

## SP106-107 Getting Started with SAS Programming

### 106 Export Results, Exporting Reports

### 107 Using SQL in SAS, Joining Tables using SQL in SAS

```
*****.
* p106a02.sas Activity 6.02 *;
* 1) Complete the PROC EXPORT step to read the *;
* PG1.STORM_FINAL SAS table and create a *;
* comma-delimited file named STORM_FINAL.CSV. Use *;
* &outpath to substitute the path of the output *;
* folder. *;
* 2) Run the program and view the text file: *;
* *;
* SAS Studio - Navigate to the output folder in the *;
* Navigation pane, right-click on storm_final.csv, *;
* and select View File as Text. *;
* *;
* Enterprise Guide - Select Open -> Navigate to the *;
* output folder in the Servers pane, right click *;
* storm_final.csv and select Open. *;
*****.
* Syntax *;
* *;
* PROC EXPORT DATA=input-table *;
* OUTFILE="output-file" *;
* <DBMS=identifier> <REPLACE>; *;
* RUN; *;
*****.
```

```
proc export data=pg1.storm_final
```

```
    outfile="&outpath/storm_final.csv"
```

```
    dbms=csv replace;
```

```
run;
```

```
NOTE: The file '/home/u58304328/EPG1V2/output/storm_final.csv' is:
      Filename=/home/u58304328/EPG1V2/output/storm_final.csv,
      Owner Name=u58304328,Group Name=oda,
      Access Permission=-rw-r--r--,
      Last Modified=26Apr2021:23:55:22
```

```
NOTE: 3093 records were written to the file '/home/u58304328/EPG1V2/output/storm_final.csv'.
      The minimum record length was 69.
      The maximum record length was 124.
```

```
NOTE: There were 3092 observations read from the data set PG1.STORM_FINAL.
```

```
*****;
```

```
* p106a03.sas Activity 6.03          *;
```

```
* 1) Complete the LIBNAME statement using the XLSX    *;
```

```
*   engine to create an Excel workbook named        *;
```

```
*   storm.xlsx in the output folder.                *;
```

```
* 2) Modify the DATA step to write the storm_final  *;
```

```
*   table to the storm.xlsx file.                   *;
```

```
* 3) After the DATA step, write a statement to clear *;
```

```
*   the library.                                     *;
```

```
* 4) Run the program and view the log to confirm that *;
```

```
*   storm.xlsx was exported with 3092 rows.          *;
```

```
* 5) If possible, open the storm.xlsx file. How do   *;
```

```
*   dates appear in the storm_final workbook?        *;
```

```
*****;
```

```
* Syntax          *;
```

```
* LIBNAME libref xlsx "path/file.xlsx";             *;
```

```
* <use libref for output table(s)>                  *;
```

```
* LIBNAME libref CLEAR;                              *;
```

```
*****;
```

```
libname xl_lib xlsx "&outpath/storm.xlsx";
```

```
data xl_lib.storm_final;
```

```
    set pg1.storm_final;
```

```
    drop Lat Lon Basin OceanCode;
```

```
run;
```

```
libname xl_lib clear;
```

```
93      libname xl_lib xlsx "&outpath/storm.xlsx";
```

```
NOTE: Libref XL_LIB was successfully assigned as follows:
```

```
      Engine:      XLSX
```

```
      Physical Name: /home/u58304328/EPG1V2/output/storm.xlsx
```

```
94
```

```
95      data xl_lib.storm_final;
```

```
96      set pg1.storm_final;
```

```
97      drop Lat Lon Basin OceanCode;
```

```
98      run;
```

```
NOTE: There were 3092 observations read from the data set PG1.STORM_FINAL.
```

```
NOTE: The data set XL_LIB.storm_final has 3092 observations and 11 variables.
```

```
NOTE: The export data set has 3092 observations and 11 variables.
```

```
*****;
```

```
* p106a04.sas Activity 6.04      *;
```

```
* 1) Add ODS statements to create an Excel file named *;
```

```
* pressure.xlsx in the output folder. Be sure to *;
```

```
* close the ODS location at the end of the program. *;
```

```
* Run the program and open the Excel file.      *;
```

```
* * SAS Studio: Navigate to the output folder in *;
```

```
* the Files and Folders section of the navigation *;
```

```
* pane. Select pressure.xlsx and click Download. *;
```

```
* * Enterprise Guide: Click the Results - Excel tab *;
```

```
* and click Download.      *;
```

```

* 2) Add the STYLE=ANALYSIS option in the first ODS  *;
* EXCEL statement. Run the program again and open  *;
* the Excel file.  *;
*****.

```

```

*Add ODS statement;

ods excel file="&outpath/pressure.xlsx" style=analysis;

title "Minimum Pressure Statistics by Basin";

ods noproctitle;

proc means data=pg1.storm_final mean median min maxdec=0;
  class BasinName;
  var MinPressure;
run;

```

```

title "Correlation of Minimum Pressure and Maximum Wind";

proc sgscatter data=pg1.storm_final;
  plot minpressure*maxwindmph;

run;

title;

```

```

*Add ODS statement;

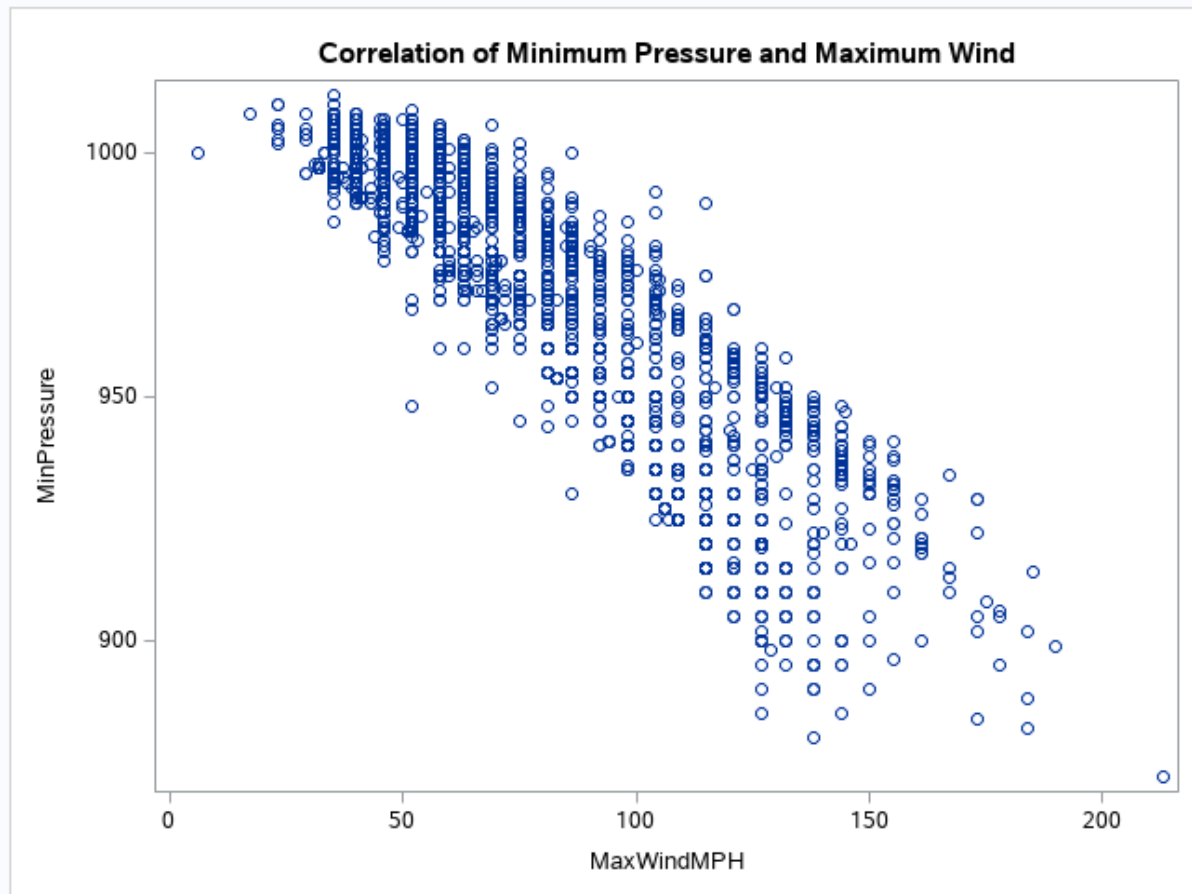
ods excel close;

ods proctitle;

```

### Minimum Pressure Statistics by Basin

Analysis Variable : MinPressure				
BasinName	N Obs	Mean	Median	Minimum
East Pacific	675	979	987	872
North Atlantic	478	980	988	882
North Indian	60	983	989	920
South Indian	594	965	974	895
South Pacific	359	967	975	884
West Pacific	928	962	965	880



```

*****;

* p106a05.sas Activity 6.05          *;

* 1) Run the program and open the pressure.pptx file.  *;

* 2) Modify the ODS statements to change the output  *;

*   destination to RTF. Change the style to sapphire. *;

* 3) Run the program and open the pressure.rtf file.  *;

* 4) Add the STARTPAGE=NO option in the first ODS RTF *;

*   statement to eliminate the page break.          *;

* 5) Rerun the program and examine the results in   *;

*   Microsoft Word.                                *;

*****;

```

```
ods powerpoint file="&outpath/pressure.pptx" style=powerpointlight;
```

```
title "Minimum Pressure Statistics by Basin";
```

```
ods noproctitle;
```

```
proc means data=pg1.storm_final mean median min maxdec=0;
```

```
  class BasinName;
```

```
  var MinPressure;
```

```
run;
```

```
title "Correlation of Minimum Pressure and Maximum Wind";
```

```
proc sgscatter data=pg1.storm_final;
```

```
  plot minpressure*maxwindmph;
```

```
run;
```

```
title;
```

```
ods powerpoint close;
```

```
ods rtf file="&outpath/pressure.rtf" style=sapphire;
```

```
title "Minimum Pressure Statistics by Basin";
```

```
ods noproctitle;
```

```
proc means data=pg1.storm_final mean median min maxdec=0;
```

```
    class BasinName;
```

```
    var MinPressure;
```

```
run;
```

```
title "Correlation of Minimum Pressure and Maximum Wind";
```

```
proc sgscatter data=pg1.storm_final;
```

```
    plot minpressure*maxwindmph;
```

```
run;
```

```
title;
```

```
ods rtf close;
```

```
ods rtf file="&outpath/pressure.rtf" style=sapphire startpage=no;
```

```
title "Minimum Pressure Statistics by Basin";
```

```
ods noproctitle;
```

```
proc means data=pg1.storm_final mean median min maxdec=0;
```

```
    class BasinName;
```

```
    var MinPressure;
```

```
run;
```

```
title "Correlation of Minimum Pressure and Maximum Wind";
```

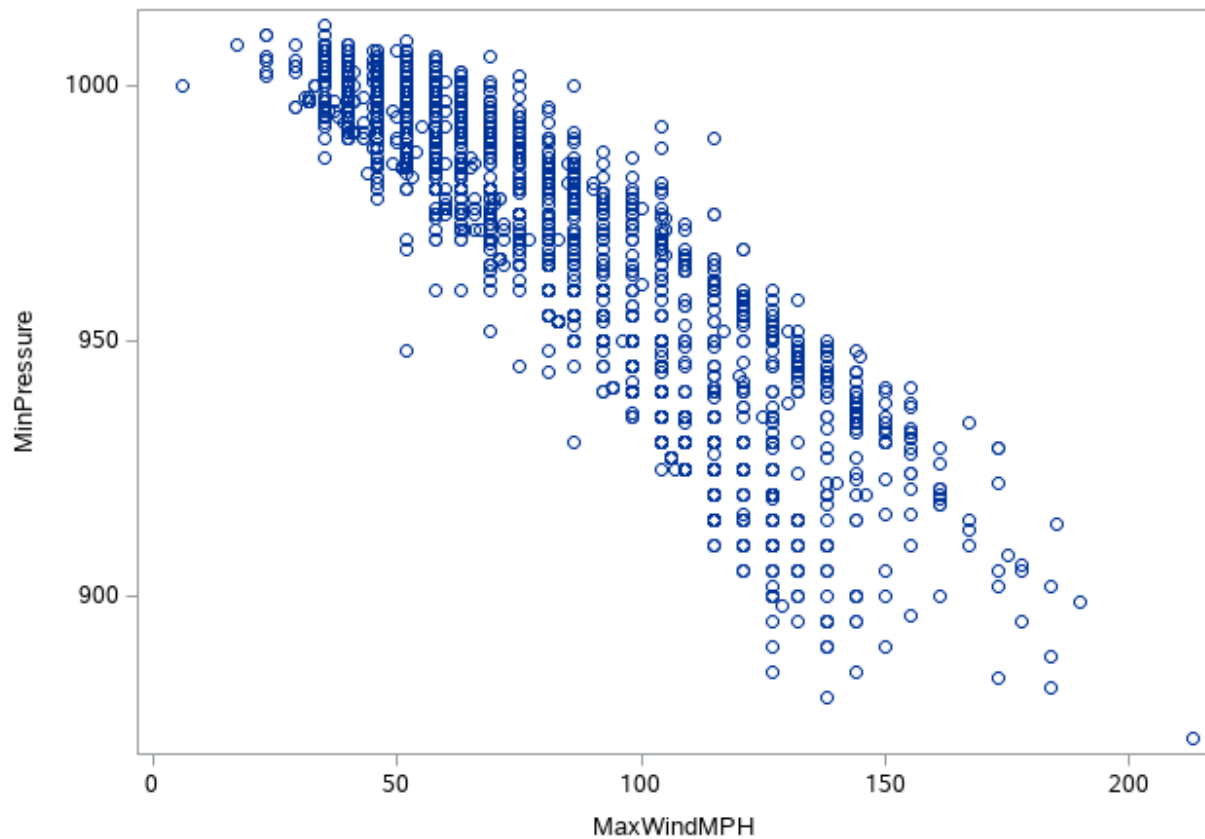
```
proc sgscatter data=pg1.storm_final;  
    plot minpressure*maxwindmph;  
run;  
title;  
  
ods rtf close;
```



### Minimum Pressure Statistics by Basin

Analysis Variable : MinPressure				
BasinName	N Obs	Mean	Median	Minimum
East Pacific	675	979	987	872
North Atlantic	478	980	988	882
North Indian	60	983	989	920
South Indian	594	965	974	895
South Pacific	359	967	975	884
West Pacific	926	962	965	880

### Correlation of Minimum Pressure and Maximum Wind



```

*****
* p106d01.sas Exporting Data to an Excel Workbook      *;
*****
* Syntax and Example                                *;
*
*
* LIBNAME libref XLSX "path/file.xlsx";              *;
* <use libref for output table(s)>                   *;
* LIBNAME libref CLEAR;                               *;
*****

```

```
libname myxl xlsx "&outpath/cars.xlsx";
```

```

data myxl.asiacars;
  set sashelp.cars;
  where origin='Asia';
run;

```

```
libname myxl clear;
```

```

*****
* Demo
*
* 1) Examine the DATA and PROC MEANS steps and      *;
* identify the temporary SAS tables that will be     *;
* created. Highlight the demo program and run the    *;
* selected code.                                     *;
*
* 2) Add a LIBNAME statement to create a library named *;
* xlout that points to an Excel file named           *;
* SOUTHPACIFIC.XLSX in the OUTPUT folder of the      *;
* course data.                                       *;

```

```

* 3) Modify the DATA and PROC steps to write output    *;
*   tables to the xout library.                        *;
* 4) Add a LIBNAME statement to clear the xout        *;
*   libref. Highlight the demo program and run the    *;
*   selected code.                                    *;
* 5) Open Excel if it is available. Open the          *;
*   SOUTH PACIFIC.XLSX workbook and confirm that the *;
*   data is contained in the worksheets that are      *;
*   named South_Pacific and Season_Stats.            *;
*****

```

```
data South_Pacific;
```

```
    set pg1.storm_final;
```

```
    where Basin="SP";
```

```
run;
```

```
proc means data=pg1.storm_final noprint maxdec=1;
```

```
    where Basin="SP";
```

```
    var MaxWindKM;
```

```
    class Season;
```

```
    ways 1;
```

```
    output out=Season_Stats n=Count mean=AvgMaxWindKM max=StrongestWindKM;
```

```
run;
```

```
libname xout xlsx "&outpath/southpacific.xlsx";
```

```
data xout.South_Pacific;
```

```
    set pg1.storm_final;
```

```
        where Basin="SP";  
run;  
  
proc means data=pg1.storm_final noprint maxdec=1;  
    where Basin="SP";  
    var MaxWindKM;  
    class Season;  
    ways 1;  
    output out=xlout.Season_Stats n=Count mean=AvgMaxWindKM max=StrongestWindKM;  
run;  
  
libname xlout clear;
```

```

*****;

* p106d02.sas Exporting Results to Excel      *;

*****;

* Syntax and Example      *;

*      *;

* ODS EXCEL FILE="filename.xlsx" <STYLE=style>      *;

*      <OPTIONS (SHEET_NAME='label')>;      *;

* /* SAS code that produces output */      *;

* ODS EXCEL OPTIONS (SHEET_NAME='label');      *;

* /* SAS code that produces output */      *;

* ODS EXCEL CLOSE;      *;

*****;

*****;

* Demo      *;

* 1) Add an ODS statement to create an Excel file named *;

* wind.xlsx in the output folder of the course files. *;

* Close the excel desination at the end of the      *;

* program. Highlight the demo program and run the      *;

* selected code.      *;

* 2) Open the Excel file.      *;

* * SAS Studio: Navigate to the output folder in the *;

* Files and Folders section of the navigation      *;

* pane. Select wind.xlsx and click Download .      *;

* * Enterprise Guide: Click Results and select the      *;

* Excel file. Right-click and select Open.      *;

* 3) Examine the Excel workbook. Notice the light blue *;

* background in the results generated by the default *;

* style. Also notice the default spreadsheet names. *;

```

```

* Close the Excel file.                *;
* 4) Examine the available style options.    *;
* * SAS Studio: Submit the following program: *;
*   proc template;                        *;
*       list styles;                      *;
*   run;                                  *;
* * Enterprise Guide: Select Tools -> Style Manager. *;
* 5) Change the style by adding the STYLE=SASDOCPRINTER *;
*   option in the first ODS statement.      *;
* 6) Use the SHEET_NAME= option on the first ODS EXCEL *;
*   statement to name the first worksheet Wind Stats. *;
*   Add another ODS EXCEL statement with the SHEET_NAME=*;
*   option before the second TITLE statement and SGPLOT *;
*   step. Name the second worksheet Wind Distribution. *;
*   Highlight the demo program and run the selected *;
*   code. Open the Excel file to view the results. *;
*****

```

```
proc template;
```

```
    list styles;
```

```
run;
```

```
*Add ODS statement;
```

```
ods excel file="&outpath/wind.xlsx" style=sasdocprinter
```

```
    options(sheet_name='Wind Stats');
```

```
title "Wind Statistics by Basin";
```

```
ods noproctitle;
```

```
proc means data=pg1.storm_final min mean median max maxdec=0;
```

```
    class BasinName;
```

```
var MaxWindMPH;  
run;  
  
ods excel options(sheet_name='Wind Distribution');  
title "Distribution of Maximum Wind";  
proc sgplot data=pg1.storm_final;  
    histogram MaxWindMPH;  
    density MaxWindMPH;  
run;  
title;  
ods proctitle;  
*Add ODS statement;  
ods excel close;
```

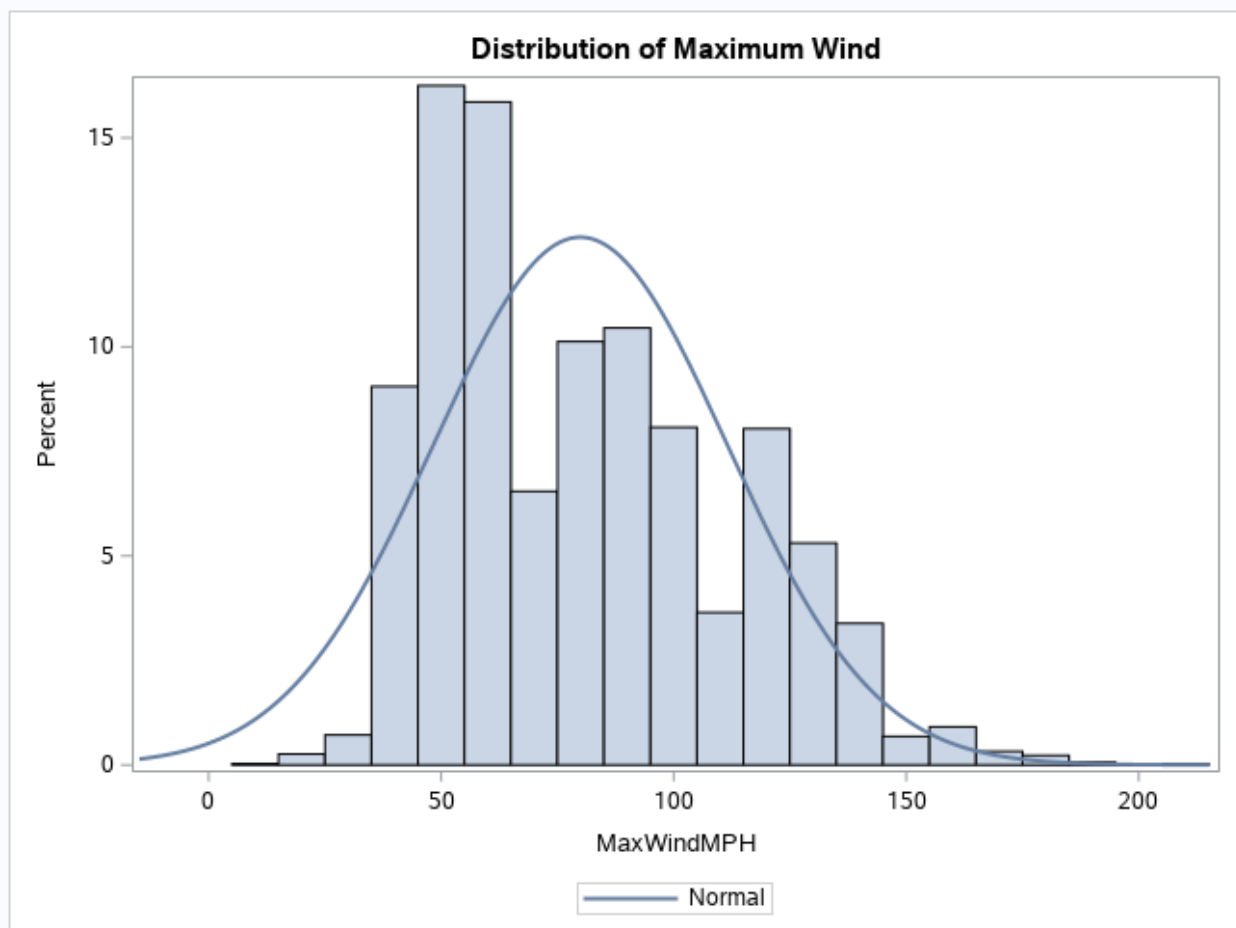
Listing of: SASHELP.TMPL_EN		
Path Filter is: Styles		
Sort by: PATH/ASCENDING		
Obs	Path	Type
1	Styles	Dir
2	Styles.Analysis	Style
3	Styles.BarrettsBlue	Style
4	Styles.DTree	Style
5	Styles.Daisy	Style
6	Styles.Default	Style
7	Styles.Dove	Style
8	Styles.EGDefault	Style
9	Styles.Excel	Style
10	Styles.FancyPrinter	Style
11	Styles.Festival	Style
12	Styles.FestivalPrinter	Style
13	Styles.Gantt	Style
14	Styles.GrayscalePrinter	Style
15	Styles.HTMLBlue	Style
16	Styles.HTMLEncore	Style
17	Styles.Harvest	Style
18	Styles.HighContrast	Style
19	Styles.HighContrastLarge	Style
20	Styles.Journal	Style

Listing of: SASHELP.TMPLMST		
Path Filter is: Styles		
Sort by: PATH/ASCENDING		
Obs	Path	Type
1	Styles	Dir
2	Styles.Analysis	Style
3	Styles.BarrettsBlue	Style
4	Styles.DTree	Style
5	Styles.Daisy	Style
6	Styles.Default	Style
7	Styles.Dove	Style
8	Styles.EGDefault	Style
9	Styles.Excel	Style
10	Styles.FancyPrinter	Style
11	Styles.Festival	Style
12	Styles.FestivalPrinter	Style
13	Styles.Gantt	Style
14	Styles.GrayscalePrinter	Style
15	Styles.HTMLBlue	Style
16	Styles.HTMLEncore	Style
17	Styles.Harvest	Style
18	Styles.HighContrast	Style
19	Styles.HighContrastLarge	Style
20	Styles.Journal	Style



### Wind Statistics by Basin

Analysis Variable : MaxWindMPH					
BasinName	N Obs	Minimum	Mean	Median	Maximum
East Pacific	675	17	83	75	213
North Atlantic	478	23	83	75	190
North Indian	60	6	64	52	146
South Indian	594	23	77	69	155
South Pacific	359	35	78	69	173
West Pacific	926	40	80	81	144



```

*****
* p106d03.sas Exporting Results to PDF          *;
*****
* Syntax                                     *;
*                                     *;
* ODS PDF FILE="filename.xlsx" STYLE=style      *;
* STARTPAGE=NO PDFTOC=1;                      *;
* ODS PROCLABEL "label";                      *;
* /* SAS code that produces output */          *;
* ODS PDF CLOSE;                             *;
*****

*****
* Demo                                     *;
* 1) Run the program and open the PDF file to examine *;
* the results. Notice that bookmarks are created, *;
* and they are linked to each procedure's output. *;
* 2) Add the STARTPAGE=NO option to eliminate page *;
* breaks between procedures. Add the STYLE=JOURNAL *;
* option.                                     *;
* 3) To customize the PDF bookmarks, add the PDFTOC=1 *;
* option to ensure that bookmarks are expanded only *;
* one level when the PDF is opened. To customize *;
* the bookmark labels, add the ODS PROCLABEL *;
* statement before each PROC with custom text. Run *;
* the program and open the PDF file.          *;
*****

```

```
ods pdf file="&outpath/wind.pdf" startpage=no style=journal pdftoc=1;
```

```
ods noproctitle;

ods proclabel "Wind Statistics";
title "Wind Statistics by Basin";
proc means data=pg1.storm_final min mean median max maxdec=0;
    class BasinName;
    var MaxWindMPH;
run;
```

```
ods proclabel "Wind Distribution";
title "Distribution of Maximum Wind";
proc sgplot data=pg1.storm_final;
    histogram MaxWindMPH;
    density MaxWindMPH;
run;
title;
```

```
ods proctitle;
ods pdf close;
```

```
*Original;
ods pdf file="&outpath/wind.pdf";
ods noproctitle;
```

```
title "Wind Statistics by Basin";
proc means data=pg1.storm_final min mean median max maxdec=0;
    class BasinName;
    var MaxWindMPH;
```

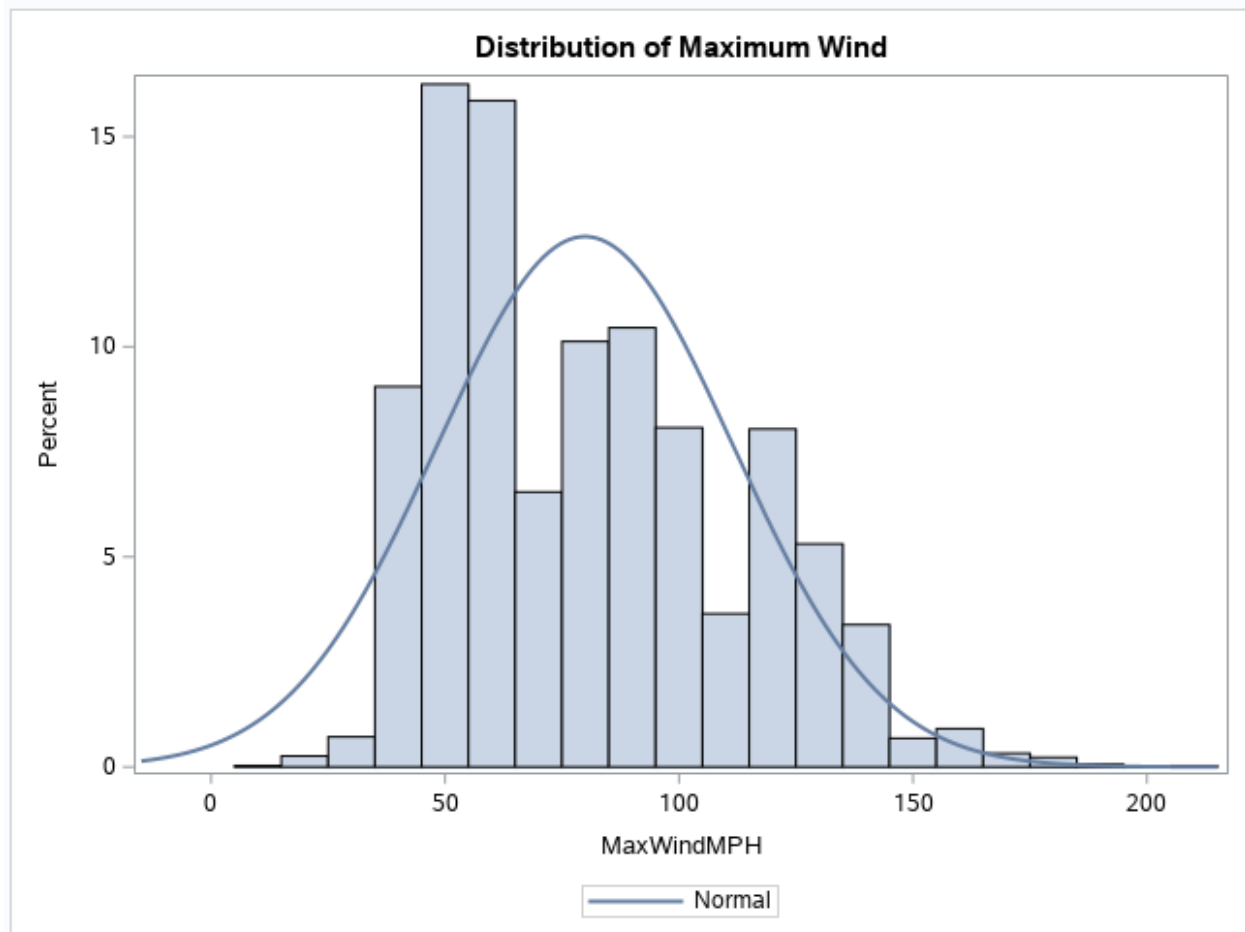
```
run;

title "Distribution of Maximum Wind";
proc sgplot data=pg1.storm_final;
    histogram MaxWindMPH;
    density MaxWindMPH;
run;
title;

ods proctitle;
ods pdf close;
```

### Wind Statistics by Basin

Analysis Variable : MaxWindMPH					
BasinName	N Obs	Minimum	Mean	Median	Maximum
East Pacific	675	17	83	75	213
North Atlantic	478	23	83	75	190
North Indian	60	6	64	52	146
South Indian	594	23	77	69	155
South Pacific	359	35	78	69	173
West Pacific	926	40	80	81	144



```

*****
* p106p01.sas LESSON 6, PRACTICE 1                               *;
* a) Before the PROC MEANS step, add an ODS EXCEL                *;
*   statement to do the following:                                *;
*   1) Write the output file to                                   *;
*       "&outpath/StormStats.xlsx".                               *;
*   2) Set the style for the Excel file to snow.                 *;
*   3) Set the sheet name for the first tab to South             *;
*       Pacific Summary.                                         *;
* b) Turn off the procedure titles and report titles            *;
*   at the start of the program. Turn the procedure             *;
*   titles on at the end of the program.                         *;
* c) Immediately before the PROC PRINT step, add an             *;
*   ODS EXCEL statement to set the sheet name to                *;
*   Detail.                                                       *;
* d) At the end of the program, add an ODS EXCEL                *;
*   statement to close the Excel destination.                   *;
* e) Submit the program. If possible, open the                  *;
*   StormStats.xlsx workbook in Excel.                          *;
*****

```

```

ods excel file="&outpath/StormStats.xlsx" style=snow
              options(sheet_name="South Pacific Summary");
ods noproctitle;
title;
proc means data=pg1.storm_detail maxdec=0 median max;
  class Season;
  var Wind;
  where Basin='SP' and Season in (2014,2015,2016);

```

```
run;
```

```
ods excel options(sheet_name="Detail");
```

```
proc print data=pg1.storm_detail noobs;
```

```
  where Basin='SP' and Season in (2014,2015,2016);
```

```
  by Season;
```

```
run;
```

```
ods proctitle;
```

```
ods excel close;
```

Analysis Variable : Wind Wind(MPH)			
Season	N Obs	Median	Maximum
2014	504	30	120
2015	257	50	135
2016	371	50	150

Season=2014											
Basin	Sub_basin	Name	ISO_time	Type	Latitude	Longitude	Wind	Pressure	Hem_NS	Hem_EW	Region
SP	EA	ALESSIA	25NOV2013:18:00:00.00	NR	-13.5	135.8	.	1002	S	E	South Pacific/Indian
SP	EA	ALESSIA	26NOV2013:00:00:00.00	NR	-13.7	136.5	.	1004	S	E	South Pacific/Indian
SP	EA	ALESSIA	26NOV2013:06:00:00.00	NR	-14.4	136.8	.	1000	S	E	South Pacific/Indian
SP	EA	ALESSIA	26NOV2013:12:00:00.00	NR	-14.8	136.9	25	1002	S	E	South Pacific/Indian
SP	EA	ALESSIA	26NOV2013:18:00:00.00	NR	-15.3	136.9	30	998	S	E	South Pacific/Indian
SP	EA	ALESSIA	27NOV2013:00:00:00.00	NR	-15.6	137.1	30	997	S	E	South Pacific/Indian
SP	EA	ALESSIA	27NOV2013:06:00:00.00	NR	-15.9	137.6	40	993	S	E	South Pacific/Indian
SP	EA	ALESSIA	27NOV2013:12:00:00.00	NR	-16.2	137.5	40	991	S	E	South Pacific/Indian
SP	EA	ALESSIA	27NOV2013:18:00:00.00	NR	-16.9	137.3	30	1000	S	E	South Pacific/Indian
SP	EA	ALESSIA	28NOV2013:00:00:00.00	NR	-16.2	135.8	25	1005	S	E	South Pacific/Indian
SP	EA	ALESSIA	28NOV2013:06:00:00.00	NR	-16	135.5	25	1001	S	E	South Pacific/Indian
SP	EA	ALESSIA	28NOV2013:12:00:00.00	NR	-15.8	136	25	1004	S	E	South Pacific/Indian
SP	EA	ALESSIA	28NOV2013:18:00:00.00	NR	-15.8	136.7	25	.	S	E	South Pacific/Indian
SP	EA	ALESSIA	29NOV2013:00:00:00.00	NR	-16	137.2	25	.	S	E	South Pacific/Indian
SP	EA	ALESSIA	29NOV2013:06:00:00.00	NR	-16.2	137.6	25	1002	S	E	South Pacific/Indian
SP	EA	ALESSIA	29NOV2013:12:00:00.00	NR	-15.8	136.5	20	1005	S	E	South Pacific/Indian
SP	EA	ALESSIA	29NOV2013:18:00:00.00	NR	-15.8	137.4	20	1003	S	E	South Pacific/Indian
SP	EA	ALESSIA	30NOV2013:00:00:00.00	NR	-15.8	136.9	20	1007	S	E	South Pacific/Indian
SP	EA	ALESSIA	30NOV2013:06:00:00.00	NR	-15	136.4	20	1005	S	E	South Pacific/Indian
SP	EA	ALESSIA	30NOV2013:12:00:00.00	NR	-14	135	15	1006	S	E	South Pacific/Indian
SP	MM	IAN	04JAN2014:00:00:00.00	NR	-16.6	-176.8	20	1003	S	W	South Pacific/Indian
SP	MM	IAN	04JAN2014:06:00:00.00	NR	-17.4	-176.9	20	1002	S	W	South Pacific/Indian

```

*****
* p106p02.sas LESSON 6, PRACTICE 2                               *;
* a) Modify the program to write the output file to              *;
*   &outpath/ParkReport.rtf. Set the style for the              *;
*   output file to Journal and remove page breaks              *;
*   between procedure results. Suppress the printing           *;
*   of procedure titles.                                         *;
* b) Run the program. Open the output file in                   *;
*   Microsoft Word. Notice that the Journal style is           *;
*   applied to the results, but the graph is now gray          *;
*   scale instead of color. Also notice that the date          *;
*   and time the program ran is printed in the upper           *;
*   right corner of the page. Close Microsoft Word.            *;
* c) Modify your SAS program so that both tables are           *;
*   created using the Journal style, but the graph is          *;
*   created using the SASDOCPRINTER style.                      *;
* d) Add an OPTIONS statement with the NODATE option           *;
*   at the beginning of the program to suppress the            *;
*   date and time in the RTF file. Restore the option           *;
*   for future submissions by adding an OPTIONS                 *;
*   statement with the DATE option at the end of the            *;
*   program.                                                     *;
* e) Run the program. Open the new output file using           *;
*   Microsoft Word. Ensure that the style for both             *;
*   tables is the same, but that the graph is now              *;
*   displayed in color. Close the report.                       *;
*****

```

```
ods rtf file="&outpath/ParkReport.rtf" style=journal startpage=no;
```



```

ods noproctitle;
options nodate;
title "US National Park Regional Usage Summary";

proc freq data=pg1.np_final;
    tables Region /nocum;
run;

ods rtf style=journal;
proc means data=pg1.np_final mean median max nonobs maxdec=0;
    class Region;
    var DayVisits Campers;
run;

ods rtf style=sasdocprinter;
title2 'Day Visits vs. Camping';
proc sgplot data=pg1.np_final;
    vbar Region / response=DayVisits;
    vline Region / response=Campers ;
run;

title;
ods proctitle;
ods rtf close;
options date;

*First Modification;
ods rtf file="&outpath/ParkReport.rtf" style=journal startpage=no;

```

```

ods noproctitle;
title "US National Park Regional Usage Summary";

proc freq data=pg1.np_final;
    tables Region /nocum;
run;

proc means data=pg1.np_final mean median max nonobs maxdec=0;
    class Region;
    var DayVisits Campers;
run;

title2 'Day Visits vs. Camping';
proc sgplot data=pg1.np_final;
    vbar Region / response=DayVisits;
    vline Region / response=Campers ;
run;
title;
ods proctitle;
ods rtf close;

```

```

*Original;
title "US National Park Regional Usage Summary";

```

```

proc freq data=pg1.np_final;
    tables Region /nocum;
run;

```

```
proc means data=pg1.np_final mean median max nonobs maxdec=0;
```

```
class Region;
```

```
var DayVisits Campers;
```

```
run;
```

```
title2 'Day Visits vs. Camping';
```

```
proc sgplot data=pg1.np_final;
```

```
vbar Region / response=DayVisits;
```

```
vline Region / response=Campers ;
```

```
run;
```

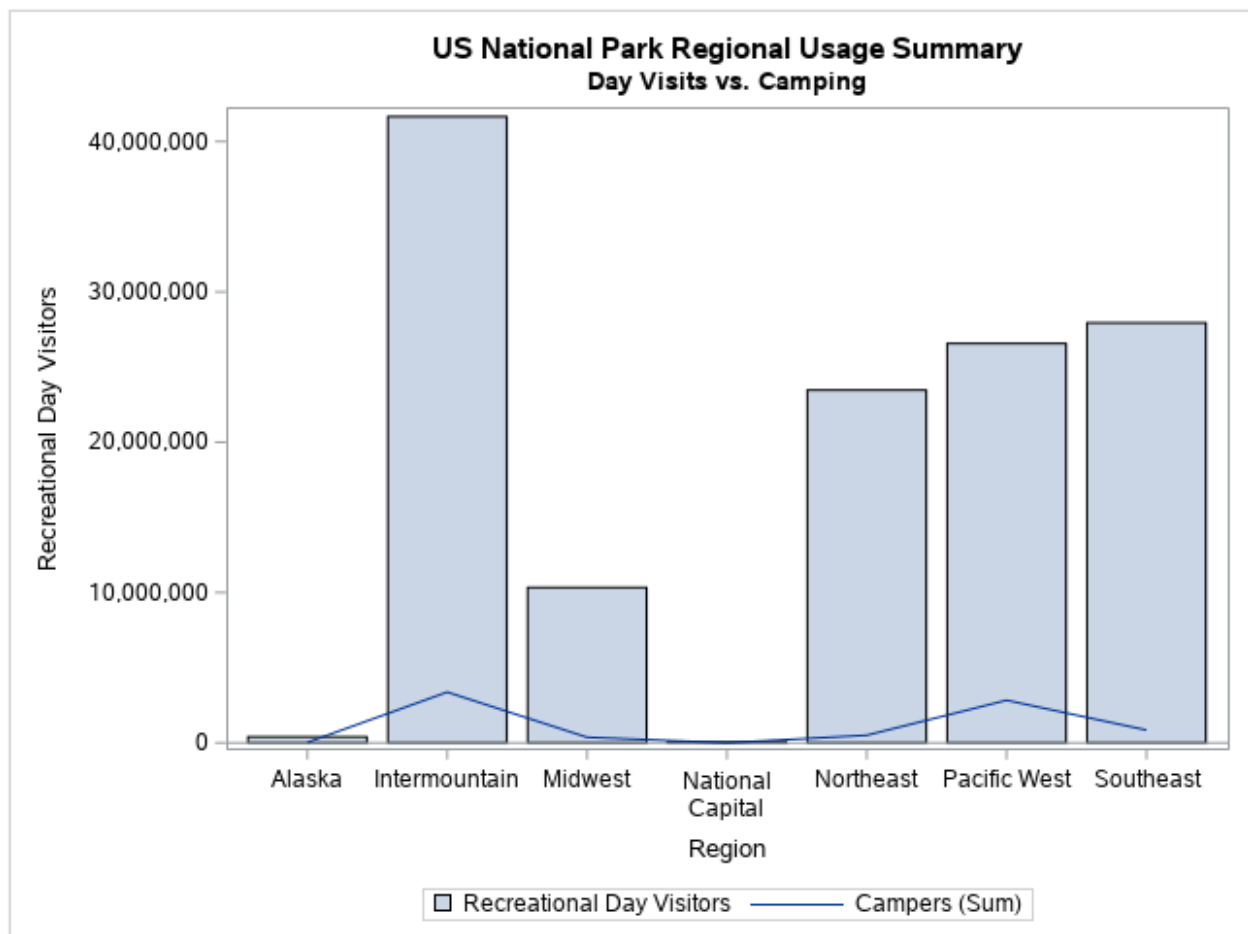
```
title;
```

### US National Park Regional Usage Summary

Region	Frequency	Percent
Alaska	6	4.44
Intermountain	52	38.52
Midwest	18	13.33
National Capital	1	0.74
Northeast	13	9.63
Pacific West	23	17.04
Southeast	22	16.30

### US National Park Regional Usage Summary

Region	Variable	Label	Mean	Median	Maximum
Alaska	DayVisits	Recreational Day Visitors	66304	15250	346534
	Campers		4212	4282	7050
Intermountain	DayVisits	Recreational Day Visitors	801061	228679	5969811
	Campers		64890	3358	798361
Midwest	DayVisits	Recreational Day Visitors	573976	133680	2423390
	Campers		20471	18	87152
National Capital	DayVisits	Recreational Day Visitors	67489	67489	67489
	Campers		0	0	0
Northeast	DayVisits	Recreational Day Visitors	1804742	1197931	4812930
	Campers		38730	0	229674
Pacific West	DayVisits	Recreational Day Visitors	1154931	756344	5028868
	Campers		123113	25516	1084164
Southeast	DayVisits	Recreational Day Visitors	1269815	488705	11312788
	Campers		38662	2579	411603

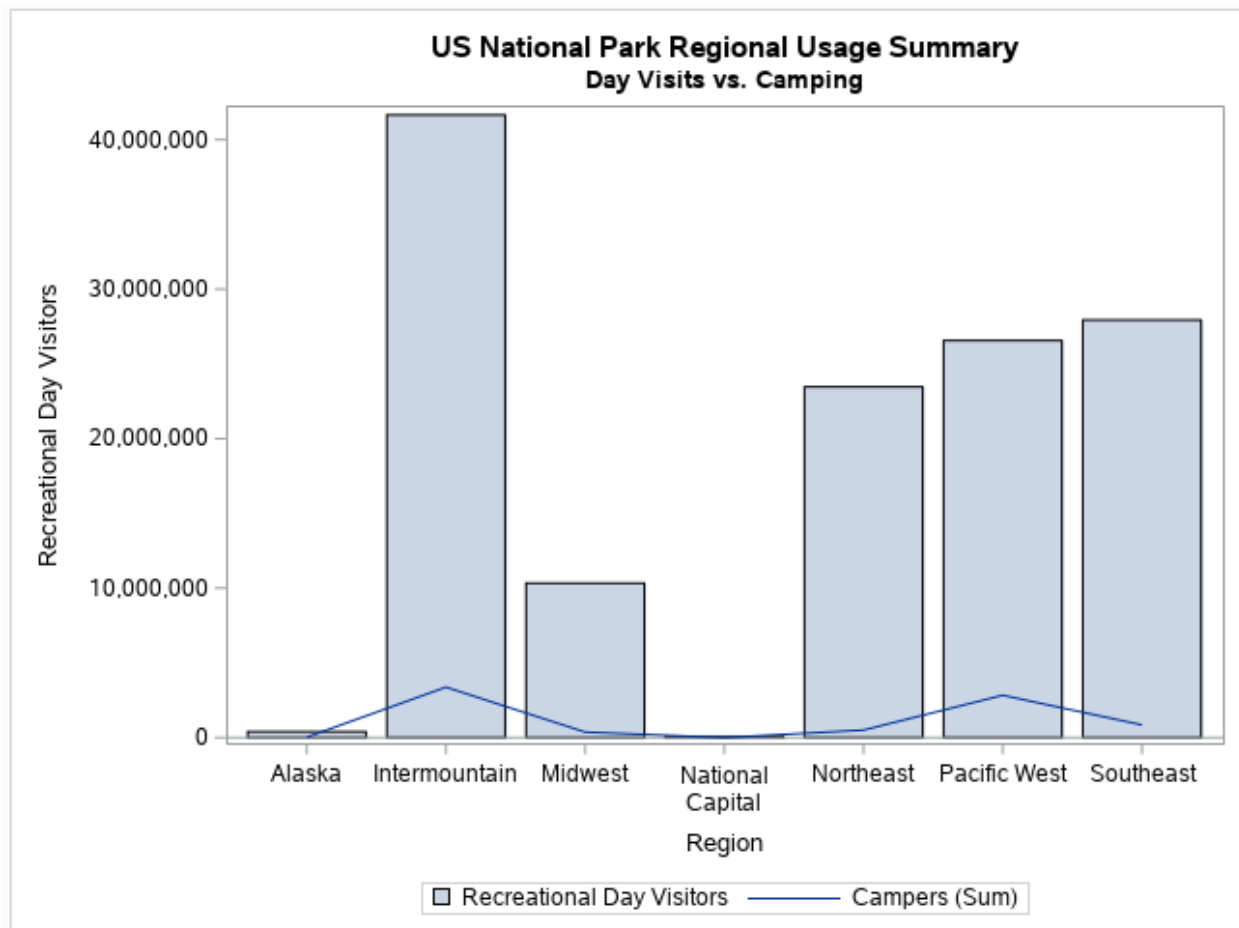


### US National Park Regional Usage Summary

Region	Frequency	Percent
Alaska	6	4.44
Intermountain	52	38.52
Midwest	18	13.33
National Capital	1	0.74
Northeast	13	9.63
Pacific West	23	17.04
Southeast	22	16.30

### US National Park Regional Usage Summary

Region	Variable	Label	Mean	Median	Maximum
Alaska	DayVisits Campers	Recreational Day Visitors	66304 4212	15250 4282	346534 7050
Intermountain	DayVisits Campers	Recreational Day Visitors	801061 64890	228679 3358	5969811 798361
Midwest	DayVisits Campers	Recreational Day Visitors	573976 20471	133680 18	2423390 87152
National Capital	DayVisits Campers	Recreational Day Visitors	67489 0	67489 0	67489 0
Northeast	DayVisits Campers	Recreational Day Visitors	1804742 38730	1197931 0	4812930 229674
Pacific West	DayVisits Campers	Recreational Day Visitors	1154931 123113	756344 25516	5028868 1084164
Southeast	DayVisits Campers	Recreational Day Visitors	1269815 38662	488705 2579	11312786 411603



### US National Park Regional Usage Summary

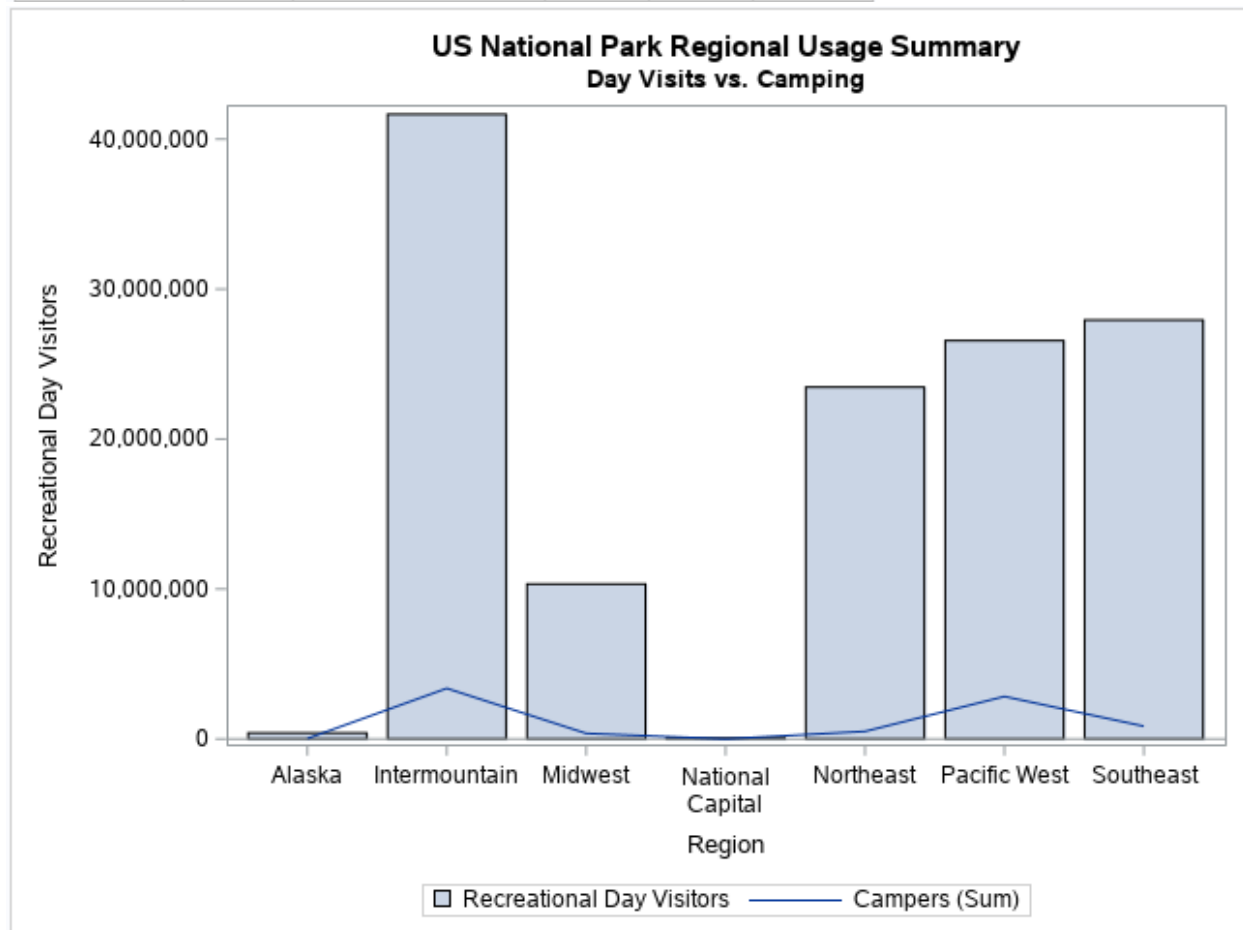
The FREQ Procedure

Region	Frequency	Percent
Alaska	6	4.44
Intermountain	52	38.52
Midwest	18	13.33
National Capital	1	0.74
Northeast	13	9.63
Pacific West	23	17.04

## US National Park Regional Usage Summary

### The MEANS Procedure

Region	Variable	Label	Mean	Median	Maximum
Alaska	DayVisits Campers	Recreational Day Visitors	66304 4212	15250 4282	346534 7050
Intermountain	DayVisits Campers	Recreational Day Visitors	801061 64890	228679 3358	5969811 798361
Midwest	DayVisits Campers	Recreational Day Visitors	573976 20471	133680 18	2423390 87152
National Capital	DayVisits Campers	Recreational Day Visitors	67489 0	67489 0	67489 0
Northeast	DayVisits Campers	Recreational Day Visitors	1804742 38730	1197931 0	4812930 229674
Pacific West	DayVisits Campers	Recreational Day Visitors	1154931 123113	756344 25516	5028868 1084164
Southeast	DayVisits Campers	Recreational Day Visitors	1269815 38662	488705 2579	11312786 411603



```

*****
* p107a02.sas Activity 7.02
*
* 1) Complete the SQL query to display Event and Cost
* from PG1.STORM_DAMAGE. Format the values of Cost.
*
* 2) Add a new column named Season that extracts the
* year from Date.
*
* 3) Add a WHERE clause to return rows where Cost is
* greater than 25 billion.
*
* 4) Add an ORDER BY clause to arrange rows by
* descending Cost. Which storm had the highest
* cost?
*****
* Syntax
*
* PROC SQL;
* SELECT col-name, col-name FORMAT=fmt
* FROM input-table
* WHERE expression
* ORDER BY col-name <DESC>;
* QUIT;
*
*
* New column in SELECT list:
* expression AS col-name
*****

```

title "Most Costly Storms";

proc sql;

\*Add a SELECT statement;

SELECT Event, Cost format=dollar20., Year(Date) as Season

from pg1.storm\_damage



where Cost > 25000000000

order by Cost desc;

quit;

Most Costly Storms		
Event	Cost	Season
Hurricane Katrina	\$161,300,000,000	2005
Hurricane Harvey	\$125,000,000,000	2017
Hurricane Maria	\$90,000,000,000	2017
Hurricane Sandy	\$70,900,000,000	2012
Hurricane Irma	\$50,000,000,000	2017
Hurricane Andrew	\$48,300,000,000	1992
Hurricane Ike	\$35,100,000,000	2008
Hurricane Ivan	\$27,300,000,000	2004

```

*****;

* p107a03.sas Activity 7.03          *;

* 1) Define aliases for STORM_SUMMARY and      *;
*   STORM_BASINCODES in the FROM clause.      *;

* 2) Use one table alias to qualify Basin in the *;
*   SELECT clause.                          *;

* 3) Complete the ON expression to match rows when *;
*   Basin is equal in the two tables. Use the table *;
*   aliases to qualify Basin in the expression. Run *;
*   the step.                              *;

*****;

* Syntax                                *;

* FROM table1 AS alias1 INNER JOIN table2 AS alias2 *;
*   ON alias1.column = alias2.column          *;

*****;

proc sql;

select Season, Name, s.Basin, BasinName, MaxWindMPH

   from pg1.storm_summary as s inner join pg1.storm_basincodes as b

        on upcase(s.Basin) = b.Basin

   order by Season desc, Name;

quit;

```

Season	Name	Basin	BasinName	MaxWindMPH
2016		NI	North Indian	35
2016	AERE	WP	West Pacific	69
2016	AGATHA	EP	East Pacific	52
2016	ALEX	na	North Atlantic	86
2016	AMOS	SP	South Pacific	92
2016	ANNABELLE	SI	South Indian	63
2016	BLAS	EP	East Pacific	138
2016	BOHALE	SI	South Indian	40
2016	BONNIE	na	North Atlantic	46
2016	CELIA	EP	East Pacific	98
2016	CHABA	WP	West Pacific	132
2016	CHANTHU	WP	West Pacific	63
2016	COLIN	na	North Atlantic	58
2016	CONSON	WP	West Pacific	52
2016	CORENTIN	SI	South Indian	69
2016	DANIELLE	na	North Atlantic	46
2016	DARBY	EP	East Pacific	121
2016	DAYA	SI	South Indian	44
2016	DIANMU	WP	West Pacific	46
2016	EARL	na	North Atlantic	86
2016	EIGHT	na	North Atlantic	35
2016	EMERAUDE	SI	South Indian	127
2016	ESTELLE	EP	East Pacific	69
2016	FANTALA	SI	South Indian	155
2016	FIONA	na	North Atlantic	52
2016	FRANK	EP	East Pacific	86
2016	GASTON	na	North Atlantic	121
2016	GEORGETTE	EP	East Pacific	132
2016	HAIMA	WP	West Pacific	132
2016	HERMINE	na	North Atlantic	81
2016	HOWARD	EP	East Pacific	58
2016	IAN	na	North Atlantic	63
2016	IVETTE	EP	East Pacific	58

```

*****
* p107d01.sas Reading and Filtering Data with SQL      *;
*****
* Syntax and Example                                  *;
*                                                     *;
* PROC SQL;                                           *;
*   SELECT col-name, col-name FORMAT=fmt             *;
*   FROM input-table                                *;
*   WHERE expression                                 *;
*   ORDER BY col-name <DESC>;                          *;
* QUIT;                                              *;
*                                                     *;
* New column in SELECT list:                          *;
* expression AS col-name                            *;
*****

```

```

proc sql;
select Name, Age, Height*2.54 as HeightCM format 5.1,
       Birthdate format=date9.
from pg1.class_birthdate
where age > 14
order by Height desc;
quit;

```

```

*****
* Demo                                                *;
* 1) Add a SELECT statement to retrieve all columns  *;
*   from PG1.STORM_FINAL. Highlight the step and run *;
*   the selected code. Examine the log and results. *;

```

```

* 2) Modify the query to retrieve only the Season,    *;
*   Name, StartDate, and MaxWindMPH columns. Format  *;
*   StartDate with MMDDYY10. Highlight the step and  *;
*   run the selected code.                          *;
* 3) Modify Name in the SELECT clause to convert the *;
*   values to proper case.                          *;
* 4) Add a WHERE clause to include storms during or  *;
*   after the 2000 season with MaxWindMPH greater   *;
*   than 156.                                       *;
* 5) Add an ORDER BY clause to arrange rows by      *;
*   descending MaxWindMPH, and then by Name.        *;
* 6) Add TITLE statements to describe the report.   *;
*   Highlight the step and run the selected code.   *;
*****

```

```
proc sql;
```

```
*Add SELECT statement;
```

```
select *
```

```
    from pg1.storm_final;
```

```
quit;
```

```
proc sql;
```

```
*Add SELECT statement;
```

```
select Season, Name, StartDate format=mmddyy10., MaxWindMPH
```

```
    from pg1.storm_final;
```

```
quit;
```

```
proc sql;
```

```
*Add SELECT statement;
```

```

select Season, propcase(Name) as Name, StartDate format=mmddyy10., MaxWindMPH
    from pg1.storm_final;

quit;

```

```

title "International Storms since 2000";

```

```

title2 "Category 5 (Wind>156)";

```

```

proc sql;

```

```

*Add SELECT statement;

```

```

select Season, propcase(Name) as Name, StartDate format=mmddyy10., MaxWindMPH
    from pg1.storm_final
    where MaxWindMPH > 156 and Season >= 2000
    order by MaxWindMPH desc, Name;

quit;

title;

```

Name	Age	HeightCM	Birthdate
Philip	18	182.9	21NOV2002
Ronald	15	170.2	14OCT2003
Mary	15	168.9	28MAR2003
William	15	168.9	28DEC2003
Janet	15	158.8	02APR2003

Season	Name	Basin	BasinName	OceanCode	Ocean	StormType	MaxWindMPH	MaxWindKM	MinPressure	StartDate	EndDate	StormLength	Lat	Lon
2017	ALFRED	SI	South Indian	I	Indian		50	80	994	16FEB2017	22FEB2017	6	.	.
2017	BART	SP	South Pacific	P	Pacific		45	72	994	19FEB2017	22FEB2017	3	.	.
2017	BLANCHE	SI	South Indian	I	Indian		65	105	984	02MAR2017	07MAR2017	5	.	.
2017	CALEB	SI	South Indian	I	Indian		50	80	989	23MAR2017	27MAR2017	4	.	.
2017	DEBBIE	SP	South Pacific	P	Pacific		120	193	943	23MAR2017	30MAR2017	7	.	.
2017	ERNIE	SI	South Indian	I	Indian		140	225	922	05APR2017	10APR2017	5	.	.
2017	COOK	SP	South Pacific	P	Pacific		100	161	961	06APR2017	11APR2017	5	.	.
2017	MAARUTHA	NI	North Indian	I	Indian		45	72	996	15APR2017	17APR2017	2	.	.
2017	ARLENE	NA	North Atlantic	A	Atlantic		50	80	990	19APR2017	21APR2017	2	.	.
2017	FRANCES	SI	South Indian	I	Indian		75	121	981	21APR2017	01MAY2017	10	.	.
2017	GREG	SI	South Indian	I	Indian		40	64	997	29APR2017	03MAY2017	4	.	.
2017	DONNA	SP	South Pacific	P	Pacific		125	201	935	01MAY2017	10MAY2017	9	.	.
2017	ELLA	SP	South Pacific	P	Pacific		70	113	977	07MAY2017	16MAY2017	8	.	.
2017	ADRIAN	EP	East Pacific	P	Pacific		45	72	1004	08MAY2017	10MAY2017	1	.	.
2017	MORA	NI	North Indian	I	Indian		70	113	978	28MAY2017	31MAY2017	3	.	.
2017	BEATRIZ	EP	East Pacific	P	Pacific		45	72	1001	31MAY2017	02JUN2017	2	.	.
2017	KATIA	NA	North Atlantic	A	Atlantic		105	169	972	05JUN2017	09SEP2017	96	.	.

**International Storms since 2000  
Category 5 (Wind>156)**

Season	Name	StartDate	MaxWindMPH
2017	ALFRED	02/16/2017	50
2017	BART	02/19/2017	45
2017	BLANCHE	03/02/2017	65
2017	CALEB	03/23/2017	50
2017	DEBBIE	03/23/2017	120
2017	ERNIE	04/05/2017	140
2017	COOK	04/06/2017	100
2017	MAARUTHA	04/15/2017	45
2017	ARLENE	04/19/2017	50
2017	FRANCES	04/21/2017	75
2017	GREG	04/29/2017	40
2017	DONNA	05/01/2017	125
2017	ELLA	05/07/2017	70
2017	ADRIAN	05/09/2017	45
2017	MORA	05/28/2017	70
2017	BEATRIZ	05/31/2017	45
2017	KATIA	06/05/2017	105

Season	Name	StartDate	MaxWindMPH
2015	Patricia	10/20/2015	213
2017	Irma	08/30/2017	185
2005	Wilma	10/15/2005	184
2009	Rick	10/15/2009	178
2005	Rita	09/18/2005	178
2017	Maria	09/16/2017	175
2007	Dean	08/13/2007	173
2007	Felix	08/31/2007	173
2005	Katrina	08/23/2005	173
2016	Winston	02/10/2016	173
2003	Isabel	09/06/2003	167
2004	Ivan	09/02/2004	167
2002	Kenna	10/22/2002	167
2016	Matthew	09/28/2016	167
2010	Celia	06/18/2010	161
2002	Elida	07/23/2002	161
2005	Emily	07/11/2005	161
2002	Herman	08/30/2002	161
2006	Ioke	08/16/2006	161
2014	Marie	08/22/2014	161

```

*****;
* p107d02.sas Joining Tables with PROC SQL          *;
*****;

* Syntax and Example                                *;
*                                                    *;
* PROC SQL;                                         *;
*   SELECT col-name, col-name                        *;
*   FROM input-table1 INNER JOIN input-table2      *;
*   ON table1.col-name=table2.col-name;            *;
* QUIT;                                             *;
*****;

```

```

proc sql;
select class_update.Name, Grade, Age, Teacher
  from pg1.class_update inner join pg1.class_teachers
    on class_update.Name=class_teachers.Name;
quit;

```

```

*****;

* Demo                                             *;
* 1) Open PG1.STORM_SUMMARY and PG1.STORM_BASINCODES *;
*   and compare the columns. Identify the matching *;
*   column.                                       *;
* 2) Add PG1.STORM_BASINCODES to the FROM clause to *;
*   perform an inner join on Basin. Remember to *;
*   qualify the columns as table-name.col-name in the *;
*   ON expression.                               *;
* 3) Add the BasinName column to the query after *;
*   Basin. Highlight the step, run the selected code, *;

```



```

*    and examine the log. Why does the program fail?  *;
*  4) Modify the query to qualify the Basin column in  *;
*    the SELECT clause. Highlight the step and run the *;
*    selected code.                                *;
*****

```

```

proc sql;
select Season, Name, Basin, MaxWindMPH
    from pg1.storm_summary
    order by Season desc, Name;
quit;

```

```

proc sql;
select Season, Name, storm_summary.Basin, BasinName, MaxWindMPH
    from pg1.storm_summary inner join pg1.storm_BasinCodes
    on storm_summary.Basin = storm_BasinCodes.Basin
    order by Season desc, Name;
quit;

```

Name	Grade	Age	Teacher
Alfred	8	14	Thomas
Alice	7	13	Evans
Barbara	6	13	Smith
Henry	8	14	Thomas
James	6	12	Smith
Jane	5	12	Garcia
Janet	9	15	Jones
Jeffrey	7	13	Evans
John	6	12	Smith
Joyce	5	11	Garcia
Judy	8	14	Thomas
Louise	6	12	Smith
Mary	9	15	Jones
Philip	10	16	Williams
Robert	7	12	Evans
Ronald	10	15	Williams
Thomas	6	11	Smith
William	9	15	Jones

Season	Name	Basin	BasinName	MaxWindMPH
2016		NI	North Indian	35
2016	AERE	WP	West Pacific	69
2016	AGATHA	EP	East Pacific	52
2016	AMOS	SP	South Pacific	92
2016	ANNABELLE	SI	South Indian	63
2016	BLAS	EP	East Pacific	138
2016	BOHALE	SI	South Indian	40
2016	CELIA	EP	East Pacific	98
2016	CHABA	WP	West Pacific	132
2016	CHANTHU	WP	West Pacific	63
2016	CONSON	WP	West Pacific	52
2016	CORENTIN	SI	South Indian	69
2016	DARBY	EP	East Pacific	121
2016	DAYA	SI	South Indian	44
2016	DIANMU	WP	West Pacific	46
2016	EMERAUDE	SI	South Indian	127
2016	ESTELLE	EP	East Pacific	69
2016	FANTALA	SI	South Indian	155
2016	FRANK	EP	East Pacific	86
2016	GEORGETTE	EP	East Pacific	132
2016	HAIMA	WP	West Pacific	132
2016	HOWARD	EP	East Pacific	58
2016	IVETTE	EP	East Pacific	58
2016	JAVIER	EP	East Pacific	63
2016	KAY	EP	East Pacific	52
2016	KOMPASU	WP	West Pacific	40
2016	KYANT	NI	North Indian	46
2016	LESTER	EP	East Pacific	144
2016	LIONROCK	WP	West Pacific	104

Season	Name	Basin	MaxWindMPH
2016		NI	35
2016	AERE	WP	69
2016	AGATHA	EP	52
2016	ALEX	na	86
2016	AMOS	SP	92
2016	ANNABELLE	SI	63
2016	BLAS	EP	138
2016	BOHALE	SI	40
2016	BONNIE	na	46
2016	CELIA	EP	98
2016	CHABA	WP	132
2016	CHANTHU	WP	63
2016	COLIN	na	58
2016	CONSON	WP	52
2016	CORENTIN	SI	69