SAS绘图

示例SASHELP.CARS

MAKE	HORSEPOWER	LENGTH	INVOICE
Acura	265	189	$33,337
Audi	170	179	$23,508
BMW	225	180	$33,873
Buick	275	193	$34,357

直方图

```
PROC SORT DATA = SASHELP.CARS OUT = C NODUPKEY;
BY MAKE;
RUN;

PROC PRINT DATA = C;
RUN;
```

HORSEPOWER VS. INVOICE FOR BMW MAKERS BY TYPES

Obs	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_Cit
1	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6	265	1
2	Audi	A4 1.8T 4dr	Sedan	Europe	Front	$25,940	$23,508	1.8	4	170	2
3	BMW	X3 3.0i	SUV	Europe	All	$37,000	$33,873	3.0	6	225	1
4	Buick	Rainier	SUV	USA	All	$37,895	$34,357	4.2	6	275	1
5	Cadillac	Escalade	SUV	USA	Front	$52,795	$48,377	5.3	8	295	1
6	Chevrolet	Suburban 1500 LT	SUV	USA	Front	$42,735	$37,422	5.3	8	295	1
7	Chrysler	PT Cruiser 4dr	Sedan	USA	Front	$17,985	$16,919	2.4	4	150	2
8	Dodge	Durango SLT	SUV	USA	All	$32,235	$29,472	4.7	8	230	1
9	Ford	Excursion 6.8 XLT	SUV	USA	All	$41,475	$36,494	6.8	10	310	1
10	GMC	Envoy XUV SLE	SUV	USA	Front	$31,890	$28,922	4.2	6	275	1
11	Honda	Civic Hybrid 4dr manual (gas/electric)	Hybrid	Asia	Front	$20,140	$18,451	1.4	4	93	4
12	Hummer	H2	SUV	USA	All	$49,995	$45,815	6.0	8	316	1
13	Hyundai	Santa Fe GLS	SUV	Asia	Front	$21,589	$20,201	2.7	6	173	2
14	Infiniti	G35 4dr	Sedan	Asia	Rear	$28,495	$26,157	3.5	6	260	1
15	Isuzu	Ascender S	SUV	Asia	All	$31,849	$29,977	4.2	6	275	1
16	Jaguar	X-Type 2.5 4dr	Sedan	Europe	All	$29,995	$27,355	2.5	6	192	1
17	Jeep	Grand Cherokee Laredo	SUV	USA	Front	$27,905	$25,686	4.0	6	195	1
18	Kia	Sorento LX	SUV	Asia	Front	$19,635	$18,630	3.5	6	192	1
19	Land Rover	Range Rover HSE	SUV	Europe	All	$72,250	$65,807	4.4	8	282	1
20	Lexus	GX 470	SUV	Asia	All	$45,700	$39,838	4.7	8	235	1

21	Lincoln	Navigator Luxury	SUV	USA	All	$52,775	$46,360	5.4	8	300	1
22	MINI	Cooper	Sedan	Europe	Front	$16,999	$15,437	1.6	4	115	2
23	Mazda	Tribute DX 2.0	SUV	Asia	All	$21,087	$19,742	2.0	4	130	2
24	Mercedes-Benz	G500	SUV	Europe	All	$76,870	$71,540	5.0	8	292	1
25	Mercury	Mountaineer	SUV	USA	Front	$29,995	$27,317	4.0	6	210	1
26	Mitsubishi	Endeavor XLS	SUV	Asia	All	$30,492	$28,330	3.8	6	215	1
27	Nissan	Pathfinder Armada SE	SUV	Asia	Front	$33,840	$30,815	5.6	8	305	1
28	Oldsmobile	Alero GX 2dr	Sedan	USA	Front	$18,825	$17,642	2.2	4	140	2
29	Pontiac	Aztekt	SUV	USA	Front	$21,595	$19,810	3.4	6	185	1
30	Porsche	Cayenne S	SUV	Europe	All	$56,665	$49,865	4.5	8	340	1
31	Saab	9-3 Arc Sport 4dr	Sedan	Europe	Front	$30,860	$29,269	2.0	4	210	2
32	Saturn	VUE	SUV	USA	All	$20,585	$19,238	2.2	4	143	2
33	Scion	xA 4dr hatch	Sedan	Asia	Front	$12,965	$12,340	1.5	4	108	3
34	Subaru	Impreza 2.5 RS 4dr	Sedan	Asia	All	$19,945	$18,399	2.5	4	165	2
35	Suzuki	XL-7 EX	SUV	Asia	Front	$23,699	$22,307	2.7	6	185	1
36	Toyota	Prius 4dr (gas/electric)	Hybrid	Asia	Front	$20,510	$18,926	1.5	4	110	5
37	Volkswagen	Touareg V6	SUV	Europe	All	$35,515	$32,243	3.2	6	220	1
38	Volvo	XC90 T6	SUV	Europe	All	$41,250	$38,851	2.9	6	268	1

```
PROC UNIVARIATE DATA = SASHELP.CARS;
VAR HORSEPOWER;
RUN;
```

The SAS System

The UNIVARIATE Procedure
Variable: Horsepower

Moments			
N	428	**Sum Weights**	428
Mean	215.885514	**Sum Observations**	92399
Std Deviation	71.8360316	**Variance**	5160.41543
Skewness	0.93033074	**Kurtosis**	1.55215863
Uncorrected SS	22151103	**Corrected SS**	2203497.39
Coeff Variation	33.2750587	**Std Error Mean**	3.47232565

Basic Statistical Measures			
Location		**Variability**	
Mean	215.8855	**Std Deviation**	71.83603
Median	210.0000	**Variance**	5160
Mode	200.0000	**Range**	427.00000
		Interquartile Range	90.00000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	62.17318	**Pr > |t|**	<.0001
Sign	**M**	214	**Pr >= |M|**	<.0001
Signed Rank	**S**	45903	**Pr >= |S|**	<.0001

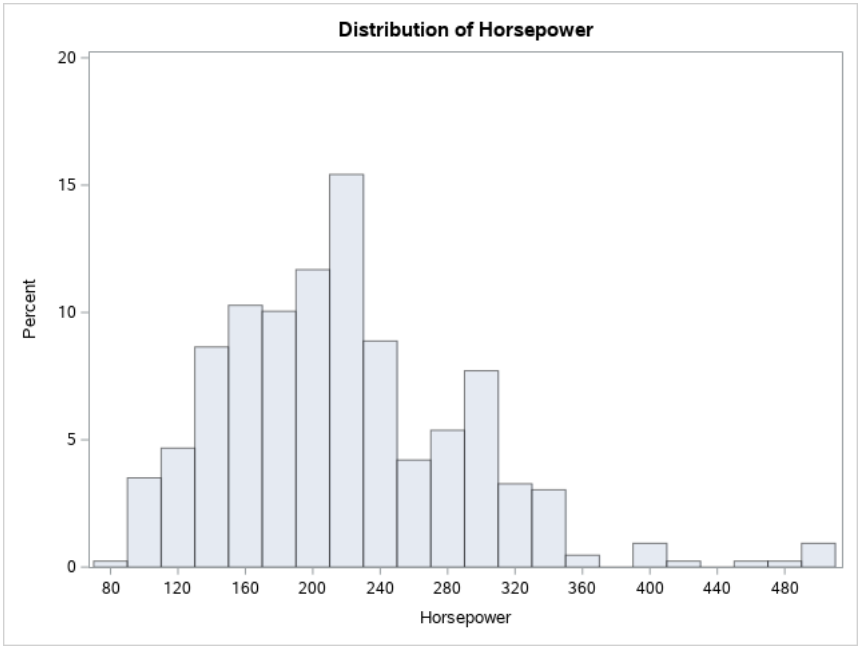
Quantiles (Definition 5)	
Level	**Quantile**
100% Max	500
99%	477
95%	340
90%	302
75% Q3	255
50% Median	210
25% Q1	165
10%	130
5%	115
1%	103
0% Min	73

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
73	151	477	335
93	150	493	263
100	405	493	271
103	171	493	272
103	170	500	115

```
PROC UNIVARIATE DATA = SASHELP.CARS NOPRINT;
HISTOGRAM HORSEPOWER
/
MIDPOINTS = 100 TO 500 BY 20;
RUN;
```

The SAS System

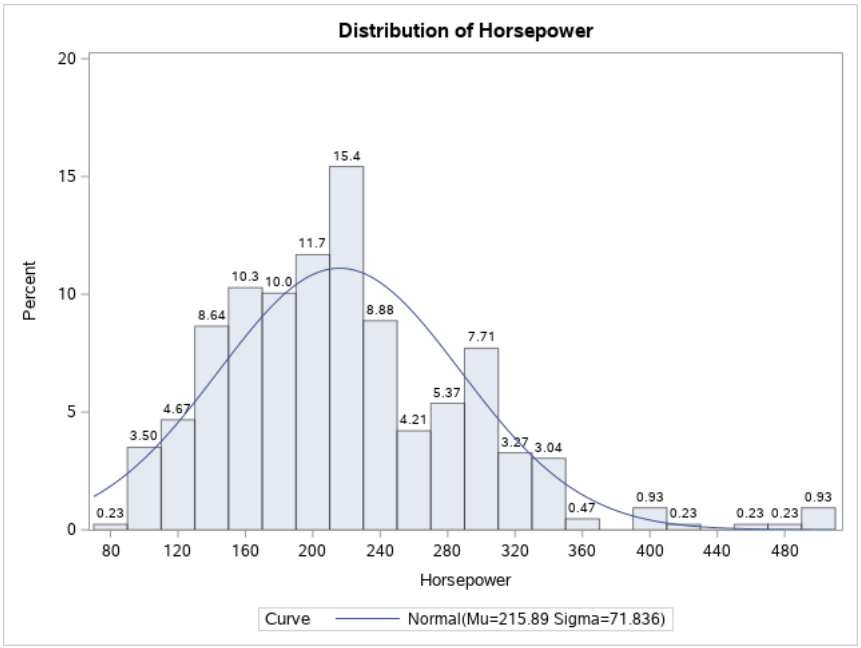
The UNIVARIATE Procedure




```
PROC UNIVARIATE DATA = SASHELP.CARS NOPRINT;
HISTOGRAM HORSEPOWER
/
NORMAL (
    MU = EST
    SIGMA = EST
    COLOR = BLUE
    W = 1
)
BARLABEL = PERCENT
MIDPOINTS = 100 TO 500 BY 20;
RUN;
```

The SAS System

The UNIVARIATE Procedure



The SAS System

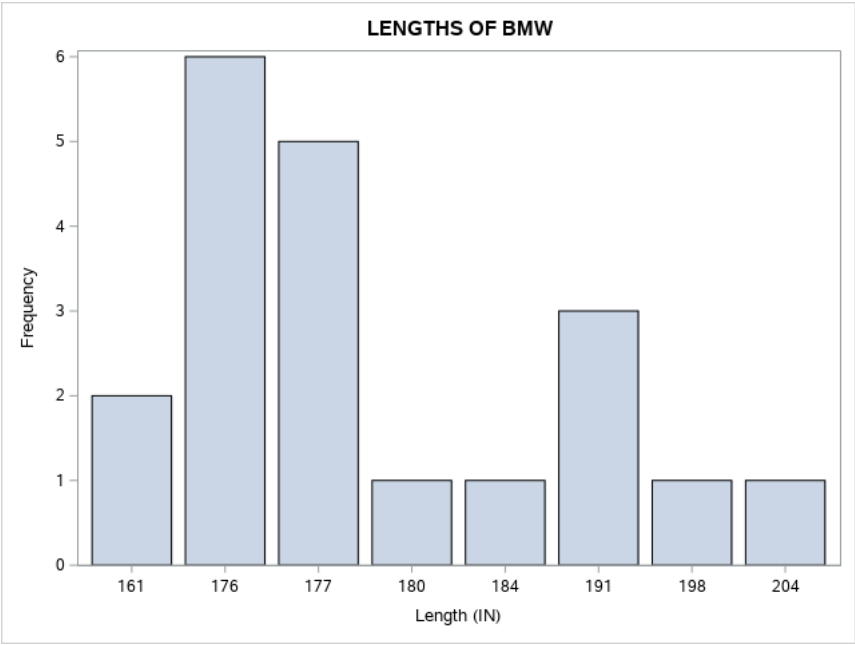
The UNIVARIATE Procedure
Fitted Normal Distribution for Horsepower

Parameters for Normal Distribution		
Parameter	**Symbol**	**Estimate**
Mean	Mu	215.8855
Std Dev	Sigma	71.83603

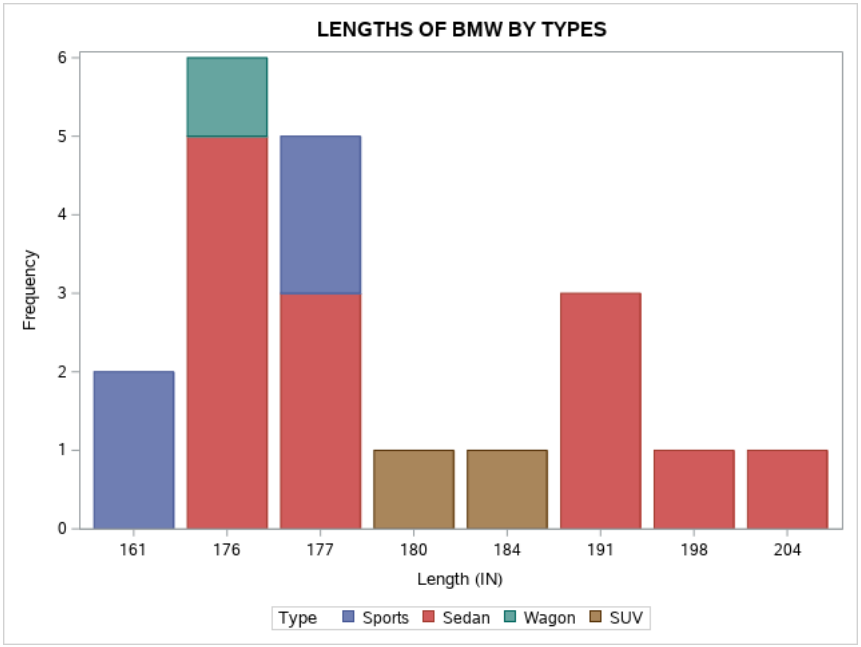
Goodness-of-Fit Tests for Normal Distribution				
Test	**Statistic**		**p Value**	
Kolmogorov-Smirnov	**D**	0.09051574	**Pr > D**	<0.010
Cramer-von Mises	**W-Sq**	0.58980554	**Pr > W-Sq**	<0.005
Anderson-Darling	**A-Sq**	3.68580519	**Pr > A-Sq**	<0.005

Quantiles for Normal Distribution		
	Quantile	
Percent	**Observed**	**Estimated**
1.0	103.000	48.7699
5.0	115.000	97.7258
10.0	130.000	123.8239
25.0	165.000	167.4328
50.0	210.000	215.8855
75.0	255.000	264.3382
90.0	302.000	307.9471
95.0	340.000	334.0453
99.0	477.000	383.0011

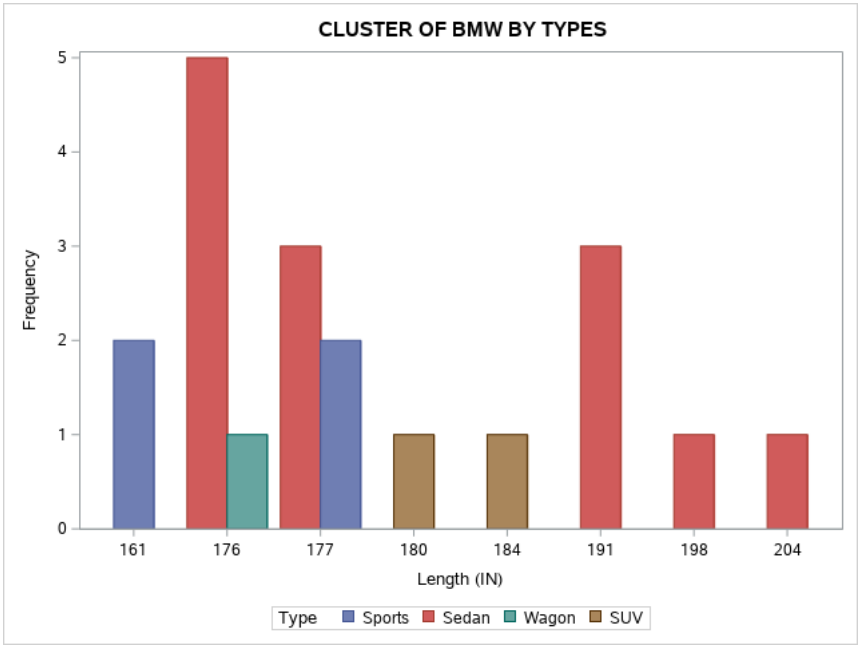
```
PROC SGPLOT DATA = SASHELP.CARS(WHERE = (MAKE IN ('BMW')));
VBAR LENGTH;
TITLE 'LENGTHS OF BMW';
RUN;
QUIT;
```



```
PROC SGPLOT DATA = SASHELP.CARS(WHERE = (MAKE IN ('BMW')));
VBAR LENGTH /GROUP = TYPE ;
TITLE 'LENGTHS OF BMW BY TYPES';
RUN;
QUIT;
```




```
PROC SGPLOT DATA = SASHELP.CARS(WHERE = (MAKE IN ('BMW')));
VBAR LENGTH /GROUP = TYPE GROUPDISPLAY = CLUSTER;
TITLE 'CLUSTER OF BMW BY TYPES';
RUN;
QUIT;
```

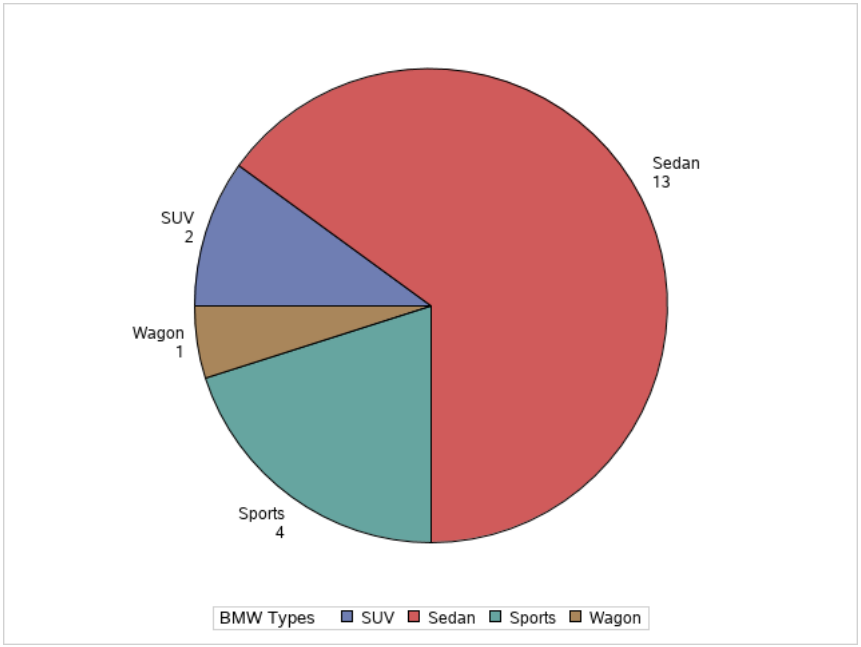



```
PROC TEMPLATE;
```

```
  DEFINE STATGRAPH PIE0;
    BEGINGRAPH;
      LAYOUT REGION;
        PIECHART CATEGORY = type /
          DATALABELLOCATION = OUTSIDE
          CATEGORYDIRECTION = CLOCKWISE
          START = 180 NAME = 'pie';
        DISCRETELEGEND 'pie' /
          TITLE = 'BMW Types';
      ENDLAYOUT;
    ENDGRAPH;
  END;
RUN;

PROC SGRENDER
    DATA = SASHELP.CARS(WHERE = (MAKE IN ('BMW')))
    TEMPLATE = PIE0;
RUN;
```

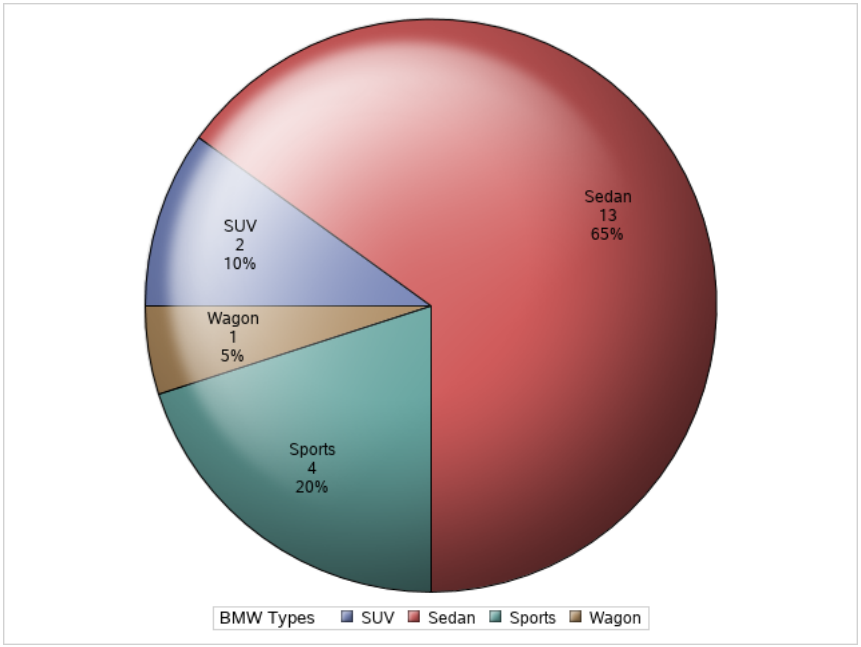
CLUSTER OF BMW BY TYPES




```
PROC TEMPLATE;
  DEFINE STATGRAPH PIE1;
    BEGINGRAPH;
      LAYOUT REGION;
        PIECHART CATEGORY = type /
          DATALABELLOCATION = INSIDE
          DATALABELCONTENT=ALL
          CATEGORYDIRECTION = CLOCKWISE
          DATASKIN= SHEEN
          START = 180 NAME = 'pie';
        DISCRETELEGEND 'pie' /
          TITLE = 'BMW Types';
      ENDLAYOUT;
    ENDGRAPH;
  END;
RUN;

PROC SGRENDER
    DATA = SASHELP.CARS(WHERE = (MAKE IN ('BMW')))
    TEMPLATE = PIE1;
RUN;
```

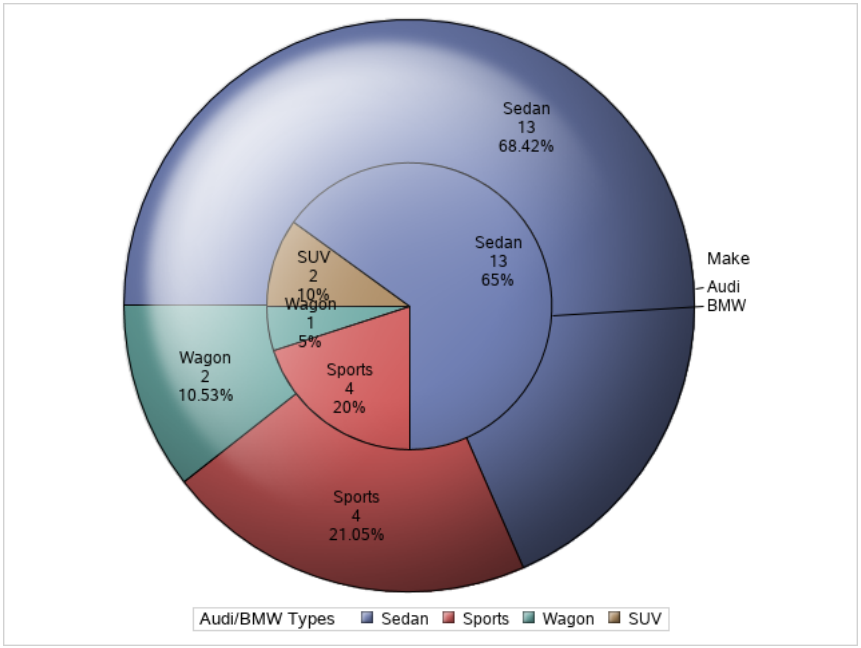
CLUSTER OF BMW BY TYPES



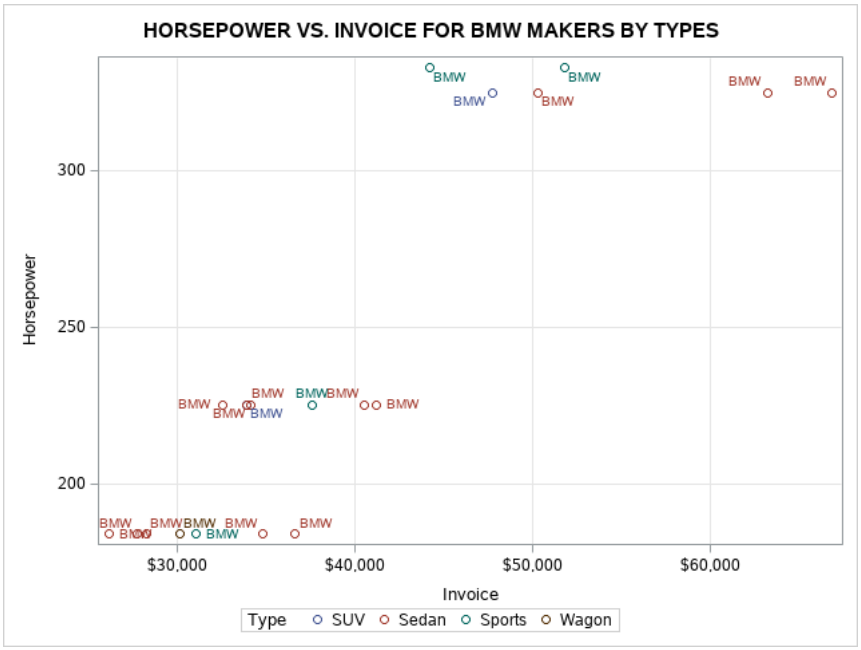

```
PROC TEMPLATE;
  DEFINE STATGRAPH PIE2;
    BEGINGRAPH;
      LAYOUT REGION;
        PIECHART CATEGORY = type / Group = make
          DATALABELLOCATION = INSIDE
          DATALABELCONTENT=ALL
          CATEGORYDIRECTION = CLOCKWISE
          DATASKIN= SHEEN
          START = 180 NAME = 'pie';
        DISCRETELEGEND 'pie' /
          TITLE = 'Audi/BMW Types';
      ENDLAYOUT;
    ENDGRAPH;
  END;
RUN;

PROC SGRENDER
    DATA = SASHELP.CARS(WHERE = (MAKE IN ('Audi', 'BMW')))
    TEMPLATE = PIE2;
RUN;
```

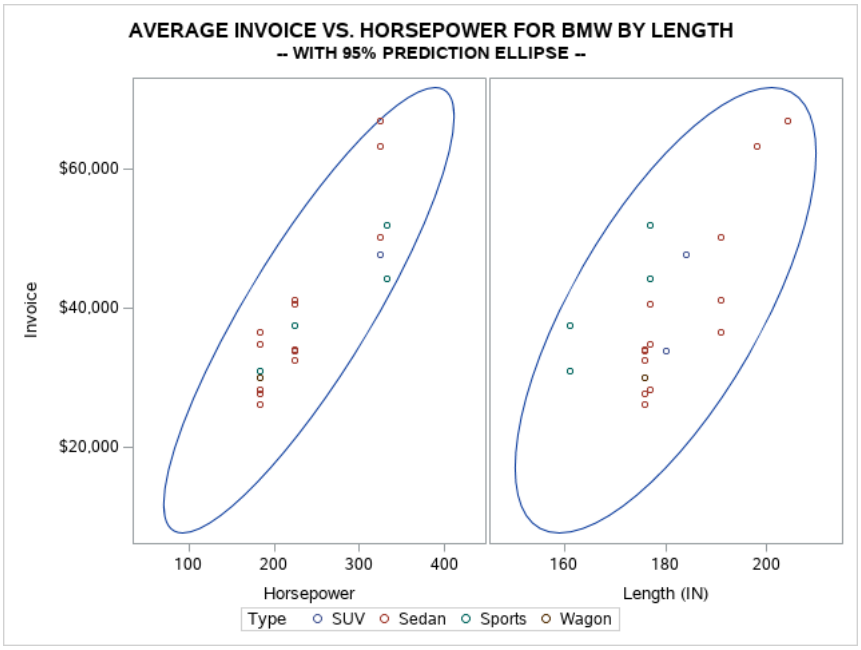
CLUSTER OF BMW BY TYPES



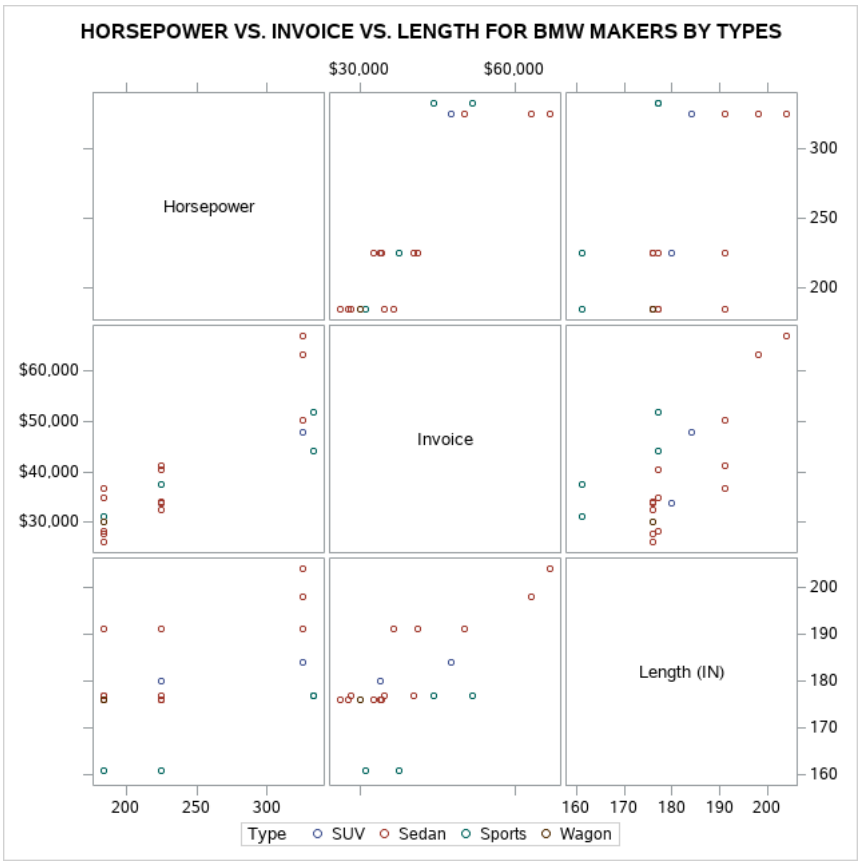
```
PROC SGSCATTER
    DATA = SASHELP.CARS(WHERE = (MAKE IN ('BMW')));
    PLOT HORSEPOWER * INVOICE
    / DATALABEL = MAKE GROUP = TYPE GRID;
    TITLE 'HORSEPOWER VS. INVOICE FOR BMW MAKERS BY TYPES';
RUN;
```



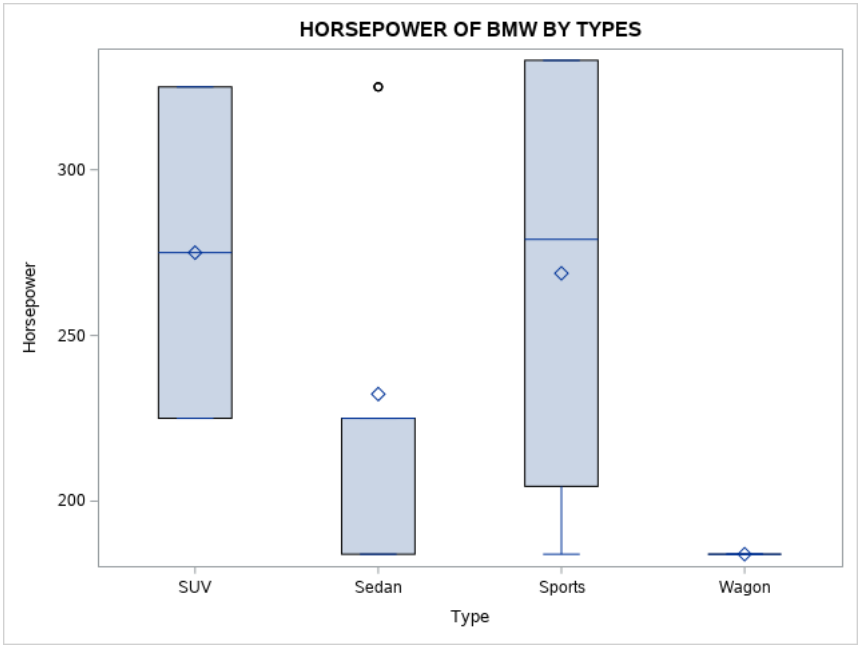

```
PROC SGSCATTER DATA = SASHELP.CARS(WHERE = (MAKE IN ('BMW')));
    COMPARE Y = INVOICE  X = (HORSEPOWER LENGTH)
    /GROUP = TYPE ELLIPSE = (ALPHA = 0.05 TYPE = PREDICTED);
    TITLE
    'AVERAGE INVOICE VS. HORSEPOWER FOR BMW BY LENGTH';
    TITLE2
    '-- WITH 95% PREDICTION ELLIPSE --'
    ;
    FORMAT
    INVOICE DOLLAR6.0;
RUN;
```



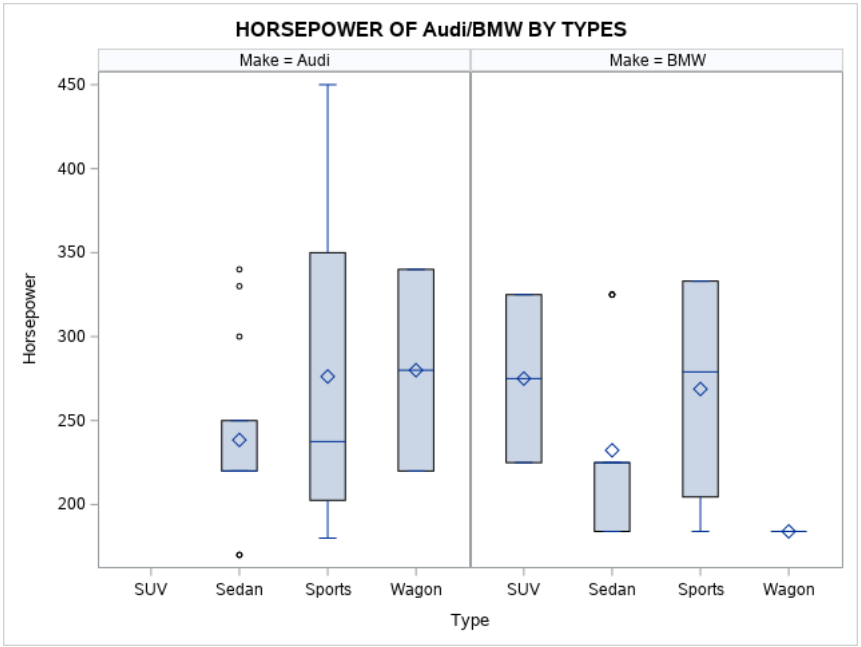

```
PROC SGSCATTER DATA = SASHELP.CARS(WHERE = (MAKE IN ('BMW')));
    MATRIX HORSEPOWER INVOICE LENGTH
    / GROUP = TYPE;
    TITLE 'HORSEPOWER VS. INVOICE VS. LENGTH FOR BMW MAKERS BY TYPES';
RUN;
```



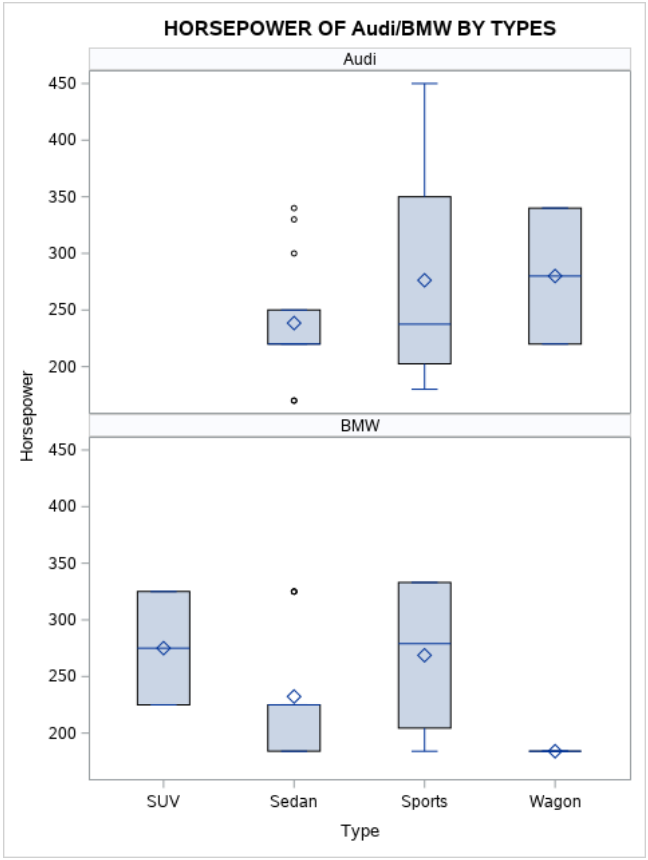
```
PROC SGPLOT DATA = SASHELP.CARS(WHERE = (MAKE IN ('BMW')));
    VBOX HORSEPOWER
    / CATEGORY = TYPE;
    TITLE 'HORSEPOWER OF BMW BY TYPES';
RUN;
```




```
PROC SGPANEL DATA = SASHELP.CARS(WHERE = (MAKE IN ('Audi', 'BMW')));
    PANELBY MAKE;
    VBOX HORSEPOWER / CATEGORY = TYPE;
    TITLE 'HORSEPOWER OF Audi/BMW BY TYPES';
RUN;
```




```
PROC SGPANEL DATA = SASHELP.CARS(WHERE = (MAKE IN ('Audi', 'BMW')));
    PANELBY MAKE / COLUMNS = 1 NOVARNAME;
    VBOX HORSEPOWER / CATEGORY = TYPE;
    TITLE 'HORSEPOWER OF Audi/BMW BY TYPES';
RUN;
```


HORSEPOWER OF Audi/BMW BY TYPES
Audi
BMW
Horsepower
450
400
350
300
250
200
SUV
Sedan
Sports
Wagon
Type