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%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% ENGR 132
% Program Description
% The purpose of this program is to analyze data - volcano type, name,
% country, latitude, longitude, and elevation above sea level -
% which involves volcanos from all around the world and is gathered by
% remote sensing. The analysis is conducted based on the limitations
% of the tools used for the data collection.
%
% Assigment Information
%   Assignment:     PS 02, Problem 2
%   Author:         Tomoki Koike, koike@purdue.edu
%   Team ID:        002-08
%   Contributor:    no contributor
%   My contributor(s) helped me:
%     [ ] understand the assignment expectations without
%         telling me how they will approach it.
%     [ ] understand different ways to think about a solution
%         without helping me plan my solution.
%     [ ] think through the meaning of a specific error or
%         bug present in my code without looking at my code.
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

# INITIALIZATION

```
%Importing the data file of volcanoes
volcanoData = csvread('Data_volcano_list.csv', 1, 3);

%Setting variables for the columns in the data table
latit = volcanoData(:,1);    %The columns for the latitude of the
                             %volcanoes (DD: decimal degrees)
long = volcanoData(:,2);     %The columns for the longitude of the
                             %volcanoes (DD)
elevtn = volcanoData(:,3);   %The columns for the elevation of the
                             %volcanoes (m: meters)

%Settings of rows that are stratovolcanoes
```

```
latitStrato = volcanoData(121:395,1);
longStrato = volcanoData(121:395,2);
elevtnStrato = volcanoData(121:395,3);
```

# CALCULATIONS

```
%A. How many volcanoes are visible in the PoLAR Viewer images and
%what is their average elevation?
%How many?
polView_volc = find(latit >= 50);  %Finding the row indices with
                                   %volcanoes that have latitudes
                                   %larger than 50 (DD)
polView_number = numel(polView_volc);
                                   %The number of volcanoes that were
                                   %listed up by the previous command
%Average Elevation?
polView_elevtn = elevtn(polView_volc,:);
                                   %The elevation of the volcanoes
                                   %with latitudes larger than 50 DD
polView_AvgElevtn = mean(polView_elevtn);
                                   %The average elevation of the
                                   %volcanos with latitudes larger
                                   %than 50 DD


%B. How many stratovolcanoes are visible in the VII images and what
%is the minimum and maximum elevation found in the stratovolcanoes
%visible to VII?
%How many?
VII_strato = find((latitStrato <= 0)&(elevtnStrato > 2500));
%The row indices of stratovolcanoes that have elevation higher
%than 2500 and latitude equal to or less than 0
VII_stratoNumber = numel(VII_strato); %The number of stratovolcanoes
                                      %listed by the previous
                                      %command
%The minimum and maximum elevation?
VII_stratoElevtn = elevtnStrato(VII_strato);
                                      %The elevations of the
                                      %stratovolcanoes with
                                      %elevation higher than 2500
                                      %and latitude equal to or less
                                      %than 0 (m)
VII_stratoElevtnMin = min(VII_stratoElevtn);
                                      %The minimum elevation within
                                      %the elevations listed in the
                                      %previous command (m)
VII_stratoElevtnMax = max(VII_stratoElevtn);
                                      %The maximum elevation within
                                      %the elevations listed in the
                                      %previous command (m)
```

```
%C. How many stratovolcanoes and how many non-stratovolcanoes are
%visible in the ACP-1 images?
%How many stratovolcanoes?
ACP_strato = find(-39.5<=latitStrato & latitStrato<=39.5);
%The row indices of the stratovolcanoes with latitudes bigger than and
%equal -39.5 and lower than and equal to 39.5 (DD)
ACP_stratoNumber = numel(ACP_strato); %The number of stratovolcanoes
                                      %listed in the previous command
%How many non-stratovolcanoes?
ACP_volc = find(-39.5<=latit & latit<=39.5);
%The number of any type of volcano that have a latitude higher than
%and equal to -39.5 and lower than and equal to 39.5 (DD)
ACP_volcNumber = numel(ACP_volc); %The number of volcanoes listed in
                                  %the previous command
ACP_nonstratoNumber = ACP_volcNumber - ACP_stratoNumber;
                               %The number of non-stratovolcanoes that
                               %have a latitude higher than and equal
                               %to -39.5 and lower than and equal to
                               %39.5


%D. How many stratovolcanoes are visible in the MASC images and
%what is their average elevation?
%How many?
MASC_strato = find((100<=longStrato & longStrato<145)|(-140<longStrato
 & longStrato<=-120));
%The stratovolcanoes that are visible with MASC (DD)
MASC_stratoNumber = numel(MASC_strato);
%The number of stratovolcanoes that are listed in the previous command
%Average elevation?
MASC_stratoElevtn = elevtnStrato(MASC_strato,:);
                              %The elevations of the stratovolcanoes
                              %listed in the previous command(m)
MASC_stratoAvgElevtn = mean(MASC_stratoElevtn);
                              %The average elevation of the elevations
                              %listed in the previous command (m)


% _____________________
```

# FORMATTED TEXT DISPLAYS

```
%A
fprintf("The number of volcanoes visible in the Polar Viewer is
 %d and the average elevation of those volcanoes is %.2f m.\n",
 polView_number, polView_AvgElevtn);
%B
fprintf("The number of stratovolcanoe visible in the VII is %d and
 the minimum and maximum elevations among those stratovolcanoes
 are %d m and %d m.\n", VII_stratoNumber, VII_stratoElevtnMin,
 VII_stratoElevtnMax);
```

```
%C
fprintf("The number of statovolcanoes and non-stratovolcanoes
 visible in the ACP-1 are %d and %d.\n",  ACP_stratoNumber,
 ACP_nonstratoNumber);
%D
fprintf("The number of stratovolcanoes visible in the MASC is %d
 and the average elevation of those stratovolcanoes is %.2f m.\n",
 MASC_stratoNumber, MASC_stratoAvgElevtn);
```

```
The number of volcanoes visible in the Polar Viewer is 81 and the
 average elevation of those volcanoes is 2060.93 m.
The number of stratovolcanoe visible in the VII is 40 and the minimum
 and maximum elevations among those stratovolcanoes are 2518 m and
 6887 m.
The number of statovolcanoes and non-stratovolcanoes visible in the
 ACP-1 are 174 and 95.
The number of stratovolcanoes visible in the MASC is 85 and the
 average elevation of those stratovolcanoes is 2097.15 m.
```

# ACADEMIC INTEGRITY STATEMENT

I have not used source code obtained from any other unauthorized source, either modified or unmodified. Neither have I provided access to my code to another. The code I am submitting is my own original work.

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