EELE 475
Assignment #4
Due Tuesday Oct 4, 2011
You will need this for lab #5 (You will have two weeks to do lab #5)

Create a function that will parse the NMEA codes coming from a UART (as well as computing the checksum) that will be implemented in lab #5 starting next week (Sept 27).

The objective is to get the information contained in the GPGGA data set.

```
$GPGGA,21018.00,4539.99762,N,11102.78175,W,1,07,1.14,1518.3,M,-17.6,M,,*52
```

Characters will be streaming in that looks like the following (there is a CR-LF at the end of each data set).

```
$GPGLL,4539.99781,N,11102.77595,W,210416.00,A,A*4
$GPRMC,210417.00,A,4539.99764,N,11102.77603,W,0.444,,280909,,,A*65
$GPVTG,,T,,M,0.444,N,0.822,K,A*2F
$GPGGA,210417.00,4539.99764,N,11102.77603,W,1,07,1.13,1516.1,M,-17.6,M,,*5C
$GGSA,A,3,26,27,09,02,28,17,12,,,,,,1.87,1.13,1.48*07
$GPGSV,4,1,13,02,17,190,18,04,40,169,11,09,47,292,35,11,04,042,*72
$GPGSV,4,2,13,12,16,296,22,14,01,345,,15,03,234,27,17,66,051,24*71
$GPGSV,4,3,13,20,11,069,2,0,323,26,27,53,277,36,28,34,105,19*7F
$GPGSV,4,4,13,32,06,044,21*4F
$GPGLL,4539.99764,N,11102.77603,W,210417.00,A,A*72
$GPRMC,210418.00,A,4539.99756,N,11102.77591,W,0.285,,280909,,,A*68
$GPVTG,,T,,M,0.285,N,0.527,K,A*2C
$GPGGA,210418.00,4539.99756,N,11102.77591,W,1,07,1.13,151.1,M,-17.6,M,,*5A
$GPGSA,A,3,26,27,09,02,28,17,12,,,,,,1.87,1.13,1.48*07
$GPGSV,4,1,13,02,17,190,19,04,40,169,08,09,47,292,35,11,04,042,*7B
$GPGSV,4,2,13,12,16,296,22,14,01,345,,15,03,234,27,17,66,051,23*76
$GPGS,43,13,20,11,069,,26,09,323,27,27,53,277,37,28,34,105,19*7F
$GPGSV,4,4,13,32,06,044,22*4C
$GPGLL,4539.99756,N,11102.77591,W,210418.00,A,A*74
```

For this homework, read in the file GPS_characters.txt. Read in the file a single character at a time and print out the relevant information from the GPGGA packet to the console each time you encounter it. Take a picture of the command window that shows this information.

Do not use any standard libraries for parsing; you need to create your own parsing functions where data is coming one character at a time.

Information on how to interpret the GPGGA data set can be found on page 92 of GPS_Info.pdf (found on D2L site). You will need to check the checksum for any errors and ignore the dataset if there are errors. Information on how to calculate the checksum can be found on page 98. Information on WGS-84 can be found on page 60.

Information on computing the distance between two latitude/longitude points can be found at: http://www.movable-type.co.uk/scripts/latlong-vincenty.html