FREQUENCY DISTRIBUTION

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Statistical Series

- When the data is presented in some specific order and sequence, it is called as a statistical series.

- In other words, statistical series is the arrangement of a data in a certain systematic order.

- Frequency distributions :

- A frequency distribution (or frequency table) lists classes (or categories) of values, along with frequencies (or counts) of the number of values that fall into each class.

- A data is considered discrete if it is finite or a countable number.

- A data is considered continuous if is an uncountable number, represented by an interval on the number line.

- In statistics, a **frequency distribution** is a table that displays the frequency of various outcomes in a sample. Each entry in the table contains the frequency or count of the occurrences of values within a particular group or interval, and in this way, the table summarizes the distribution of values in the sample.

- A **frequency distribution** shows us a summarized grouping of data divided into mutually exclusive classes and the number of occurrences in a class. It is a way of showing unorganized data.

e.g. to show results of an election, income of people for a certain region, sales of a product within a certain period, student loan amounts of graduates, etc. Some of the graphs that can be used with frequency distributions are histograms, line charts, bar charts and pie charts. Frequency distributions are used for both qualitative and quantitative data.

- There are three types of series in **Statistics and Data:**

- **Individual Series:** Individual Series is a statistical series in which the all the observations are listed out and all the observations have a frequency of 11. For eg: 1,2,3,4,5,6,7,81,2,3,4,5,6,7,8 is an Individual Series.

- **Discrete Series:** Discrete Series is a statistical series in which all the observations are listed out along with their corresponding frequency in the form of a table. All the observations may not have the same frequency.

- **Continuous Series:** Continuous Series is a statistical series in which all the class intervals along with their corresponding frequency are listed out in the form of a table. All the class intervals may not have the same frequency.

Individual Series

- When the raw data is presented individually in the form of a series, it is called an individual series. In simple words, individual series is the arrangement of raw data individually. It gives numeric values for a specific situation. In an individual series items are shown singly.
For example, following are the marks of secured by the students in a class out of 100.
56, 77, 88, 49, 60, 92, 70, 81, 69, 51,
As we can see, in the above data, it is not clear that how many students got 56 marks or how many got 77 and so on.

Individual series : Under this method, the value of all the units are shown separately The following example will illustrate this:

Example : The marks obtained by 10 students in statistics are following :

S. No.	1	2	3	4	5	6	7	8	9	10
Marks	16	18	22	19	14	20	25	30	32	50

The individual series may be arranged in following two orders :

(a) Ascending Order : When data are arranged in ascending order i.e., a small value to a big value it is known as arranging them in ascending order. The figures of above example may be arranged in ascending order as follows :

S. No.	1	2	3	4	5	6	7	8	9	10
Marks	14	16	18	19	20	22	25	30	32	50

(b) Descending Order : When data are arranged serially starting from a big value to small value it is known as arrangement of data in descending order.

S. No.	1	2	3	4	5	6	7	8	9	10
Marks	14	16	18	19	20	22	25	30	32	50

Discrete Series

In these series all the items are divided in certain groups, but these groups are not continuous, therefore these series are known as discrete series. The numbered item that fall in every group are shown in each group which are known as frequencies. The following examples will illustrate this :

Examples :

S. Wo.	1	2	3	4	5	6	7	8	9	10
Income in Rs.	15	20	25	5	35	45	40	5	15	20
S. No	11	12	13	14	15	16	17	18	19	20
Income in Rs.	10	5	15	20	30	25	40	35	10	50
S. No.	21	22	23	24	25	26	V	28	29	30
Income in Rs	15	20	5	25	10	5	45	20	50	25
S. No	31	32	33	34	35	36	37	38	39	40
Income in Rs.	20	15	30	10	30	25	5	5	35	15

(i) Discrete Series in Ascending Order :

Income in Rs.	Tally Sheet	No. of Persons (Frequencies)
5		7
10		4
15		6
20		6
25		5
30		3
35		3
40		2
45		2
50		2
	Total	40

(ii) Discrete Series in Descending Order :

Income in Rs.	Tally Sheet	No. of Persons (Frequencies)
50		2
45		2
40		2
35		3
30		3
25		5
20		6
15		6
10		4
5		7
	Total	40.

Discrete series

On the other hand, discrete gives data for each specific value of variable.

The important thing in the discrete series is that, the variable involved in the series has integer values.

Data are presented in a manner that exact measurement of items are clearly shown. For example, Given below is a table that shows the wages earned by 30 workers.

Wages	No. of Workers (Frequency)
2500	7
3000	9
4000	5
4500	6
5000	3

From the above table, it is very clear that 7 workers are getting wages Rs. 2500, 9 workers are getting Rs. 3000 and so on.

Continuous Series

Under such series all the variables are divided in certain continuous groups and their respective frequencies will be written with them. The following example will clear the form of such series:

Example:

Marks :	0—5	5—10	10—15	15—20	20—25	25—30	30—35	35—40
No. of Students :	11	22	25	30	19	17	11	10

Following are the elements of a continuous series:

(i) Class Intervals : These are the measurements in which some problems is measured and written in continuous group. In the above example, (0 − 5), (5 − 10) etc. are the class intervals of the series.

(ii) Limits of Class Intervals : Each class interval figure is known as limits of class interval. Small figures class intervals are known as lower limit class interval. In class interval (0 − 5) 0 is lower limit and 5 is a upper limit of this class interval.

(iii) Magnitude of Class Intervals The difference between upper limit and lower limit of a class interval is known as its magnitude. In class interval (0 − 5) 5 is the magnitude.

(iv) Mid Value The average of two limits of the class interval is known as mid value e.g., the mid value of class interval

(v) Frequencies : Number of repetition of items of various class intervals in the universe is known as frequencies which will be written with them.

Exclusive and Inclusive Continuous Series:

(a) Exclusive Series : Where the value of upper limit is not included in the same group, but will be included in next group, it is known as exclusive series e.g.

Class interval	0–10	10–20	20–30	30–40	40–50	50–60
Frequency	8	12	15	16	9	3

In the above series, 10, 20, 30,40, 50, and 60 will not be included in first, second third, fourth, fifth and sixth group respectively.

(b) Inclusive Series : Where value of upper limit is included in the same group, it is known as inclusive series e.g.,

Class interval	10–19	20–29	30–39	40–49	50–59
Frequency	5	9	12	18	14

In the above series, value 19, 29, 39, 49 and 59 will be included in the same groups in which they are written, therefore, this series will be known as inclusive series

Constructing a Frequency Distribution

- 1. Decide on the number of classes to include in the frequency distribution. The number of classes should be between five and twenty.

- 2. Find the class width. The class width is the difference between the maximum and minimum data entries, divided by the number of classes, and rounded up to the next convenient number.

- 3. Find the class limits. A lower class limit is the least number that can belong to a specific class and an upper class limit is the greatest. Use the minimum data entry as the lower limit of the first class. To find the remaining lower limits, add the class width to the lower limit of the preceding class.

- 4. Use tally marks to sort the data entries into classes.

- 5. Count each of the tally marks to find the total frequency, f, for each class.

Example : Construct frequency distribution

Below is the marks of 35 students in English test (out of 10). Arrange these marks in tabular form using tally marks. 5, 8, 7, 6, 10, 8, 2, 4, 6, 3, 7, 5, 8, 5, 1, 7, 4, 6, 3, 5, 2, 8, 4, 2, 6, 4, 2, 8, 9, 5, 4, 7, 5, 5, 8.

Marks	Number of Students = Frequency	Tally Marks
1	1	I
2	4	IIII
3	2	II
4	5	ⅢⅢ
5	7	ⅢⅢ II
6	4	IIII
7	4	IIII
8	6	ⅢⅢ I
9	1	I
10	1	I
Total	35	

பின்வரும் விவரங்களுக்கு அலைவெண் பரவல் பட்டியல் அமைக்க.

16	14	13	13	16	28	19
18	14	19	20	23	22	12
23	16	22	18	23	20	19
20	18	16	17	21	20	11
16	16	21	15	23	17	

ஒரு வகுப்பிலுள்ள 55 மாணவர்களின் எடை கிலோ கிராமில் கீழே கொடுக்கப்பட்டுள்ளது. அலைவென் பரவல் அமைக்கவும்.

43 75 41 61 83 116 42 75 64 61 90

50 110 77 84 55 76 87 62 95 70 77

69 68 80 104 79 79 58 54 100 73 93

68 59 78 90 84 76 42 69 80 65 65

70 50 79 52 103 98 50 79 72 87 85