



KTH Information and  
Communication Technology

# IK1332 Projects: Raspberry Pi IoT Connectivity Solutions

## 1 Background

An easy, cheap way to test different connectivity solutions is Raspberry Pi single board computers. They contain Bluetooth Low Energy (BLE) and Wifi 802.11ac transceiver circuits as well as USB, Ethernet and HDMI connections. It is also possible to add, for example, additional boards (HAT) for LoRa transceiver circuits.

## 2 Project Components

This project consists of designing and implementing a sensor network using simple temperature sensors and Raspberry Pi computers. The exact implementation of communication protocol and server technology is left as a task for the student group to resolve.

Start with the following:

- Study the existing code for a BLE pico-network of Raspberry Pis
- Test the sensors on one Raspberry Pi.

## 3 Grading

### Grade E (BLE)

- Use existing code to set up a pico-network using BLE, that collects temperature from slave-nodes and transmit that to the master-node.
- Present temperature data regularly on a display.

### Grade E (LoRa)

- Set up LoRa modules for collecting temperature measurements.
- Communicate between two LoRa modules.

### Grade D (BLE, LoRa)

- Organize a mesh network using Raspberry Pi. Forward the temperature data to the primary node.
- Present temperature data regularly on a display.

### Grade C (BLE, LoRa)

- Publish the data from the mesh network to a webserver.

### Grade A (BLE)

- Measure the range of BLE and compare to models/data.
- Compare the results with project **LoRa**.

### Grade A (LoRa)

- Measure the range of LoRa and compare to models/data.
- Compare the results with project **BLE**.

## Contacts

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## References

Bluetooth mesh network: <https://github.com/eribau/bluetooth-mesh-project/>

<https://www.raspberrypi.org>

LoRa HAT manual: [http://wiki.dragino.com/index.php?title=Lora/GPS\\_HAT](http://wiki.dragino.com/index.php?title=Lora/GPS_HAT)

<https://www.thethingsnetwork.org>

Beard, C., and W. Stallings, Wireless Communication Networks and Systems, Pearson Education, 2016