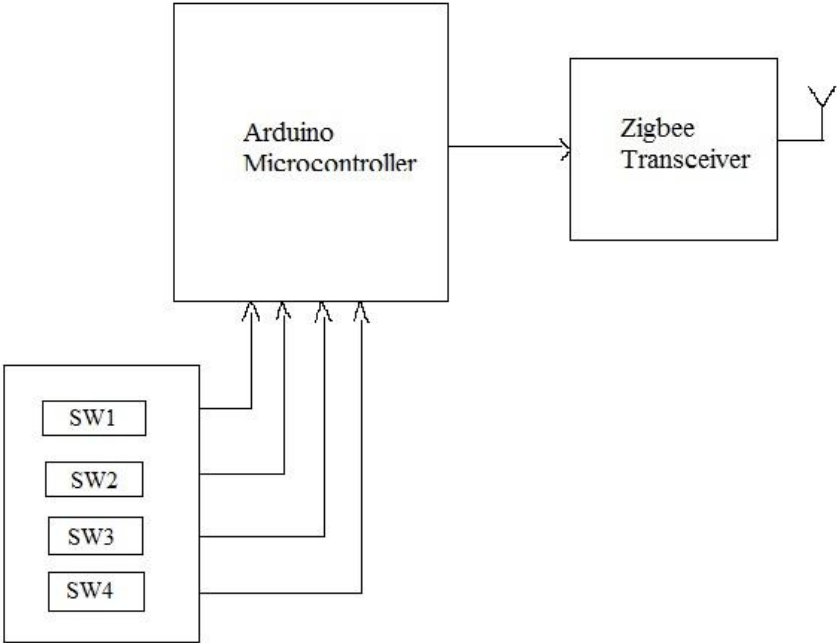# Abstract

Home automation is an emerging trend to make lives easier by controlling appliances, doors and windows remotely or in an automated way. Anything that can be connected to a network can be automated and controlled remotely. Several technologies converge to make this possible.

The main objective of this project is to develop a home automation system using an Arduino board and a wireless standard communication protocol called ZigBee.
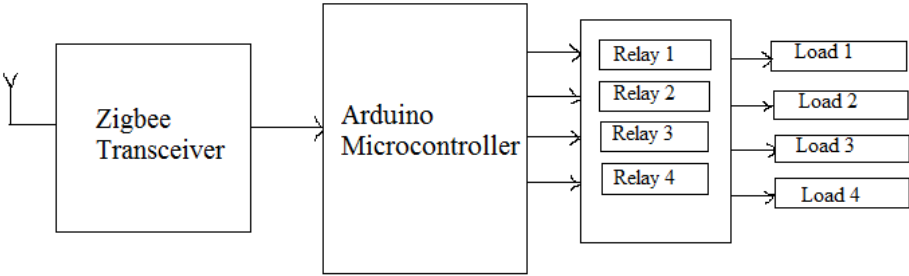
ZigBee is a protocol for communication among devices used for home automation. It uses RF for signaling and control. ZigBee is made to operate on IEEE 802.15.4 radio frequency range. The Arduino board is a hardware interface used to control and monitor devices with your computer. The project consists of an Arduino microcontroller and ZigBee transceiver at the transmitter end along with the keypad array as the control panel. The receiver side has an Arduino microcontroller and ZigBee transceiver along with the relays connected to the different appliances.

Block Diagram

Transmitter

```
                    ┌──────────────────┐          ┌──────────────┐
                    │                  │          │              │      Y
                    │    Arduino       │─────────▶│   Zigbee     │─────/
                    │  Microcontroller │          │  Transceiver │
                    │                  │          │              │
                    └──────────────────┘          └──────────────┘
                        ▲  ▲  ▲  ▲
        ┌──────────────┐│  │  │  │
        │ ┌──────┐     ││  │  │  │
        │ │ SW1  │─────┘│  │  │  │
        │ └──────┘      │  │  │  │
        │ ┌──────┐      │  │  │  │
        │ │ SW2  │──────┘  │  │  │
        │ └──────┘         │  │  │
        │ ┌──────┐         │  │  │
        │ │ SW3  │─────────┘  │  │
        │ └──────┘            │  │
        │ ┌──────┐            │  │
        │ │ SW4  │────────────┘  │
        │ └──────┘               │
        └──────────────┘
```

Receiver

```
   Y      ┌──────────────┐      ┌──────────────────┐      ┌────────────┐      ┌─────────┐
    \─────│   Zigbee     │─────▶│    Arduino       │────▶ │  Relay 1   │────▶ │ Load 1  │
          │  Transceiver │      │  Microcontroller │────▶ │  Relay 2   │────▶ │ Load 2  │
          │              │      │                  │────▶ │  Relay 3   │────▶ │ Load 3  │
          │              │      │                  │────▶ │  Relay 4   │────▶ │ Load 4  │
          └──────────────┘      └──────────────────┘      └────────────┘      └─────────┘
```

Block Diagram Description

The transmitter section consists of an Arduino microcontroller, ZigBee module and a keypad array that acts as the input interface. The keypad array is connected to one port of the microcontroller. The ZigBee module is connected to another port of the microcontroller. The control signals to the appliances are read by the microcontroller and sent to the ZigBee module which wirelessly transmits it.

The receiver section consists of an Arduino microcontroller, ZigBee module and relays connected to the different appliances in the home. The ZigBee module receives the control signals and send it to the microcontroller which is interfaced to the relays connected to the appliances. Thus the appliances are turned on/off according to the control inputs received.