MSc-II Statistics Audit Course-301

ASSIGNMENT

Graphical Analysis Using SAS

Submitted by,

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Submitted to ,

DEPARTMENT OF STATISTICS

SCHOOL OF MATHEMATICAL SCIENCES

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Data:

data heart1;
set sashelp.heart;
run;
Data Description using Proc content :

Data Set Name	SASHELP.HEART	Observations	5209
Member Type	DATA	Variables	17
Engine	V9	Indexes	0
Created	10/24/2018 21:21:26	Observation Length	168
Last Modified	10/24/2018 21:21:26	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	NO
Label	Framingham Heart Study		
Data Representation	SOLARIS_X86_64, LINUX_X86_64, ALPHA_TRU64, LINUX_IA64		
Encoding	us-ascii ASCII (ANSI)		

		Variables in Creation Order		
#	Variable	Type	Len	Label
1	Status	Char	5	
2	DeathCause	Char	26	Cause of Death
3	AgeCHDdiag	Num	8	Age CHD Diagnosed
4	Sex	Char	6	
5	AgeAtStart	Num	8	Age at Start
6	Height	Num	8	
7	Weight	Num	8	
8	Diastolic	Num	8	
9	Systolic	Num	8	
10	MRW	Num	8	Metropolitan Relative Weight
11	Smoking	Num	8	
12	AgeAtDeath	Num	8	Age at Death
13	Cholesterol	Num	8	
14	Chol_Status	Char	10	Cholesterol Status
15	BP_Status	Char	7	Blood Pressure Status
16	Weight_Status	Char	11	Weight Status
17	Smoking_Status	Char	17	Smoking Status

- **Using gchart**
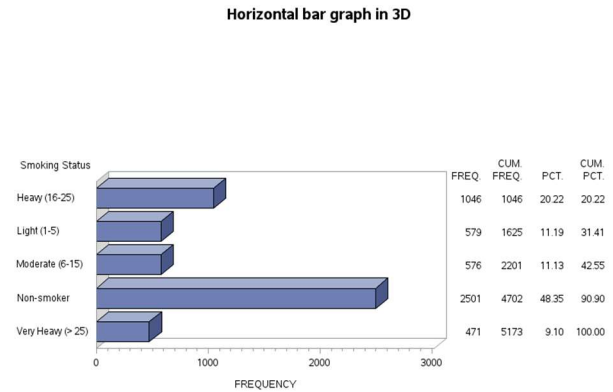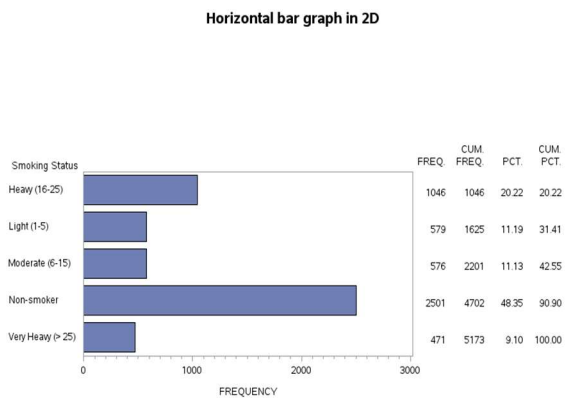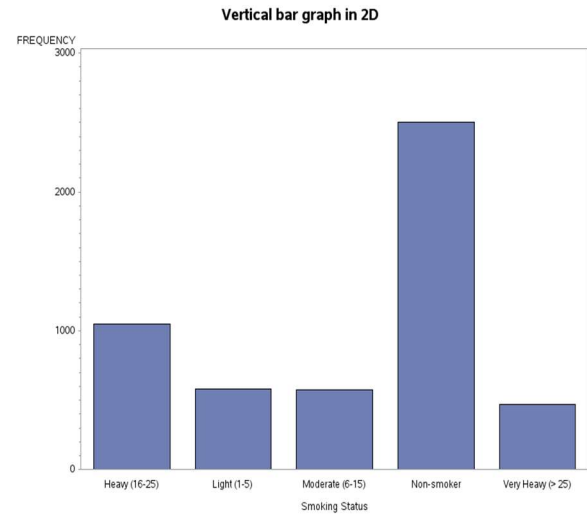
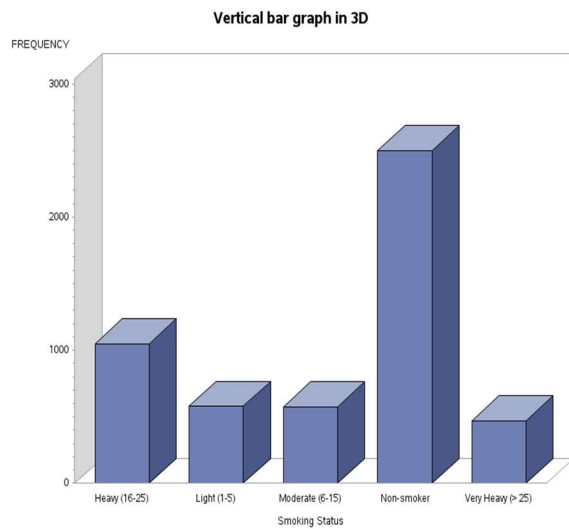## 1) Bar Graph

A bar chart **represents data in rectangular bars with length of the bar proportional to the value of the variable**. SAS uses the procedure PROC GCHART to create bar charts. We can draw both simple and stacked bars in the bar chart. In bar chart each of the bars can be given different colors.
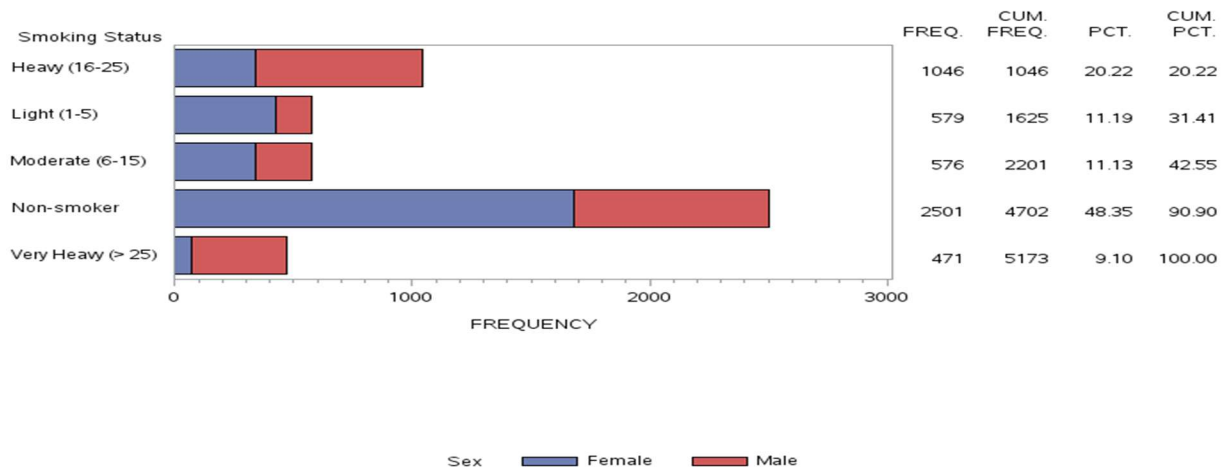
Code:

```
title "Vertical bar graph in 2D";
proc gchart data=heart1;
vbar smoking_status;
run;
quit;
title "Vertical bar graph in 3D";
proc gchart data=heart1;
vbar3d smoking_status;
run;
quit;
title "Horizontal bar graph in 2D";
proc gchart data=heart1;
hbar smoking_status;
run;
quit;
title "Horizontal bar graph in 3D";
proc gchart data=heart1;
hbar3d smoking_status;
run;
quit;
title "Horizontal bar graph in 2D by changing graphical symbol";
proc chart data=heart1;
hbar deathcause/symbol='*' nostats;
run;
quit;
title "Horizontal bar graph using option subgroup";
proc gchart data=heart1;
hbar smoking_status / subgroup=sex;
```

Results:

Vertical bar graph in 3D

FREQUENCY

Smoking Status

Vertical bar graph in 2D

FREQUENCY

Smoking Status

Horizontal bar graph in 2D

Smoking Status	FREQ.	CUM. FREQ.	PCT.	CUM. PCT.
Heavy (16-25)	1046	1046	20.22	20.22
Light (1-5)	579	1625	11.19	31.41
Moderate (6-15)	576	2201	11.13	42.55
Non-smoker	2501	4702	48.35	90.90
Very Heavy (> 25)	471	5173	9.10	100.00

FREQUENCY

Horizontal bar graph in 3D

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FREQUENCY

Horizontal bar graph using option subgroup

| Smoking Status	FREQ.	CUM. FREQ.	PCT.	CUM. PCT.
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FREQUENCY

Sex ☐ Female ☐ Male

2) Block Chart

Block charts allow grouping, which organizes the blocks into rows based on the values of a group variable, and subgrouping, which subdivides the blocks into segments based on the values of a subgroup variable.

Code:

```
title "Block Chart";
proc gchart data=heart1;
block deathcause ;
run;
quit;
title "Block Chart";
proc gchart data=heart1;
block deathcause / subgroup=sex type=percent;
run;
quit;
```
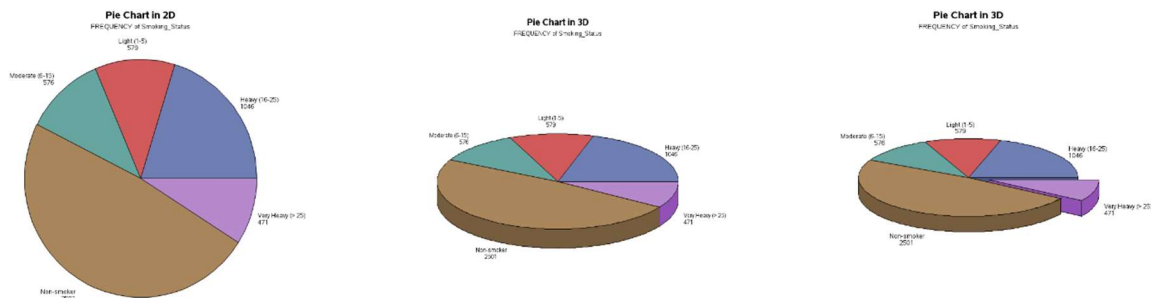
Result:
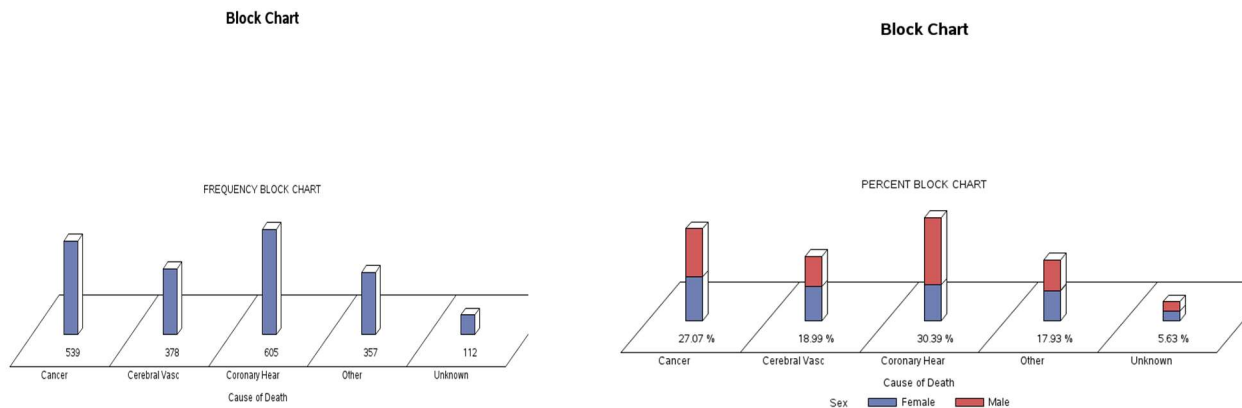
3) Pie Chart

A pie-chart is a representation of values as slices of a circle with different colors. The slices are labeled and the numbers corresponding to each slice is also represented in the chart.

Code:

```
title "Pie Chart in 2D";
proc gchart data=heart1;
pie smoking_status ;
run;
quit;
title "Pie Chart in 3D";
proc gchart data=heart1;
pie3d smoking_status ;
run;
quit;
```

Result:

4) Donut Chart

Just like a pie chart, a donut chart shows **the relationship of parts to a whole**, but a donut chart can contain more than one data series. Each data series that you plot in a donut chart adds a ring to the chart. The first data series is displayed in the center of the chart.

Code:

```
title "Donut Chart";
proc gchart data=heart1;
donut smoking_status /
donutpct=30;
run;
quit;
title "Donut Chart by subgroup";
proc gchart data=heart1;
donut smoking_status / subgroup=sex
donutpct=30;
run;
quit;
```

Result:

Donut Chart
FREQUENCY of Smoking_Status

Donut Chart by subgroup
FREQUENCY of Smoking_Status
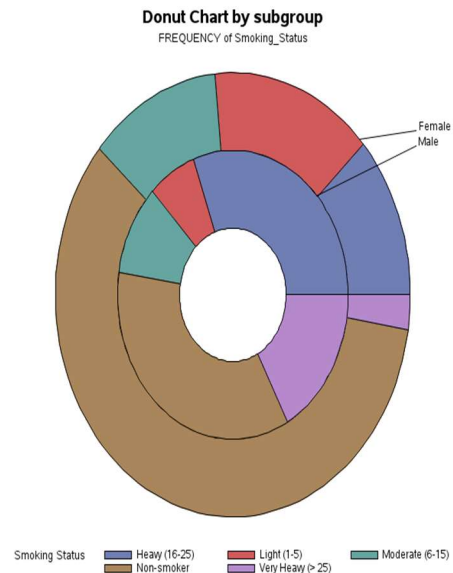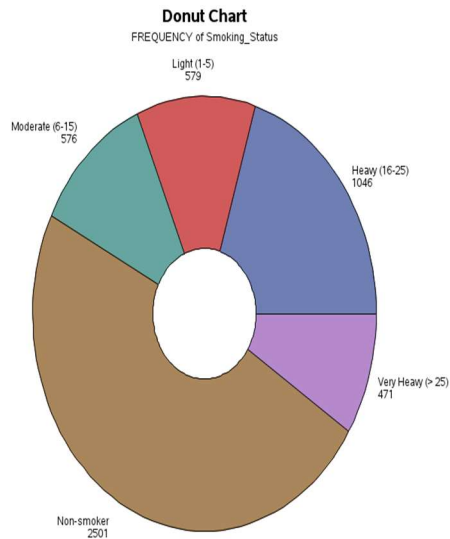
- ## **Using sgpanel**

1) Bar Graph

Creates a vertical *bar chart* that summarizes the values of a category variable.

Code:

```
title "Horizontal bar graph by group";
proc sgpanel data=sashelp.heart;
panelby sex;
hbar smoking_status /response=ageatdeath stat=mean;
run;
title "Vertical bar graph by group";
proc sgpanel data=sashelp.heart;
panelby sex;
vbar smoking_status /response=ageatdeath stat=mean;
run;
title "Pie Chart in 3D";
proc gchart data=heart1;
pie3d smoking_status / explode="Very Heavy (> 25)" ;
run;
quit;
```

Result:

Horizontal bar graph by group

Vertical bar graph by group
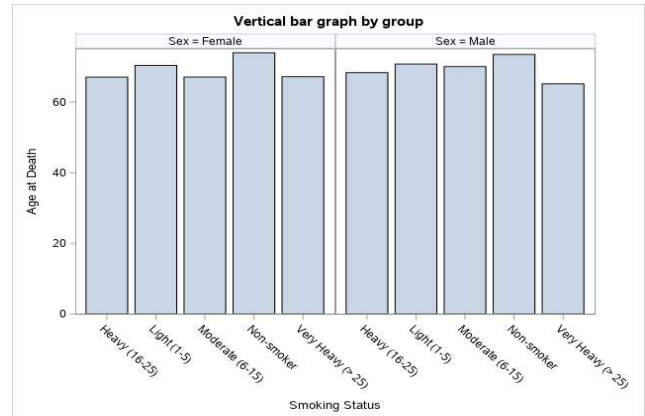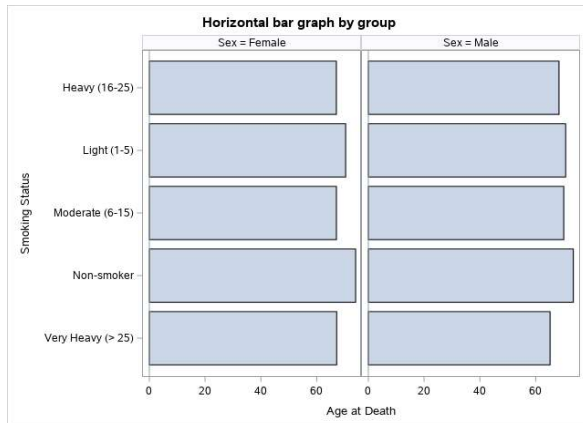
2) Box Plot

A box plot is created for each distinct value of the category variable. If you explicitly set the category axis type to LINEAR and use a numeric category variable, the box plot becomes an interval plot. Otherwise, the box plot is discrete.

Code:

```
title "vertical box plot by group";
proc sgpanel data=heart1;
panelby sex;
vbox height;
run;
title "Horizontal box plot by group";
proc sgpanel data=heart1;
panelby sex;
hbox height;
run;
```

Result:

vertical box plot by group

Horizontal box plot by group
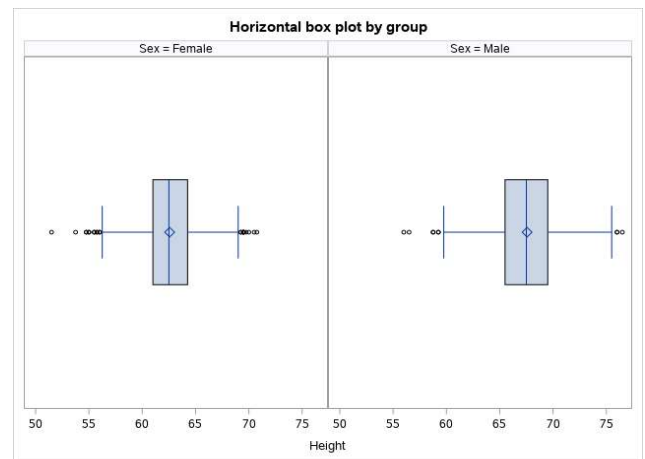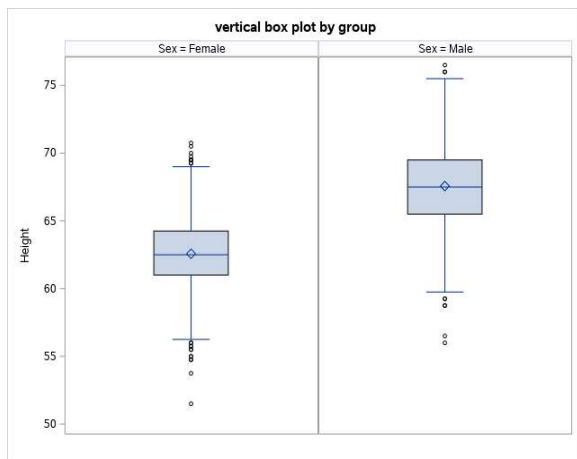
3) Histogram

The HISTOGRAM statement can be combined only with DENSITY statements in the SGPANEL procedure. Histograms **allow you to explore your data by displaying the distribution of a continuous variable (percentage of a sample) against categories of the value**. You can obtain the shape of the distribution and the data are distributed symmetrically.

Code:

```
title "Histogram using uniscale all by group";
proc sgpanel data=heart1;
panelby sex /uniscale=all;
histogram weight;
run;
title "Histogram using uniscale row by group";
proc sgpanel data=heart1;
panelby sex /uniscale=row;
histogram weight;
run;
title "Histogram using uniscale column by group";
proc sgpanel data=heart1;
panelby sex /uniscale=column;
histogram weight;
run;
```

Result:
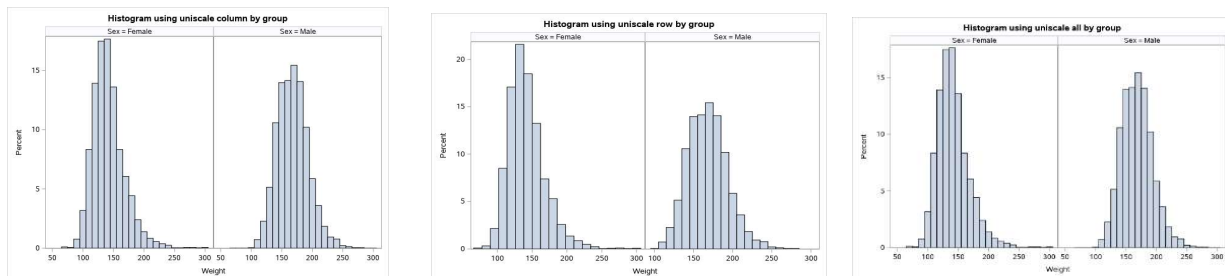
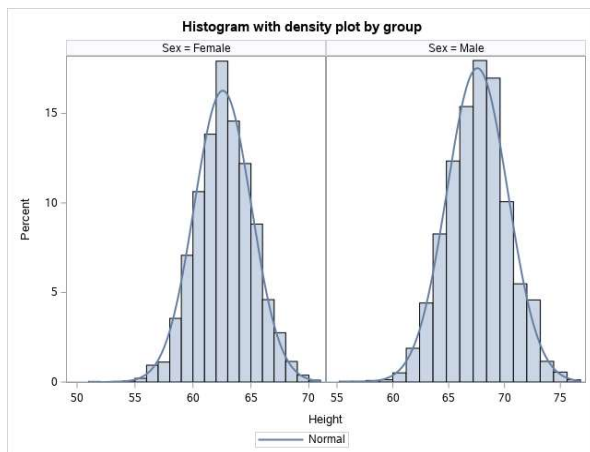
4) Density Plot

Creates a *density* curve that shows the distribution of values in your data. Specifies the value of the ID variable in a discrete attribute *map data set*.

Code:

```
title "Histogram with density plot by group";
proc sgpanel data=heart1;
panelby sex /uniscale=row;
histogram height;
density height;
run;
```

Result:

5) Scatter Plot

A scatterplot is a type of graph which uses values from two variables plotted in a Cartesian plane. It is usually used **to find out the relationship between two variables**. In SAS we use PROC SGSCATTER to create scatterplots.

Code:

```
title "Scatter Plot by sex";
proc sgpanel data=heart1;
panelby sex;
scatter x=height y=weight;
run;
```

Result: