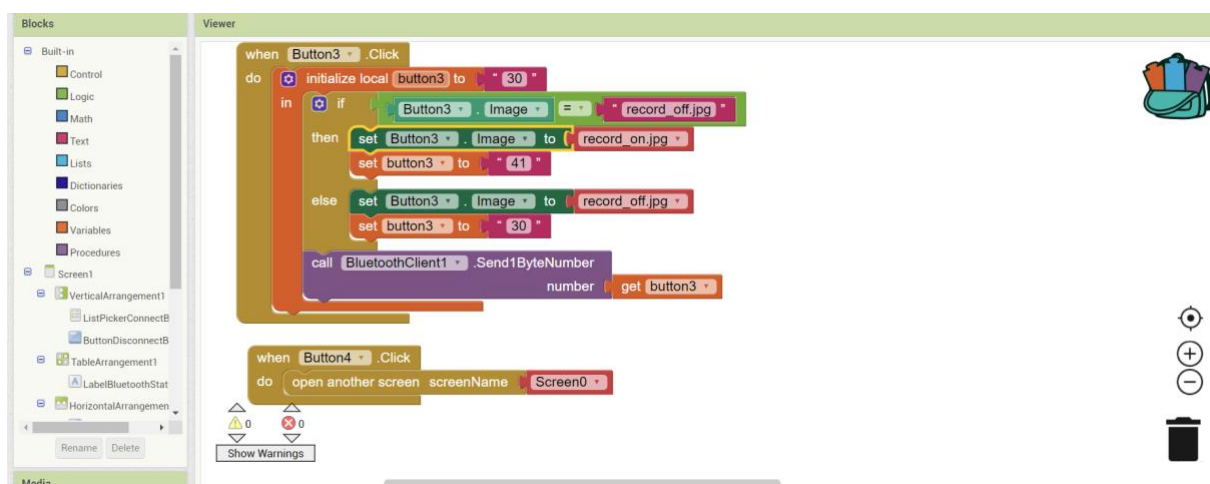
CODE (ARDUNIO AND MIT APP CODE):

```
#include "BluetoothSerial.h"

// init Class:
BluetoothSerial ESP_BT;

// init PINs: assign any pin on ESP32
int led_pin_1 = 4;
int led_pin_2 = 2;
   // On some ESP32 pin 2 is an internal LED, mine did not have one

// Parameters for Bluetooth interface
int incoming;

void setup() {
  Serial.begin(19200);
  ESP_BT.begin("ESP32_Control"); //Name of your Bluetooth interface -> will show up on
your phone

  pinMode (led_pin_1, OUTPUT);
  pinMode (led_pin_2, OUTPUT);

}

void loop() {

  // -------------------- Receive Bluetooth signal ----------------------
  if (ESP_BT.available())
  {
   incoming = ESP_BT.read(); //Read what we receive

   // separate button ID from button value -> button ID is 10, 20, 30, etc, value is 1 or 0
   int button = floor(incoming / 10);
   int value = incoming % 10;

   switch (button) {
    case 1:
      Serial.print("Button 1:"); Serial.println(value);
      digitalWrite(led_pin_1, value);
      break;
    case 2:
      Serial.print("Button 2:"); Serial.println(value);
      digitalWrite(led_pin_2, value);
      break;
   }
  }
}
```

SCREENSHOT OF ALL THE WORKING CIRCUITS WITH OUTPUT:
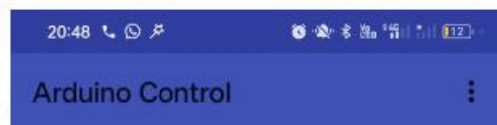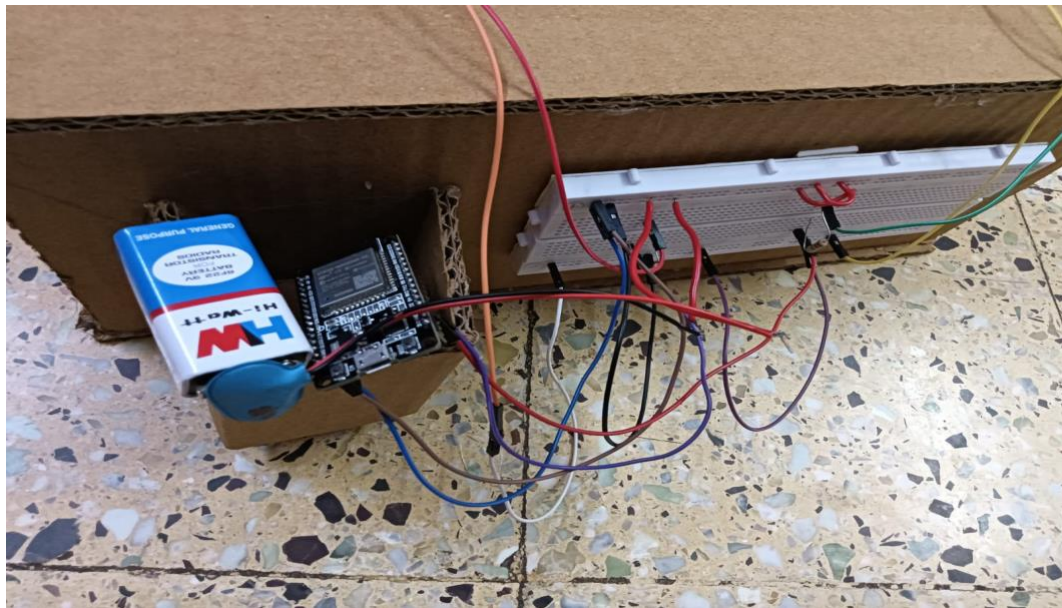
20:49

ArduinoControl

00:21:11:01:1C:F8 a19

00:21:11:01:13:EE a16

00:22:08:31:11:41 HC-05

00:21:11:01:19:C0 Amrita6

E8:6B:EA:CA:1A:BA ESP32_Control

41:42:25:BE:2C:73 AB-NB-C001

00:21:11:01:1A:5A a20

Living room lights   Kitchen lights

Gate-Open/Close
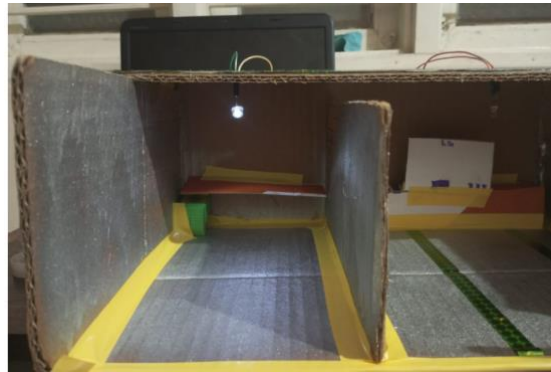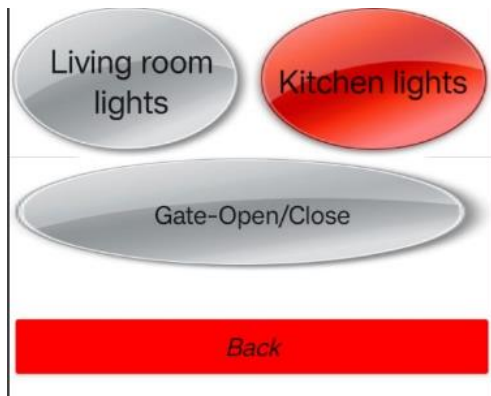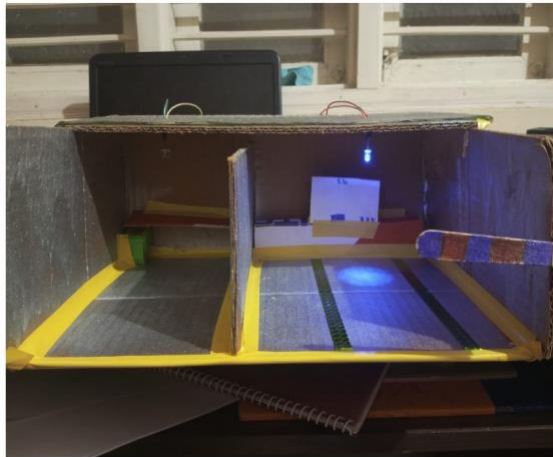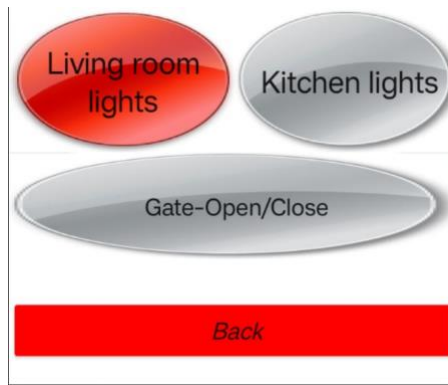
Back
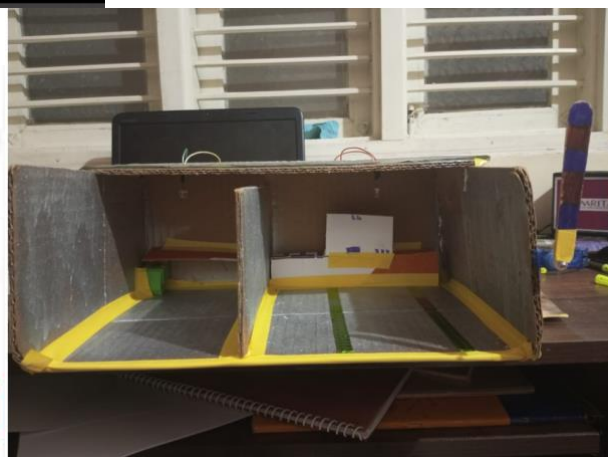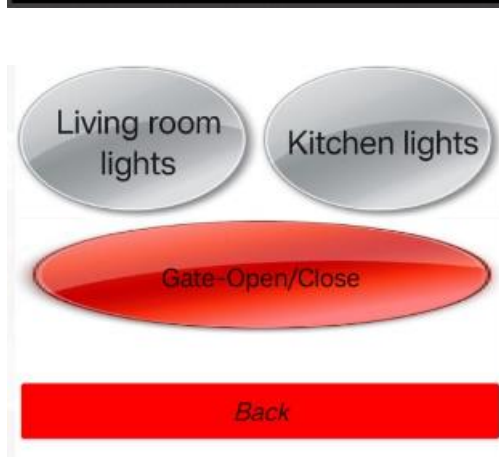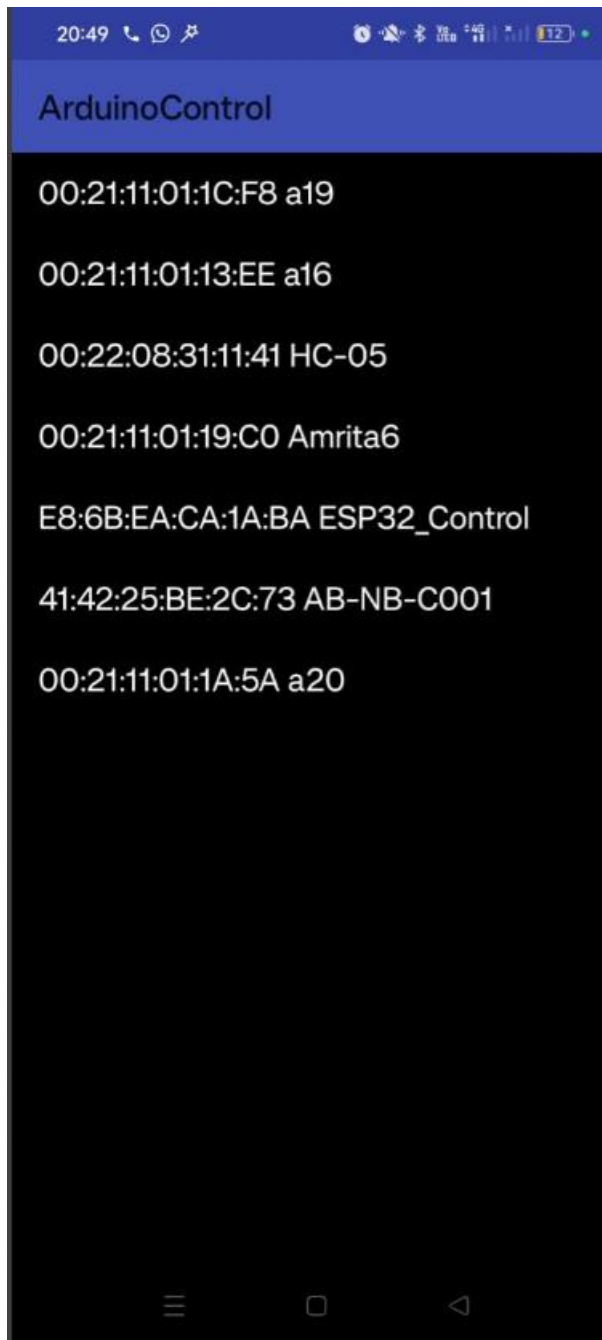
CONCLUSION:

In conclusion, this IoT home automation project successfully enables remote control of two LEDs and one fan via a mobile application, providing enhanced convenience and efficiency for users. With robust functionality and a user-friendly interface, it sets the stage for future enhancements and broader applications in smart home technology.

PROBLEMS FACED DURING THE IMPLEMENTATION (IF ANY):

There was a problem in interfacing the Bluetooth device to the app on the phone as the permission to network to the nearby devices was not given.

PROBLEMS RESOLVED USING SOLUTIONS (IF ANY):

Solution the problem was solved by going to app setting and giving permission for the Bluetooth device to connect the nearby devices.

FUTURE SCOPE:

The future scope of smart home automation is quite promising, with several key trends and innovations shaping the industry. Here are some of the major developments to look out for:

Smart Home Connectivity: This trend focuses on creating an ecosystem of connected devices that can communicate with each other, providing a seamless and integrated experience1.
In-House Security: Advancements in smart home security aim to protect residents from intrusions and burglaries using intelligent systems.
Home Robotics: The integration of robotics into smart homes will automate mundane tasks, making daily life more convenient.

Other areas of growth include advanced lighting systems, smart home heating for efficient energy usage, next-generation entertainment technologies, and sustainable home solutions. The integration of artificial intelligence and machine learning will further enhance the customization and intelligence of smart home systems, leading to a more autonomous and intuitively interactive living environment.

Overall, the future of smart home automation is geared towards revolutionizing everyday living by making homes more connected, intelligent, and responsive to the needs of their occupants.