NOTE: Problems 1, 2 and 3 are individual problems that require engineering format. Problem 4 is a team problem, although each member of the team should turn in the team’s work with their homework (for a team of 4, all 4 people will turn in a copy of the team’s work). Don’t forget to turn in your paper for problem 6. This will make keeping track of individual grades easier.

1. Uncle Fred decides that he’d like to build his own giant Arduino-Bot to ride. How much would Uncle Fred need to save per month if he wanted to be able to pay for his $20,000 giant robot in 5 years? Assume monthly compounding with 6% annual interest. $286.66

2. While looking on e-bay, Uncle Fred found a giant Arduino-Bot and was the highest bidder at $8,000.
   a. If he gets a 60-month loan with an annual interest rate of 9%, how much will he need to pay monthly? Assume monthly compounding. $166.07
   b. What is the total amount of money that Uncle Fred will pay for the robot (add all his payments)? $9,964.20

3. Uncle Fred decides that he needs a 3rd Arduino-Bot to complete his fleet.
   a. If the giant robot will cost $20,000 to build, how many years will it take him to save the money if he saves $1,000 per year with an interest rate of 6% compounded annually? Assume he puts the first $1,000 in the bank at the end of the first year. 13.53 years
   b. Let’s look deeper at the answer of 13.53 years provided in part a. How much will Uncle Fred have in the bank immediately after making his deposit at the end of year 13? $18,882.14
   c. If he does not make another deposit in the savings account, how much will he have at the end of year 14? Assume annual compounding as before. $20,015.07

4. Keep working on your prototype. Try to get all of your sensors working, although they may not be completely integrated into your prototype. For example, if you will be using an accelerometer to measure angles, then implement a program that can measure angles from your Arduino, even if the accelerometer is not yet attached to your prototype. If you are using multiple sensors, be thinking about how you will structure your Arduino sketch to include input from all sensors (and output to your actuators). For your homework, please list the sensors and output devices associated with your project and their current status:
   a. No implementation work yet for this sensor
   b. Sensor implemented by itself
   c. Sensor / device implemented with other sensors and/or output devices
   d. Sensor / device fully integrated into prototype
   A given sensor could have a status of b and d, which would mean you still needed to do some programming work related to the sensor, but other than that, it’s ready to go. An example of what your homework should look like is shown below:

<table>
<thead>
<tr>
<th>Sensor / Device</th>
<th>Status</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerometer</td>
<td>b, d</td>
<td>Program gives the angle, and sensor has been attached to prototype</td>
</tr>
<tr>
<td>Ping))</td>
<td>a, d</td>
<td>Need to program this sensor ASAP, sensor integrated into prototype</td>
</tr>
<tr>
<td>Servos</td>
<td>c</td>
<td>Implemented and everything seems to work</td>
</tr>
</tbody>
</table>

5. Bring what you need to class next time to work on your prototype; while it’s not necessary to work on your prototype in class, you do have a limited amount of time to use the classroom equipment. It’s also a good time to talk with your instructor about technical issues. Only a few more class periods remain before the Design Expo. Be sure to bring your safety glasses if you plan to do any fabrication.
6. As an engineer in a world that is becoming increasingly “flat,” it is very likely that you will work with people from other cultures during your career. Using the Internet and other sources, learn about cultural differences to help you prepare for these future interactions.

Pick a country other than your native country and discuss some of the things that you would need to consider when interacting with these people. Write a couple of paragraphs describing what you have learned (about ½ page is fine), and come to class ready to participate in an open discussion on this topic. **We expect you to spend about one hour completing this problem; this is not meant to be an exhaustive study of the topic.**

7. As you finish up your first year engineering courses, you will no longer be taking the same courses as students with other engineering majors. It is important that you be advised by a faculty member in your chosen major. Please check BOSS to see if you have an advisor already assigned to you. If not, please go to the Program Office for your major and ask the secretary there that you need an advisor:

   Biomedical Engineering       Biomedical Engineering Center 103
   Chemical Engineering        Biomedical Engineering Center 103
   Civil Engineering           Bogard Hall 222
   Electrical Engineering      Nethkin Hall 123
   Industrial Engineering      George T Madison Hall 330
   Mechanical Engineering      Bogard Hall 222
   NanoSystems Engineering     Nethkin Hall 123

   Please go by to meet your advisor to determine when he or she will be advising students. It is very important that you get a curriculum check sheet and start filling in your grades and planning your quarters. You can find a curriculum sheet online using a Google search such as “civil engineering curriculum Louisiana tech,” and these are also available outside Bogard Hall 210. Your advisor will be helping to make sure you stay on track, but please remember that you are the one with the most at stake, so ask questions to figure out when you should enroll in various courses and which courses are only offered once per year.

   The Associate Dean for Undergraduate Studies and the Student Success Specialist primarily provide advising of incoming students, so please start developing relationships with your advisor and the Program secretary as you move forward.