



检查您对此课程的准备：

1. 确保您的浏览器满足 ARM mbed 要求：

[bit.ly/supported-browsers](https://bit.ly/supported-browsers)

2. 已下载 nRF Connect 应用程序，并已将其安装在您的智能手机或平板电脑上
3. 请确保已经登录Mbed, <https://os.mbed.com/>

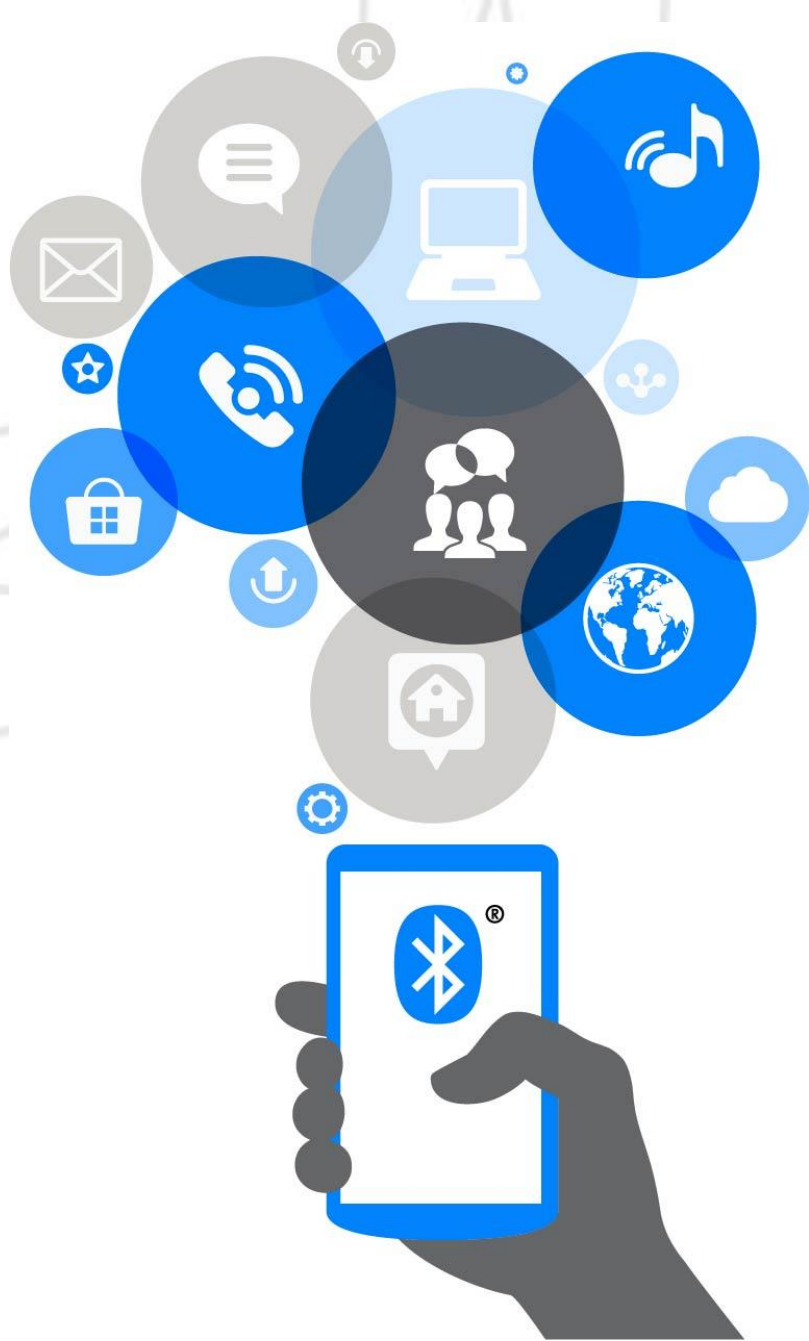


# 使用 ARM Mbed 开发自定义 *Bluetooth*<sup>®</sup> 外围设备



微信

演讲者：任凯，开发者关系经理，蓝牙技术联盟，亚太区



限制：1 小时

形式：由导师引导对示例外围设备进行实际开发，包含理论学习和动手操作两个部分；

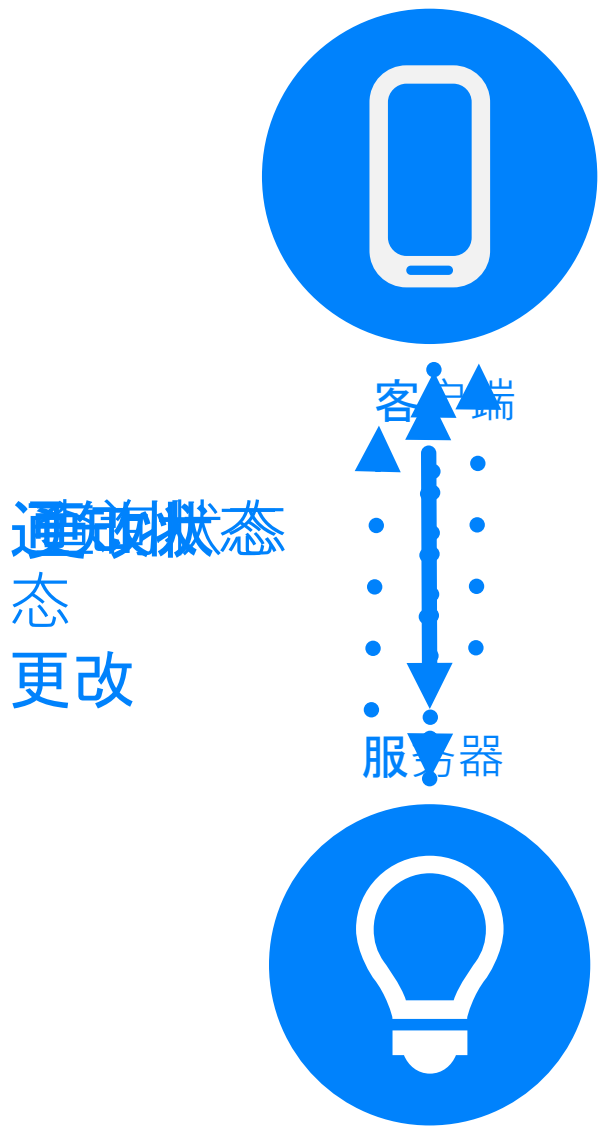
# 基本概念

设备状态的远程接口称为“配置文件”

更改状态

查询状态

通知状态更过





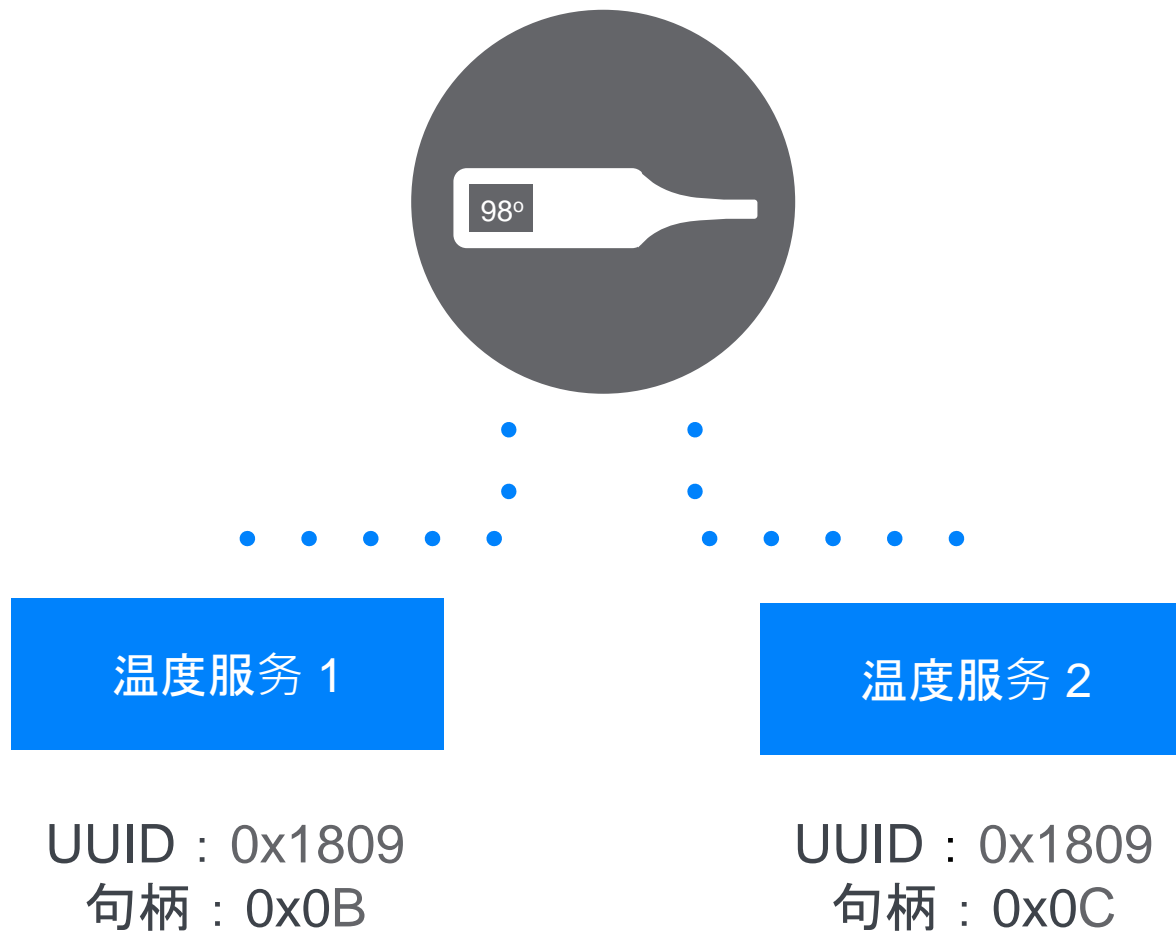
## 配置文件(profile)构建基块



属性  
读写  
通知  
等



## GATT – UUID 与句柄(handle)





## 5 个理论要点

1. **服务**是分组机制，包含特性
2. **特性**表示的是状态数据项
3. **使用描述符**可以配置特性的行为或提供其他元数据
4. **UUID** 是类型标识符
5. **句柄**是特定数据项（例如运行时的设备特性）的唯一标识符







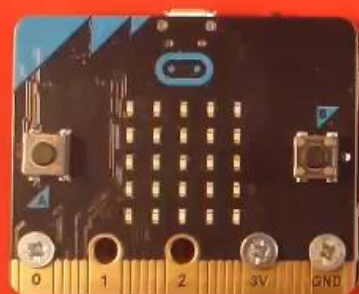
# 动手操作

探索、创新、开拓





## 要求 – 客户端控制的动画





## 设计 - 动画服务(Animation Service)

NAME Animation Type

UUID E95DC306-251D-470A-A062-FA1922DFA9A8

当前选择的动画类型 (0x01 – 0x03, 0x01=闪烁状, 0x02=波纹状, 0x03=螺旋状)

程序：读/写操作

NAME Animation Status

UUID E95D4592-251D-470A-A062-FA1922DFA9A8

当前的动画状态 (0x00 = 闲置 0x01 = 运行)

程序：读操作/通知

NAME Animation Control

UUID E95DDBE0-251D-470A-A062-FA1922DFA9A8

控制动画行为 (0x01=开始, 0x02=停止, 0x03=加快, 0x04=减慢)

程序：写操作



编程 – ARM mbed

#BluetoothAsia2018#



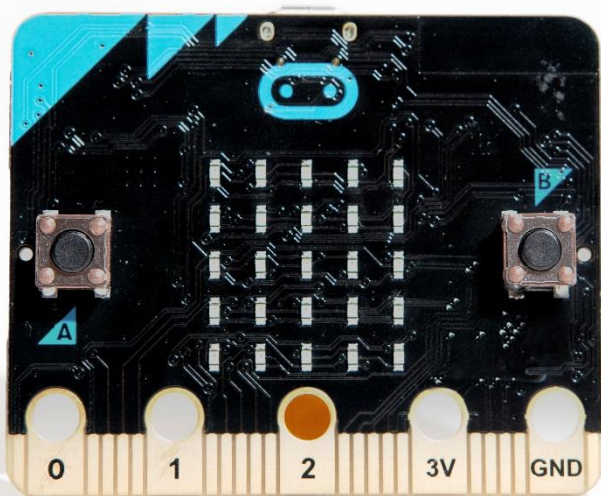
# ARMmbed

SDK

Device  
abstraction



## 测试 - micro:bit



## USB 大容量存储设备

### Windows

盘符 ( 例如 e:\)

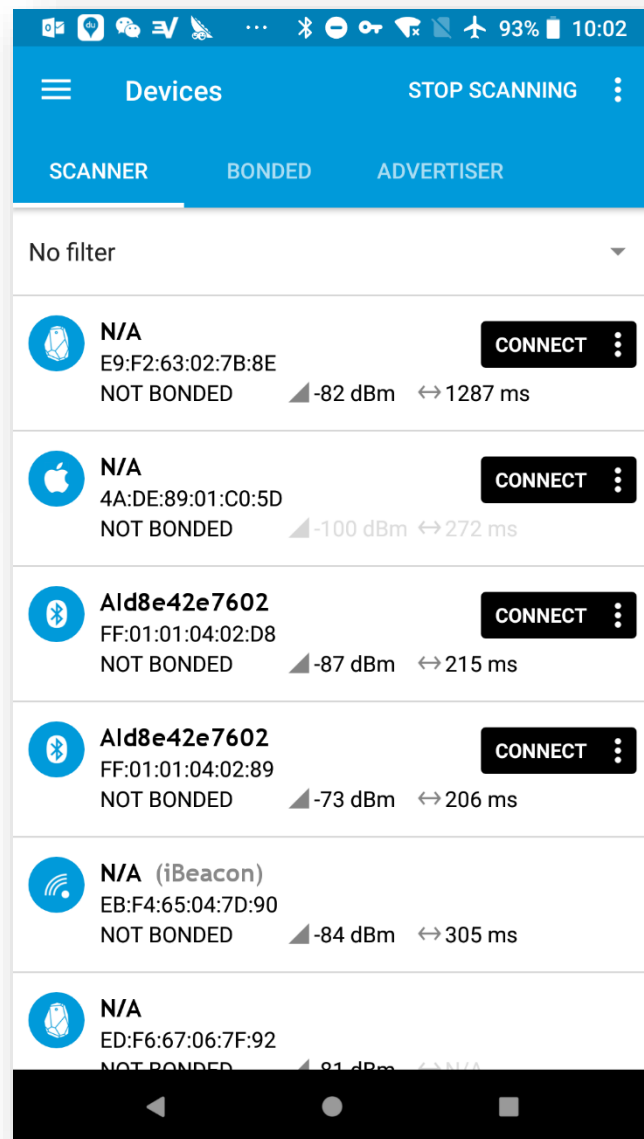
### macOS

显示在“查找工具设备  
(Finder Devices)”部分中

装载位置 /Volumes/MICROBIT



# 测试 – nRF Connect



通用蓝牙调试工具

设备搜索

服务发现

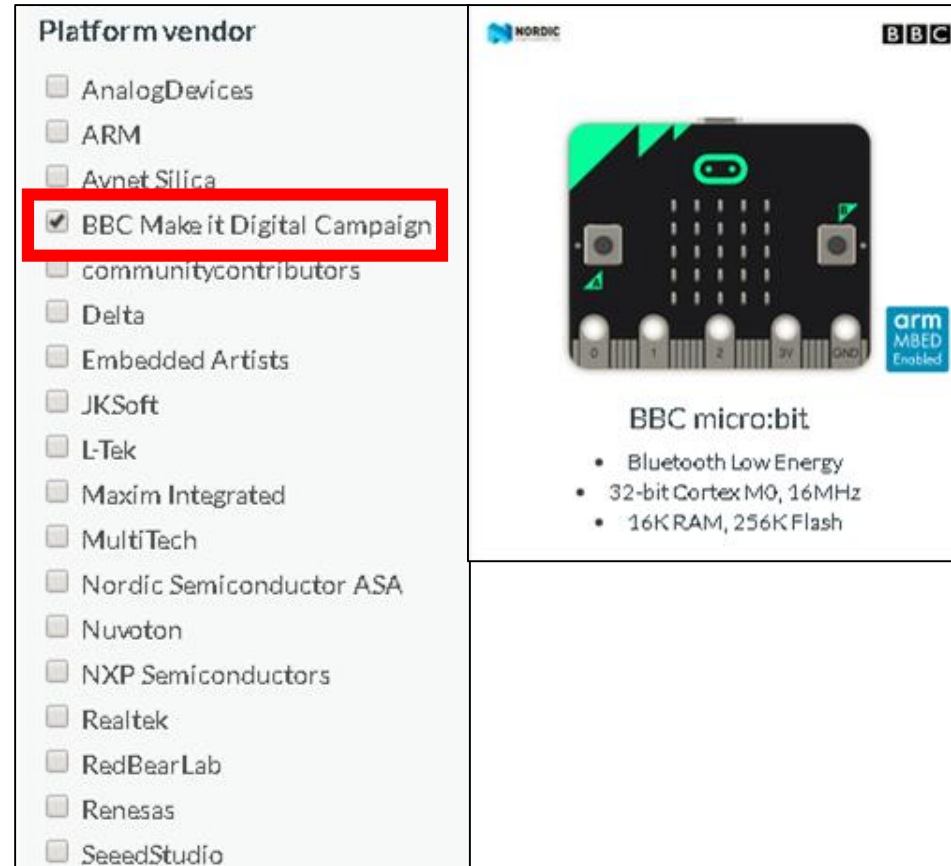
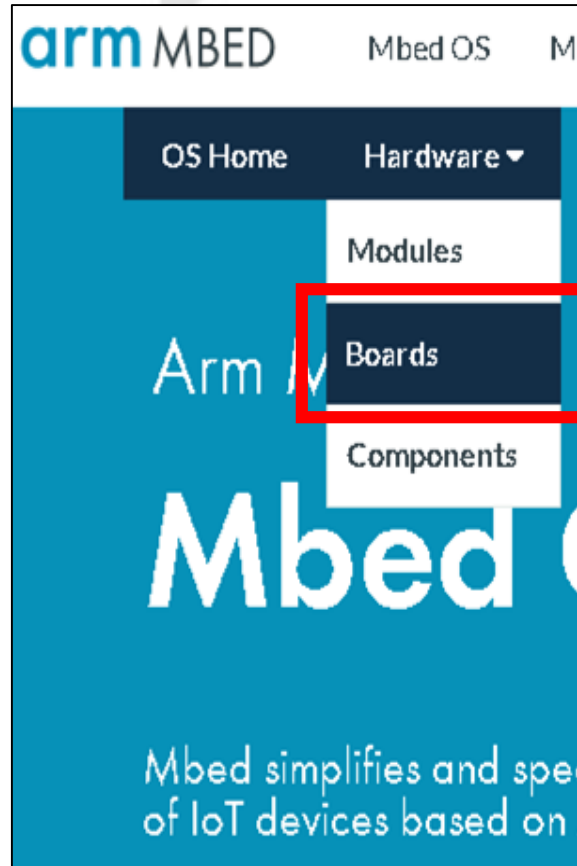
特性与描述符

# 加载micro:bit开发板

#BluetoothAsia2018#



<https://os.mbed.com/>



## Nordic Semiconductor

Nordic Semiconductor is a fabless semiconductor company specializing in ultra low-power wireless SoCs and connectivity devices for the 2.4 GHz ISM band, with ultra-low power performance and cost being the main focus areas

[+ Add to your Mbed Compiler](#)

[Buy Now](#)

[+ Follow](#)

# 加载micro:bit开发板

#BluetoothAsia2018#



arm MBED

Mbed OS

Mbed Cloud

Partner Portal

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OS Home

Hardware ▾

Code

Documentation ▾

Questions

Forum

Compiler

Boards × BBC micro:bit

✓ Platform 'BBC micro:bit' is now added to your account!



To compile a program for this board using Mbed CLI, use



Mbed

Workspace Management

New ▾ Import Save Save All Compile ▾ Mbed Cloud ▾ Commit ▾ Revision ↶ ↷

BBC micro:bit

Default ▾

Program Workspace <

Workspace Management

Workspace Details

My Programs  
+ BluetoothAsia2018Beaco  
+ BluetoothAsia2018Periph



Manage your Program Workspace

Listing all programs in your Program Workspace

Total Programs 2

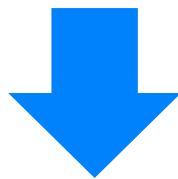


# 加载beacon工程

#BluetoothAsia2018#



Type URL in your browser, <http://t.cn/Ru8PzAz>




Kai Ren /  BluetoothAsia2018Peripheral

This repository is for Bluetooth Asia 2018 developer training, peripheral session.

 Dependencies:  microbit

Repository toolbox


Import into Compiler

 Export to desktop IDE



**Import Program**

Import a program from os.mbed.com into your workspace.



**Please specify name**

**Source URL:**

**Import As:** ☒ Program ☐ Library

**Import Name:**

**Update:** ☒ Update all libraries to the latest revision



**Mbed** /BluetoothAsia2018Peripheral 1.10.11.0

New Import Save Save All Compile Mbed Cloud Commit Revision Help

**Program Workspace**

- My Programs
  - BluetoothAsia2018Peripheral
    - microbit
      - Animator.cpp
      - Animator.h
      - main.cpp
      - PERIPHERAL\_DEMO\_TUTORIAL
      - peripheral\_src.txt

**Program: /BluetoothAsia2018Peripheral**

Type to filter the list ... ☐ Match Case ☐ Whole Word

Name	Size	Type	Modified
microbit		Published Library	moments ago
Animator.cpp	4.5 kB	C/C++ Source File	moments ago
Animator.h	2.3 kB	C/C++ Header File	moments ago
main.cpp	4.0 kB	C/C++ Source File	moments ago

**Program Details**

Summary Build

Name	BluetoothAsia2018Peripheral
Created	moments ago
Last Modified	moments ago
Last Built	Never
URL	<a href="http://os.mbed.com/users/krenbluetoothsig/code/BluetoothAsia2018Peripheral/">krenbluetoothsig/BluetoothAsia2018Peripheral/</a>
Revision	7:243a197



# 动手操作

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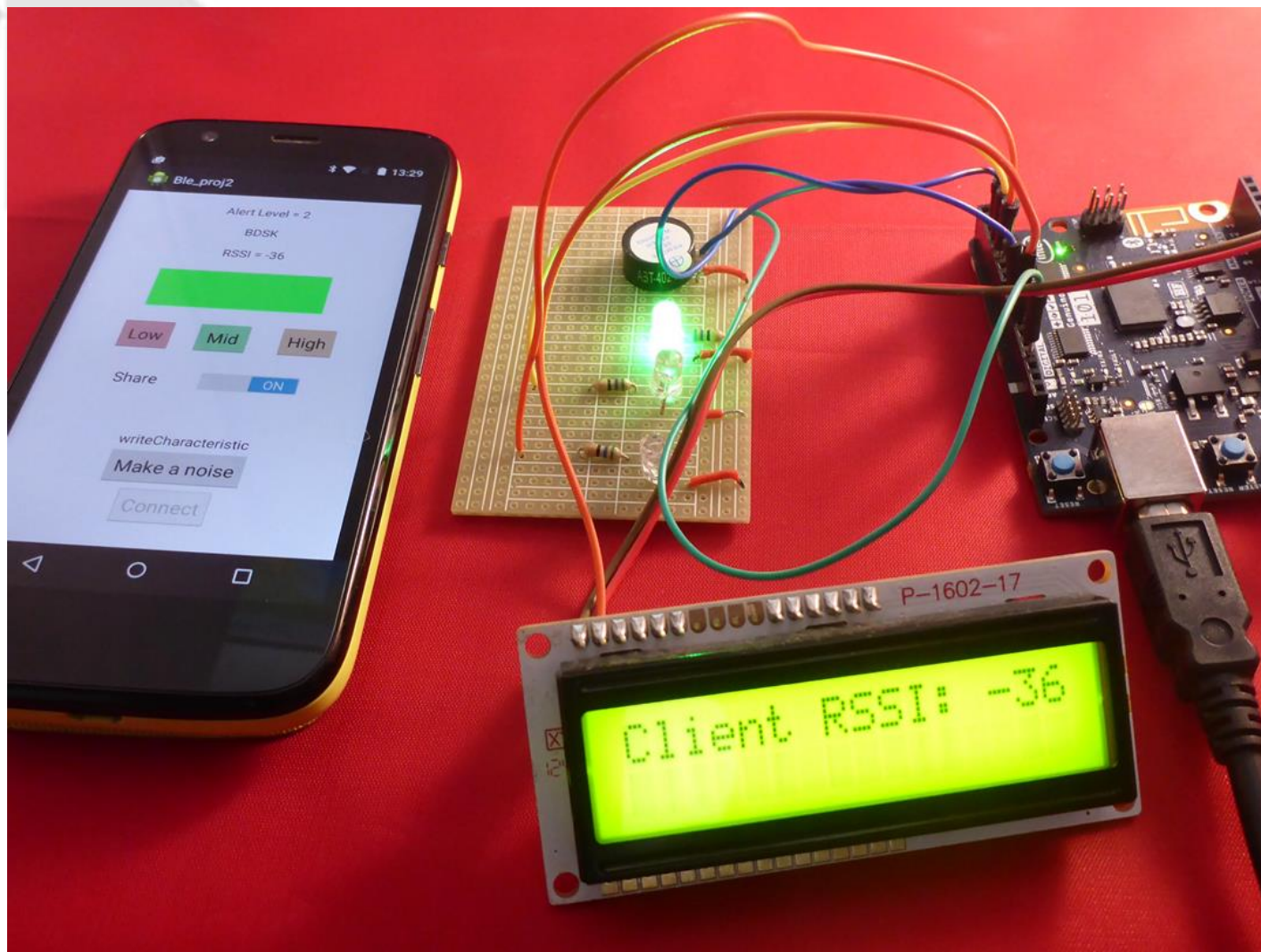


# 其他资源

探索、创新、开拓



## 蓝牙开发者入门套件(Bluetooth Developer Starter Kit)



实际操作教程

智能手机应用

Arduino 外围设备

自定义电子元器件





# Bluetooth.com 的其他开发人员资源

## Educational Kits

### Kits to help you learn more about Bluetooth

The Bluetooth SIG provides several Education Kits designed to help developers quickly learn how to start building with Bluetooth® technology.

#### Learn Bluetooth Low Energy basics

[Bluetooth LE Developer Starter Kit](#)—is a comprehensive package that includes foundation-level information and hands-on labs that walk you through assembling a Bluetooth low energy device from basic parts and a mobile application to go with it.

#### Learn about Web Bluetooth

[Web Bluetooth Tutorial](#)—illustrates how to use the Web Bluetooth APIs to achieve fundamental tasks involving Bluetooth Low Energy and you'll get the opportunity to put your knowledge into practice with a hands-on coding project.

#### Learn how to create applications which can talk to a Bluetooth mesh network

[Mesh Proxy Kit](#)—is a self-study educational resource which teaches the key technicalities involved in creating applications for smartphones and other platforms which can monitor and control nodes in a Bluetooth mesh network. It introduces the mesh proxy protocol, explains related concepts and provides hands-on coding experience. Developers will

## 开发人员资源和工具

<https://www.bluetooth.com>



官方微信



官方微博





# questions?



微信