NAVODAYA INSTITUTE OF TECHNOLOGY, RAICHUR

DEPARMENT OF COMPUTER SCIENCE & ENGINEERING

IOT Lab

Program - 10

10 Develop a program to setup a UART protocol and pass a string through the protocol.

🔧 Components Required

- 1 × Arduino Uno (or Mega/Nano)
- USB cable (for programming + UART monitor)
- (Optional) 2 Arduinos if you want **UART TX–RX between boards**
- Jumper wires

⚡ Working Principle

- UART is a **serial communication protocol** using **TX (Transmit)** and **RX (Receive)** lines.
- Arduino Uno has **Serial (pins 0 = RX, 1 = TX)** already connected to USB.
- We can send a **string** from Arduino → PC (via Serial Monitor), or Arduino ↔ Arduino.

🔌 Circuit Connections

Case 1: Arduino ↔ PC (using Serial Monitor)

- No extra wiring needed. USB cable itself handles TX/RX.

Case 2: Arduino ↔ Arduino (for practice)

- Connect TX of Arduino1 → RX of Arduino2
- Connect RX of Arduino1 → TX of Arduino2
- Connect **GND–GND**

🧪 Steps to Do the Experiment

1. Connect Arduino to PC via USB.
2. Open Arduino IDE.
3. Write program to send/receive a string over UART.
4. Upload sketch to Arduino.
5. Open **Serial Monitor** (9600 baud).
6. Observe the string being transmitted/received.

💻 Arduino Program (Send String via UART)

```
// UART Example: Transmit and Receive String

void setup() {
  Serial.begin(9600);  // Start UART communication at 9600 baud
}

void loop() {
  // --- Transmit a String ---
  Serial.println("Hello, UART World!");
  delay(1000);

  // --- Receive a String (if sent from Serial Monitor) ---
  if (Serial.available() > 0) {
    String data = Serial.readString();   // read full string
    Serial.print("Received: ");
    Serial.println(data);
  }
}
```