Design Proposal

After doing some research on the existing resources relevant to our project, we have determined a process for the data acquisition portion of our project. The process is as follows:

1. The Arduino uses the Ethercard library for the ENC28J60 Ethernet driver to host a web page. The web page contains the name and value of each of the sensors attached to the Arduino.

2. A python script accesses the web page hosted by the Arduino and downloads the text from it.

3. The downloaded text is parsed and written to a CSV file.

Step 1 was the most difficult as we were forced to work with 3rd party Arduino libraries we were unfamiliar with. We used examples provided with Ethercard to get a simple sketch working but had to modify the example in order to obtain a static IP address and accommodate a changing value. Currently, the Arduino is incapable of running the web page for more than five minutes without crashing. As a band-aid remedy to this issue, the Arduino calls a software reset once every 2 minutes (restarts the sketch without the use of the reset button). The Arduino code likely needs further revision because it still times out occasionally.

To download the webpage data, we are currently using urllib2. Currently, error and exception handling is not implemented. BeautifulSoup is used as an HTML parser to extract the relevant text from the page. In the future, urllib2 (and maybe BeautifulSoup) might be dropped in favor of the third party library Requests, on suggestion from another student.

The parsed data is then written to a file. Although it would be wonderful to store the data in a python data structure, we want long term data collection to be possible, and we would to be able to share the data easily into other programs. We are currently researching if other data storage formats would better suit our needs however, as CSV is very simplistic and over long periods of time, it will be a waste of time to scan through thousands of lines of CSV data.

So far, we have completely implemented the stated process: we have Arduino code that hosts a webserver with the ENC28J60 chip and Ethercard driver, and we have python code that interprets it and writes to CSV. Some refinements needs to be made (fix Arduino timeouts, add error handling to urllib2 calls). Our next step will be to write code that analyzes the data, part of which will involve handling a large database.