

• Types of Classification

- (1) Geographical
- (2) Chronological
- (3) Qualitative
- (4) Quantitative

- Data is organized into classes

class	frequency

Two types
| simple
| cumulative

Table is called as Frequency Distribution table

- Types of F.D.

- | Univariate (1 variable)
- | Bivariate (2 _)
- | Multivariate (more than two)

Univariate Frequency Distribution

| Individual Observation

| Discrete Frequency Distribution

| Continuous Frequency Distribution

- Counting (ex. mark)

- Measurement (ex. height)

Individual Observation

- Marks of the student

Roll No.	Marks	Roll No.	Marks
1	7	13	8
2	5	14	5
3	3	15	5
4	5	16	6
5	6	17	3
6	4	18	4
7	6	19	5
8	2	20	9
9	8	21	5
10	1	22	10
11	7	23	5
12	2	24	5
.	.	25	10

This is just raw data.

One can arrange it in rising / falling order to get some inference from it. This is called "Arranging".

2. Converting individual observations to Discrete Freq. dist.

Marks	Tally Marks	No. of Students (Freq.)
1	1	1
2	11	2
3	11	2
4	11	2
5	11	7
6		4
7	11	2
8	11	2
9	1	1
10	11	2
		$\Sigma = 25$

- We may also create classes

Class	Frequency	*	class
1 - 2	3	*	1 - 4
3 - 4	4	↓	Lower class limit
5 - 6	11	↓	Upper class limit
7 - 8	4		
9 - 10	3		

* Width of class
= Lower limit of current class
Lower limit of immediate previous/next class

- Equal Class Interval - Equal size of classes
Unequal Class Interval - Unequal . . .

Continuous Frequency Distribution

Height	No. of Student
120 - 130	10
130 - 140	17
140 - 150	10
150 - 160	11
160 - 170	09

or will go
in next class
is start naming
it as L.L.

→ This is ~~an~~ Exclusive method of classification

- Inclusive method of classification

Height	No. of Student
120 - 129	
130 - 139	
140 - 149	
150 - 159	
160 - 169	

Problem here is that we cannot consider values
b/w U.L & L.L of next class

So use this method only when no such value exist

Cumulative Frequency

Cumulative of Frequencies

marks	Freq.	Cumulative (less than)	Cumulative (greater than)
0 - 20	3	3	$26 - 3 = 23$
20 - 40	8	11	$14 - 8 = 6$
40 - 60	10	21	$4 - 10 = -6$
60 - 80	2	23	$2 - 2 = 0$
80 - 100	3	26	$0 - 3 = -3$
		26	

d. Design C.F.D ($<$ & $>$) for

Data : 20 36 03 84 11 72 52

66 85 74 21 43 57 95

15 45 88 72

class size = 10

class	Tallymarks	Freq.	CF (<)	CF (≥) (20)
10 - 20		2	2	$20 - 2 = 18$
20 - 30		2	4	$20 - 2 = 18$
30 - 40		1	5	18
40 - 50		2	7	15
50 - 60		3	10	13
60 - 70		2	12	10
70 - 80		4	16	8
80 - 90				
90 - 100		3	19	34
		1	20	1

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QA(VA)

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Date# Two way freq. distrib^c (Bivariate)

d.

 n y
25 46 → Table [25-35, 45-55]

18 32

20 30

08 20

30 50

35 52

17 08

26 42

42 64

28 50

30 50

28 46

25 42

25 38

60 70

07 08

38 48

36 55

25 38

25 40

17 28

22 36

31 58

36 64

48 78

$X \rightarrow$	5-15	15-25	25-35	35-45	45-55	55-65	Total
Y							
5-15	1	1					2
15-25	1						1
25-35		1118					3
35-45		1	TTT				6
45-55			TTT1	1			7
55-65			1	111			4
65-75							
75-85					1		1
Total	1	2	5	12	4	1	1
							25

Measure of Central Tendency

$$1. \text{ Mean} = \frac{\sum \text{observ}^n}{\text{No. of obs.}}$$

For discrete freq. distn.

$$\text{Mean} = \frac{\sum f_i m_i}{\sum f_i}$$

$\sum f_i \rightarrow$ No. of observation

For continuous freq. distn
find midpoint 'm' for each class

$$\text{Mean} = \frac{\sum f_i m_i}{\sum f_i}$$

2. Median

- The middle data of the sorted data set
(asc)
- Arrange data in asc order

N = No. of observation

If N = odd

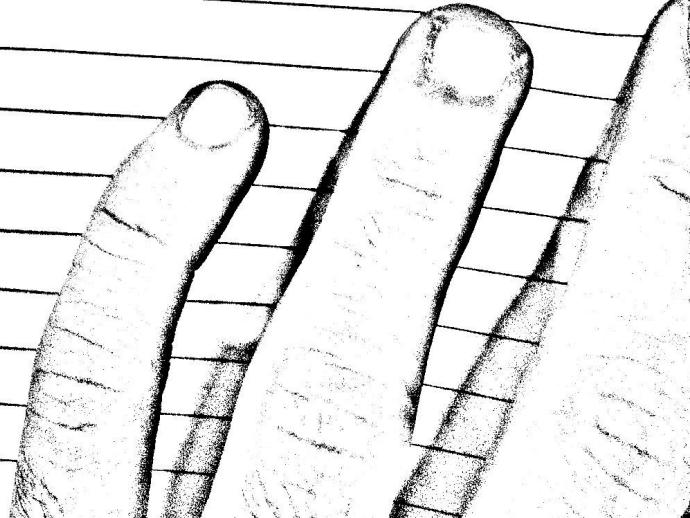
$$\text{Median} = \left(\frac{N+1}{2} \right)^{\text{th}} \text{ position}$$

If N = even

$$\text{Median} = \text{Avg} \left(\frac{N}{2}, \frac{N+1}{2} \right)$$

- For discrete freq. distribution

Median = size of $\left(\frac{N+1}{2} \right)^{\text{th}}$ item



15/8/23

QA (vA)

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A Mode

- Discrete data

ID	x_1	x_2	x_3
----	-------	-------	-------

1	20	20	20
---	----	----	----

2	20	20	30
---	----	----	----

3	30	30	40
---	----	----	----

4	20	30	50
---	----	----	----

5	15	30	60
---	----	----	----

6	20	30	70
---	----	----	----

7	30	20	90
---	----	----	----

8	15	15	110
---	----	----	-----

9	20	20	125
---	----	----	-----

10	20	15	80
----	----	----	----

for x_1

x	freq
20	6
30	2
15	2

mode = 20

for x_2

x	freq
20	4
30	4
15	2

Bimodal

for x_3

ill defined mode

• Continuous Data

Marks (Class)	No. of students (Frequency)
10 - 20	14
20 - 30	17
30 - 40	25
40 - 50	21
50 - 60	15
60 - 70	19
70 - 80	14
80 - 90	18

$$\text{Mode} = l + \frac{h * (f_1 - f_0)}{2f_1 - f_0 - f_2}$$

(two)

⇒ Identify modal class (class with highest freq.)

l = lower limit of modal class

h = width of modal class

f_0 = Freq. of Premodal class → class above modal class

f_1 = Freq. of Modal class

f_2 = Freq. of Postmodal class → class below modal class

$$\therefore \text{Mode} = 30 + \frac{10 * (25 - 17)}{2 + 25 - 17 - 21}$$

$$= 30 + \frac{80}{6 - 6} \\ = 36.67$$

Q2 Class	freq
0 - 10	8
10 - 20	12
20 - 30	10
30 - 40	11
40 - 50	9

$$\begin{aligned}
 \text{mode} &= 10 + \frac{10 \times 4}{24 - 18} \\
 &= 10 + \frac{40}{6} \\
 &= \frac{50}{3} \\
 &= 16.67
 \end{aligned}$$

Tabulation of data

- tabular representⁿ of data known as tabulation
- Diff. parts of table
 - (1) Table No.
 - (2) Title
 - (3) Stub : extreme L.H. column showing heading of row
 - (4) caption :- heading of column
- can have sub captions / sub headings
 - (5) Body
 - (6) Total
 - (7) Footnotes - explanatory note written (Not written everyone)
beneath the table
 - (8) Source - sources of embodied
(Not always)

• Types of table aka one-way table

↳ Simple Table - only one basis of classification

↳ Complex Table - more than one basis of classification

- simple : ① Table 1

② Departmentwise classification

Department	No. of students
Phy	10
Chem	20
Math	25
Stats	15
Total	70 70

⑥

- Complex

Ex. ① Two-way table

Department	No. of students	
	Male	Femal
Total		

② Three-way table

Sample data : Tea Habit

Town A : 40 %, female

Total tea drinker = 45%

Male non-tea drinker = 20 %

Town B : 55% Male

Male non-tea drinker 80%

Female Tea drinkers 15 %

Tea Habit	Town A		Town B		Total	
	Male	Female	Total	Male	Female	
% of people with Tea Habit	40	05	45	25	15	40
% of people NOT having T.H	20	33	55	30	30	60
Total	60	40	100	55	45	100

Assuming there are 100 people in each town.