EECS 373 Fall 2015 Extra Credit Assignment

Due Wednesday, December 23th at 6:00 PM sharp.

Name: _____ uniqname: _____

A number of you have expressed interest in the extra credit assignment (indeed I had hoped to get one out sooner), especially after the final exams. So, this is intended to be a fun exercise with a new hardware platform that you might encounter in industry—the point it is to just have a little fun and write up what you learn in the process, to help us assess whether the Intel Edison is appropriate for use by more junior students, and any pitfalls that one might run into trying to get it to work out of the box. For those of you so inclined, feel free to play around with it over the break and keep it if you like. If it's not your thing, just return it to the EECS 373 lab in January 2016, and we'll find some other use for it.

This is an individual assignment; all work should be your own. However, we encourage you to talk with or email your classmates about it to discuss any issues that you encounter, but if you do so, *please be sure to include the text of these emails in your assignment submission*. This assignment is equivalent in points to one letter grade "delta," *i.e.* it would change a B+ to an A-, for example. Note that these points will only be added to your grade *after* grade cutoffs are determined, so not doing this extra credit assignment cannot hurt your grade in the class, but doing the extra credit assignment will help your grade move up, provided that you are not expecting to receive an A+, in which case it will not improve your grade (but it still might be fun to do anyway).

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1. **Getting Started.** One challenge with embedded systems design is getting up to speed on a completely new platform. In this extra credit assignment, you will get a chance to play around with a new platform (the Intel Edison), see what it takes to program it, and learn a bit about the embedded Linux environment. The first step is to figure out what you have. Google around a bit (e.g. search for EDI2ARDUIN.AL.K) and see what you discover. With any luck, you'll discover you have an embedded system with the following properties:

   - Intel Atom system-on-a-chip (SoC) based on leading-edge 22 nm Silver Mont microarchitecture including a dual-core CPU and single core microcontroller (MCU)
   - Integrated Wi-Fi, Bluetooth LE, memory, and storage
   - Support for Yocto Linux, Arduino, Python, and Node.js
   - Open source community software tools enabling ease of adoption that will inspire developers

   All of that sounds pretty cool, so the next step is figuring out how to use it. Another quick Google search ("intel edison arduino quick start") turns up some interesting links:

   https://software.intel.com/en-us/iot/library/edison-getting-started

   https://learn.sparkfun.com/tutorials/edison-getting-started-guide

   https://www.arduino.cc/en/Guide/IntelEdison

Scan through these various getting started tutorials and think through the pros and cons of the different approaches. What's good about them? What's bad about them? Which one would you choose to follow? Why? Now, take the plunge! See if you can follow one of these tutorials to get some code running on the Edison is whatever language your choose (Java, Javascript, Python, etc.). Some things you might try to do (These are just suggestions! Choose anything that sounds remotely interesting to you):

- **Difficulty: Low.** Turn your Intel Edison into something that can scan for Bluetooth Low Energy (BLE) beacons using the noble package (https://github.com/sandeepmistry/noble) and lists the addresses of any devices it finds to the terminal screen when your run your program.
- **Difficulty: Medium.** See if you can get your Intel Edison to connect to your home wireless network over WiFi. Configure your Edison so it automatically reconnects to WiFi after you power cycle it.
- **Difficulty: High.** Have your Edison scrape a website to fetch the local weather, post the weather on a web page served by the Edison, and use Bluetooth Low Energy to advertise the weather using the bleno package (https://github.com/sandeepmistry/bleno) and formatted to be compliant with the EddyStone protocol standard (https://github.com/google/eddystone) so either Summon Browser (https://play.google.com/store/apps/details?id=edu.umich.eecs.lab11.summon) or Physical Web browser (https://play.google.com/store/apps/details?id=physical_web.org.physicalweb&hl=en) can display it. This might be more of a Holiday Break project! ☺

2. **Writeup.** Keep a journal of what you tried to do to get things to work, any difficulties that you encountered while learning about this system, and suggestions for improving the user experience. Copious notes are better than sparse ones. Also, note any bugs that you find the in the user documentation. This is a new platform and I'm mostly curious about your experiences. There is no "right" or "wrong" solution here. All submissions that document an earnest effort to do something, regardless of whether it all worked out in the end, will receive the extra credit. A reasonable target for a writeup would be a couple of pages of text (feel free to write more, include pictures/screenshots/etc, or post it to your blog). Submit your assignments to GradeScope by the due date.

3. **Demo.** Purely optional, but if you do end up doing something cool, please do stop by my office in Winter 2016 and show me what you ended up doing! I'm hoping that this class gave you all the tools to become skilled Makers (http://www.johnseelybrown.com/makermovement.pdf)! Happy Holidays!