Problem 1. (Total 25 pts)

(a) (15 pts) We are interested in a function similar to the almostmax1.m function from class, but we want it to work on vectors that might have repeated values; in particular, we want the function output to be the second-highest distinct value in the input vector. (For example, suppose that you have a vector [2 4 4 1]. In this case the second-highest distinct value is 2.) Call your new function almostmaxnew.m. You may assume that the input vector has at least three elements, and you must allow for the possibility that there isn’t a second-highest distinct value. Do not use any Matlab vector operations or internal functions except length.

(b) (10 pts) Write a function called convert.m for which the input is a single temperature value in degrees Fahrenheit, and which gives two outputs: the corresponding temperature in degrees Kelvin, and in degrees Celsius. I should be able to call the function as follows:

```matlab
>> [K C] = convert(F);
```

where F is a temperature in degrees Fahrenheit, and K and C are respectively the conversions to Kelvin and Celsius.

Problem 2. (Total 25 pts) When one considers quantities that fluctuate strongly, it is often useful to look at so-called local averages. For example, suppose you have a vector \( G = [G_1 G_2 \ldots G_N] \), where \( G_i \) is the price of a gallon of regular unleaded gasoline at your corner gas station on day \( i \). Since \( G_i \) can be subject to random fluctuations, you decide that it’s better to look at three-day average gas prices. For a given day \( i \), then, you define the three-day average gas price as \( (G_i + G_{i-1} + G_{i-2})/3 \). You want to write a function that takes in the vector \( G \), then tells you what the lowest three-day average gas price is, and on what day \( i \) that low three-day average was achieved. You only need to consider the three-day averages for days 3 through \( N \), and you can assume that \( N \) is at least 3.

(a) (7 pts) Depict this function in a flowchart. Assume that \( G \) and \( N \) can be input to the flowchart.

(b) (18 pts) Implement the function in Matlab, using the file name lowavg.m. Define the function so that the input is just the \( G \) vector, and the output has the form \([L \ i]\), where \( L \) is the lowest three-day average and \( i \) is the corresponding day. You may not use any Matlab vector operations or internal functions except length.