Complete Statistics Assignment Solutions

[Md. Monjurul Hasan Bhuiyan]
*Student ID: [10000*****4*
Course: [STA201]

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1 1.3 and 1.4

2 Quantitative Data: Frequency Distributions

2.1 Example 1: Income of Students

Data Provided: Income in Tk vs. No. of students ($n = 52$).

a. Data Summarization

Income (Tk)	Frequency (f)	Cum. Freq (cf)	Rel. Freq (rf)	rf Percent (%)	Cum. Percent (%)
50–100	8	8	$8/52 \approx 0.154$	15.4	15.4
100–150	11	19	$11/52 \approx 0.212$	21.2	36.6
150–200	10	29	$10/52 \approx 0.192$	19.2	55.8
200–250	20	49	$20/52 \approx 0.385$	38.5	94.3
250–300	3	52	$3/52 \approx 0.058$	5.8	100.1
Total	**52**		**1.001**	**100.1**	

Note: Total percentage is slightly above 100% due to standard rounding.

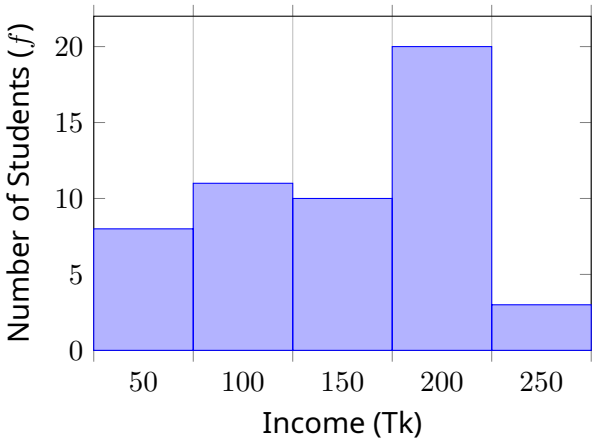
b. Analytical Questions & Conclusion

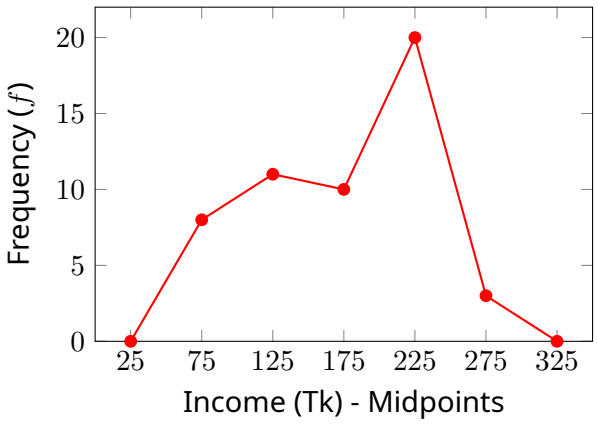
3. How many students (% or proportion) have income less than 150 Tk?
Answer: Students in the 50-100 and 100-150 groups. $8 + 11 = 19$ students. As a percentage: $15.4\% + 21.2\% = 36.6\%$.

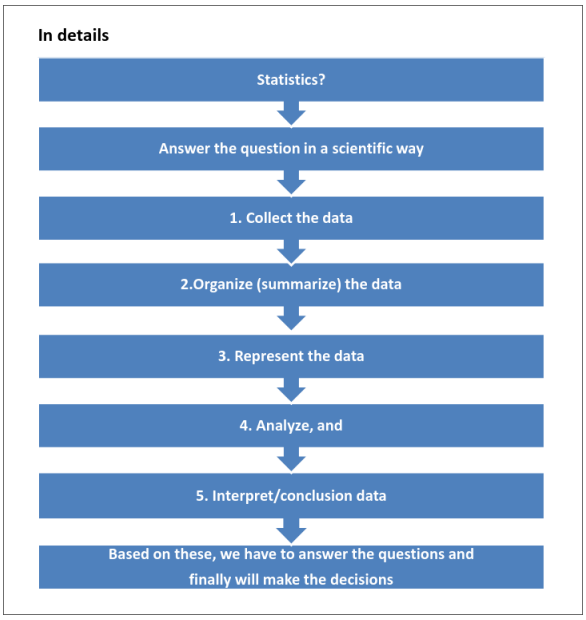
4. How many students have income equal to or more than 200 Tk?
Answer: Students in the 200-250 and 250-300 groups. $20 + 3 = 23$ students. As a percentage: $38.5\% + 5.8\% = 44.3\%$.

Conclusion / Comment:
A maximum of 38.5% of students have an income between 200-250 Tk, while the minimum number of students (5.8%) fall into the highest income bracket of 250-300 Tk.

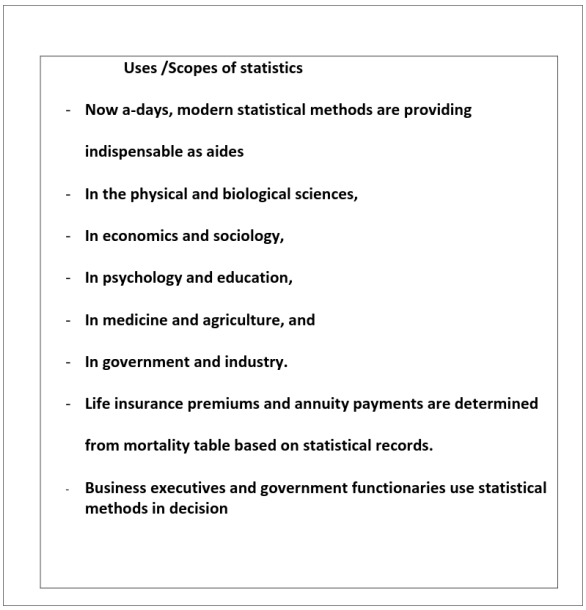
c. Graphs: Histogram and Frequency Polygon



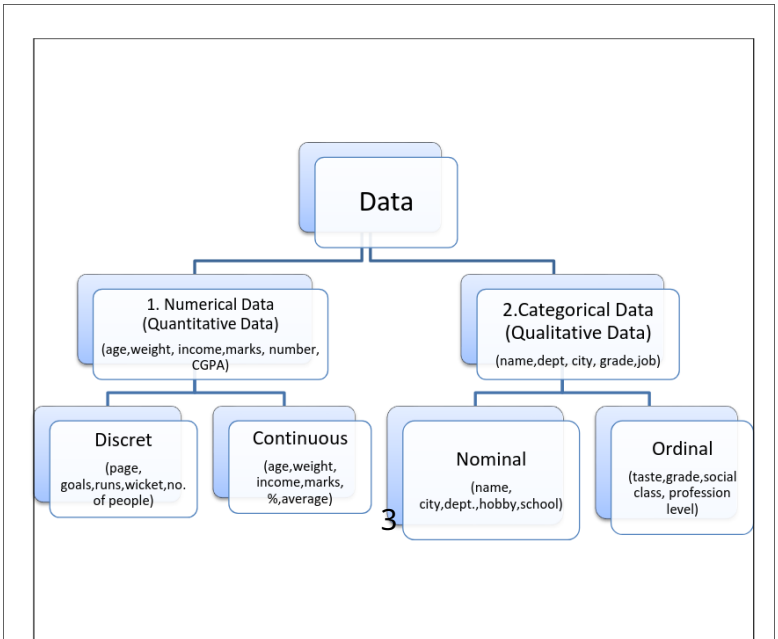




(a) Caption for Figure 1



(b) Caption for Figure 2



2.2 Example 2: Age Distribution (15-40 years)

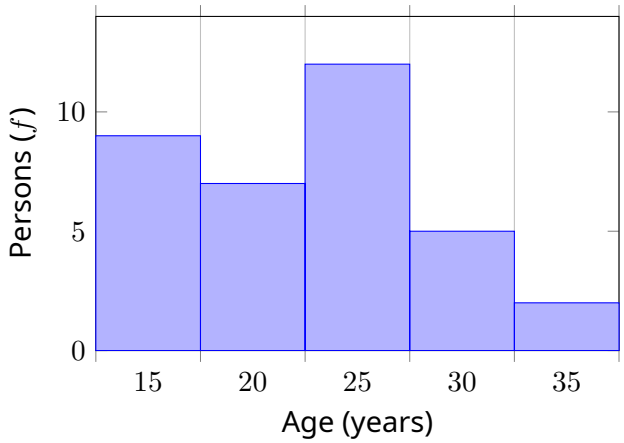
Data Provided: Age vs. Number of Persons ($n = 35$).

a. Data Summarization

Age (years)	Freq (f)	Cum. Freq (cf)	Rel. Freq (rf)	rf Percent (%)	Cum. Percent (%)
15–20	9	9	0.257	25.7	25.7
20–25	7	16	0.200	20.0	45.7
25–30	12	28	0.343	34.3	80.0
30–35	5	33	0.143	14.3	94.3
35–40	2	35	0.057	5.7	100.0
Total	**35**		**1.000**	**100.0**	

b. Graphs and Conclusion

Conclusion: The largest age demographic in this dataset is 25-30 years, comprising 34.3% of the individuals. The distribution is heavily skewed to the right (younger population), with 80% of individuals being under the age of 30.



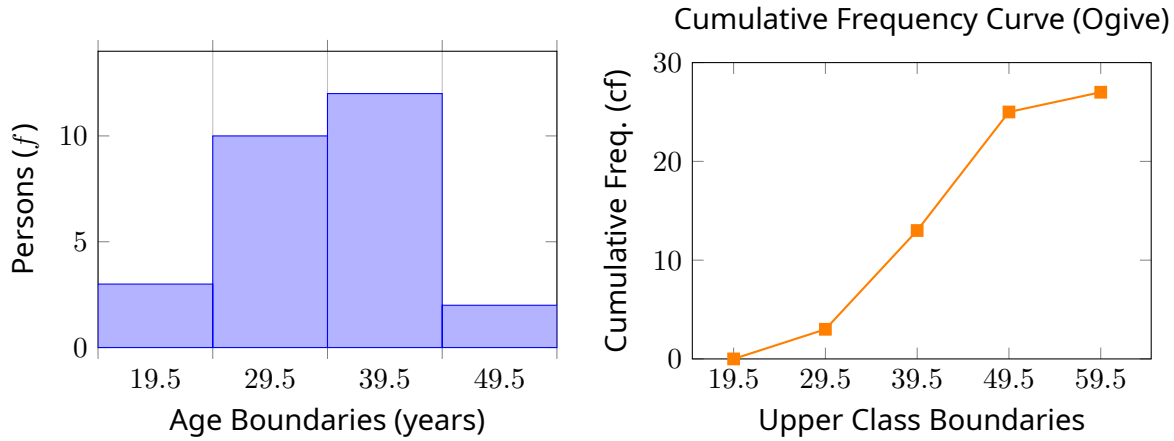
2.3 Example 3: Age Distribution (With Class Gaps)

Data Provided: Age vs. Number of persons. Classes have gaps (20-29, 30-39...), so we first calculate continuous class boundaries (19.5-29.5...).

Age limits	Boundaries	f	cf	rf	rf (%)	Cum. (%)
20–29	19.5–29.5	3	3	0.111	11.1	11.1
30–39	29.5–39.5	10	13	0.370	37.0	48.1
40–49	39.5–49.5	12	25	0.444	44.4	92.5
50–59	49.5–59.5	2	27	0.074	7.4	99.9
Total		**27**		**0.999**	**99.9**	

a. Data Summarization (Using True Class Boundaries)

b. Graphs & Ogive



Conclusion: The maximum number of individuals (44.4%) fall within the 40-49 age group (boundaries 39.5-49.5). The frequency curve would show a left-skewed distribution as most individuals are older than 30.

3 Qualitative Data Analysis

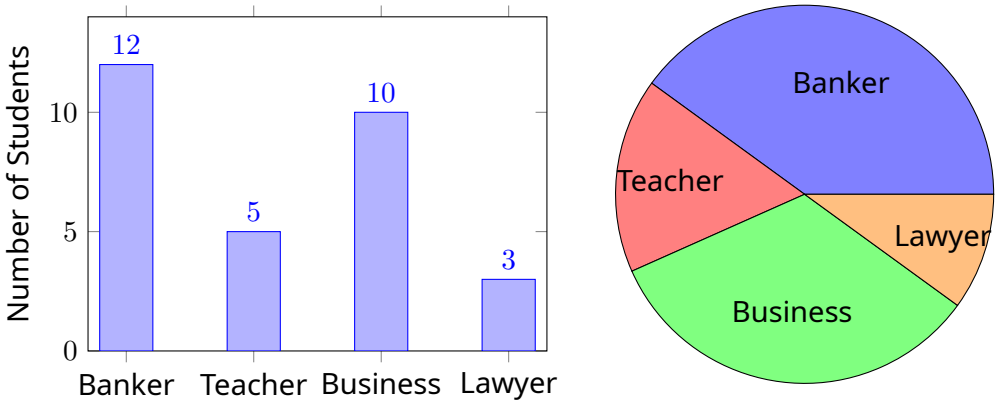
3.1 Example 1: Future Profession

Data Provided: Future Profession vs. No. of students ($n = 30$).
a. Data Type: This is **Qualitative Nominal Data**.

Data Table for Pie Chart

Profession	Freq (f)	Percentage (%)	Degree (°) calculation	Degree (°)
Banker	12	40.0	0.400×360	144
Teacher	5	16.7	0.167×360	60
Business	10	33.3	0.333×360	120
Lawyer	3	10.0	0.100×360	36
Total	**30**	**100.0**		**360**

Pie Chart & Bar Diagram



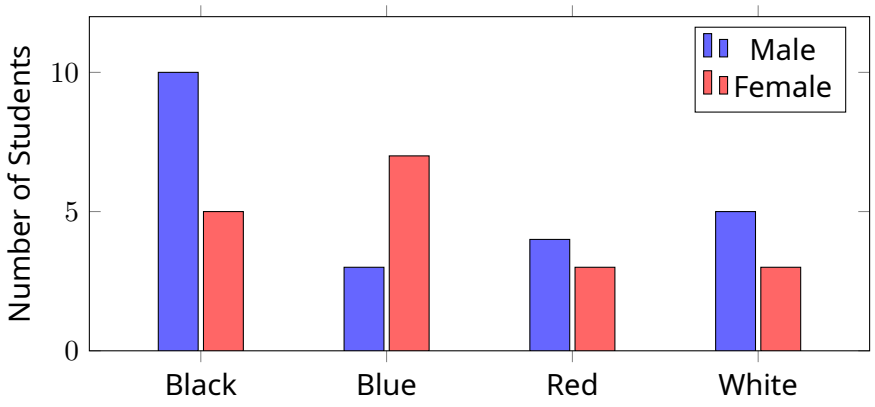
Comment: The majority of students (40%) want to be bankers, while the least preferred profession is Lawyer (10%).

3.2 Example 2: Favourite Colours (Overall & Grouped by Gender)

Data Type: Qualitative Nominal.

Grouped Bar Diagram (Male vs Female)

Colour	Male ($n = 22$)	Female ($n = 18$)	% Male	% Female
Black	10	5	45.5%	27.8%
Blue	3	7	13.6%	38.9%
Red	4	3	18.2%	16.7%
White	5	3	22.7%	16.7%



Comment: For males, the maximum percentage (45.5%) favour Black, and the minimum (13.6%) favour Blue. Conversely, for females, the maximum (38.9%) favour Blue, while Red and White are tied for the minimum (16.7% each).

4 Time Series Data Analysis

4.1 Example 1: Price of Sugar Over Time

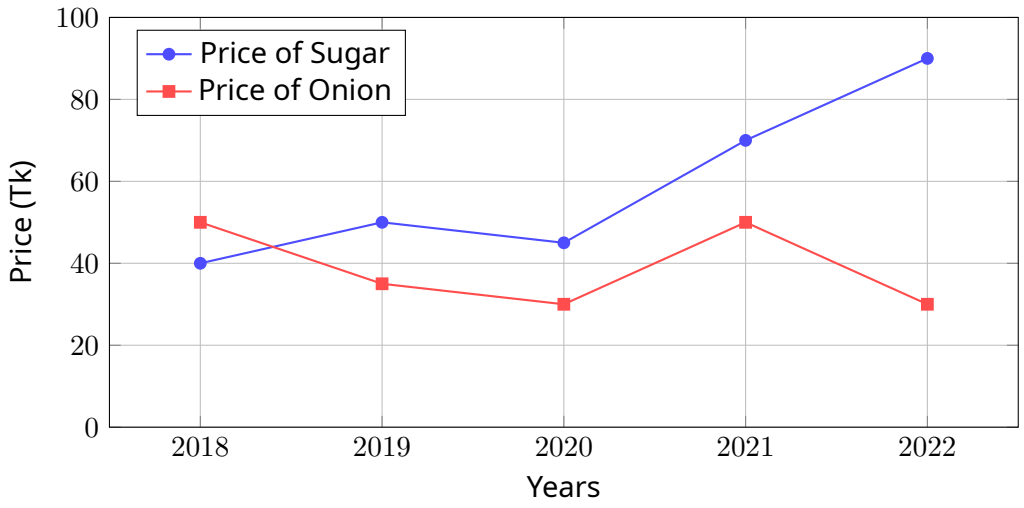
a. Type of data: This is **Time Series Data** (data collected at successive points in time).
c. Write 5 examples of time series data: 1. Daily stock market closing prices. 2. Annual gross domestic product (GDP) of a country. 3. Monthly rainfall in a specific city. 4. Hourly temperature readings. 5. Annual sales revenue of a company.

4.2 Example 5: Price of Sugar vs Price of Onion

Data Provided:

Years	Price of Sugar (Tk)	Price of Onion (Tk)
2018	40	50
2019	50	35
2020	45	30
2021	70	50
2022	90	30

Line Diagram & Interpretation



Comment / Conclusion: The line graph clearly shows that the price of sugar has a general **increasing trend** over the years 2018 to 2022, rising steeply from 45 Tk in 2020 to 90 Tk in 2022. In contrast, the price of onions does not show a steady trend; it is highly **unstable and fluctuating**, dropping as low as 30 Tk and spiking back to 50 Tk multiple times within the same period.