

Welcome To....



**Chapter 02:
Data Presentation (part 1)**

- Know the appropriate tool for data presentation
- Exploring fact from data

Contents

- Definition of Frequency Distribution with Examples
- Construction of Frequency Distribution for quantitative data
- Graphical presentation of quantitative data

Type of Data Presentation

1. Graphical Presentation of Data.

Qualitative Variable

- Bar chart
- Pie Chart

Quantitative Variable

- Histogram
- Frequency Polygon
- Ogive curve
- Line graph
- Boxplot
- Scatter Diagram

2. Tabular Presentation of Data.

Frequency Distribution

3. Textual Presentation of Data.

Use Words, statements or paragraphs with numbers to present data.

Frequency distribution with Examples

Frequency distribution:

A grouping of data into mutually exclusive categories or different classes showing the number of observations in each category or class is called **frequency distribution**.

Examples of Frequency Distribution:

for Quantitative data

Fasting blood glucose level in diabetics at the time of diagnosis

Fasting glucose level	No of diabetics		
	Male	Female	Total
120-129	8	4	12
130-139	4	4	8
140-149	6	4	10
150-159	5	5	10
160-169	9	6	15
170-179	9	9	18
180-189	3	2	5
	44	34	78

for Qualitative data

Distribution of Smartphone User

Type of smartphone	Tally	Frequency
Android		12
Window Phone		8
Iphone		15
Amazon's fire phone		5
		Sum = 40

Construction of frequency distribution for quantitative data

Construction of frequency distribution:

Example:

Mr. Rahman is a professor of X University. He wishes prepare to a report showing the number of hours per week students spend studying. He selects a random sample of 30 students and determines the number of hours each student studied last week.

15.0, 23.7, 19.7, 15.4, 18.3, 23.0, 14.2, 20.8, 13.5, 20.7, 17.4, 18.6, 12.9, 20.3, 13.7, 21.4, 18.3, 29.8, 17.1, 18.9, **10.3**, 26.1, 15.7, 14.0, 17.8, **33.8**, 23.2, 12.9, 27.1, 16.6.

Organize the data into a frequency distribution.

Construction of frequency distribution for quantitative data

Step 1: Decide on the number of classes using the formula

$$2^k \geq n$$

Where k=number of classes
n=number of observations

$$\text{Or, } k \geq \frac{\ln n}{\ln 2}$$

There are 30 observations so n=30

Two raised to the fifth power is 32.

Therefore, we should have **at least** 5 classes, i.e., k=5.

$$\text{Or, } k \geq \frac{\ln 30}{\ln 2} = 4.9 \approx 5$$

Step 2: Determine the class interval or width using the formula

$$i \geq (H - L) / k = \frac{(33.8 - 10.3)}{5} = 4.7. \text{ Round up to the next integer of 5 hours.}$$

H=Highest data value

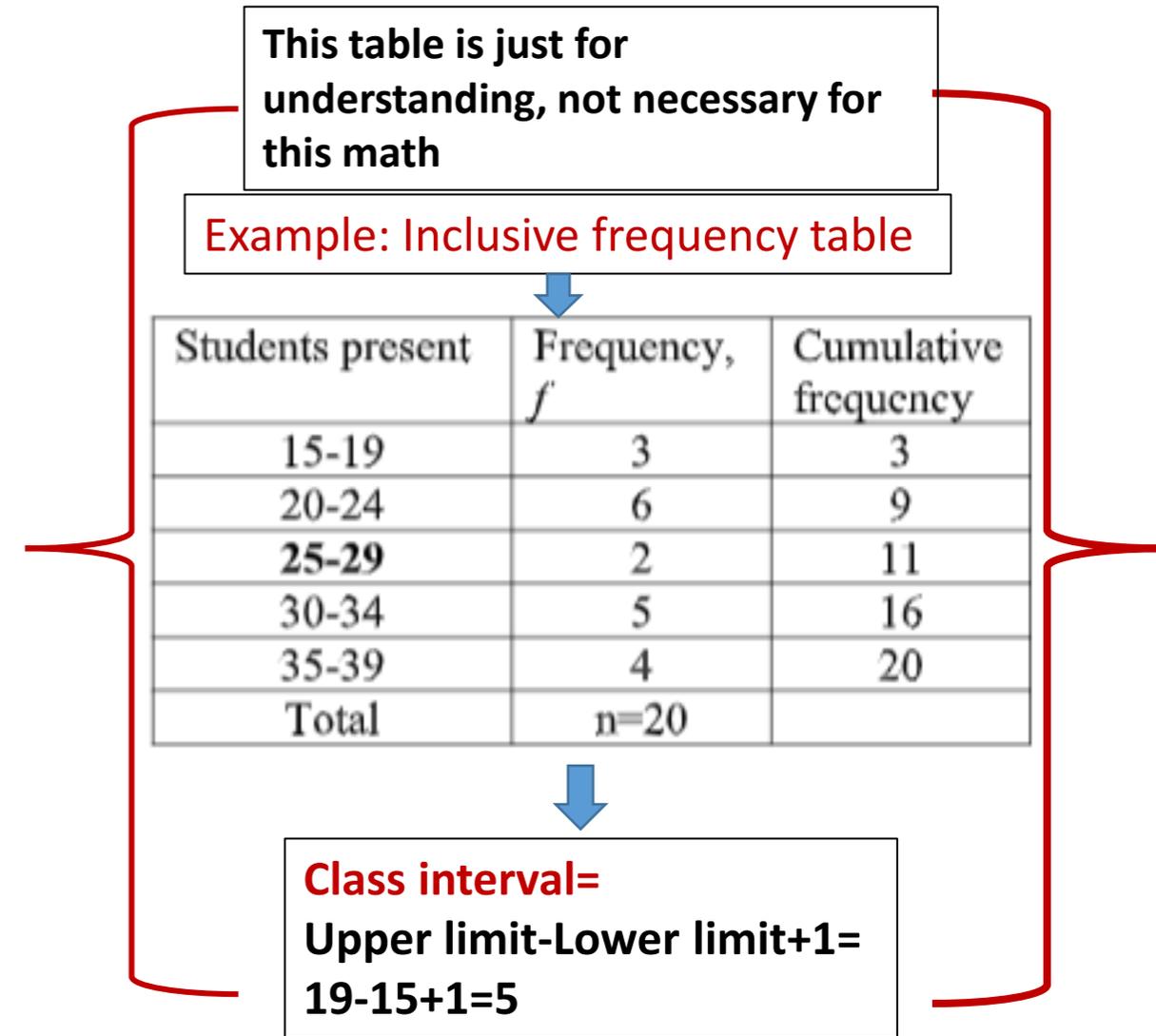
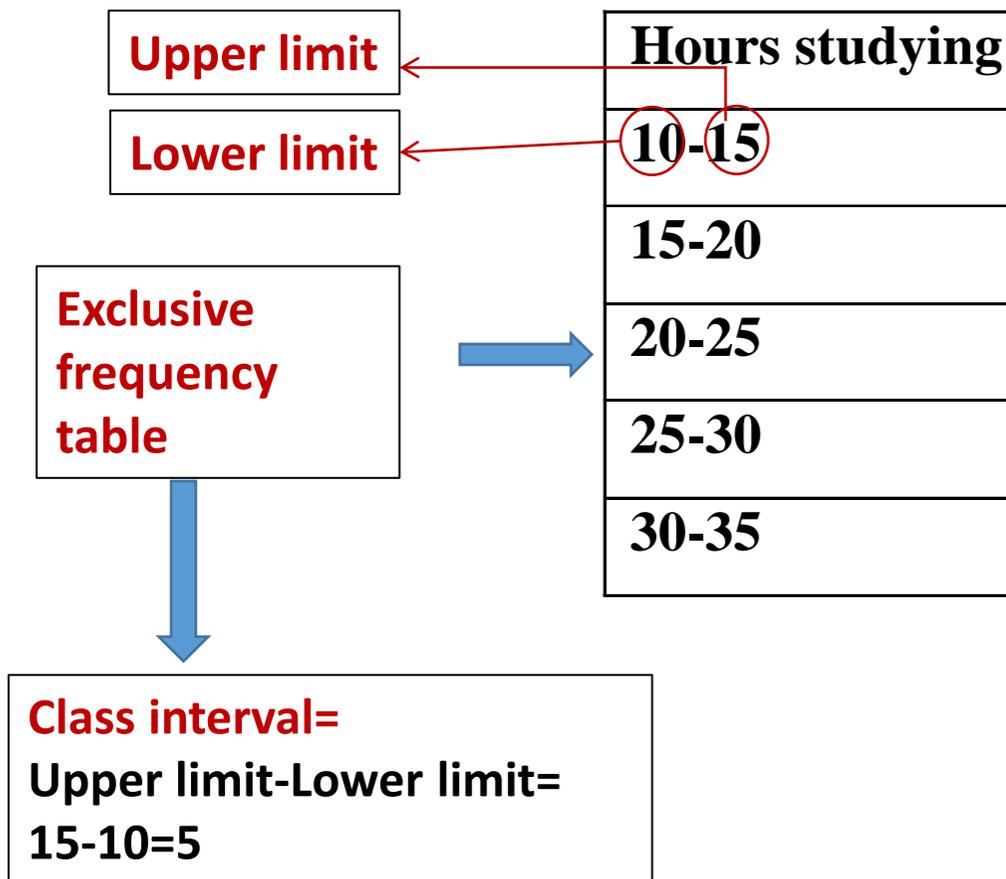
L=Lowest data value

Step 3: Set the individual class limits and

Steps 4 and 5: Tally and count the number of items in each class.

Construction of frequency distribution for quantitative data

Table-1: Frequency Distribution of the number of hours per week students spend on studying



Calculate of Relative, Percentage and Cumulative frequency

Relative frequency = Class Frequency / Total Frequency

Percentage frequency = Relative Frequency * 100%

Study Hour	Frequency
10 – 15	7
15 – 20	12
20 – 25	7
25 – 30	3
30 – 35	1
Total	30

Less than Cumulative frequency =

Pre-class frequency +
Class Frequency

More than Cumulative frequency =

Post-class frequency +
Class Frequency

Graphical presentation of frequency distribution for quantitative data

Three types of graphical presentation for quantitative data are:

1. Histogram
2. Frequency Polygon
3. Ogive Curve/ Cumulative Frequency Curve

Class boundaries	Frequency
99.5-104.5	2
104.5-109.5	8
109.5-114.5	18
114.5-119.5	13
119.5-124.5	7
124.5-129.5	1
129.5-134.5	1

Draw the following graphs for this temperature data.

- Histogram
- Frequency Polygon
- Ogive Curve/ Cumulative Frequency Curve

Graphical presentation of frequency distribution for quantitative data

From the calculation of the following table we will learn how to draw all the 3 mentioned graphs.

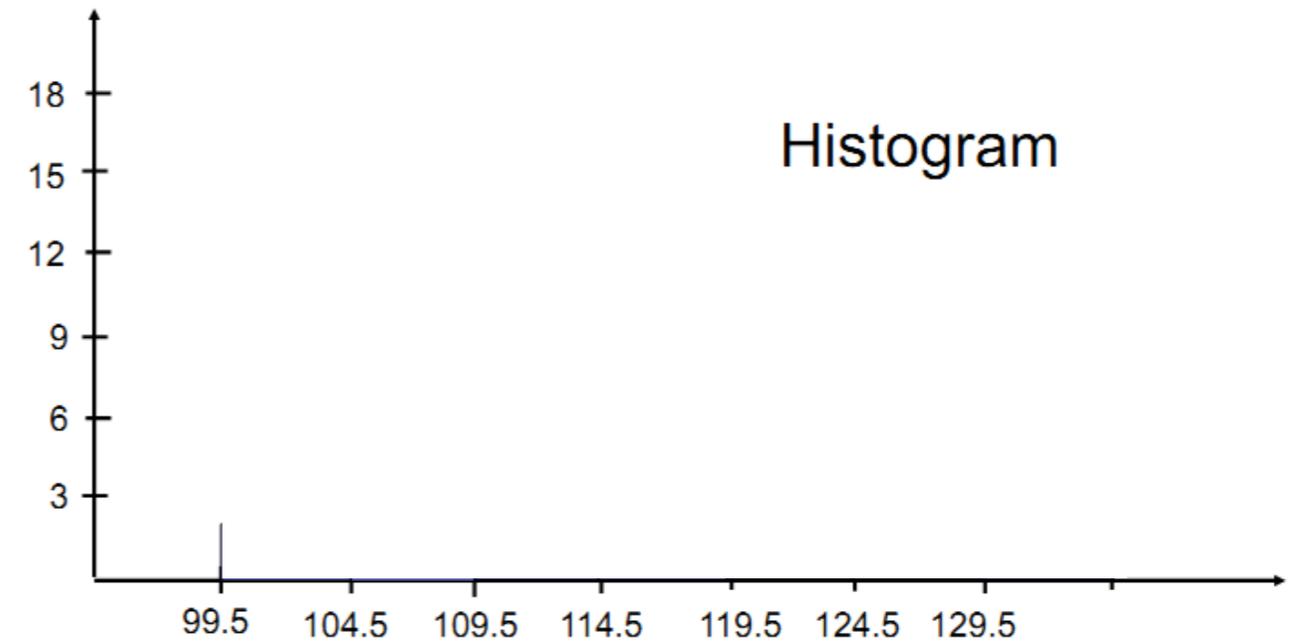
1. Histogram:
Col-1& 2.

2. Frequency polygon:
Col-1, 2 & 5.

3. Less than Ogive curve:
Col-1(upper limits)& col-6.

Graphical presentation of frequency distribution for quantitative data

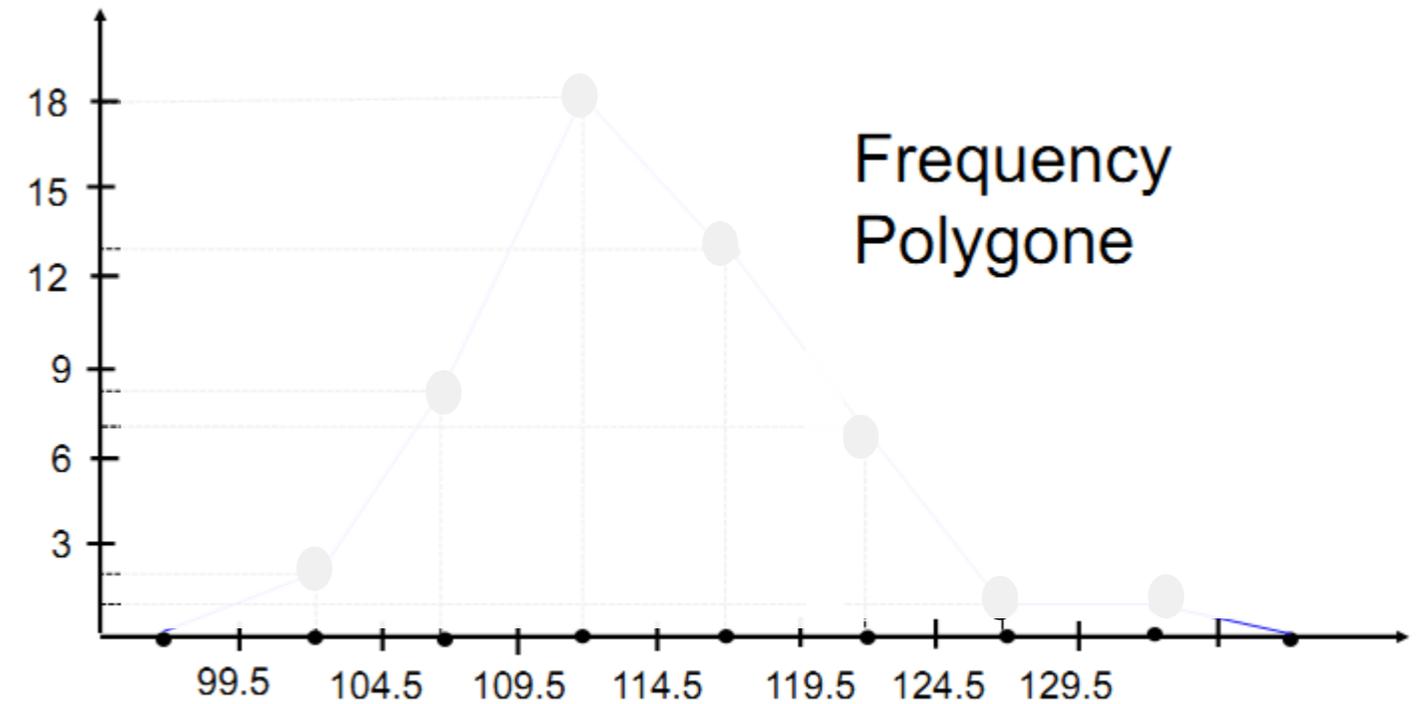
class	Frequency (f_i)
99.5-104.5	2
104.5-109.5	8
109.5-114.5	18
114.5-119.5	13
119.5-124.5	7
124.5-129.5	1
129.5-134.5	1
Total	n=50



- The largest concentration is in the class 109.5 – 114.5.

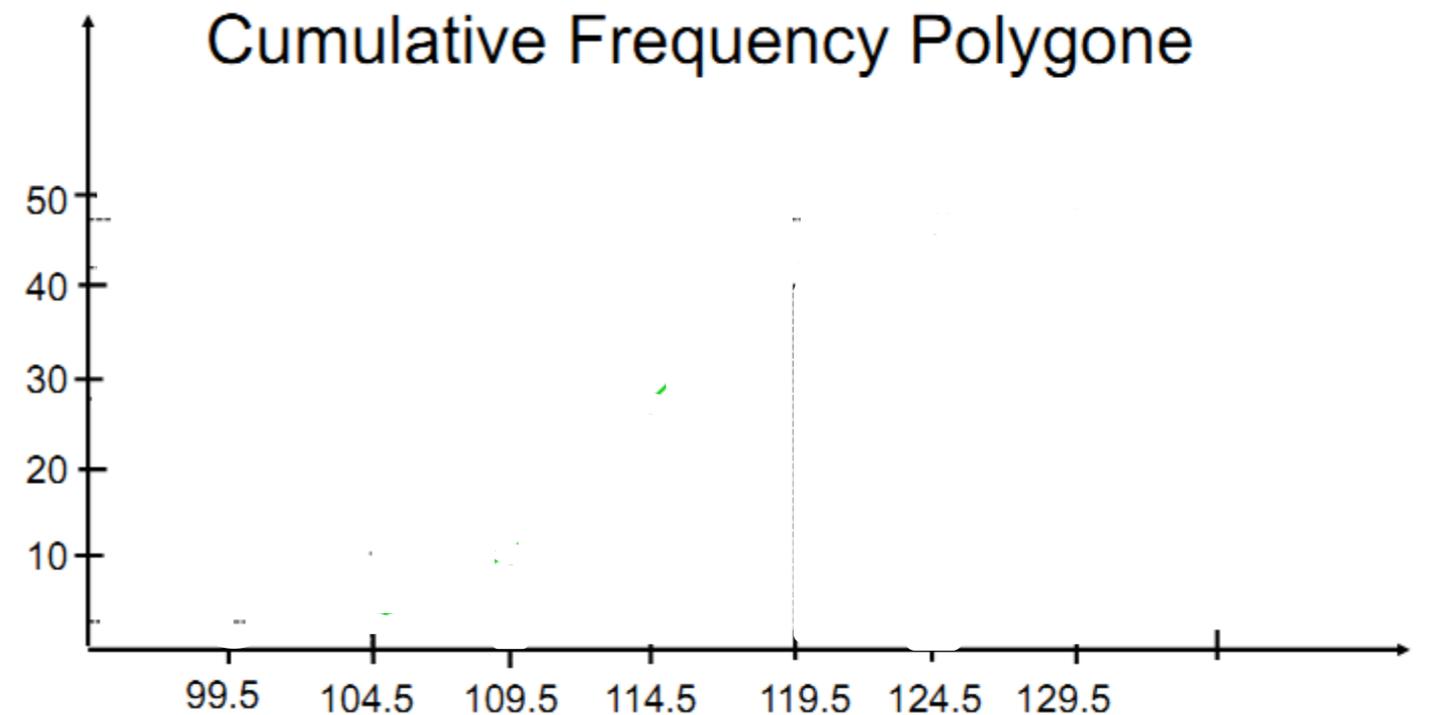
Graphical presentation of frequency distribution for quantitative data

class	Frequency (f_i)	Midpoints ($U+L$)/2
99.5-104.5	2	
104.5-109.5	8	
109.5-114.5	18	
114.5-119.5	13	
119.5-124.5	7	
124.5-129.5	1	
129.5-134.5	1	
Total	n=50	



Graphical presentation of frequency distribution for quantitative data

class	Frequency (f_i)	Cumulative Frequency
99.5-104.5	2	2
104.5-109.5	8	10
109.5-114.5	18	28
114.5-119.5	13	41
119.5-124.5	7	48
124.5-129.5	1	49
129.5-134.5	1	50
Total	n=50	



Exercise to solve

- Construct a frequency distribution table using appropriate class interval.
- Draw Histogram, frequency polygon and ogive curve.
- How many shops were able to sold more than 70 shoes?

1. The following figures are the weights (in grams) of a group of fish sampled from a reservoir:

226	233	233	244	224	235	238	244
222	239	233	243	221	230	237	240
225	230	236	242	222	235	237	240
220	235	238	243	222	232	232	242
229	231	234	241	228	237	237	245
229	231	237	244	225	236	235	240

- 2.** In a study of the weights of a sample of semi-precious gem-stones, the following results were obtained (grams):

1.33	1.59	1.82	1.92	1.46	1.57	1.82	2.06
1.59	1.70	1.81	2.02	1.24	1.53	1.69	2.01
1.57	1.62	1.61	1.93	1.11	1.90	1.79	1.91
1.19	1.53	1.90	1.90	1.17	1.97	1.92	2.06
1.41	1.64	1.83	1.90	1.11	1.81	1.83	1.90
1.15	1.68	1.82	1.98	1.39	1.54	1.92	2.04

3. You are given the following data:

6	10	6	4	9	5
5	5	5	7	6	2
5	5	5	4	5	7
6	7	8	6	8	4
7	5	5	5	5	7
8	7	6	7	5	4
6	4	4	7	4	6
6	7	8	6	7	6
7	8	5	6	5	7
3	6	4	7	4	4

- Construct a frequency distribution for these data.
- Based on the frequency distribution, develop a histogram.
- Construct a relative frequency distribution.
- Develop a relative frequency histogram.
- Compare the two histograms. Why do they look alike?

4. You are given the following data:

6	10	6	4	9	5
5	5	5	7	6	2
5	5	5	4	5	7
6	7	8	6	8	4
7	5	5	5	5	7
8	7	6	7	5	4
6	4	4	7	4	6
6	7	8	6	7	6
7	8	5	6	5	7
3	6	4	7	4	4

- Construct a frequency distribution for these data.
- Based on the frequency distribution, develop a histogram.
- Construct a relative frequency distribution.
- Develop a relative frequency histogram.
- Compare the two histograms. Why do they look alike?

5. The *San Diego Union Tribune* reported that the 30-year fixed-rate mortgage rates had risen to an average of 5.74%. A sample of mortgage rates in the San Diego area produced the following interest rates:

5.84	5.73	5.58	5.69	5.84	5.68	5.73
5.79	5.77	5.67	5.76	5.70	5.70	5.66
5.71	5.80	5.81	5.75	5.81	5.78	5.79
5.77	5.73	5.67	5.74	5.76	5.76	5.74
5.73	5.71	5.71	5.72	5.80	5.69	5.88
5.70	5.75	5.75	5.68	5.72	5.70	5.67
5.83	5.76	5.80				

- Construct a histogram with eight classes beginning at 5.58.
- Determine the proportion of mortgage rates that are at least 5.74%.
- Generate an ogive for this data.

