

Computer Applications in CEE- Assignment #7 Solution

Problem 1

Task 1:

There are multiple ways for doing this task, for a small data file we can use the “xlsread” function.

```
% Assignment 7 Computer Apps

clc;
clear;

% Reading the Excel File

[num,txt,row] = xlsread('C:\Users\Navid\Documents\MATLAB\US_dams_clean.xlsx','damData');
```

Task 2:

```
% Finding Dams with Normal Storage More than 50,000 acre-feet
% Normal Storage is column 6 in num, * Note: Num returns all the numerical
% values from the Excel File.

desired = find(num(:,6) > 50000);

% Now we need to read the dams' names from row which has one more row
disp('List of First 15 Dams with More than 50,000 acre-feet Storage:');
disp(row(desired(1:15) + 1,1));
```

Command Window Result:

```
List of First 15 Dams with More than 50,000 acre-feet Storage:
'TOA VACA DAM'
'STRUCTURE 333'
'STRUCTURE 336'
'STRUCTURE 12A'
'STRUCTURE 12B'
'STRUCTURE 12C'
'STRUCTURE 12D'
'STRUCTURE 337'
'STRUCTURE NO. 31'
'STRUCTURE NO. 141 (SPILLWAY L-38E-1)'
'STRUCTURE NO. 143 (CULVERT L-35B-1)'
'STRUCTURE 11A'
'STRUCTURE 11B'
'STRUCTURE 11C'
'PUMPING STATION NO. 8'
```

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- Note: Always check your variables from the workspace tab and double check to see whether your command is returning what you actually were looking for.

You should get 1,186 dams with that criteria, with an average of $8.82e+6$ acre-feet.

Task 3:

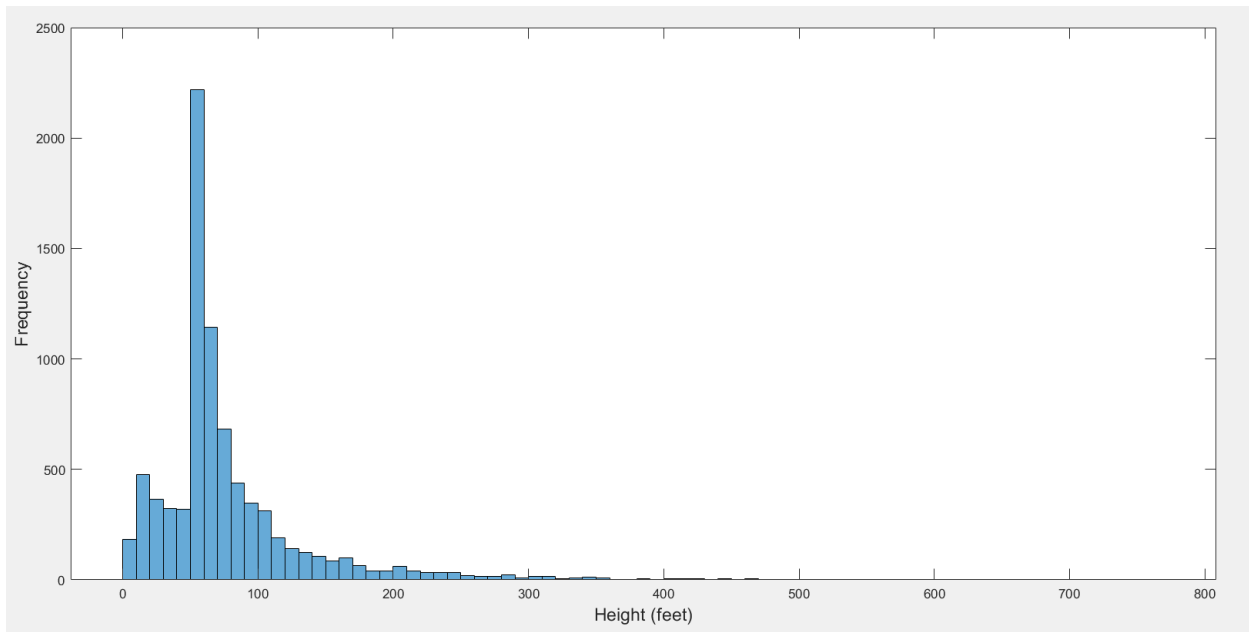
Now we simply find the indices of those dams built after 1945. Some rows are entered as 9999, therefore we restrict them

```
% Finding the dams built after 1945, last column in num variable

dams_after1945 = raw(find(num(:,end) > 1945 & num(:,end) < 9999) + 1,:);
length(dams_after1945)
nanmean(cell2mat(dams_after1945(:,6)))
disp(dams_after1945(1:15,1));
```

You should find 5,274 dams with an average height of 81.25 feet. Note: some rows have blank (NaN) values that's why I used **nanmean** instead of regular mean. Another approach is to first identify the dams with values less than 9999 and then perform the analysis on the remaining dams.

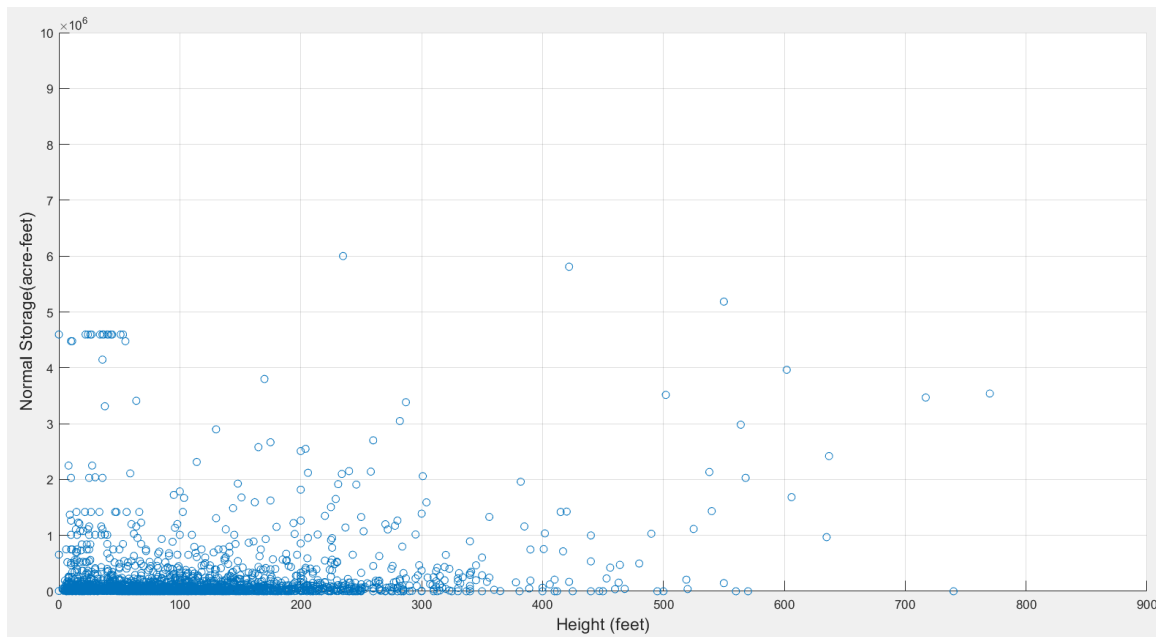
Task 4:



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For the second part, you can easily plot a scatter plot, but there's a dam with an enormous storage which causes every other dam to be around the x-axis, therefore you can fix your axis to have a better representation.

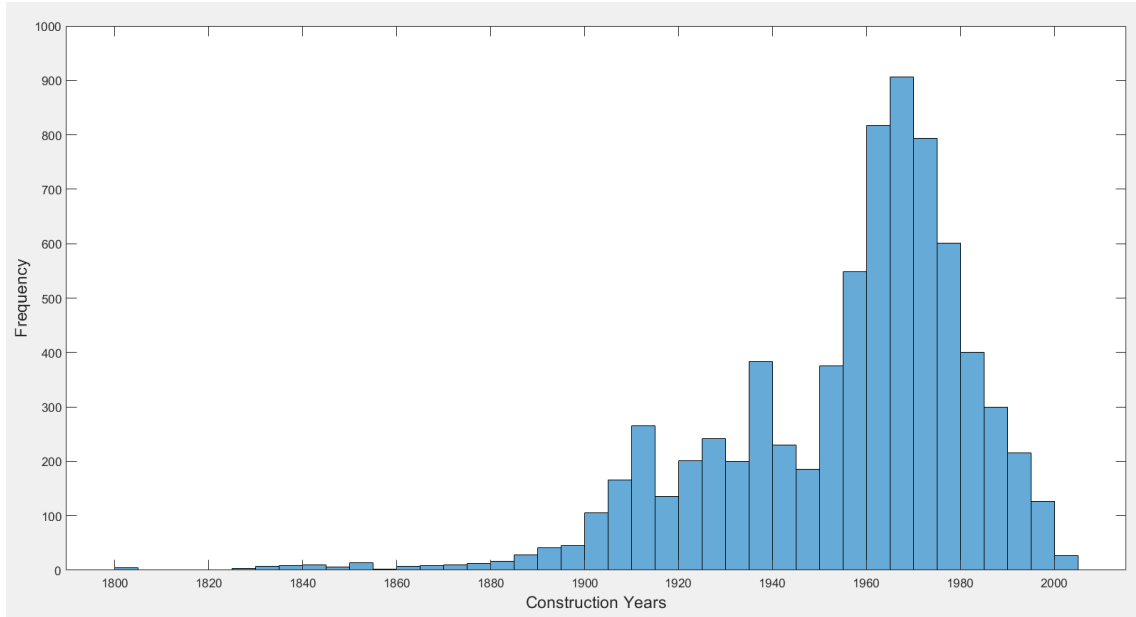
```
figure;  
scatter(num(:,4),num(:,6));  
grid on;  
axis([0 900 0 10e6]);  
xlabel('Height (feet)','fontsize',14);  
ylabel('Normal Storage(acre-feet)','fontsize',14);
```



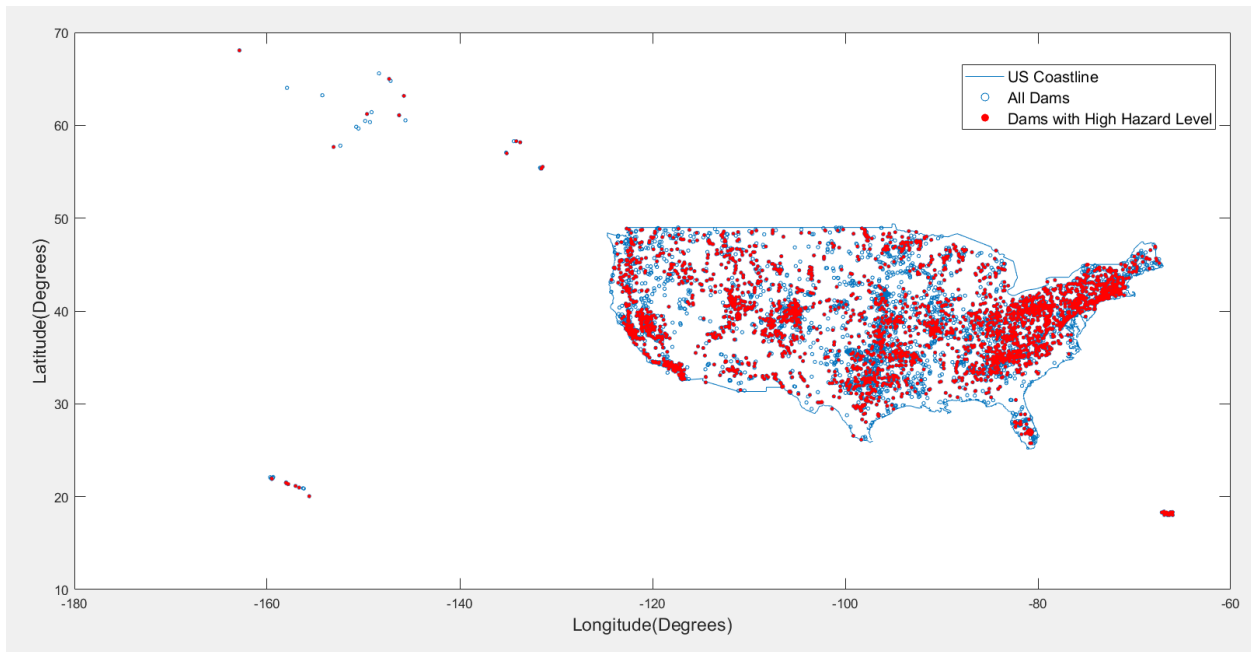
Problem 2:

Task 1:

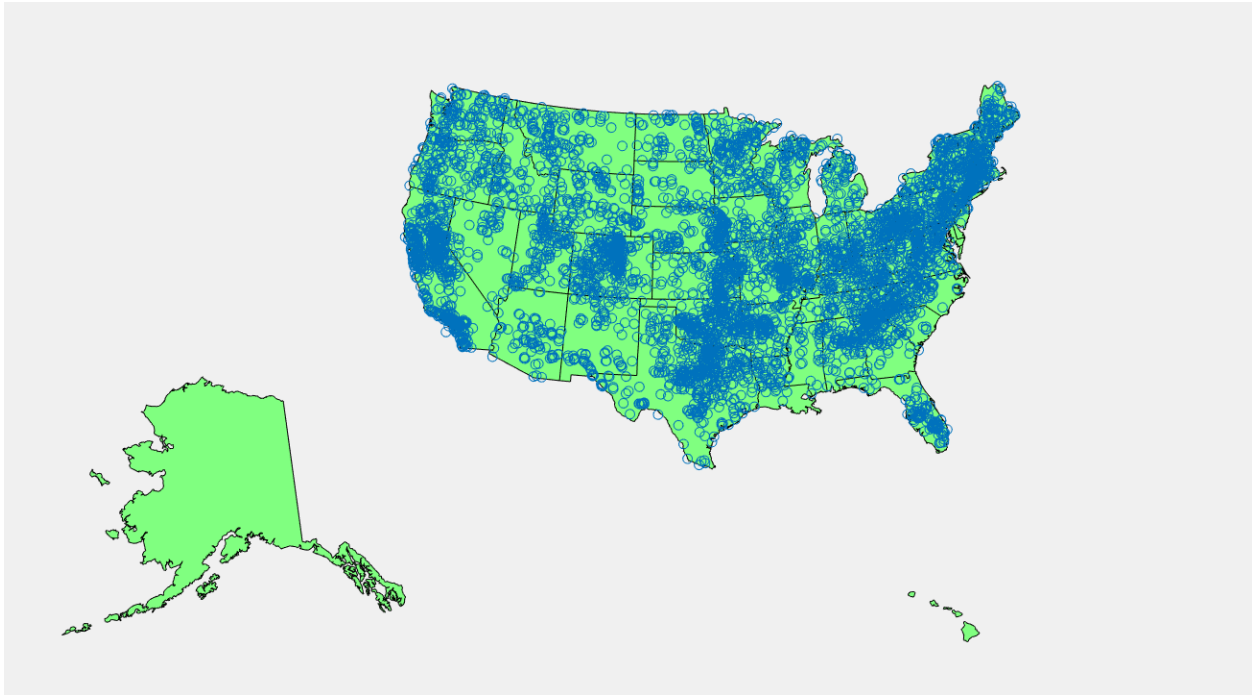
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Task 2 & 3:



Or you can construct US map by geoshow functions in MATLAB and create something similar to the following plot:



Problem 3

Very simple function in MATLAB, similar to one of your previous assignments where you wrote the function in VBA.

Problem 4

Task 1:

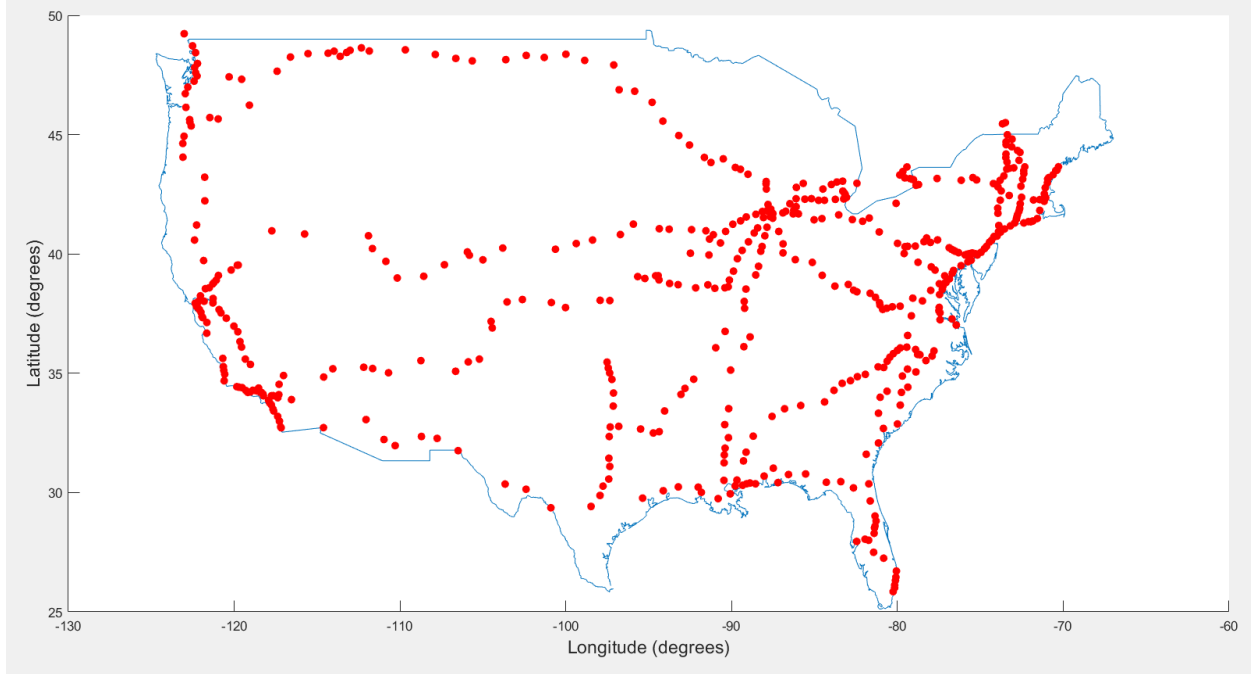
Simply parse the excel file. You can use readtable function for parsing a variety of files in MATLAB.

Task 2:

First find 'RAIL' indices:

```
rail_index = find(ismember(amtrack.Station_Type,'RAIL'));
```

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Task 3:

In Virginia:

