Smart Home Application

Description:

- This is a simple smart home app using ATmega32a MCU with external frequency 16 MHz
- The master MCU interface with the user using Bluetooth Module.
- UART is the type of communication between MCU and Bluetooth Module with 8-bit data, no parity and 1 stop bit.
- SPI is used to communicate between master MCU and slave MCU.

Components:

- 2 * ATmega32a.
- 2 * Crystal 16 MHz
- 2 * Led.
- 2 * 330 ohm Resistor.
- 1 * Bluetooth Module.

Truth Table:

Data	TO DO
1	Toggle LED_0
2	Toggle LED_2
3	Close all LEDs

Flowchart:

```
                              ┌─────────┐
                              │  Start  │
                              └────┬────┘
                                   │
                                   ▼
┌──────────────┐            ◇─────────────◇
│ send data to │            │ Does Master │
│ slave using  │◄── yes ────│ receive data│── no ──┐
│     SPI      │            │    from     │        │
└──────┬───────┘            │  bluetooth  │        │
       │                    │   module?   │        │
       no                   ◇─────────────◇        │
       │                                           │
       ▼                                           │
┌──────────────┐                                   │
│  Switch data │                                   │
└──────┬───────┘                                   │
       │                                           │
       ▼                                           │
  ◇──────────◇          ┌──────────────┐           │
  │ data=='1'│── yes ──►│  Toggle Led0 │───────────┤
  ◇──────────◇          └──────────────┘           │
       │                                           │
       no                                          │
       │                                           │
       ▼                                           │
  ◇──────────◇          ┌──────────────┐           │
  │ data=='2'│── yes ──►│  Toggle Led2 │───────────┤
  ◇──────────◇          └──────────────┘           │
       │                                           │
       no                                          │
       │                                           │
       ▼                                           │
  ◇──────────◇          ┌──────────────┐           │
  │ data=='3'│── yes ──►│ Close All Leds│──────────┤
  ◇──────────◇          └──────────────┘           │
       │                                           │
       └──────────────── no ──────────────────────┘
```

Start

Does Master receive data from bluetooth module? — yes → **send data to slave using SPI** — no

send data to slave using SPI → no → **Switch data**

data == '1' ? — yes → **Toggle Led0**

data == '2' ? — yes → **Toggle Led2**

data == '3' ? — yes → **Close All Leds** — no