Smart Home
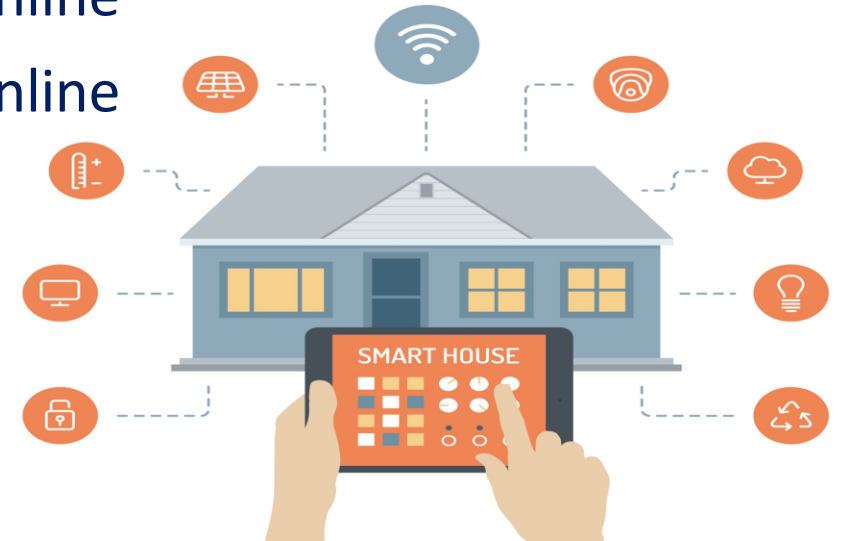
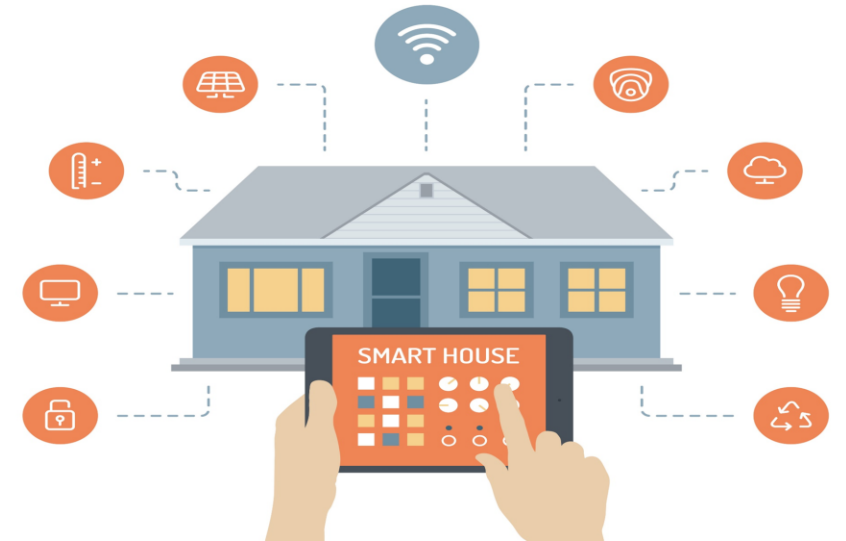Mohamed Mohamed Mohamed Hassen   Q9-Online

Yousef Mohamed Mohamed Ahmed   Q9-Online

Mohamed Orabeya   Q9-Online

Outlines

1. Problem statement
2. Problem solving
3. System construction
4. System instruction
5. Flow chart
6. Architecture
7. Simulation
8. GitHub Repo Link

Problem statement

- Our traditional homes are suffers from lack in communication between the home and its resident.

- No feedback if something went wrong as:

1. The door is closed or not .

2. Fire alert during work.

3. Forgetting the Ac on for a long time.

4. Anonymous person enters the home while you not existing there.
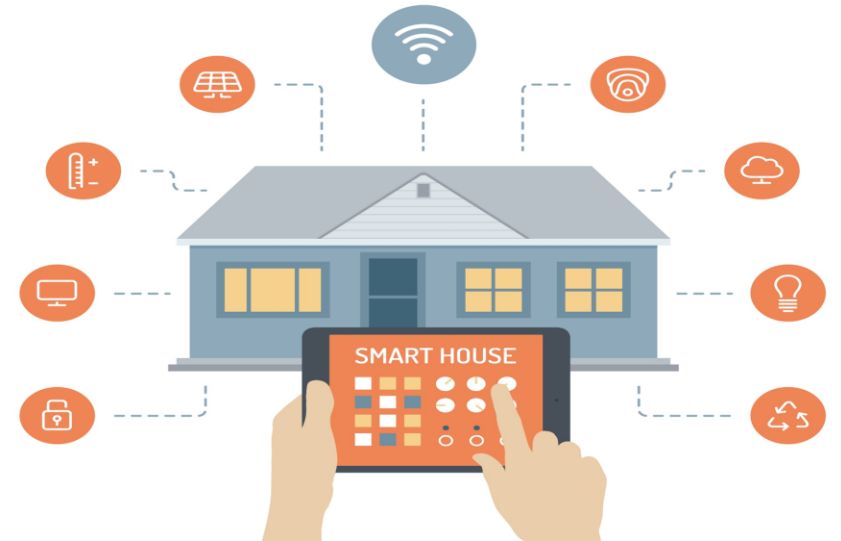
Problem solving

- Smart home is the brilliant solution for all the previous information.
- Smart home provide an access to the resident to check the at anytime & everywhere.
- Smart home includes some sensors that fix the previous problems:

1. Door sensor: to check whether the door is closed or not.
2. Fire sensor is connected to LAN network to give you a mobile alert notification.
3. Schedule notification to remind you that the AC is working.
4. Internal cameras and sensors to avoid theft.
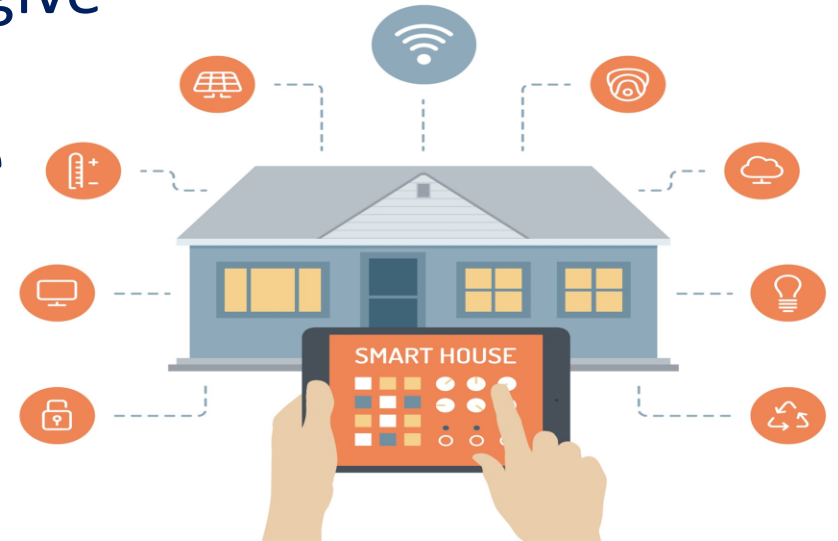
System construction

- System is consists of 2 microcontroller an Bluetooth module.

- Our system is based on Bluetooth connection between a mobile device and master microcontroller.

- Master microcontroller send instruction to the slave one.

- The sent instruction is based on the instruction sent by the user via Bluetooth.
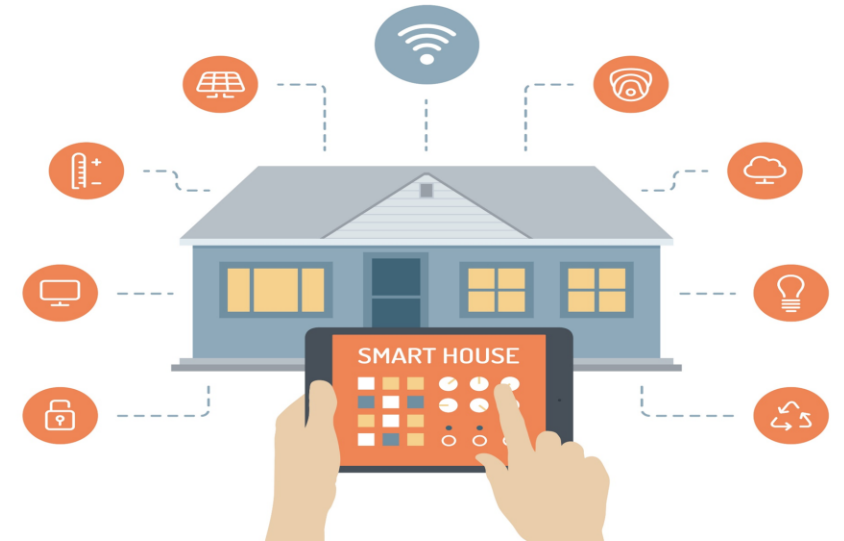
SMART HOUSE
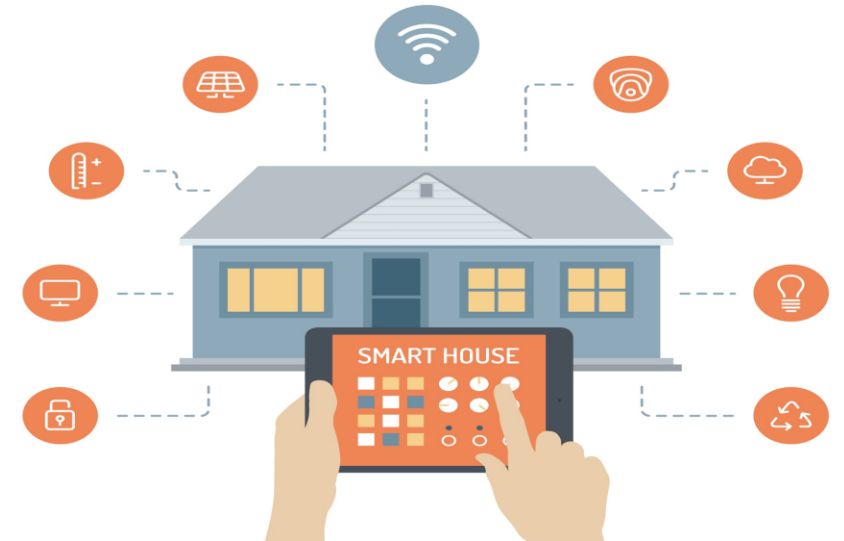
System construction
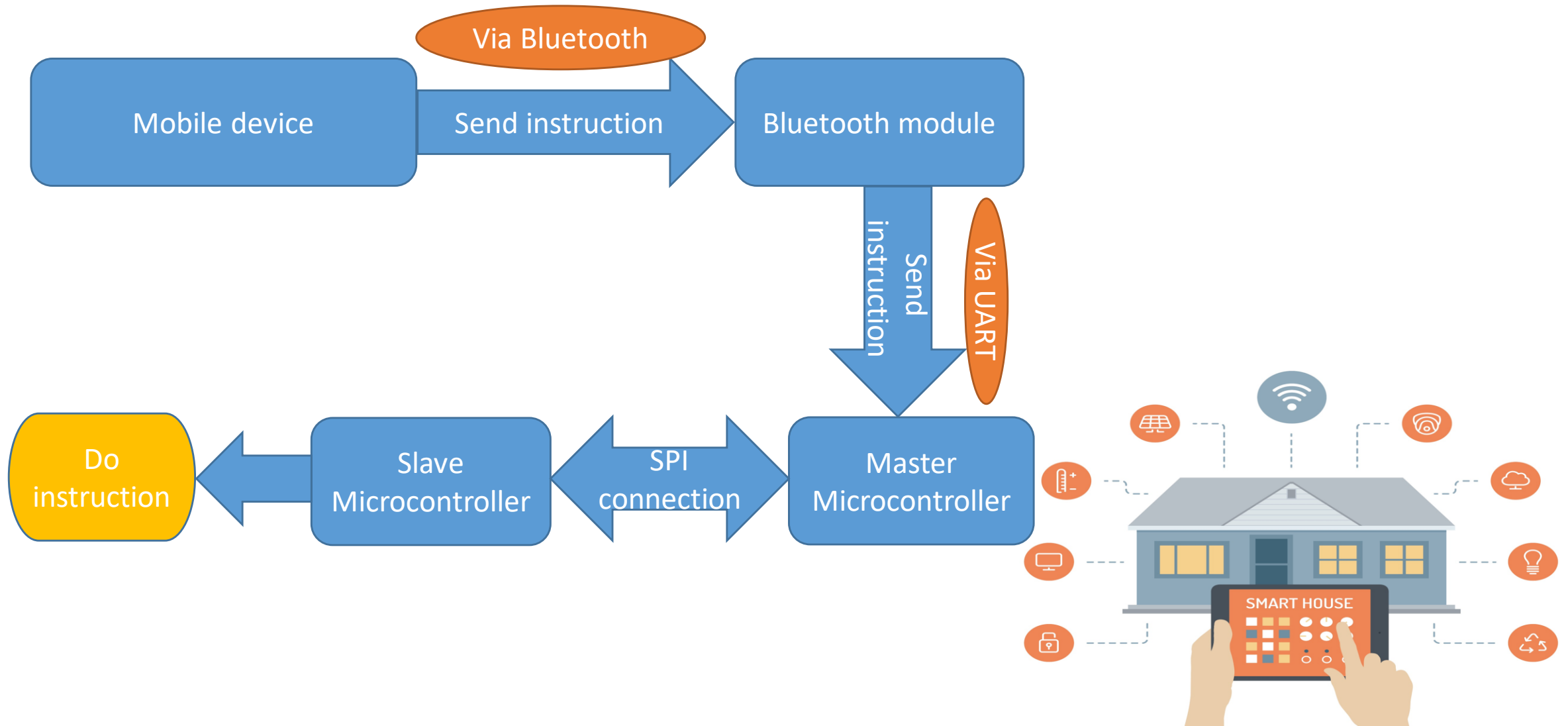
System instruction

- System has 2 outputs: AC and light system.
- Output form is based on the instruction sent from mobile device.
- Instructions are:
1) TURN AC ON ONLY.
2) TURN AC OFF ONLY.
3) TURN LIGHT ON ONLY.
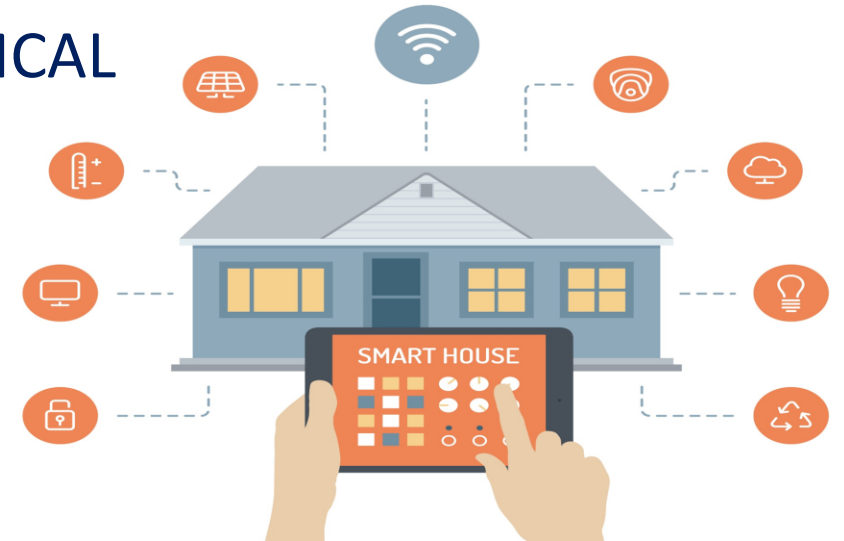4) TURN LIGHT OFF ONLY.
5) TURN ON BOTH.
6) TURN OFF BOTH.

System instruction

- Instructions description :

1) TURN AC ON ONLY : master send address 0x10 to slave microcontroller, so the slave microcontroller will turn on the AC only.

2) TURN AC OFF ONLY : master send address 0x20 to slave microcontroller, so the slave microcontroller will turn off the AC only.

3) TURN LIGHT ON ONLY : master send address 0x30 to slave microcontroller, so the slave microcontroller will turn on the light only.

4) TURN LIGHT OFF ONLY : master send address 0x40 to slave microcontroller, so the slave microcontroller will turn off the light only .

5) TURN ON BOTH : master send address 0x50 to slave microcontroller, so the slave microcontroller will turn on both AC and light.

6) TURN OFF BOTH : master send address 0x60 to slave microcontroller, so the slave microcontroller will turn off both AC and light.
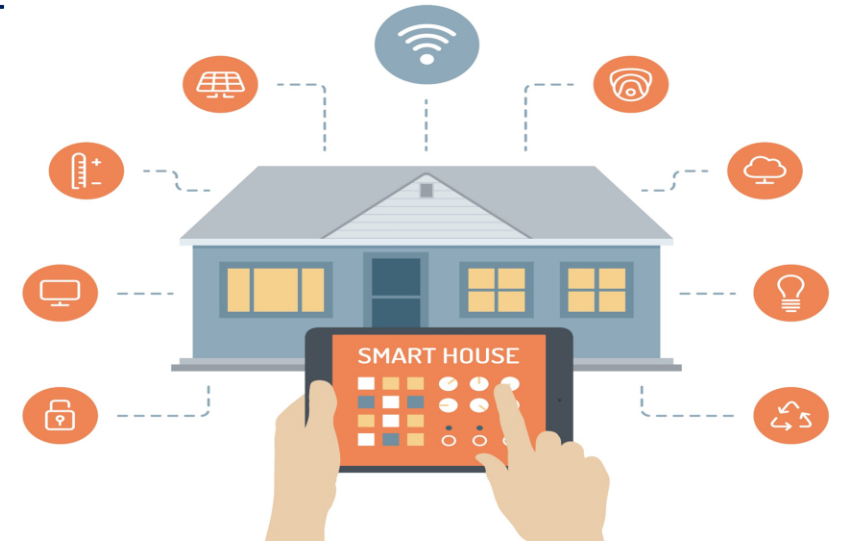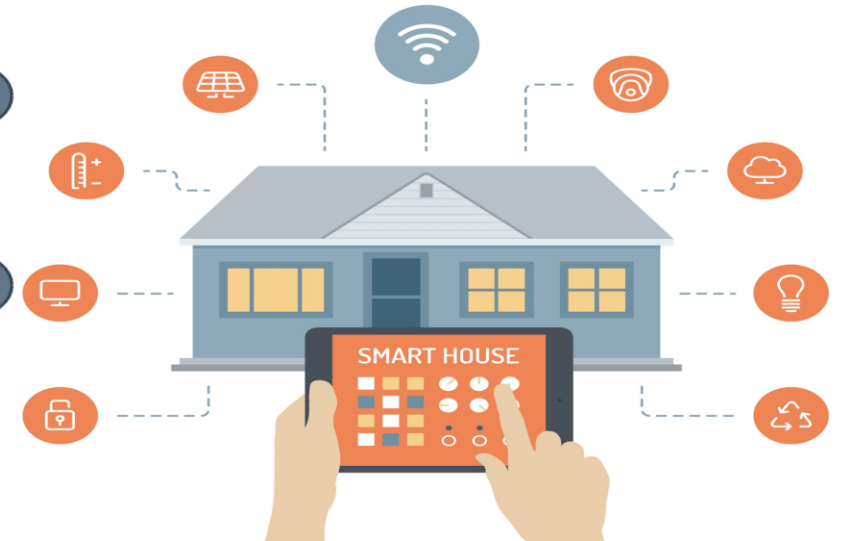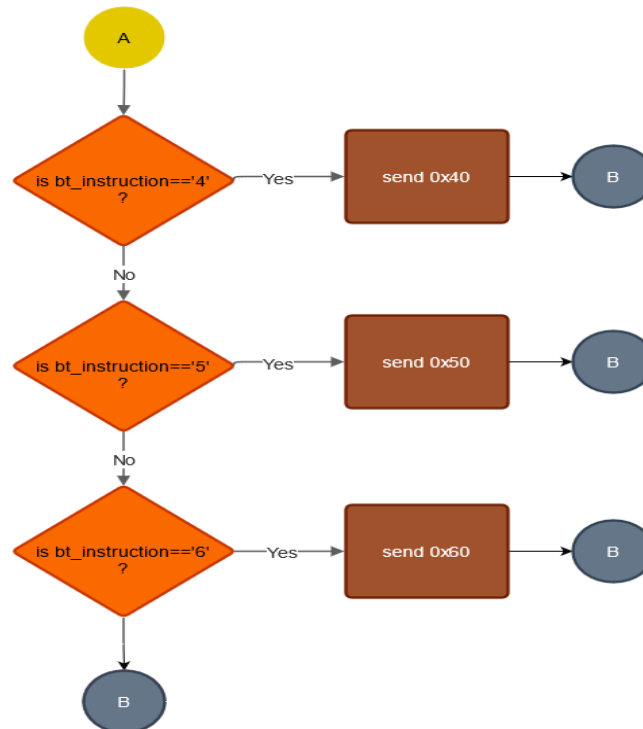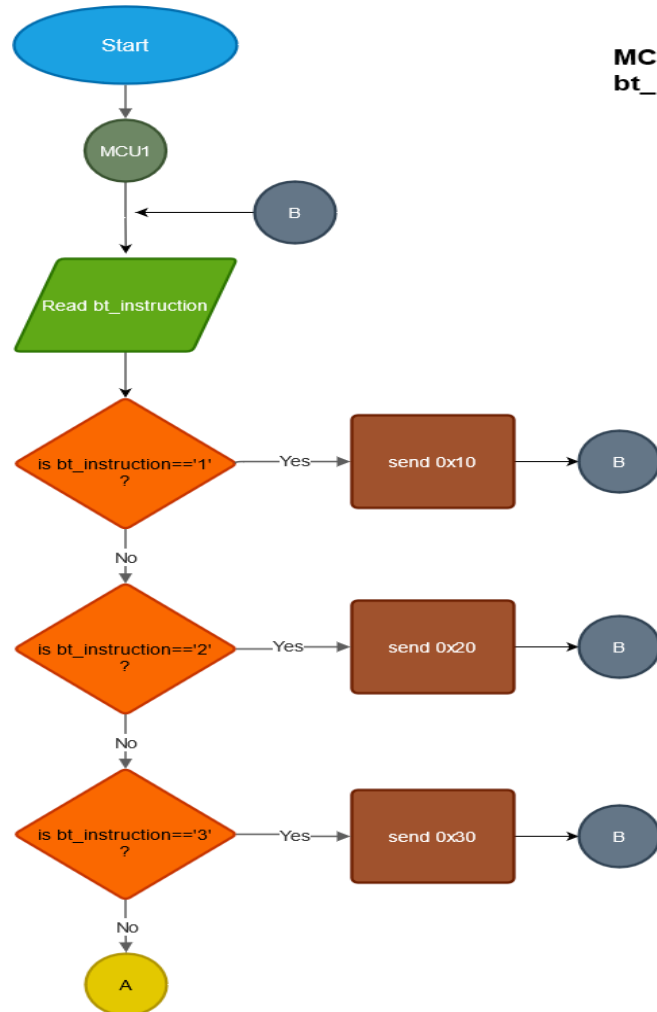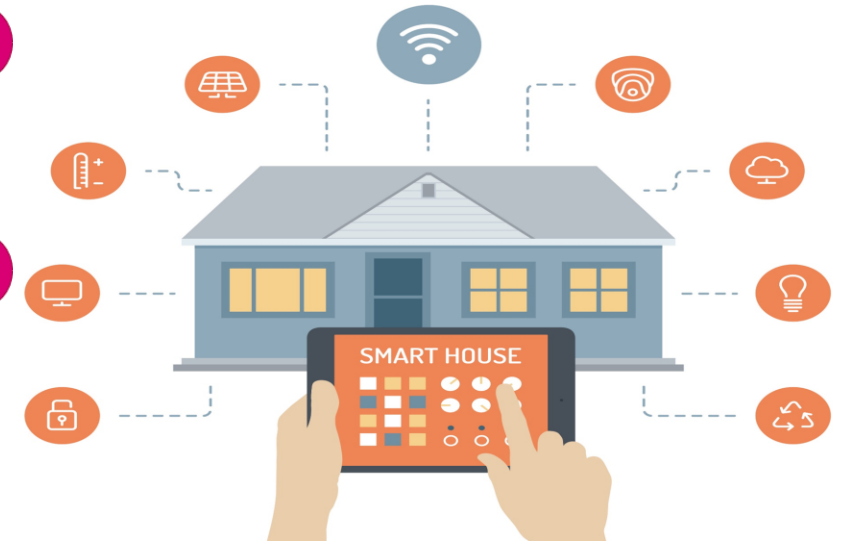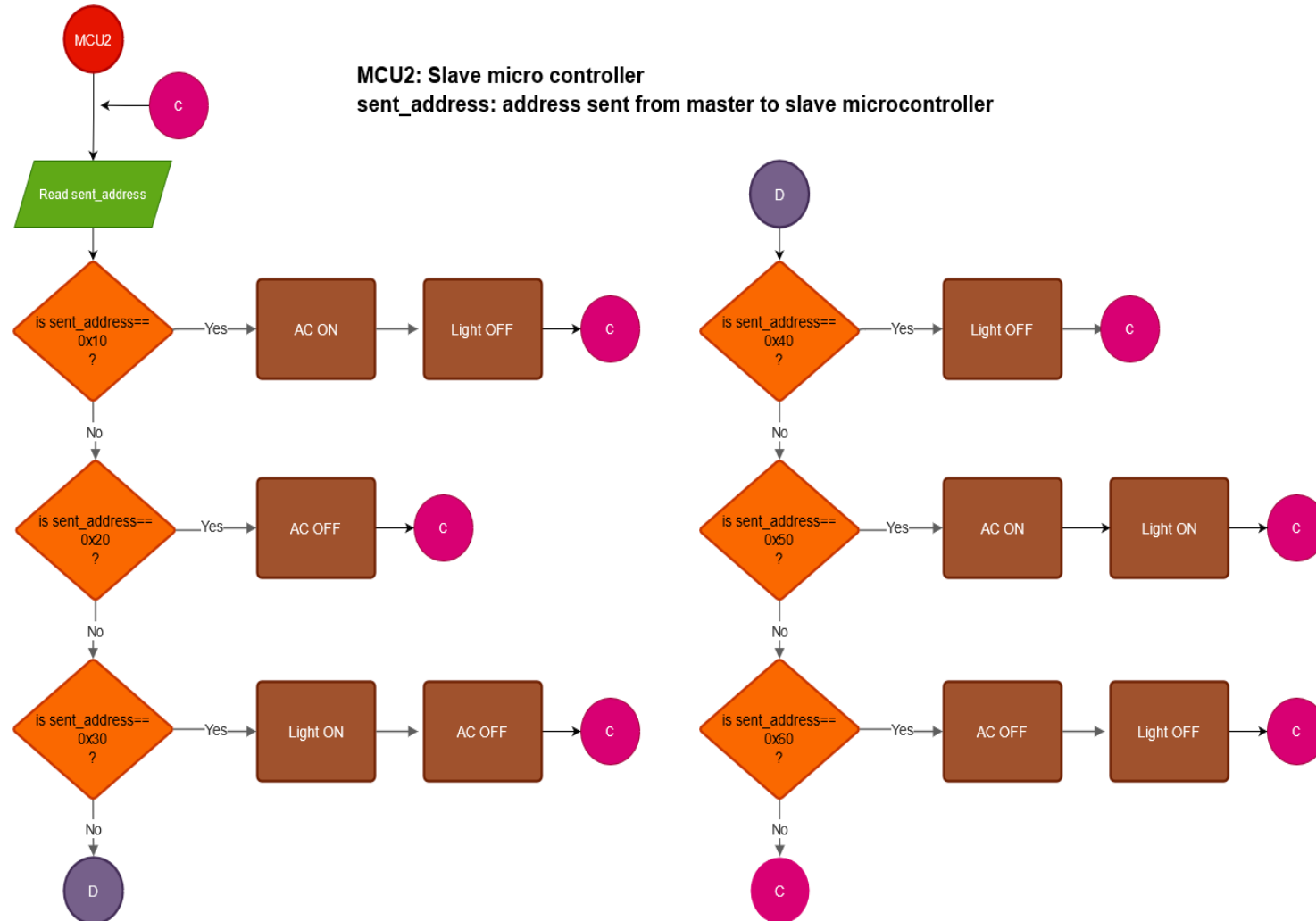
Architecture

- Our design based on layered Architecture for each microcontroller.
- Master microcontroller has 3 software module of MCAL(microcontroller abstraction layer):

1. Input / output module.

2. SPI module.

3. UART module

- Slave microcontroller has 2 software module of MCAL (microcontroller abstraction layer):

1. Input / output module.

2. SPI module.

Flow chart

```
Start
  ↓
MCU1 ← B
  ↓
Read bt_instruction
  ↓
is bt_instruction=='1' ? ──Yes──→ send 0x10 ──→ B
  ↓ No
is bt_instruction=='2' ? ──Yes──→ send 0x20 ──→ B
  ↓ No
is bt_instruction=='3' ? ──Yes──→ send 0x30 ──→ B
  ↓ No
  A
```

MCU1:Master micro controller
bt_instruction:instruction sent from Bluetooth module

```
A
  ↓
is bt_instruction=='4' ? ──Yes──→ send 0x40 ──→ B
  ↓ No
is bt_instruction=='5' ? ──Yes──→ send 0x50 ──→ B
  ↓ No
is bt_instruction=='6' ? ──Yes──→ send 0x60 ──→ B
  ↓ No
  B
```

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Flow chart

MCU2: Slave micro controller
sent_address: address sent from master to slave microcontroller
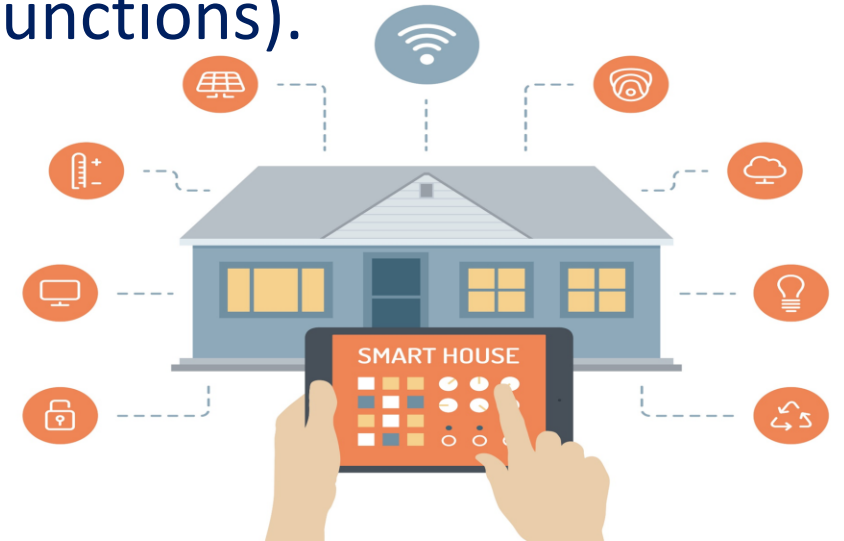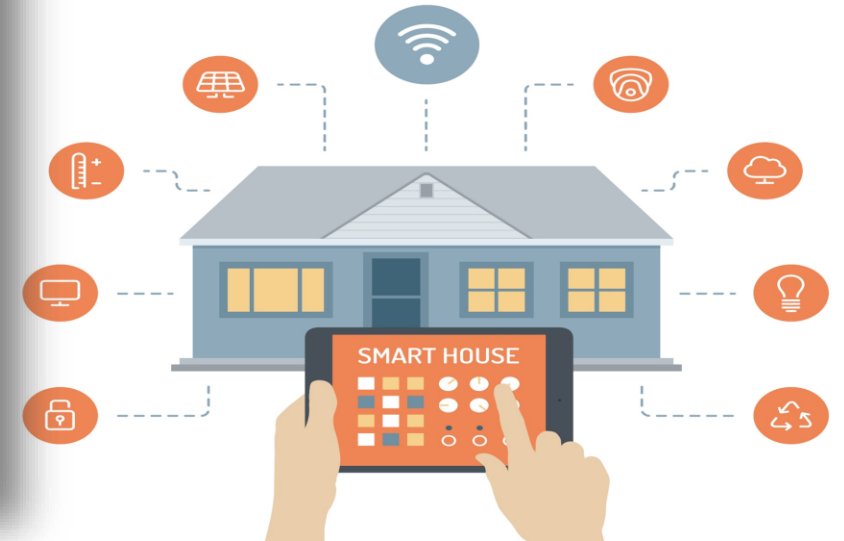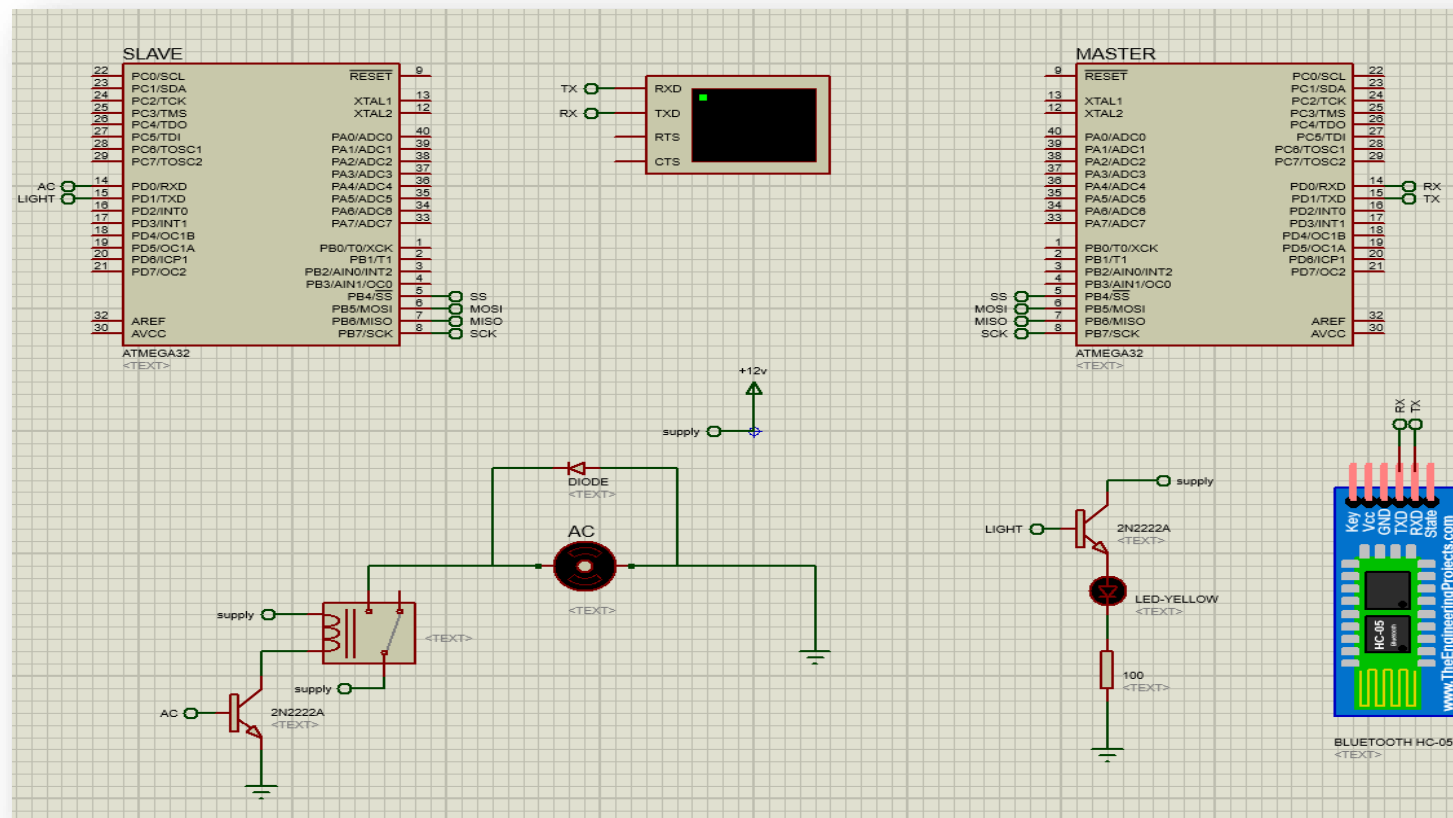
Architecture

- Each software module is composed of 3 files:

1. Private.h (contains private information that can't be shared with the user).

2. Interface.h (contains information as prototypes, macros & function used).

3. Program.h (contains main logic of the used functions).

- The main code includes the interface files of each module in order to be called.

Simulation

- System simulation is done by PROTEUS simulation in order to test whole the system. (check the PROTEUS file for real-time simulation)

GitHub Repo Link

- Mohamed Hassen's link:

❖ https://github.com/Muhamed1470/smart-home.git

- Yousef Mohamed's link:

❖ https://github.com/yousefmohammed98/smart-home.git

- Mohamed Orabeya's link:

❖ https://github.com/Orabya/Smart-home.git