NOTE: Problems 1 through 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).

1. Uncle Fred is babysitting three of his nieces and nephews. At the playground, Uncle Fred, who weighs 200 pounds, sits on one side of the see-saw 3 feet away from the pivot. One of the kids, who weighs about 100 pounds, sits on the other side 2 feet away from the pivot. His sister, who doesn't like him, sits at the very end, 6 feet away from the pivot on the side opposite Uncle Fred. She weighs in at 75 pounds. Where must the 3rd child, who weighs 50 pounds, sit in order to balance the see-saw? 1 foot from the pivot on Uncle Fred's side.

2. Dr. Barker wants a new (to him) car. There is a 2004 330i available for $20,000. If he pays $2000 down payment, and finances $18,000, he has 2 options. One is through the local bank at 2.99% per year for 48 months, compounded monthly. The other is available through a credit union at 3.99% per year for 48 months and is a simple interest loan. Which loan has the greater future value (greater cost to Dr. Barker)? The simple interest loan has a greater future value (since the interest rate is higher); the compound loan is a better deal for Dr. Barker. F for the simple loan is $20,872.80, and F for the compound loan is 20,283.81.

3. If you want to have $5000 when you graduate from college to take a European vacation, how much would you need to invest now assuming you could earn a 5% annual interest rate compounded monthly over a 3-year period? Perform this calculation using the formula given in class. After performing the calculation, create an Excel spreadsheet listing the net worth of your account every month over the three year period (starting with the P you computed above and ending with $5000). $4,304.89

4. Implement at least one of the sensors that was loaned to you for the design project. Provide the following:
   a. The name of the sensor
   b. A description of how the sensor works (a few sentences is OK)
   c. The program listing you used to implement the sensor
   If you have several sensors, you should probably implement more than one for the next class.
   
   Note: Please remember to keep all of your sensor packaging in a safe place so you can return the sensor in the same packaging. This packaging is usually labeled and helps us to keep track of things, plus it protects the sensors. Also, please don’t solder anything to your sensor. We can provide three-conductor extensions to you, and you can purchase extensions with more conductors or longer extensions – see the Parallax web site and other sources. If you suspect that a sensor is broken, please let us know when you give it back – future students will be frustrated if they are provided with a broken sensor. We will not charge you for an electrically damaged sensor, only for a mechanically damaged sensor or a sensor that is not returned. Still, please be careful not to carelessly “fry” a sensor through improper wiring.

5. Keep working on your prototype and incorporating your sensors. The 3rd prototype will be due on class 14 (class after next) and the final prototype is due at the Expo on Class 18. Stay focused and make sure you go ahead and move forward with prototyping. You don’t have to turn in anything for this problem.

6. Bring any tools you need to class next time to work on your prototype. You should have about one hour in class to work on the prototype. Be sure to bring your safety glasses.