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1 clc
2 clear
3 %loading data and selecting date rows and data row
4 load data_sectionM.mat
5 data=[SECTION_M(1,4:end);
6     SECTION_M(2,4:end);
7     SECTION_M(3,4:end);
8     SECTION_M(51,4:end)];
9
10 %{
11 %Making sure data is good, adding extra decimals to check✓
if more data.
12 column=5;
13 year=data(1,column);
14 month=data(2,column);
15 day=data(3,column);
16 temperature=data(4,column);
17 fprintf('year=%d month=%d day=%d temperature=%.8f\n',' ',✓
year,month,day,temperature)
18 %}
19
20 %extracting monthly mean, maximum, and minimum✓
temperatures from the data. This
21 %will create three row vectors with 504 items in each✓
because there are 504
22 %months in 42 years of data.
23 %means
24 %max
25 %mins
26
27 %prepare for loop
28 %set empty vectors
29 current_month=1 ;
30 temperatures=[];
31 mean_monthly_temperatures=[];
32 max_monthly_temperatures=[];
33 min_monthly_temperatures=[];
34 %set loop for finding the hottest and coldest temperature✓

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along with when

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35 %they occurred
36 hottest.temp=-1000;
37 coldest.temp=1000;
38 %run through data
39 for i=1:length(data)
40     year=data(1,i);
41     month=data(2,i);
42     day=data(3,i);
43     temp=data(4,i);
44     %within loop, append to vectors
45     if month~=current_month
46         len=length(mean_monthly_temperatures);
47         mean_monthly_temperatures(len+1)=mean(
temperatures);
48         max_monthly_temperatures(len+1)=max(temperatures);
49         min_monthly_temperatures(len+1)=min(temperatures);
50         temperatures=[];
51     end
52     temperatures(day)=temp;
53     %locate when hottest or coldest temperature happened
54     if hottest.temp < temp
55         hottest=struct('temp',temp,'year',year,'month',
month,'day',day);
56     end
57     if coldest.temp > temp
58         coldest=struct('temp',temp,'year',year,'month',
month,'day',day);
59     end
60     current_month=month;
61 end
62 len=length(mean_monthly_temperatures);
63 %disp for assignment clarity so leaving out semicolon
64 mean_monthly_temperatures(len+1)=mean(temperatures)
65 max_monthly_temperatures(len+1)=max(temperatures)
66 min_monthly_temperatures(len+1)=min(temperatures)
67 disp(hottest)
68 disp(coldest)
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69
70 %making x-axis for graph
71 datestamps=(datetime(1975,1,1):calmonths(1):datetime(
(2016,12,31)));
72 datestamps.Format='MMM-yyyy';
73
74 %plot the three graphs in one figure
75 figure(1)
76 subplot(3,1,1)
77 plot(datestamps,mean_monthly_temperatures,'k-')
78 xlabel('Months between Jan-1975 and Dec-2016')
79 ylabel('Temperature(C°)')
80 title('Mean Monthly Temperature at Longitude -176.875,
Latitude 83.625')
81
82 subplot(3,1,2)
83 plot(datestamps,max_monthly_temperatures,'k-')
84 xlabel('Months between Jan-1975 and Dec-2016')
85 ylabel('Temperature(C°)')
86 title('Maximum Monthly Temperature at Longitude -176.875,
Latitude 83.625')
87
88 subplot(3,1,3)
89 plot(datestamps,min_monthly_temperatures,'k-')
90 xlabel('Months between Jan-1975 and Dec-2016')
91 ylabel('Temperature(C°)')
92 title('Mininum Monthly Temperature at Longitude -176.875,
Latitude 83.625')
93
94 %need to extract all months together
95 % alljans=mean_monthly_temperatures(1:12:504);
96 %allfebs=mean_monthly_temperatures(2:12:504);
97 %allmars=mean_monthly_temperatures(3:12:504);
98 %above is too lengthy so prepare for a loop to create a
matrix
99
100 allmeans = zeros(12,42);
101 allmax = zeros(12,42);

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102 allmin = zeros(12,42);
103 for i=1:12
104     allmeans(i,:)=mean_monthly_temperatures(i:12:504);
105     allmax(i,:)=max_monthly_temperatures(i:12:504);
106     allmin(i,:)=min_monthly_temperatures(i:12:504);
107 end
108 %combine matrices and display
109 allmonths=cat(1,allmeans,allmax,allmin)
110
111
112 juliantable=zeros(36,6);
113 for i=1:36
114     juliantable(i,1)=min(allmonths(i,:));
115     juliantable(i,2)=mean(allmonths(i,:));
116     juliantable(i,3)=median(allmonths(i,:));
117     juliantable(i,4)=mode(allmonths(i,:));
118     juliantable(i,5)=max(allmonths(i,:));
119     juliantable(i,6)=std(allmonths(i,:));
120 end
121 %create labelled table
122 description={'min','mean','median','mode','max','std'};
123 months={'Jan (Mean) ','Feb (Mean) ','Mar (Mean) ','Apr (
(Mean) ','May (Mean) ','Jun (Mean) ','Jul (Mean) ','Aug (Mean) ','Sep (
(Mean) ','Oct (Mean) ','Nov (Mean) ','Dec (Mean) ','Jan (
(ExtMax) ','Feb (ExtMax) ','Mar (ExtMax) ','Apr (ExtMax) ','May (
(ExtMax) ','Jun (ExtMax) ','Jul (ExtMax) ','Aug (ExtMax) ','Sep (
(ExtMax) ','Oct (ExtMax) ','Nov (ExtMax) ','Dec (ExtMax) ','Jan (
(ExtMin) ','Feb (ExtMin) ','Mar (ExtMin) ','Apr (ExtMin) ','May (
(ExtMin) ','Jun (ExtMin) ','Jul (ExtMin) ','Aug (ExtMin) ','Sep (
(ExtMin) ','Oct (ExtMin) ','Nov (ExtMin) ','Dec (ExtMin) '};
124 juliantablelabelled=array2table(
(juliantable,'VariableNames',description,'RowNames',months);
125 writetable(juliantablelabelled,'juliantable.
xls','WriteRowNames',true)
126 disp(juliantablelabelled)
127
128 %write a function to polyfit, subplot, and return slopes
129 slopesmean=showpolyfittemp(2,allmeans,'Mean Temp(C°)');

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130 slopesmax=showpolyfittestemp(3,allmax,'Max Temp(C°)');
131 slopesmin=showpolyfittestemp(4,allmin,'Min Temp(C°)');
132
133 %create a table with the slopes
134 description={'Months','Mean T','ExtMax T','ExtMin T'};
135 months=✓
{'Jan','Feb','Mar','Apr','May','Jun','Jul','Aug','Sep','Oct',✓
'Nov','Dec'}';
136 SlopeTable=table(months,slopesmean,slopesmax,✓
slopesmin,'VariableNames',description);
137 disp(SlopeTable)
138 writetable(SlopeTable,'slopetable.xls')
```