1. Required Problems

Solve all required Problems 1–4. Note that we have deliberately under-specified some of these problems. Use your best judgement and document your code **clearly**. You may not use arrays for any of the following problems. You must use **TokenReader** to gather all input. **You may use the space/paper saving techniques posted to the newsgroup for printing programs and output.**

1. Do Programming Project 2.11 from Lewis&Loftus. Name the program **Project2_1**. Thus, the Main Class should have the name **Project2_1**. Hint: You will have to change the Java target setting for CodeWarrior.

   Demonstrate your program with the following data. The total amount of gas used is 5 gallons. The start and end readings of the trip-odometer are 13 and 140 miles, respectively.

2. Write a program called **Project2_2** to: (1) Read in a sequence of *positive* integers – a non-positive integer terminates the sequence (2) Print the number of multiples of 5 found in the sequence.

   Demonstrate your program with the following input sequences:

   - 5, 21, 1, 21, 25, 32, -1
   - 0, 5, -1 (Hint: What should the program do if the user enters zero? Beware of what *positive* means!)
   - 150, -1

3. Write a program called **Project2_3** to: (1) Read in a sequence of integers between ± 100, inclusive – an out-of-range number terminates the sequence (2) Print the number of sign changes for the sequence. Recall that there are three different signs: +, 0, and –.

   Demonstrate your program with the following input sequences:

   - -99, -97, 12, -10, 1, -2, 101
   - 1, -1, 0, 1, -1, 101
   - 1, -101
   - 2000

4. Write a program called **Project2_4** to: (1) Read in a sequence of elevations from a contour map, terminated by **-1** (2) Print the two neighboring elevations with the steepest gradient. The gradient G between elevations x and y is $G = |x - y|$, assuming constant spacing between measurements.

   Demonstrate your program with the following input sequences:

   - 52, 63, 63, 95, 100, -1
   - 0, -1

2. Bonus Problem

The following problem is optional and, consequently, worth bonus points: Do Programming Project 2.9 from Lewis&Loftus. The Main Class should have the name **Project2_B**.

3. What To Submit

Follow the submission instructions and other procedures from the Projects page on the CS100 Course Website. You should include all programs and output from each.