LAB-9

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AIM/OBJECTIVE OF THE EXPERIEMENT:

1. To establish a bi-directional serial communication between two microcontrollers
(Ardunio).
2.To send and receive data(string and integer) between two microcontrollers.

ELECTRONIC COMPONENTS USED:

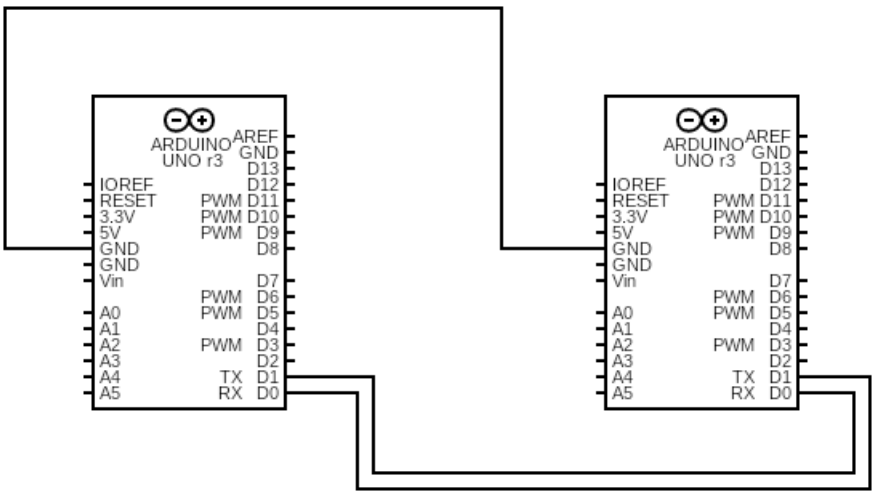
1)Ardunio UNO s

2)Slide switches

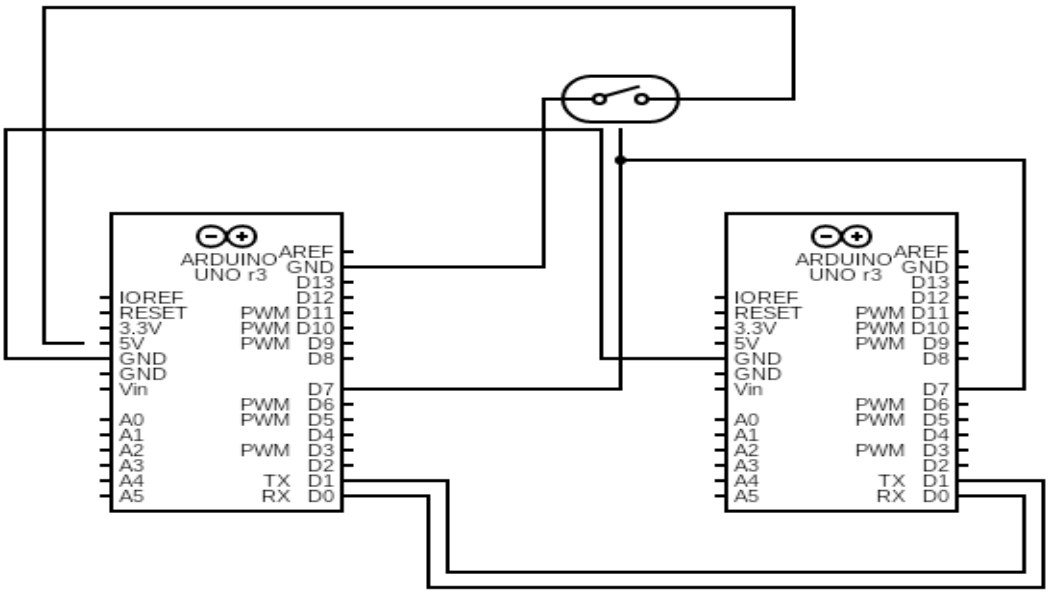
3)Connecting wires

REFERENCE CIRCUIT:

***I)*Uni-directional:**



II)Bi-Directional Serial Communication:-



PROCEDURE:

I)For Uni-Directional

1)Take 2 ardunio UNO s and place it on the white space.

2)Now we need to arrange serial communication between two ardunios for this purpose we need to connect TX pin of sender Ardunio UNO to the RX pin of receivers Ardunio UNO.

3)Now connect Sender's Ardunio ground pin GND to the Receiver's ground pin GND.

4)Make a circuit as shown in reference circuit diagram.

5)Now write code in the code section for both ardunios.

Transmitter Ardunio's code:(1st Ardunio)

```
char mystr[6] = "Hello";

int val=6;

void setup()

{
```

```
  Serial.begin(9600);
}
void loop()
{
  Serial.write(mystr,5);
  Serial.println(val);
  Serial.println();
  delay(1000);
}
```

Receiver's code:(Second Ardunio)

```
char mystr[6];
void setup()
{
  Serial.begin(9600);
}
void loop()
{
   Serial.readBytes(mystr,5);
  Serial.println(mystr);
  if(Serial.available())
  {
    int x;
    x = Serial.parseInt();
    Serial.println(x);
    delay(1000);
  }
  Serial.println();
}
```

6)Now observe the outputs of both ardunios in serial monitor.

II)For Bi-Directional Serial communication.

1)Take 2 ardunio UNO s and place it on the white space.

2)Now we need to arrange serial communication between two ardunios for this purpose we need to connect TX pin of sender Ardunio UNO to the RX pin of receivers Ardunio UNO.

3)Now connect TX pin of receiver's Ardunio UNO to the RX pin of sender's Ardunio UNO.

4)Now connect Sender's Ardunio ground pin GND to the Receiver's ground pin GND.

5)Here iam using switch based communication. So take slide switche and make the connections shown in the reference circut

6)Now write the code in code section for both ardunios(receiver's Ardunio and Sender's Ardunio)

First Ardunio code:

```
char Send[7] = "HELLO,";
char Recieve[7];
int decide = LOW;
int compare = LOW;
int switchPin = 7;
char buffer[5];
int count=0;

void setup()
{
  Serial.begin(9600);
  pinMode(switchPin, INPUT);
```

```
}
void loop()
{
        delay(5000);
        int change=decide;

   decide = digitalRead(switchPin);

   if (LOW == decide)
   {
      Serial.write(Send, 5);
        delay(100);
      Serial.readBytes(buffer, 6);
      int x=Serial.parseInt();
        delay(5000);
        Serial.print((x+1)%10);
    Serial.println();
   }
   else
   {
      Serial.readBytes(Recieve, 8);
      Serial.print(Recieve);
      Serial.println();
        delay(100);
   }
}
```

Second Ardunio code:

```
char Send[7] = "Hi!!!,";
char Recieve[7];
int decide = LOW;
int compare = LOW;
int switchPin = 7;
char buffer[7];
int count=0;
void setup()
{
   Serial.begin(9600);
   pinMode(switchPin, INPUT);
}
void loop()
{
        delay(5000);
   decide = digitalRead(switchPin);
   if (LOW == decide)
   {
      Serial.readBytes(Recieve, 8);
      Serial.print(Recieve);
        delay(100);
        int x=Serial.parseInt();
        delay(1000);
        Serial.print((x+1)%10);
      Serial.println();
```

```
  }
  else
  {
    Serial.write(Send, 6);
    delay(100);
    Serial.readBytes(buffer , 7);
    int x=Serial.parseInt();
    delay(1000);
    Serial.print((x+1)%10);
     Serial.println();

  }
}
```

7)Now observe the outputs of both ardunios in serial monitor

NOTE: If Slide switch is on then 2nd ardunio acts as a transmitter and 1st ardunio acts as receiver.

If slide switch is OFF then 1st ardunio acts as a Transmitter and 2nd Ardunio acts as a Receiver.

Observation:

Q)Why do we need to connect TX and RX Pin??

A)In order to give Serial Communication between them we need to give connections to these, simply connect the TX pin of your controller to the RX pin and RX from your controller to TX. Ground goes to ground. This it will information as like RS232 from one one ardunio to other.Because of this we do serial communication, we don't need to serial port in order to make serial connection because we are using RX and TX pins to do serial communication.

Conclusion:

1)In this experiement, we show that how ardunios transfer data from one ardunio to another ardunio.

2)In this experiement, I established a bi-directional and uni-directional serial communication between two microcontrollers(Two ardunios).

3)Two ardunios send and receive data(Serial communication).

4)In this experiement i learnt how to establish serial communication between two ardunios.

5)In Uni-Directional one ardunio acts as sender and another as transmitter but in Bi-directional both ardunios acts transmitter and sender.

LINK FOR THE TINKERCAD SIMULATION:

I)For Uni-Directional:

https://www.tinkercad.com/things/isy7kfEQSJc-lab-9-uni-directional-serial-communication/editel?sharecode=IV5EEeMPWUcv1HFXtUNYX19p6lgHwrMHJPvf0B1H7Ck

II)For Bi-Directional:

https://www.tinkercad.com/things/gg91sXYbfJL-lab-9-bidirectional-serial-communication/editel?sharecode=xmaYtkHdKTC7L9w6U43uU4GULi7aK0LgTnWfLsLQKUU

THANKYOU.....