ECEN 5823-001
Internet of Things Embedded Firmware

Lecture #25

27 November 2018

Be Boulder.

University of Colorado Boulder

Agenda

- Class Announcements
- Course project rubric - preliminary
- Reading Assignment
- Final Exam
- Comparing different Low Power RF technologies
- Low power RF co-existence

Course Project questions/discussions

Class Announcements

- Course project update 2 is due Tuesday, November 27th at 11:59pm
- Final Exam is on Monday, December 17th
  - On-campus students will take it at 4:30pm in ECCS 1B14
  - Distant students the exam will be open at 4:30pm and must be completed by 11:59pm on the 17th

- Course demo signup has started!
  - https://docs.google.com/spreadsheets/d/16ptNNX_VnZ24nZUCIAx9v0wLgThQoEv4PflUBVypAbM/edit#gid=0
  - You must use your @Colorado.edu email address for access

Course demo project rubric - preliminary

ECEN 5823-001
Internet of Things Embedded Firmware
Preliminary 10/20/2018
Fall 2018

Team Members: _____

Date: _____

		Points
Demonstrates theory, skills, and technology of project (20pts)		_____
Correctly programs requested code	_____ (10 pts)	
Correctly walks through code	_____ (5 pts)	
Demonstrates knowledge during code walk through	_____ (5 pts)	
Blue Gecko demonstrated operating in low energy (10 pts)		_____
Low Energy demonstrated using Energy Profiler	_____ (5 pts)	

Reading Assignment

ECEN5023-001 – Reading List
Internet of Things Embedded Firmware
Week 13

There is no quiz on this reading, but material from these readings will be on the final exam!

1. "Selecting the Appropriate Wireless Mesh Network Technology"
    a. https://www.silabs.com/whitepapers/selecting-the-appropriate-wireless-mesh-network-technology

2. "Driving Wi-Fi, zigbee, and Thread coexistence in the 2.4 GHz band, part 1: Unmanaged coexistence"
    a. http://www.embedded-computing.com/embedded-computing-design/driving-wi-fi-zigbee-and-thread-coexistence-in-the-2-4-ghz-band-part-1-unmanaged-coexistence#

3. "Driving Wi-Fi, zigbee, and Thread coexistence in the 2.4 GHz band, part 2: Managed coexistence"
    a. http://www.embedded-computing.com/embedded-computing-design/driving-wi-fi-zigbee-and-thread-coexistence-in-the-2-4-ghz-band-part-2-managed-coexistence#

Final Exam

- This Final Exam comprises of 80 questions in total
  - You will have 90 minutes to complete
- Forty questions will be from past quizzes
  - These questions will be from quizzes 6 thru 10.
- Forty questions will be new questions based from lectures
  - These questions will be from lecture 13 onward
  - All questions related to assignment or the course project are also valid to be asked on the exam.
- All students are allowed notes comprising of both sides of a single sheet of 8x11 paper which must be turned in at the end of the final.
  - This page of notes must be of your original work.

Final Exam

- On-campus students must take the final exam in the assigned final exam room, ECCS 1B14, on Monday the 17th.
- Distant students will have until end of day, 11:59pm, on Monday, December 17th, to complete the final.
- CU Honor Code will be in forced for this exam.
- I will enable you to see your question responses after everyone has completed the final exam and I have completed grading the final exam.

Comparing ZigBee, Thread, and Bluetooth Mesh

- Which protocol dominates the smart home and building automation products?
- What are some of the important traits that these radio protocols must meet?
- If we wanted to measure robustness, how would we quantify it?

tp://www.embedded-computing.com/networking/how-zigbee-thread-and-bluetooth-mesh-stack-ip-in-performance-benchmarking

Comparing ZigBee, Thread, and Bluetooth Mesh

- It is your job to pick and deploy an industrial automation mesh based system. What are the key considerations that you must analyze to make a decision?
  - Power consumption
  - Throughput
  - Latency
  - Scalability
  - Security
  - Internet Protocol (IP) connectivity

Comparing ZigBee, Thread, and Bluetooth Mesh

- What are the two basic low power RF wireless topologies?
- What are the two biggest reasons that mesh is chosen over star topology for industrial automation?
- What is a third reason that mesh is chosen for industrial automation?

Comparing ZigBee, Thread, and Bluetooth Mesh

- There are commonly three types of devices in an industrial automation network in terms of the perspective of power, what are they?
- Why would energy harvesting be found in an industrial automation system?
- Why would AC-powered devices be concerned with low power?