Simple IoT App

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IOT Introduction

- Short for Internet of Things

- Thing:
  - any device i.e. sensors

- Connect things together
  - Turn them into smarter devices.
  - Data sharing can provide important insights.

Project Requirements

1. Time/Data retrieval from an RTC module.
2. Setting an alarm.
3. Managing the module LEDS.
4. Use WiFi module as access point and server.

System Components

- ESP8266module
  - high durability.
  - Compactness.
  - Power-saving architecture.
  - 32-bit tensilica processor.
  - Programmable component
    - Arduino
    - Micro-Python

System Components

- STM32L432KC Microprocessor
  - An advanced cheap microprocessor.
  - 2 UARTS
  - Has ADC
  - Many timers options.

System Components

- DS3231
  - Real Time Clock.
  - Low power.
  - Supports up to 4 alarms.
  - Battery support.
  - Supports I2C connection.

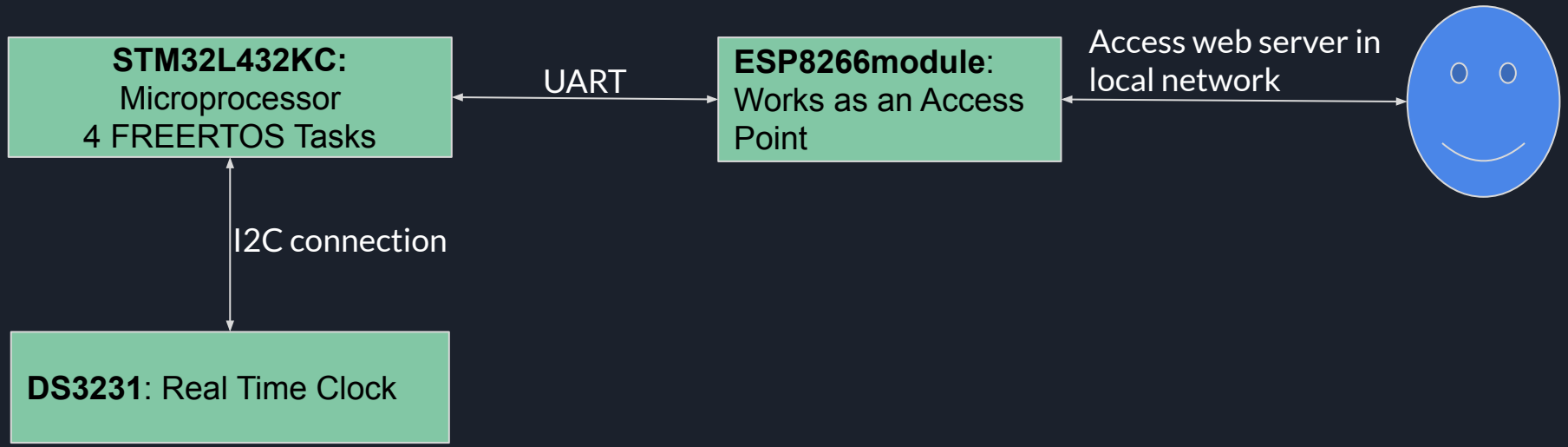
Arduino

1. Open source hardware project.
   a. Hardware and microprocessors.
   b. Designs are shared.

2. Easy to use library and IDE for programming different components.

3. Supports two environments: JAVA, C/C++.

System Architecture



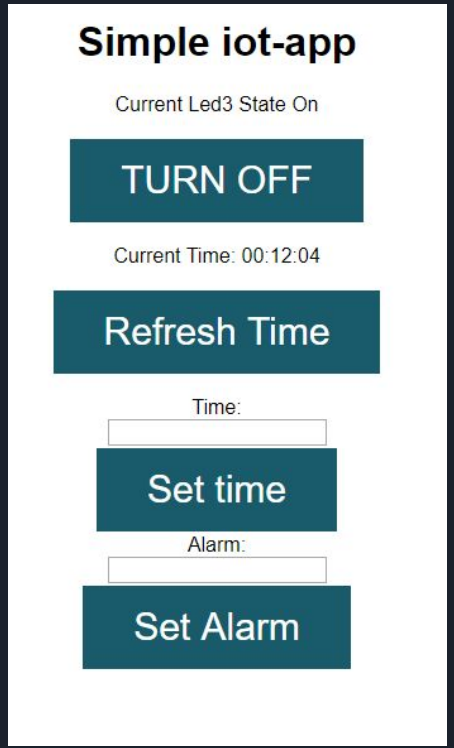
FreeRTOS

- The FreeRTOS provides
  - Ability to create and control tasks.
  - Queues management.

- The project is built using FreeRTOS
  - Task for receiving instructions from WiFi module and transmitting replies back.
  - Task that executes necessary steps for requests from the WiFi.
  - Task for requesting time from RTC, setting time, or setting alarm. Task is usually suspended.

Web interface

1. Provides access for controlling the microprocessor Led.
2. Can request the RTC time.
3. Set current time.
4. Set an alarm.



Project Timeline

1. Reading about the different components and microPython.(7th May)
2. Managing the STM32 module Leds.(8th May)
3. Managing the time module.(9th May)
4. Build connection between ESP8266 and the STM32 module.(11th May)
5. Use the ESP8266 as a WIFI Access Point and test connection with it.(12th May)
6. Providing the user interface required to access the application’s main features. (15th May)
7. Supporting time setting and alarms. (18th May)
8. Improving performance and increasing reliability. (25th May)

About the project

- This project was submitted as a part of the Embedded Systems Course in AUC 2020.

- Github: https://github.com/mickey-me/iot-app