

## Experiment - 10

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**Subject: IOT LAB**

### Aim:

Implementation of Zigbee Protocol using Raspberry Pi/Arduino.

### Objective:

1. Learn about XBee Wireless Communication Setup
2. Learn about IoT programming.

### Components Required:

1. Step 1 Download X-CTU Software
2. Step 2 Put together your XBee breakout board
3. Configure 1st XBee as a coordinator
4. Configure 2nd XBee as Router
5. Test the configuration

### Theory:

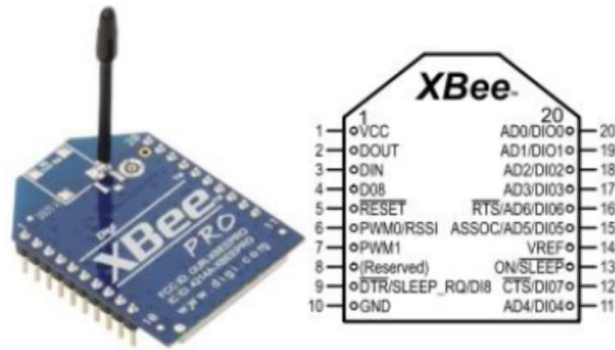
#### Zigbee:

Zigbee is a wireless communication protocol targeted for battery powered devices (it has both low power and low cost). It generally operates in the 2.4GHz range (although there are geographic variations), and supports data ranges from 20 to 250 kbits/s.

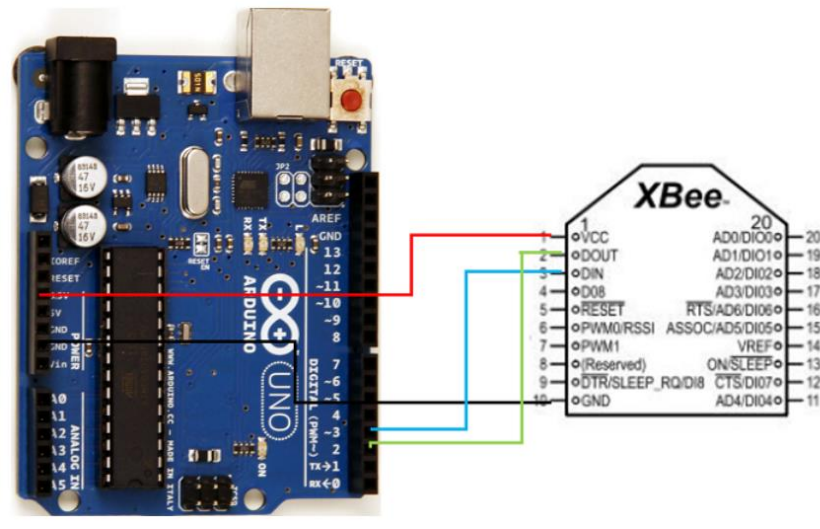
The transmission distance though, is small compared to the likes of LoRa. It is 10 to 100 m, whereas LoRa can transmit over a few kilometers. Another thing to note is that Zigbee communication does not work very well if there is no line of sight between transmitter and receiver.



These work with UART and therefore, it is fairly easy to interface them with Arduino. It is important to look at the pinout of XBee though, to understand which are the UART pins –



### Circuit Diagram:



### Code 1: On the transmitting side, the code will be:

```
#include <SoftwareSerial.h>

SoftwareSerial xbeeSerial(2,3); //RX, TX

void setup() {
    Serial.begin(9600);
    xbeeSerial.begin(9600);
}

void loop() {
    if(Serial.available() > 0){
        char input = Serial.read();
        xbeeSerial.print(input);
    }
}
```

## Code 2: On the receiving side, the code will be:

```
#include <SoftwareSerial.h>

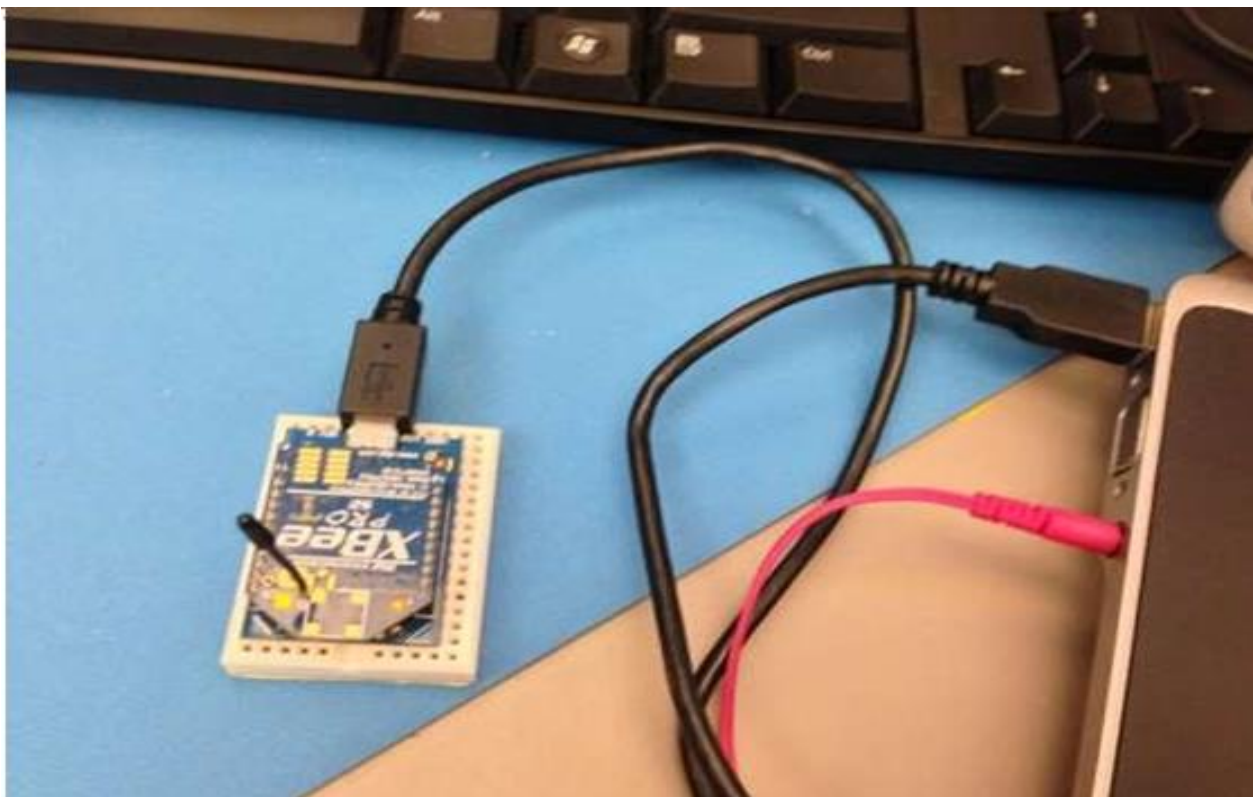
SoftwareSerial xbeeSerial(2,3); //RX, TX

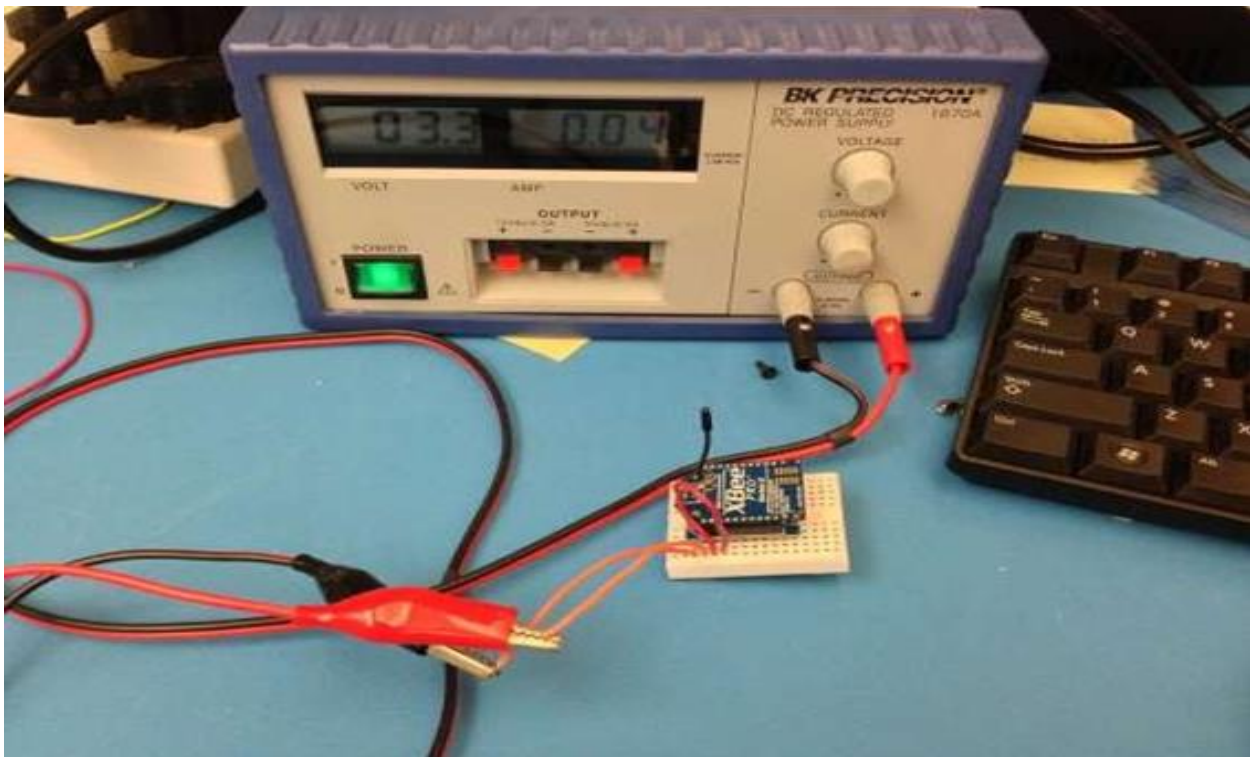
void setup() {
  Serial.begin(9600);
  xbeeSerial.begin(9600);
}

void loop() {
  if(xbeeSerial.available() > 0){
    char input = xbeeSerial.read();

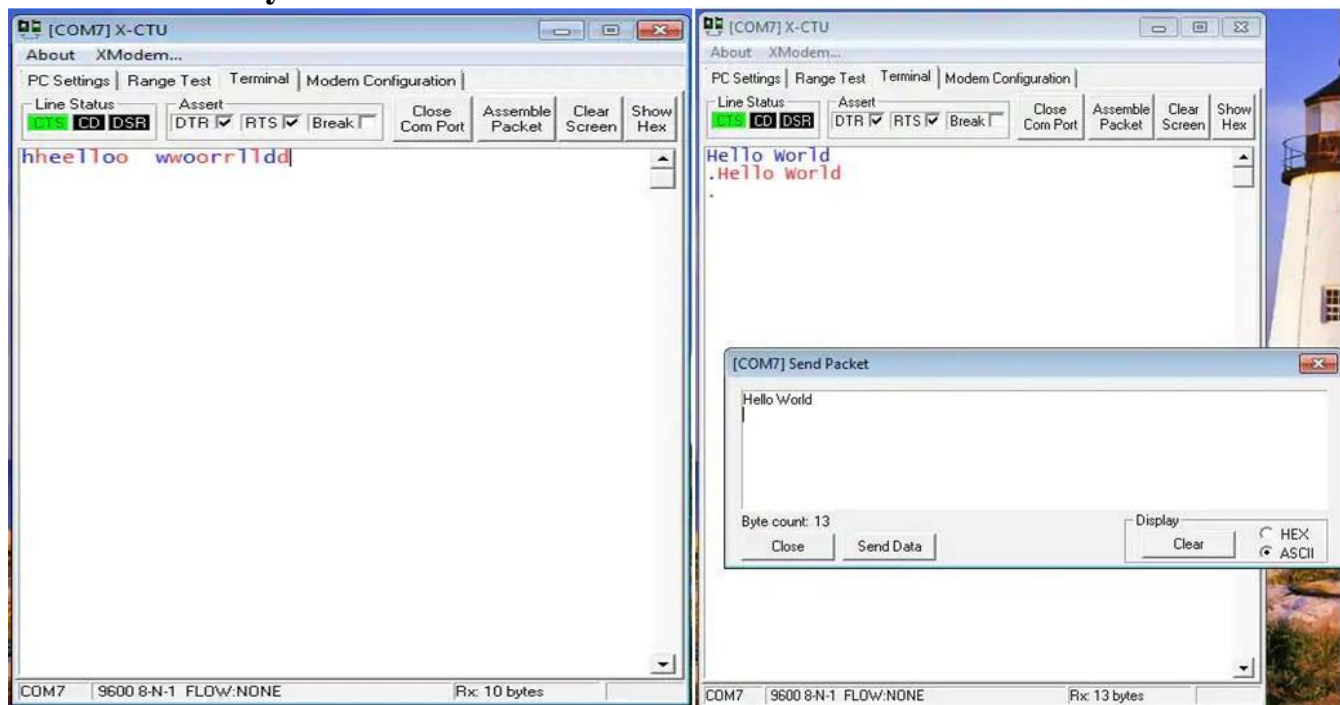
    Serial.print(input);
  }
}
```

## Output:





## Result and Analysis:



## Learning Outcomes:

1. Learn about IoT based simulations.
2. XBee Wireless Communication Setup
3. Learn about Arduino and Pins