2) DESIGN A BLUETOOTH-CONTROLLED HOME AUTOMATION SYSTEM TO SWITCH DEVICES ON AND OFF.

ANS: project on **Bluetooth-controlled home automation** using an **Arduino Uno** and **HC-05 Bluetooth module**, allowing control of home appliances (like lights, fans, etc.) using a **mobile app**.

**✅ Objective:**

* Control multiple devices (e.g., lights/fans) via Bluetooth from a smartphone.
* Toggle ON/OFF based on commands sent through a mobile app.

**COMPONENTS REQUIRED**

| **Component** | **Quantity** |
| --- | --- |
| **Arduino Uno** | **1** |
| **HC-05 Bluetooth Module** | **1** |
| **Relay Module (5V)** | **2–4** |
| **1KΩ Resistors** | **2** |
| **LED / Bulb (AC appliance)** | **As needed** |
| **Transistor (e.g., BC547)** | **Optional (for relay driving)** |
| **Diode 1N4007** | **Optional (flyback diode for relay)** |
| **Jumper Wires** | **As needed** |
| **Breadboard** | **1** |

**CIRCUIT DIAGRAM OVERVIEW (Fritzing available)**

**🔹 Arduino to HC-05 Bluetooth Module:**

| **HC-05 Pin** | **Arduino Pin** |
| --- | --- |
| **VCC** | **5V** |
| **GND** | **GND** |
| **TXD** | **D10** |
| **RXD** | **D11 (via 1KΩ + 2KΩ voltage divider)** |

**🔹 Arduino to Relay Module (for appliances):**

**| Relay IN1 | Arduino D2 |  
| Relay IN2 | Arduino D3 |**

**You can connect more relays similarly to D4, D5, etc.**

**📲 MOBILE APP INTERFACE**

**Use any Bluetooth terminal app like:**

* **Bluetooth Terminal HC-05 (Android)**
* **Arduino Bluetooth Controller (Android)**
* **Custom MIT App Inventor app (optional)**

**Send character commands:**

* **"A" – Turn ON device 1**
* **"a" – Turn OFF device 1**
* **"B" – Turn ON device 2**
* **"b" – Turn OFF device 2**

**💡 WORKING DEMO**

**Video demo idea:**

* **Connect LED/bulb through relay.**
* **Use phone Bluetooth app to send "A", "a" etc.**
* **LED/bulb turns ON and OFF.**

**ARDUINO CODE (Deliverable)**

**#include <Software Serial.h>**

**Software Serial BT Serial(10, 11); // RX, TX**

**const int device1 = 2;**

**const int device2 = 3;**

**void setup() {**

**pinMode(device1, OUTPUT);**

**pinMode(device2, OUTPUT);**

**BTSerial.begin(9600);**

**Serial.begin(9600);**

**}**

**void loop() {**

**if (BTSerial.available()) {**

**char command = BTSerial.read();**

**Serial.println(command);**

**switch (command) {**

**case 'A': digitalWrite(device1, HIGH); break;**

**case 'a': digitalWrite(device1, LOW); break;**

**case 'B': digitalWrite(device2, HIGH); break;**

**case 'b': digitalWrite(device2, LOW); break;**

**}**

**}**

**}**

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