1. Types of Data in SPSS

SPSS gives three options regarding types of data: nominal, ordinal and scale.

1. Nominal data

These are categorical (Qualitative) data that have no order. The categories within each variable are mutually exclusive: respondents can only fall into one category.

Examples of nominal variables:

- **Gender** – respondents can be male or female.
- **Disease/health status** – respondents can either have a disease or not
- **Marital status** – respondents can only have one marital status at a given time: single, married, divorced, widowed

2. Ordinal data

These are also categorical variables in which the categories are ordered.

Examples of ordinal variables:

- **Age group** – for example, 30–39, 40–49, 50–59, 60+
- **Likert scales** – strongly agree, agree, neither agree nor disagree, disagree, strongly disagree.
- **Academic degree –** assistant professor, associate professor, professor.

3. Scale data

In SPSS this covers discrete and continuous data.

➢ Discrete data comprise variables that can only take integers (whole numbers).

Examples of discrete data:

- Number of nights spent in hospital
- Number of courses of a given drug prescribed during the study period
- Age at last birthday
- Number of cigarettes smoked in a week

➢ Continuous data can take any value.

Examples of continuous data:

- Blood pressure
- Body mass index (BMI)
- Height of patient
- Time to recover

Exercise 1: Determine the type of the following data.

1. Number of patients
2. Place of residence
3. Hair color
4. Degree of injury in an accident
5. Type of diabetes

Exercise 2: Give examples of each type of the data.

2. Graphic Display of Frequency Distributions

Frequency distributions can be presented either in tables or graphically. Graphs have the advantage of communicating information quickly. They can also be useful to researchers themselves early in the analysis process when they are trying to understand their data. In this section, we will present some graphics tools to display frequency distributions.

## Bar Graphs

There are three types of bar graphs.

1. Simple Bar

When a variable is measured on a nominal scale, or on an ordinal scale with a small number of values, researchers can construct a bar graph to display frequency information. A bar graph consists of two dimensions: a horizontal dimension (the X-axis) and a vertical dimension (the Y-axis).

In a bar graph, the categories are typically listed along the horizontal X axis, and the frequencies or percentages are displayed on the vertical Y axis. The bars above each category are drawn to the height that indicates the frequency or relative frequency for that category. In a bar graph for categorical data, the bars for adjacent categories should be drawn not touching each other; each bar width and the distance between bars should be equal.

L7

Example 5

Construct a simple bar graph of the data in Example 4.

Using SPSS (See the video)

L7
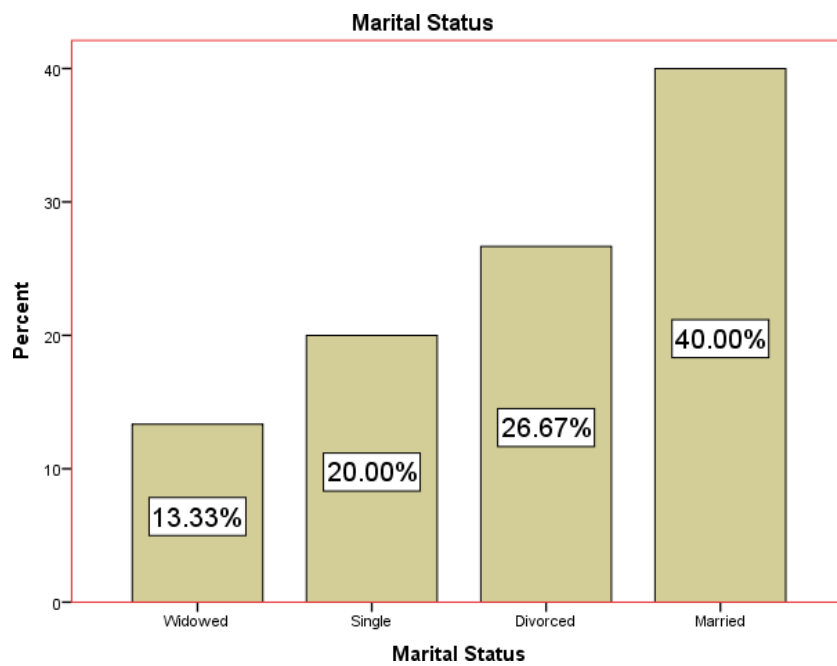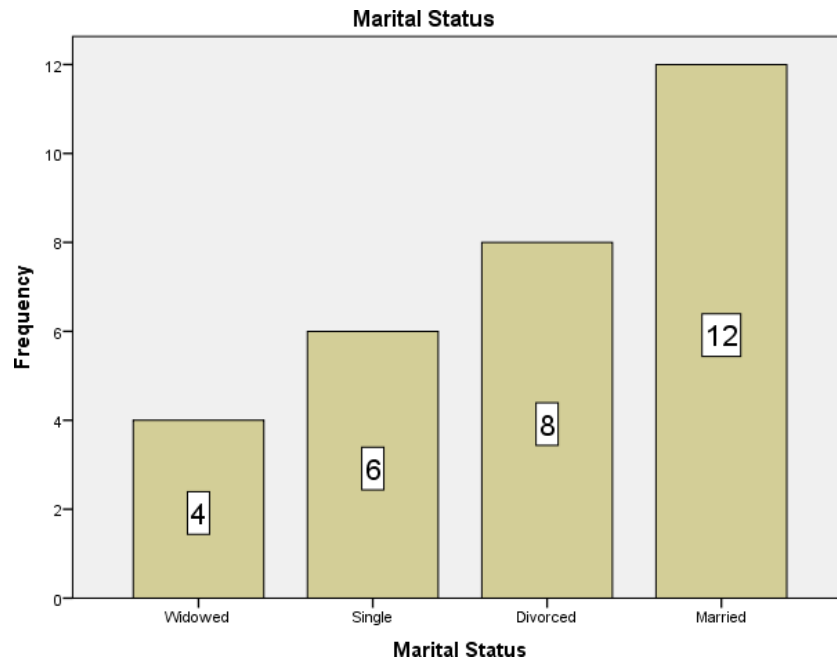
2. Clustered Bar

The clustered bars are used to compare between two or more subjects by drawing adjacent bars.

Example 6

The following table presents the number of nurses in a certain hospital during the years from 2016 till 2020.

year	2016	2017	2018	2019	2020
Male	20	27	32	28	26
Female	24	30	35	30	31

Construct a clustered bar graph of the data.

The number of nurses during the period from 2016 -2020
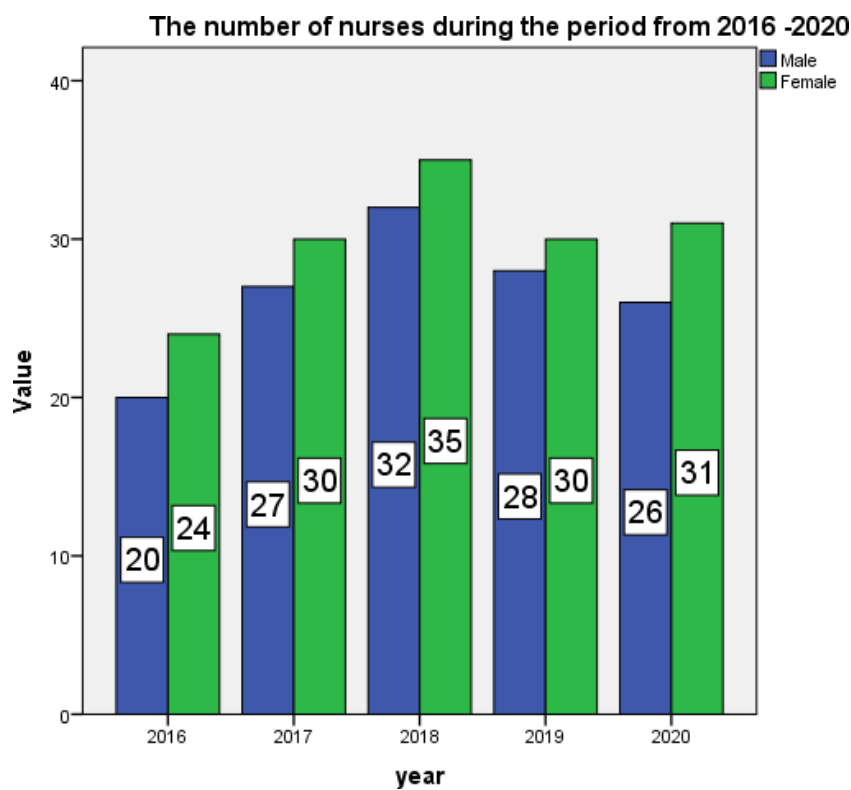
3. Stacked Bar

The stacked bars are used to compare between two or more subjects by dividing each column into parts proportional to the number it represents.

Example 7

Construct a stacked bar graph for the data in Example 6.
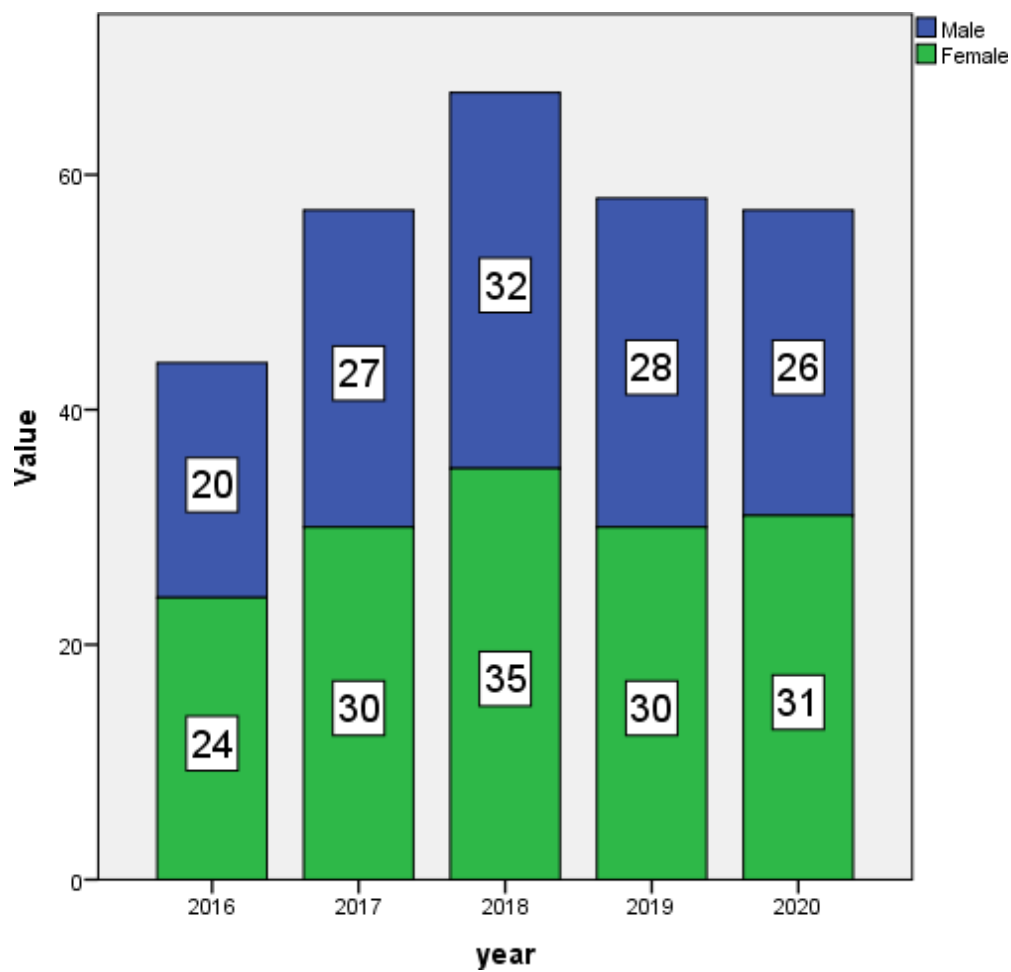
Histograms

Frequency information for interval-level and ratio-level data can be displayed in a **histogram**, which is a graphic display similar to a bar graph. In a histogram, however, the bars touch one another because adjacent values are not distinct categories, but rather contiguous scores on an ordered dimension.

Example 8

Construct a histogram graph for the data in Example 2 (Hear rate data) and display the normal curve.
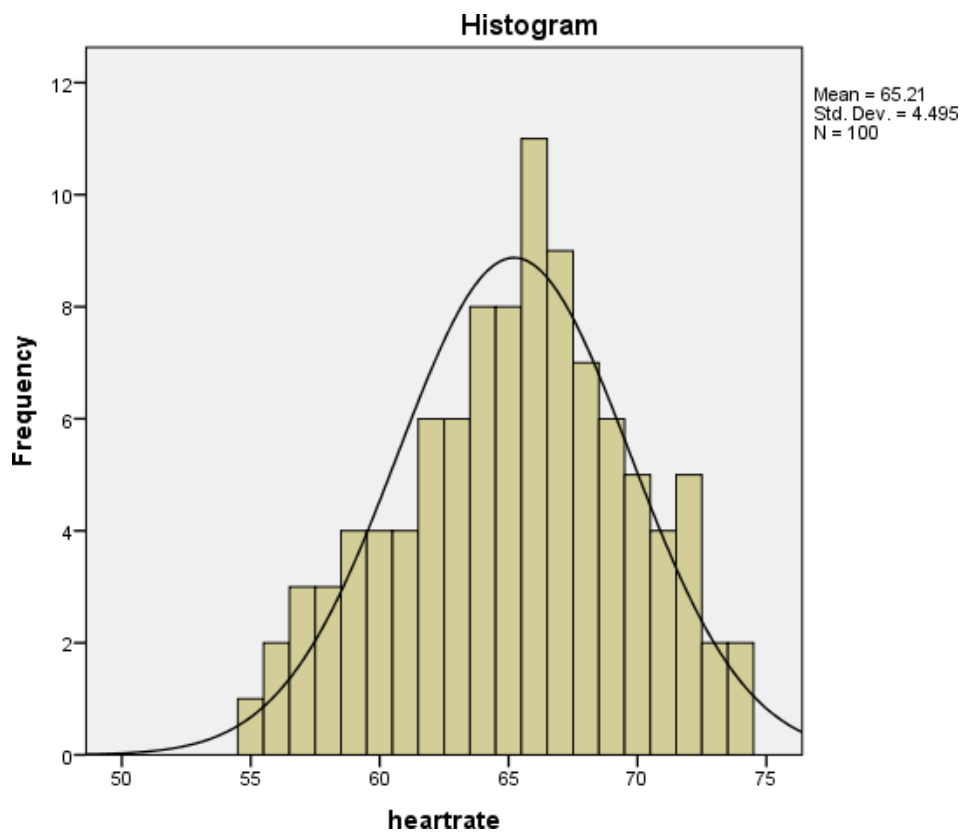
The curve Graphs

It is used to clarify the general trend of one or more phenomena during a specific period.

Example 9

1. Display the number of males data from Example 6 using a simple curve graph.
2. Display the data from Example 6 using a multiple curve graph.
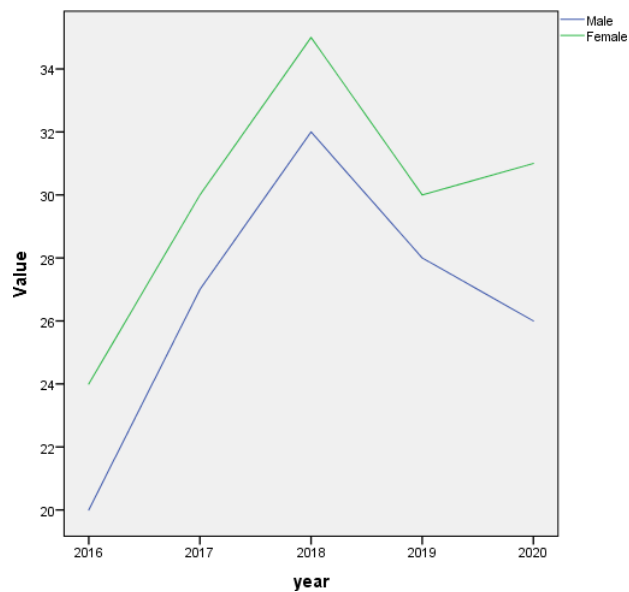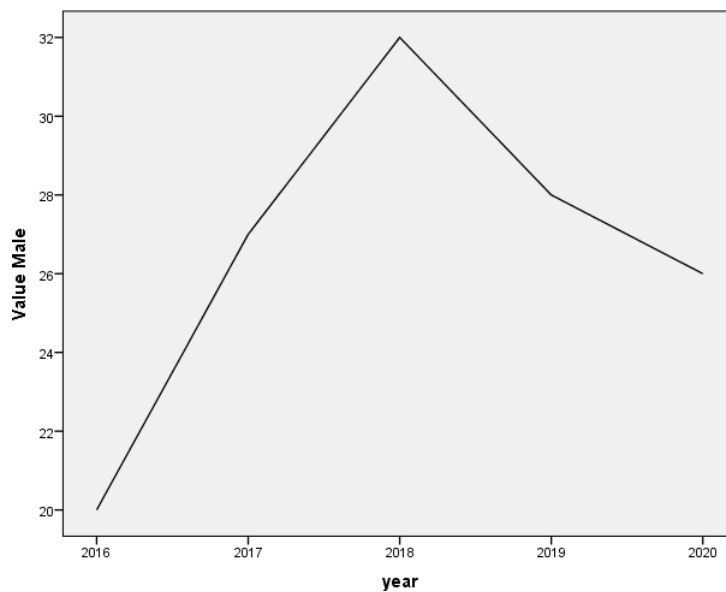
The Pie Charts

The pie chart (sometimes called a circle graph) is a circle divided into pie-shaped wedges corresponding to the percentages. All the pieces of the pie must add up to 100%. The angle of a pie = the frequency percentage of the pie $\times$ 360.

For example, the angle of pie for married patients $= \frac{40}{100} \times 360 = 144$.
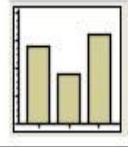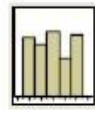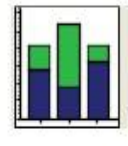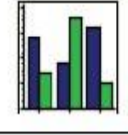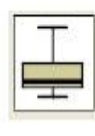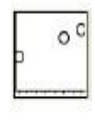
Example 10
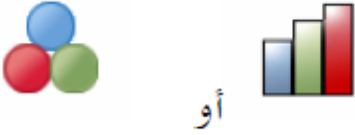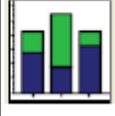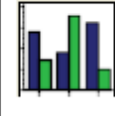
Display the marital status data from Example 4 using a pie chart.

Marital Status

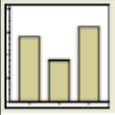|		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Married	12	40.0	40.0	40.0
	Single	6	20.0	20.0	60.0
	Divorced	8	26.7	26.7	86.7
	Widowed	4	13.3	13.3	100.0
	Total	30	100.0	100.0	

L7

Marital Status

Married
Single
Divorced
Widowed

12
8
4
6

Marital Status

Married
Single
Divorced
Widowed

40.00%
26.67%
13.33%
20.00%
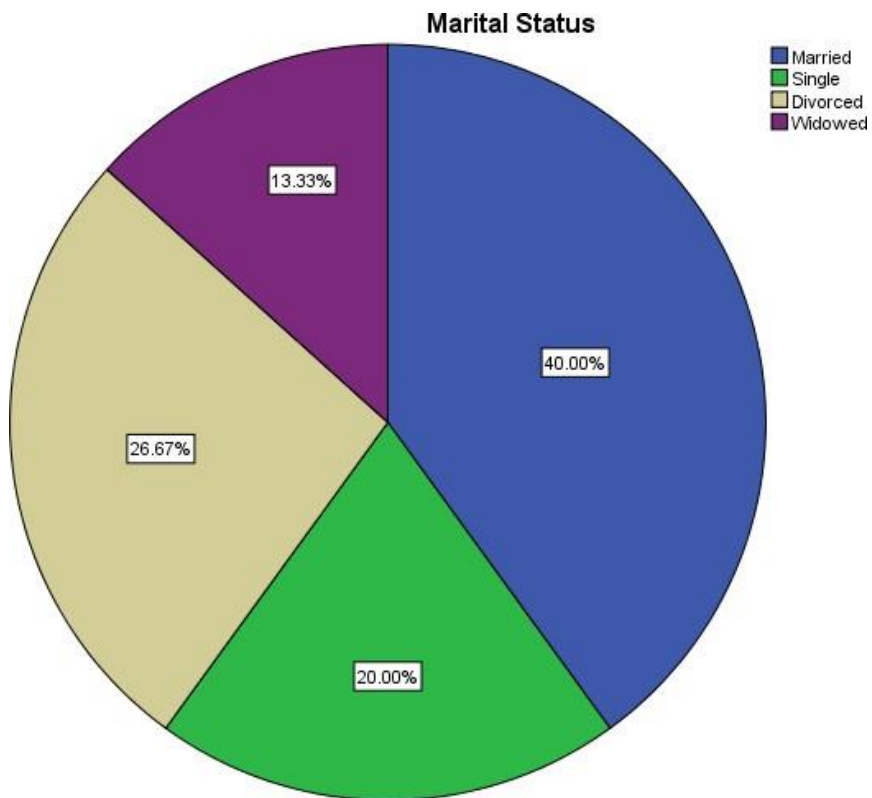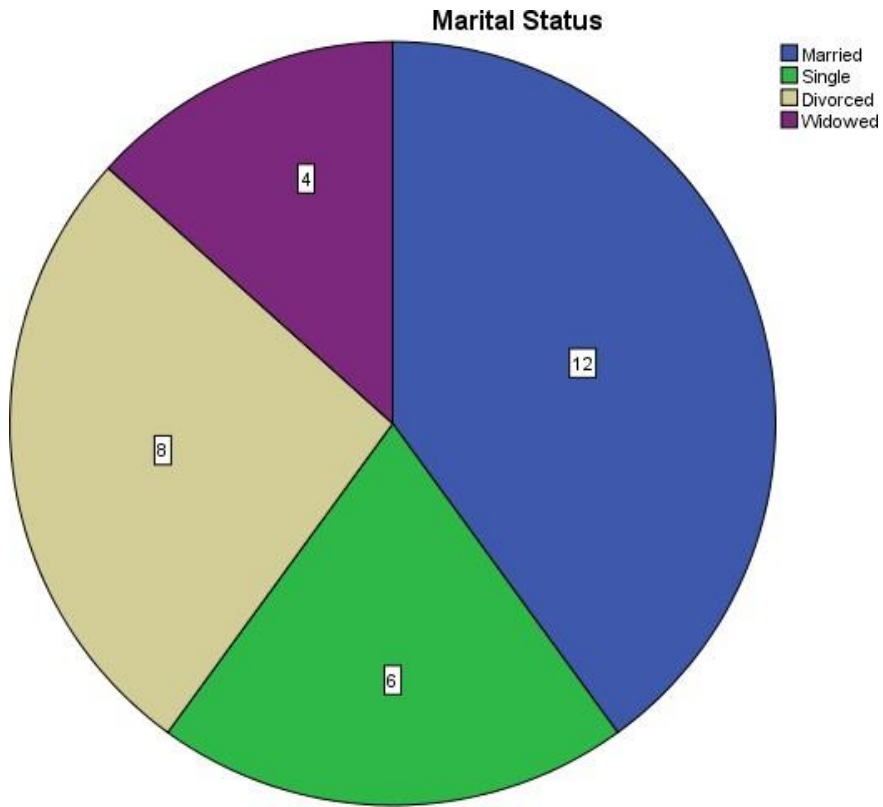
A summary of the most important graphics suitable for the different types of data

الكَمي Scale			الترتيبي Ordinal			الإسمى Nominal
Line		الخط البياني	Bars			الأعمدة البيانية
Histo-grame		المدرج التكراري	Sub-divided bars			الأعمدة البيانية المجزأة
Poly-gone		المضلع التكراري	Multiple bars			الأعمدة البيانية المتجاورة
Curve		المنحنى التكراري	Pie chart			الرسوم الدائرية
Box-plot		الرسم الصندوقى				
Scatter		شكل الانتشار				

الإسمى   أو   الترتيبي
Nominal   or   Ordinal
أو

تستخدم الأعمدة البيانية لعرض بيانات وصفية او عرض جدول تكراري بسيط لظاهرة واحدة	**Bars**		الأعمدة البيانية
تستخدم الأعمدة البيانية المجزأة لعرض بيانات كلية مقسمة الى اجزائها المتكاملة	**Sub-divided bars**		الأعمدة البيانية المجزأة
تستخدم الأعمدة البيانية المجزأة لعرض بيانات متعارضة	**Multiple bars**		الأعمدة البيانية المتجاورة
تستخدم الرسوم الدائرية لعرض بيانات كلية مقسمة الى اجزائها المتكاملة	**Pie**		الرسوم الدائرية

			الكمي Scale
يستخدم الخط البيانى لعرض بيانات كمية لظاهرة مأخوذة على فترات زمنية	Line		الخط البيانى
يستخدم المدرج التكرارى لعرض بيانات كمية لظاهرة بعد تحويلها الى فئات متساوية بشكل اعمدة متلاصقة	Histo-grame		المدرج التكراري
يستخدم المضلع التكرارى لعرض بيانات كمية لظاهرة بعد تحويلها الى فئات متساوية بشكل خطوط منكسرة	Poly-gone		المضلع التكراري
يستخدم المنحنى التكرارى لعرض بيانات كمية لظاهرة بعد تحويلها الى فئات متساوية بشكل خطوط منحنية	Curve		المنحنى التكراري
يستخدم الرسم الصندوقى لعرض بيانات كمية لظاهرة بالاستعانة بالوسيط والربيعان.	Box-plot		الرسم الصندوقى
يستخدم شكل الانتشار لعرض بيانات كمية لظاهرتان مرتبطتان عن طريق رسم نقاط.	Scatter		شكل الانتشار