# 2108-511 Numerical Techniques in Geomatics
# Assignment#2

This assignment involves using Matlab's relational/logical operations as well as logical indexing to subset data from a real-world data set and compute the desired statistics.

The given file 'kl_tg_93_08.txt' contains monthly-averaged sea level of the year 1993-2008 at Ko Lak tidal station in Prachuab Khirikhan. A part of this file is shown below.

```
1993.042        0.168
1993.125        0.041
1993.208        0.029
1993.292        -0.033
1993.375        -0.116
1993.458        -0.245
1993.542        -0.244
1993.625        -0.221
1993.708        -0.154
1993.792        0.069
1993.875        0.161
1993.958        0.191
1994.042        0.143
1994.125        -0.003
1994.208        0.155
1994.292        -0.032
1994.375        -0.175
1994.458        -0.252
1994.542        NaN
1994.625        -0.255
1994.708        -0.226
```

The first column is the year/month in format yyyy.mmm (e.g. 1993.208) where yyyy designates year and mmm designates the middle of the month. The number 1993 means 1993 CE and .208 means the middle of March (0.208 = 2.5/12).

The second column contains average sea height (in m) of each month relative to mean sea level (MSL) which is set to zero.

Use **load** function to obtain data in a text file. For example,

**load kl_tg_93_08.txt**

will read all data in the file and automatically assign to an array **kl_tg_93_08**.

Another format giving you more control of the variable name used to store the data is exemplified below:

**dat = load('kl_tg_93_08.txt')**

which will read all data into an array **dat**.

Answer the following questions:

1. How many months having no data (**NaN**)? And in which year does this happen? Use **isnan** function to find NaN.

After the completion of question 1, you may need to remove all months having no data (NaN) in order to avoid complicating further computations. Any arithmetic operations involving NaN will results in NaN.

2. How many months are there in the data set that sea level is
    a. below MSL
    b. higher than MSL?

3. In which year that the annual average sea level is lowest and highest?

4. Taking all data into consideration, in which month of the year that the sea level is highest? In order to separate the fraction part (which in our case represents month of the year) from a real number, use Matlab's **fix** function to obtain the integer part and then subtract it from the number.

5. Find the mean of sea level of 4 4-year periods:
    a. 1993-1996,
    b. 1997-2000,
    c. 2001-2004 and
    d. 2005-2008.

    What are the patterns that you can notice?