

Summarization

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SENIOR LECTURER, STATISTICS

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- ❑ Frequency distribution (for qualitative data) and
- ❑ Frequency distribution (for quantitative data)
- ❑ Proportion
- ❑ Percentage
- ❑ Ratio

Frequency distribution

(for qualitative data)

- Distribution of total frequency into possible categories

- **Example:**

Below given occupations of 20 randomly selected men-

Student, Student, Public service, Businessman, Day labor, Public service, Private service, Day labor, Student, Public service, Public service, Private service, Businessman, Day labor, Businessman, Private service, Businessman, Public service, Private service, Public service.

Frequency distribution

(for qualitative data)

Student, Student, Public service, Businessman, Day labor, Public service, Private service, Day labor, Student, Public service, Public service, Private service, Businessman, Day labor, Businessman, Private service, Businessman, Public service, Private service, Public service.

Frequency distribution:

Occupation	Tally	Frequency
Businessman		
Day Labor		
Private service		
Public service		
Student		
Total		

Frequency distribution

(for qualitative data)

Student, Student, Public service, Businessman, Day labor, Public service, Private service, Day labor, Student, Public service, Public service, Private service, Businessman, Day labor, Businessman, Private service, Businessman, Public service, Private service, Public service.

Frequency distribution:

Occupation	Tally	Frequency
Businessman	IIII	4
Day Labor	III	3
Private service	IIII	4
Public service	IIII I	6
Student	III	3
Total		n= 20

Frequency distribution

(for qualitative data)

Table 1: Frequency distribution table of occupation of the respondent

Occupation	Tally	Frequency	Relative frequency
Businessman	IIII	4	$4/20 = 0.20$
Day Labor	III	3	$3/20 = 0.15$
Private service	IIII	4	$4/20 = 0.20$
Public service	IIII I	6	$6/20 = 0.30$
Student	III	3	$3/20 = 0.15$
Total		n= 20	1

Frequency distribution

(for qualitative data)

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► **Class task:**

Let the blood types of 40 persons are as follows:

O O A B A O A A A O B O B O O A O O A A A A A B A B A A O O A
O O A A A O A O O A B.

Summarize this data in a frequency table.

Frequency distribution

(for quantitative data)

- Distribution of total frequency into possible numeric classes

- **Example:**

Below given the total monthly income (in thousand taka) of 30 randomly selected families-

30, 40, 6, 110, 11, 15, 55, 20, 120, 45, 30, 47, 52, 68, 105, 62, 52, 98, 76, 85, 83, 91, 49, 38, 57, 27, 23, 42, 9, 65

Frequency distribution

(for quantitative data)

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Steps for finding frequency distributions:

Step1: Decide on the **number of classes** (K), such that, $2^K \geq n$

Here, $(2^5 = 32) \geq (n = 30)$, so $K=5$

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Frequency distribution

(for quantitative data)

Steps for finding frequency distributions:

Step 1: Decide on the **number of classes** (K), such that, $2^K \geq n$

Here, $(2^5 = 32) \geq (n = 30)$, so $K=5$

Step 2: Determine the **class interval** (i).

$$i \geq \frac{\text{Highest value (H)} - \text{Lowest value (L)}}{K}$$

$$\text{Here, } i \geq \frac{H-L}{K} = \frac{120-6}{5} = \frac{114}{5} = 22.8 \approx 23$$

Frequency distribution

(for quantitative data)

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Steps for finding frequency distributions:

Step 3: Set the class limits

Classes	Tally marks	Frequency
05-30		
30-55		
55-80		
80-105		
105-130		
Total		

Frequency distribution

(for quantitative data)

Steps for finding frequency distributions:

Step 4: Tally the values into classes and count the number of observations in each class.

Classes	Tally marks	Frequency
05-30		7
30-55		10
55-80	I	6
80-105		4
105-130		3
Total		n= 30

Frequency distribution

(for quantitative data)

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Table 2: Frequency distribution table of monthly family income

Classes	Tally marks	Frequency	Relative frequency	Percentage
05-30	II	7	$7/30 = 0.23$	$(7/30)*100 = 23$
30-55		10	$10/30 = 0.34$	$(10/30)*100 = 34$
55-80	I	6	$6/30 = 0.20$	20
80-105		4	$4/30 = 0.13$	13
105-130		3	$3/30 = 0.10$	10
Total		n= 30	1	100

Example: Let us consider the following table showing the distribution of marks of 27 students

Class limit	Class mid value	Frequency	Relative frequency	Cumulative frequency	Cumulative relative frequency
0 – 10	5	4	0.148	4	0.148
10 – 20	15	8	0.296	4+8	0.444
20 – 30		5		4+8+5	
30 – 40		4			
40 – 50		3			
50 – 60		2			
60 – 70	65	1			
Total					

Frequency distribution

(for quantitative data)

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► **Class task:**

Age (in years) of 52 people:

34, 67, 40, 72, 37, 33, 42, 62, 49, 32, 52, 40, 31, 19, 68, 55, 57, 54, 37, 32,
54, 38, 20, 50, 56, 48, 35, 52, 29, 56, 68, 65, 45, 44, 54, 39, 29, 56, 43, 42,
22, 30, 26, 20, 48, 29, 34, 27, 40, 28, 45, 21.

Summarize the data in a frequency table.

More...

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Consider a frequency distribution table-

Categories	Frequency
Cat A	f_1
Cat B	f_2
Cat C	f_3
Total	N $(= f_1 + f_2 + f_3)$

□ **Proportion (Relative Frequency):** $Proportion = \frac{f_i}{N}$, $(i= 1, 2, 3)$

□ **Percentage:** $Percentage = \frac{f_i}{N} \times 100$, $(i= 1, 2, 3)$

More...

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Consider a frequency distribution table-

Categories	Frequency
Cat A	f_1
Cat B	f_2
Cat C	f_3
Total	N $(= f_1 + f_2 + f_3)$

□ **Ratio:** $Ratio = \frac{f_i}{f_j}, \quad (i, j = 1, 2, 3 \text{ and } i \neq j)$

More...

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Table : Frequency distribution table of occupation of the respondent

Occupation	Tally	Frequency	Percentages
Businessman	IIII	4	$\frac{4}{20} \times 100 = 20$
Day Labor	III	3	15
Private service	IIII	4	20
Public service	IIII I	6	30
Student	III	3	15
Total		n= 20	100

Ratio of Day labor to Public service is $\frac{15}{30} = \frac{1}{2}$. (can write, 1:2)

More on frequency table...

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Frequency: The number of observations falling into each class

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More on frequency table...

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Frequency: The number of observations falling into each class

Class intervals: the frequencies of a particular class is bounded by two values. The width of the class formed by this two values is Class Interval.

Example, if a class is (5 to 25), then the interval is $i=20$ ($=25-5$)

More on frequency table...

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Frequency: The number of observations falling into each class

Class intervals: the frequencies of a particular class is bounded by two values. The width of the class formed by this two values is Class Interval.

Example, if a class is (5 to 25), then the interval is $i=20$ ($=25-5$)

Class limits: The smallest value of a class is technically known as the lower class limit of that particular class and largest value of that class is known as the upper class limit.

Example, for a class (5 to 25), 5 is the lower class limit and 25 is the upper class limit

More on frequency table...

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Class mid-point: The mid-point or mid-value of a class is the value that falls in the middle of the class interval.

$$\text{Midpoint} = \frac{\text{Upper class limit (U)} + \text{Lower class limit (L)}}{2}$$

More on frequency table...

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Class mid-point: The mid-point or mid-value of a class is the value that falls in the middle of the class interval.

$$\text{Midpoint} = \frac{\text{Upper class limit (U)} + \text{Lower class limit (L)}}{2}$$

Open interval: An open interval is an interval with one of its limits (in either side).

Example, a class like (<30) or (>80) or ($75+$) are open-ended class intervals