

A series of horizontal bars of varying lengths and colors (teal, blue, and dark blue) are positioned on the left side of the slide, creating a modern, abstract background element.

It's All about the Base—Procedures

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PROC FREQ



Biggest Challenge

PROC FREQ will not insert categories that are not present in the data with a count of zero, even when you apply a format that contains the category that does not exist in the data.



Best Use Case

PROC FREQ creates data sets with total counts that can be used later as denominators, when merged with detail data.



Competing Procs

PROC TABULATE

PROC REPORT

PROC FREQ

```
proc freq data=sashelp.cars;  
    tables origin*make*type /  
    out=example1 norow nocol;  
  
run;
```

	Origin	Make	Type	COUNT	PERCENT
1	Asia	Acura	SUV	1	0.2336448598
2	Asia	Acura	Sedan	5	1.1682242991
3	Asia	Acura	Sports	1	0.2336448598
4	Asia	Honda	Hybrid	2	0.4672897196
5	Asia	Honda	SUV	3	0.7009345794
6	Asia	Honda	Sedan	11	2.5700934579
7	Asia	Honda	Sports	1	0.2336448598
8	Asia	Hyundai	SUV	1	0.2336448598
9	Asia	Hyundai	Sedan	10	2.3364485981
10	Asia	Hyundai	Sports	1	0.2336448598

PROC FREQ

```
proc sort data=sashelp.cars out=cars;
```

```
  by origin;
```

```
run;
```

```
proc freq data=cars;
```

```
  by origin;
```

```
  tables make*type /
```

```
    out=example2 norow nocol;
```

```
run;
```

	Origin	Make	Type	COUNT	PERCENT
1	Asia	Acura	SUV	1	0.6329113924
2	Asia	Acura	Sedan	5	3.164556962
3	Asia	Acura	Sports	1	0.6329113924
4	Asia	Honda	Hybrid	2	1.2658227848
5	Asia	Honda	SUV	3	1.8987341772
6	Asia	Honda	Sedan	11	6.9620253165
7	Asia	Honda	Sports	1	0.6329113924
8	Asia	Hyundai	SUV	1	0.6329113924
9	Asia	Hyundai	Sedan	10	6.3291139241
10	Asia	Hyundai	Sports	1	0.6329113924
11	Asia	Infiniti	Sedan	6	3.7874682544

PROC MEANS



Biggest Challenge

The procedure does not calculate percentages.



Best Use Case

Use PROC MEANS when you want to generate data sets with statistic totals.



Competing Procs

PROC TABULATE

PROC SQL

PROC MEANS

```
proc means data=sashelp.shoes noprint nway;  
    class region subsidiary;  
    var sales;  
    output out=sums(drop=_type__freq_) sum=subsid_sales;  
run;
```

```
data shoes;  
    merge sashelp.shoes sums;  
    by region subsidiary;  
    subsid_perc = round(sales/subsid_sales*100,.01);  
run;
```

PROC MEANS

```
proc means data=casheln_shoes noprint nway;
```

	Region	Product	Subsidiary	Stores	Sales	Inventory	Returns	subsid_sales	subsid_perc
1	Africa	Boot	Addis Ababa	12	\$29,761	\$191,821	\$769	\$467,429	6.37
2	Africa	Men's Casual	Addis Ababa	4	\$67,242	\$118,036	\$2,284	\$467,429	14.39
3	Africa	Men's Dress	Addis Ababa	7	\$76,793	\$136,273	\$2,433	\$467,429	16.43
4	Africa	Sandal	Addis Ababa	10	\$62,819	\$204,284	\$1,861	\$467,429	13.44
5	Africa	Slipper	Addis Ababa	14	\$68,641	\$279,795	\$1,771	\$467,429	14.68
6	Africa	Sport Shoe	Addis Ababa	4	\$1,690	\$16,634	\$79	\$467,429	0.36
7	Africa	Women's Casual	Addis Ababa	2	\$51,541	\$98,641	\$940	\$467,429	11.03
8	Africa	Women's Dress	Addis Ababa	12	\$108,942	\$311,017	\$3,233	\$467,429	23.31
9	Africa	Boot	Algiers	21	\$21,297	\$73,737	\$710	\$395,600	5.38
10	Africa	Men's Casual	Algiers	4	\$63,206	\$100,982	\$2,221	\$395,600	15.98
11	Africa	Men's Dress	Algiers	13	\$123,743	\$428,575	\$3,621	\$395,600	31.28
12	Africa	Sandal	Algiers	25	\$29,198	\$84,447	\$1,530	\$395,600	7.38

by region subsidiary;

subsid_perc = round(sales/subsid_sales*100,.01);

run;

PROC TABULATE



Biggest Challenge

The procedure cannot perform basic mathematical calculations, such as adding, subtracting, multiplying, or dividing analysis variables.



Best Use Case

PROC TABULATE calculates totals and subtotals for various combinations of class variables.



Competing Procs

PROC REPORT

PROC TABULATE

```
proc format;  
    value sysp 131-high = 'red';  
run;
```

```
proc tabulate data=sashelp.heart;  
    class bp_status weight_status;  
    var diastolic systolic;  
    table bp_status*weight_status all='TOTALS'*weight_status='',  
        (diastolic systolic*[s={foreground=sysp.}])*mean*f=8.;  
    keylabel mean=' ';  
run;
```

PROC TABULATE

```
proc format;
    value syp 131-high
run;

proc tabulate data=sashe
    class bp_status we
    var diastolic systol
    table bp_status*w
        (dia
    keylabel mean=' ';
run;
```

		Diastolic	Systolic
Blood Pressure Status	Weight Status		
High	Normal	93	153
	Overweight	97	156
	Underweight	92	155
Normal	Normal	79	126
	Overweight	81	128
	Underweight	78	126
Optimal	Normal	70	109
	Overweight	71	111
	Underweight	69	107
TOTALS	Normal	80	129
	Overweight	88	141
	Underweight	78	126

```
weight_status=' ',
=syp.}})*mean*f=8.;
```

PROC REPORT



Biggest Challenge

There is a learning curve to using the compute block, the most powerful aspect of PROC REPORT.



Best Use Case

Use it to create a final report that includes customized headers and text, coloring based on certain values (trafficlighting), and calculations based on various columns.



Competing Procs

PROC PRINT

PROC TABULATE

PROC REPORT

```
proc format;
    value bmi low-18.4= 'yellow' 18.5-24.9='green' 25-29.9='orange' 30-high='red';
proc report data=sashelp.heart;
    column bp_status sex,(height weight bmi);
    define bp_status / group;
    define sex / across ' ';
    define height / mean 'Height (Avg)' f=8.2;
    define weight / mean 'Weight (Avg)' f=8.1;
    define bmi / computed 'BMI (Avg)' f=8. style(column)=[background=bmi.];
    compute bmi;
        _c4_ = 703 * (_c3_ / (_c2_ * _c2_));
        _c7_ = 703 * (_c6_ / (_c5_ * _c5_));
    endcomp;
    compute after;
        abmi = sum(_c4_,_c7_)/2;
        line "The overall average BMI is: " abmi 8.1;
    endcomp;
run;
```

PROC REPORT

```
proc format;
    value bmi low-18.4= 'yellow' 18.5-24.9='green' 25-29.9='orange' 30-high='red';
proc report data=sashelp.heart;
    column bp_status sex,(height weight bmi);
    define bp_status / group;
    define sex / group;
    define height / mean;
    define weight / mean;
    define bmi / mean;
    compute
        _c7_ = 703 * (_c6_ / (_c5_ * _c5_));
    endcomp;
    compute after;
        abmi = sum(_c4_,_c7_)/2;
        line "The overall average BMI is: " abmi 8.1;
    endcomp;
run;
```

	Female			Male		
Blood Pressure Status	Height (Avg)	Weight (Avg)	BMI (Avg)	Height (Avg)	Weight (Avg)	BMI (Avg)
High	62.32	151.0	27	67.33	173.8	27
Normal	62.72	137.3	25	67.73	163.3	25
Optimal	62.81	128.6	23	67.91	157.6	24
The overall average BMI is: 25.6						

PROC SQL



Biggest Challenge

It is not a standard SAS procedure that requires a certain set of statements or options. There is a learning curve to understand the syntax and take full advantages of its capabilities.



Best Use Case

For the average SAS programmer, PROC SQL is best used for generating macro variables in one step, such as a list of unique variable values, population totals, or minimum and maximum values.



Competing Procs

PROC CONTENTS

PROC DATASETS

PROC FREQ

PROC MEANS

PROC SORT

DATA Step

PROC SQL

```
proc sql;  
    create table example24 as  
    select * from sashelp.class as one  
    join (select distinct sex, sum(weight) as overallweight  
          from sashelp.class group by sex) as two  
    on one.sex=two.sex;  
quit;
```

PROC SQL

```
proc sql;
```

```
create table
```

```
select * from
```

```
join (select
```

```
from
```

```
on one.set
```

```
quit;
```

	Name	Sex	Age	Height	Weight	overallweight
1	Alfred	M	14	69	112.5	1089.5
2	Alice	F	13	56.5	84	811
3	Barbara	F	13	65.3	98	811
4	Carol	F	14	62.8	102.5	811
5	Henry	M	14	63.5	102.5	1089.5
6	James	M	12	57.3	83	1089.5
7	Jane	F	12	59.8	84.5	811
8	Janet	F	15	62.5	112.5	811
9	Jeffrey	M	13	62.5	84	1089.5
10	John	M	12	59	99.5	1089.5
11	Joyce	F	11	51.3	50.5	811
12	Judy	F	14	64.3	90	811
13	Louise	F	12	56.3	77	811
14	Mary	F	15	66.5	112	811
15	Philip	M	16	72	150	1089.5
16	Robert	M	12	64.8	128	1089.5
17	Ronald	M	15	67	133	1089.5
18	Thomas	M	11	57.5	85	1089.5
19	William	M	15	66.5	112	1089.5

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Thank You

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