Kamal Babaei Sonbolabadi SAS "STAT475" FINALPROJECT

All outputs must contain your first name, last name, and date and time. You will need to use macro variables to achieve that.

Problem. (**Use PROC SQL wherever possible**). Use the SAS dataset *snowstationsdata.sas7bdat*, to answer the following questions:
1. How many lines does the file contain?
2. What are the variable names in the imported file? (Hint: use proc contents).
3. How many different snow stations are the data given for?
4. How many years have been the data recorded for each station?
5. Make an ordered list of years and give the number of stations that had measurements that year.
6. Compute the highest value of max_SWE for each station. (Note: max_SWE=maximum annual Snow Water Equivalent). Order by station name.
7. You might have noticed by now that a station name 'ADIN MOUNTAIN' had been misspelled as 'ADIN MOUTAIN'. Fix this typo.
8. How many different regions are involved in snow data collection?
9. How many stations are there in each region?
10. Create a data set that contains variables STATION_ID, STATION_NAME, TOTAL_MAX_SWE, REGION, ELEVATION, LATITUDE, and LONGITUDE, and which entries are the snow stations that had been in operation for the most recent 50 years (from 1963 to 2012). That is, you have to take the stations that have records from 1963 to 2012, and compute the highest max_SWE values (call them TOTAL_MAX_SWE) over the duration of these 50 years.

1-1
Code:

```
data dummyset;
input null;
cards;
;
run;

%macro header;
%let fullname = Kamal BabaeiSonbolabadi;
%let firstname = %scan(&fullname, 1);
%let lastname = %scan(&fullname, 2);
title1 "This Assignment was Completed by &firstname &lastname on &sysday,
&sysdate at &systime";
run;
options nonumber nodate;
run;
proc print data = dummyset noobs;
run;
%mend;
%header
proc sql;
create table Lines as
select count(year) as Lines from 'C:\Users\Kamal\Desktop\AAASchool\475-
SAS\Final\snowstationsdata.sas7bdat';
```

```
quit;
title2 ' ';
title3 'The Number of Lines Contained in the File';
proc print data = Lines noobs;
run;
```

Results:

This Assignment was Completed by Kamal BabaeiSonbolabadi on Monday, 17DEC18 at 15:46

The Number of Lines Contained in the File

Lines
18302

1-2

Code:

```
proc contents data = tmp1.snowstationsdata;
run;
```

Results:

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The Number of Lines Contained in the File

The CONTENTS Procedure

Data Set Name	TMP1.SNOWSTATIONSDATA	Observations	18302
Member Type	DATA	Variables	10
Engine	V9	Indexes	0
Created	12/15/2016 17:27:29	Observation Length	104
Last Modified	12/15/2016 17:27:29	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	NO
Label			
Data Representation	WINDOWS_64		
Encoding	wlatin1 Western (Windows)		

Engine/Host Dependent Information	
Data Set Page Size	65536
Number of Data Set Pages	30
First Data Page	1
Max Obs per Page	629
Obs in First Data Page	608
Number of Data Set Repairs	0
ExtendObsCounter	YES
Filename	C:\Users\Kamal\Desktop\AAASchool\475- SAS\Final\snowstationsdata.sas7bdat
Release Created	9.0401M3
Host Created	X64_7PRO
Owner Name	KamalBokonDarRo\Kamal
File Size	2MB
File Size (bytes)	2031616

Alphabetic List of Variables and Attributes

#	Variable	Type	Len	Format	Informat	Label
7	ELEVATIONINFEET	Num	8	F12.1		ELEVATION(IN FEET)
8	LATITUDE	Num	8	F12.5		LATITUDE
9	LONGITUDE	Num	8	F12.5		LONGITUDE
4	MaxSWEinches	Num	8	F12.2		Max 'SWE (inches)'
10	REGION	Char	16	$16.	$16.	REGION
2	STATIONID	Char	3	$3.	$3.	STATION ID
3	STATIONNAME	Char	29	$29.	$29.	STATION NAME
1	YEAR	Num	8	F12.1		YEAR
5	YEARRECORDBEGAN	Num	8	F12.1		YEAR RECORD BEGAN
6	YEARRECORDENDS	Num	8	F12.1		YEAR RECORD ENDS

1-3

Code:

```
proc sql;
create table stats as
select count(distinct STATIONID) as Stations
from 'C:\Users\Kamal\Desktop\AAASchool\475-
SAS\Final\snowstationsdata.sas7bdat';
```

```
quit;
title4 "The Number of Different Snow Stations";
proc print data = stats noobs;
```

Results:

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The Number of Different Snow Stations

Stations
262

1-4

Code:

```
proc sql;
create table nyears as
select distinct STATIONNAME, (YEARRECORDENDS - YEARRECORDBEGAN) as Years
from 'C:\Users\Kamal\Desktop\AAASchool\475-
SAS\Final\snowstationsdata.sas7bdat';
group by STATIONNAME;
quit;
title5 "The Number of Years per Station";
proc print data = nyears noobs;
run;
```

Results:

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The Number of Years per Station

STATIONNAME	Years
ABBEY	49
ADIN MOUTAIN	82
AGNEW PASS	82
ALPHA	47
ANTELOPE RIDGE	49
ANTELOPE SPRINGS	73
ANTHONY PEAK	68
ASH CREEK	67
BADGER FLAT	52
BEACH MEADOWS	82
BEAR BASIN	65
BEAR VALLEY RIDGE 1	82
BEARD MEADOW	82
BEEHIVE MEADOW	82
BELL MEADOW	75
BENCH LAKE	39
BIG FLAT (COURSE)	66
BIG MEADOWS	82

UPPER KIBBIE RIDGE	75
UPPER TRUCKEE	82
VERNON LAKE	65
VIRGINIA LAKES	65
VIRGINIA LAKES RIDGE	43
VOLCANIC KNOB	66
WABENA MEADOWS	75
WARD CREEK 2	99
WARNER CREEK	82
WEBBER LAKE	87
WEBBER PEAK YOBA	89
WHALAN	72
WHEELER LAKE	75
WILLOW FLAT	87
WILMA LAKE	66
WOLFORD CABIN	63
WOODCHUCK MEADOW	82
WRIGHTS LAKE	56
YUBA PASS	75

1-5

Code:

```
proc sql;
create table ayears as
select distinct YEAR, count(distinct STATIONNAME) as Stations
from tmp1.snowstationsdata
group by YEAR;
quit;
title6 "Number Stations With Measurements Sorted by Year";
proc print data = ayears noobs;
run;
```

Results:

This Assignment was Completed by Kamal BabaeiSonbolabadi on Monday, 17DEC18 at 15:46

Number Stations With Measurements Sorted by Year

YEAR	Stations
1910.0	3
1911.0	3
1912.0	3
1913.0	6
1914.0	6
1915.0	6
1916.0	6
1917.0	6
1918.0	10
1919.0	10
1920.0	11
1921.0	10
1922.0	11
1923.0	11
1924.0	11
1925.0	16
1926.0	28
1927.0	30
1928.0	32
1995.0	262
1996.0	262
1997.0	262
1998.0	262
1999.0	262
2000.0	262
2001.0	262
2002.0	262
2003.0	262
2004.0	262
2005.0	262
2006.0	262
2007.0	262
2008.0	262
2009.0	262
2010.0	262
2011.0	262
2012.0	262

1-6

Code:

```
proc sql;
create table maxSWE as
select distinct STATIONNAME, max(MaxSWEinches) as Max_SWE
from tmp1.snowstationsdata
group by STATIONNAME;
quit;
title7 "The Highest SWE in Inches per Station";
proc print data = maxSWE noobs;
run;
```

Results:

This Assignment was Completed by Kamal BabaeiSonbolabadi on Monday, 17DEC18 at 15:46

The Highest SWE in Inches per Station

STATIONNAME	Max_SWE
ABBEY	153.6
ADIN MOUTAIN	153.6
AGNEW PASS	153.6
ALPHA	153.6
ANTELOPE RIDGE	153.6
ANTELOPE SPRINGS	153.6
ANTHONY PEAK	153.6
ASH CREEK	153.6
BADGER FLAT	153.6
BEACH MEADOWS	153.6
BEAR BASIN	153.6
VIRGINIA LAKES	40.1
VIRGINIA LAKES RIDGE	43.7
VOLCANIC KNOB	63.0
WABENA MEADOWS	77.4
WARD CREEK 2	89.4
WARNER CREEK	39.6
WEBBER LAKE	68.1
WEBBER PEAK YOBA	86.8
WHALAN	53.1
WHEELER LAKE	113.5
WILLOW FLAT	29.0
WILMA LAKE	88.8
WOLFORD CABIN	92.8
WOODCHUCK MEADOW	81.3
WRIGHTS LAKE	83.5
YUBA PASS	76.7

1-7
Code:

```
proc sql;
update tmp1.snowstationsdata
set STATIONNAME = 'ADIN MOUNTAIN'
where STATIONNAME = 'ADIN MOUTAIN';
select *
from 'C:\Users\Kamal\Desktop\AAASchool\475-
SAS\Final\snowstationsdata.sas7bdat'
quit;
```

Results:

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YEAR	STATION ID	STATION NAME	Max 'SWE (inches)'	YEAR RECORD BEGAN	YEAR RECORD ENDS	ELEVATION (IN FEET)	LATITUDE	LONGITUDE	REGION
1963.0	ABY	ABBEY	3.80	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
1964.0	ABY	ABBEY	10.60	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
1965.0	ABY	ABBEY	15.00	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
1966.0	ABY	ABBEY	12.10	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
1967.0	ABY	ABBEY	18.00	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
1968.0	ABY	ABBEY	11.60	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
1969.0	ABY	ABBEY	23.20	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
1970.0	ABY	ABBEY	7.50	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
1971.0	ABY	ABBEY	17.50	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
1972.0	ABY	ABBEY	13.10	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
2008.0	ABY	ABBEY	14.10	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
2009.0	ABY	ABBEY	8.80	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
2010.0	ABY	ABBEY	11.10	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
2011.0	ABY	ABBEY	20.70	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
2012.0	ABY	ABBEY	5.10	1963.0	2012.0	5650.0	39.95500	120.53800	FEATHER
1930.0	ADI	ADIN MOUNTAIN	7.90	1930.0	2012.0	6200.0	41.23700	120.79300	SACRAMENTO
1931.0	ADI	ADIN MOUNTAIN	7.90	1930.0	2012.0	6200.0	41.23700	120.79300	SACRAMENTO
1932.0	ADI	ADIN MOUNTAIN	13.30	1930.0	2012.0	6200.0	41.23700	120.79300	SACRAMENTO
1933.0	ADI	ADIN MOUNTAIN	14.70	1930.0	2012.0	6200.0	41.23700	120.79300	SACRAMENTO
1934.0	ADI	ADIN MOUNTAIN	0.00	1930.0	2012.0	6200.0	41.23700	120.79300	SACRAMENTO

1-8
Code:

```
proc sql;
create table regions as
select count(distinct REGION) as Regions
```

```
from tmp1.snowstationsdata
quit;
title8 "Number of Regions";
proc print data = regions noobs;
run;
```

Results:

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Number of Regions

Regions
12

1-9

Code:

```
proc sql;
create table rstations as
select distinct REGION, count(distinct STATIONNAME) as Stations_Per_Region
from tmp1.snowstationsdata
group by REGION;
quit;
title9 "Number of Stations per Region";
proc print data = rstations noobs;
run;
```

Results:

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Number of Stations per Region

REGION	Stations_Per_Region
AMERI_MOKEL	31
FEATHER	25
KAWEAH_TULE_KERN	24
KINGS	22
NORTH COAST	20
NORTH LAHONTAN	13
SACRAMENTO	19
SAN JOAQUIN	25
SOUTH LAHONTAN	27
STANISLAUS	15
TUOLU_MERCED	22
YUBA	19

1-10

Code:

```
proc sql;
create table recent as
select STATIONID as STATION_ID, STATIONNAME as STATION_NAME, REGION,
ELEVATIONINFEET as ELEVATION,
LATITUDE, LONGITUDE, max(MaxSWEinches) as TOTAL_MAX_SWE
from tmp1.snowstationsdata
where YEAR > 1962
group by YEAR;
quit;
title10 "Station Data for the Past 50 Years";
proc print data = recent noobs;
run;
```

Results:

This Assignment was Completed by Kamal BabaeiSonbolabadi on Monday, 17DEC18 at 19:45

Station Data for the Past 50 Years

STATION_ID	STATION_NAME	REGION	ELEVATION	LATITUDE	LONGITUDE	TOTAL_MAX_SWE
TND	TYNDALL CREEK	KAWEAH_TULE_KERN	10650.0	36.63200	118.39200	75.7
LYN	LYONS CREEK	AMERI_MOKEL	6700.0	38.81200	120.24300	75.7
WLC	WOLFORD CABIN	NORTH COAST	6150.0	41.20000	122.83300	75.7
HRG	HERRING CREEK	STANISLAUS	7300.0	38.24200	119.94200	75.7
BHM	BEACH MEADOWS	KAWEAH_TULE_KERN	7650.0	36.12200	118.29300	75.7
SPF	SPOTTED FAWN	TUOLU_MERCED	7800.0	38.09200	119.75800	75.7
RDM	RED MOUNTAIN	YUBA	7200.0	39.34300	120.50800	75.7
PHL	PHILLIPS	AMERI_MOKEL	6800.0	38.81800	120.07200	59.5
CHK	CHALK BLUFF	YUBA	4850.0	39.30500	120.81000	59.5
PGM	PEREGOY MEADOWS	TUOLU_MERCED	7000.0	37.66700	119.62500	59.5
FLC	FLORENCE LAKE	SAN JOAQUIN	7200.0	37.27700	118.96200	59.5
PRK	PARKS CREEK	NORTH COAST	6700.0	41.36700	122.55000	59.5
CDP	CEDAR PASS	SACRAMENTO	7100.0	41.58300	120.30300	59.5
PDS	PARADISE MEADOW	TUOLU_MERCED	7650.0	38.04700	119.67000	59.5
FNP	FINDLEY PEAK	YUBA	6500.0	39.47000	120.57200	59.5
PTM	PANTHER MEADOW	KAWEAH_TULE_KERN	8600.0	36.58800	118.71700	59.5
BP3	BIG PINE CREEK 3	SOUTH LAHONTAN	9800.0	37.12800	118.47500	59.5
PFV	PACIFIC VALLEY	AMERI_MOKEL	7500.0	38.51700	119.90000	59.5
FEM	FEATHER RIVER MEADOW	FEATHER	5400.0	40.35500	121.42200	59.5
STR	OSTRANDER LAKE	TUOLU_MERCED	8200.0	37.63700	119.55000	59.5