UNIVERSITAS GADJAH MADA
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
BACHELOR IN CIVIL ENGINEERING

Statistics and Probability

Data Organization and Presentation

Data Organization and Presentation

- Statistical data need to be organized and presented (visualized) such that they are "readable"

- Examples of data presentation

  - Tables

  - Charts

Data Organization and Presentations

Tables

The primary organization of data

Exact values of data (scores) are clearly readable

Trend of data cannot be easily seen

Charts

Requires table, there are always tables behind charts

Exact values of data (scores) are not easily obtained

Trend of data is clearly shown

Data Organization and Presentations

- Example
  - Exams
    - Number of students 15
    - Grading system A, B, C, D, E

- Presentation
  - Table and chart
   - Students grade
    - Grade distribution

Data Organization and Presentation

No.	Student name	Grade
1	Anabel	E
2	Barbado	C
3	Cironde	C
...	...	...
...	...	...
...	...	...
13	Maxim	D
14	Nopol	B
15	Ozone	A

- Data on the tabel are available at
  - Example_students_grade.xlsx

Table and Chart

Grade	Number of students
A	5
B	4
C	3
D	1
E	2
∑	15

**Students grade distribution**
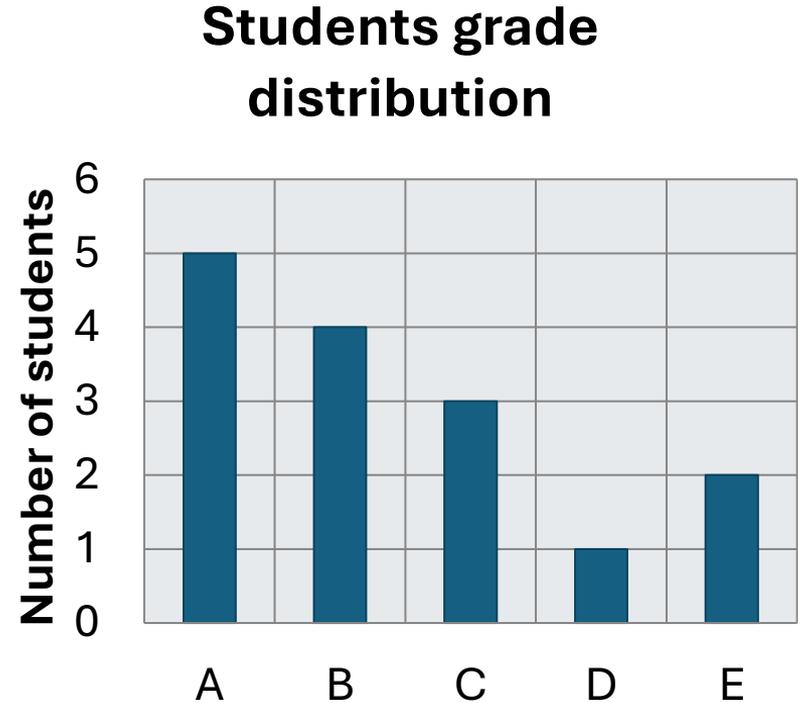
Students Score
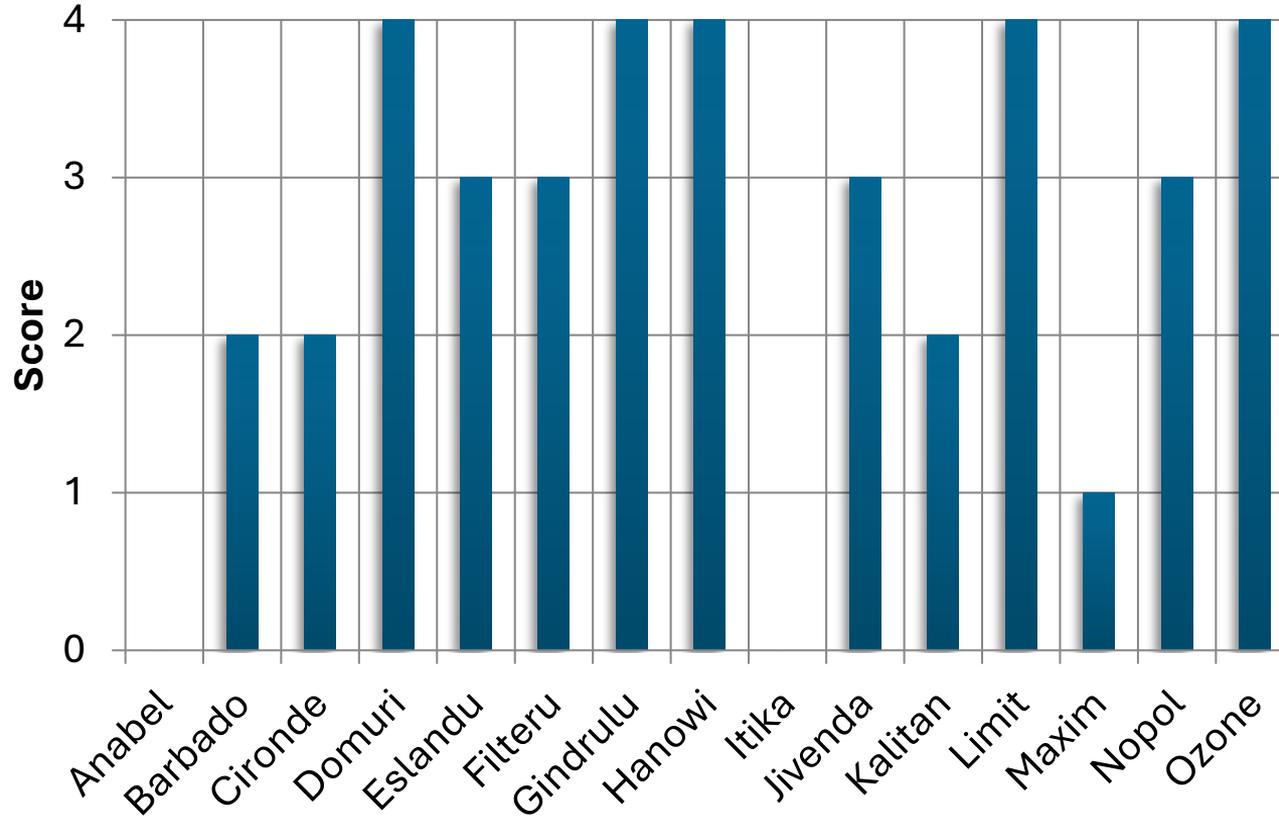
Quantification of the qualitative data (i.e. the grades A, B, C, D, E) is done by assigning numerical values (numbers) to the grades: A = 4, B = 3, C = 2, D = 1, E = 0

Students Grade
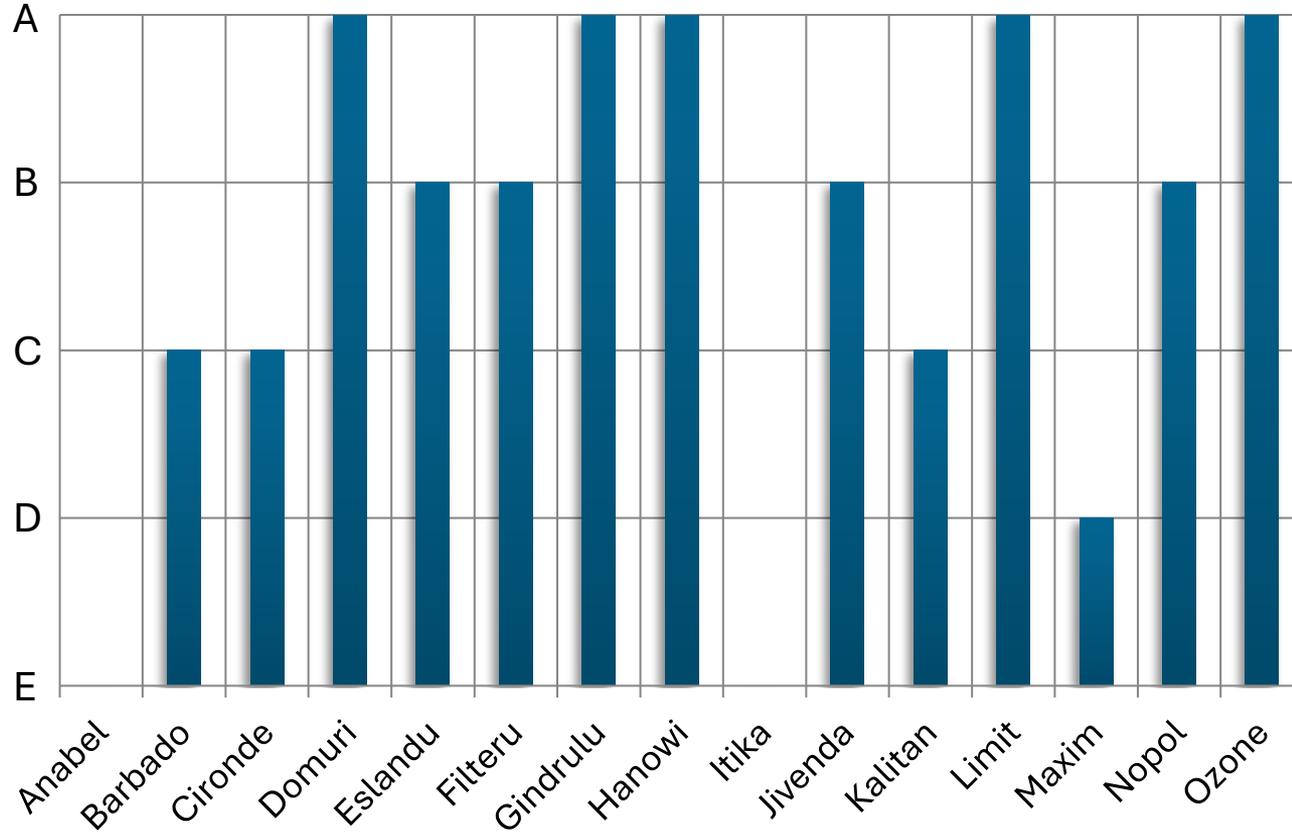
Qualitative data can be also presented in chart without converting them into quantitave data.

→ try it yourselves

Table and Chart of Students Grade

■ Tables and charts should be

- clear, readable, do not lead to misinterpretation
- efficient, display necessary information
- no exaggerations on the format (e.g. too colorful)
- good proportion among the components (titles, labels, etc.)
- no duplicate information (title, legends, axis title)

Data Presentation

- Example
  - Someone records delays, in minutes, of bus arrivals in a shelter
  - Record of the last 30 arrivals are presented
    - table of raw scores
    - frequency table

Delays of bus arrival

Arrival	1	2	3	4	5	6	7	8	9	10
Delay (minutes)	9	7	3	4	2	5	3	7	2	6

Arrival	11	12	13	14	15	16	17	18	19	20
Delay (minutes)	5	3	10	1	10	3	3	2	5	1

Arrival	21	22	23	24	25	26	27	28	29	30
Delay (minutes)	4	6	4	3	5	6	3	5	3	4

Delays of bus arrival
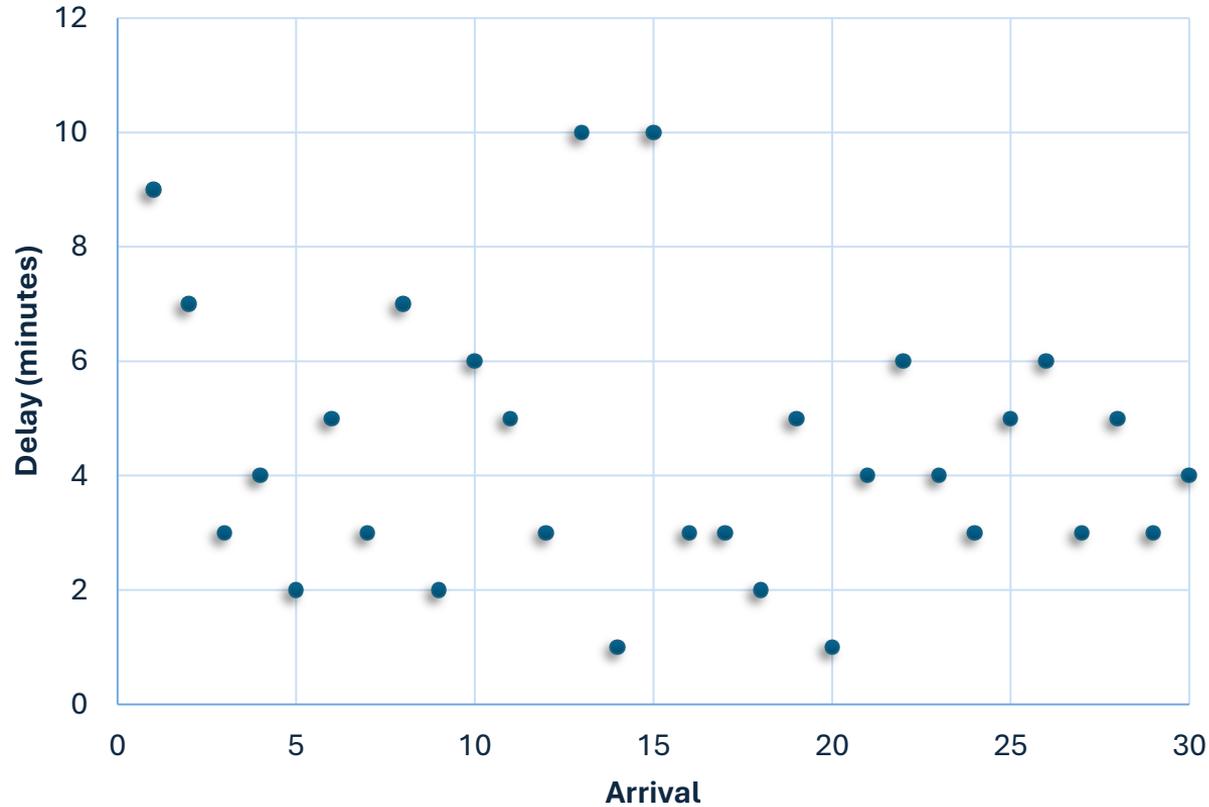
Scatter Plot

The plot shows the scatter of the data

Frequency Table

Delay (minutes)	Frequency
1	2
2	3
3	8
4	4
5	5
6	3
7	2
8	0
9	1
10	2
Σ	**30**

Delay (minutes)	Frequency
10	2
9	1
8	0
7	2
6	3
5	5
4	4
3	8
2	3
1	2
Σ	**30**

Bar Chart

Delays of bus arrival
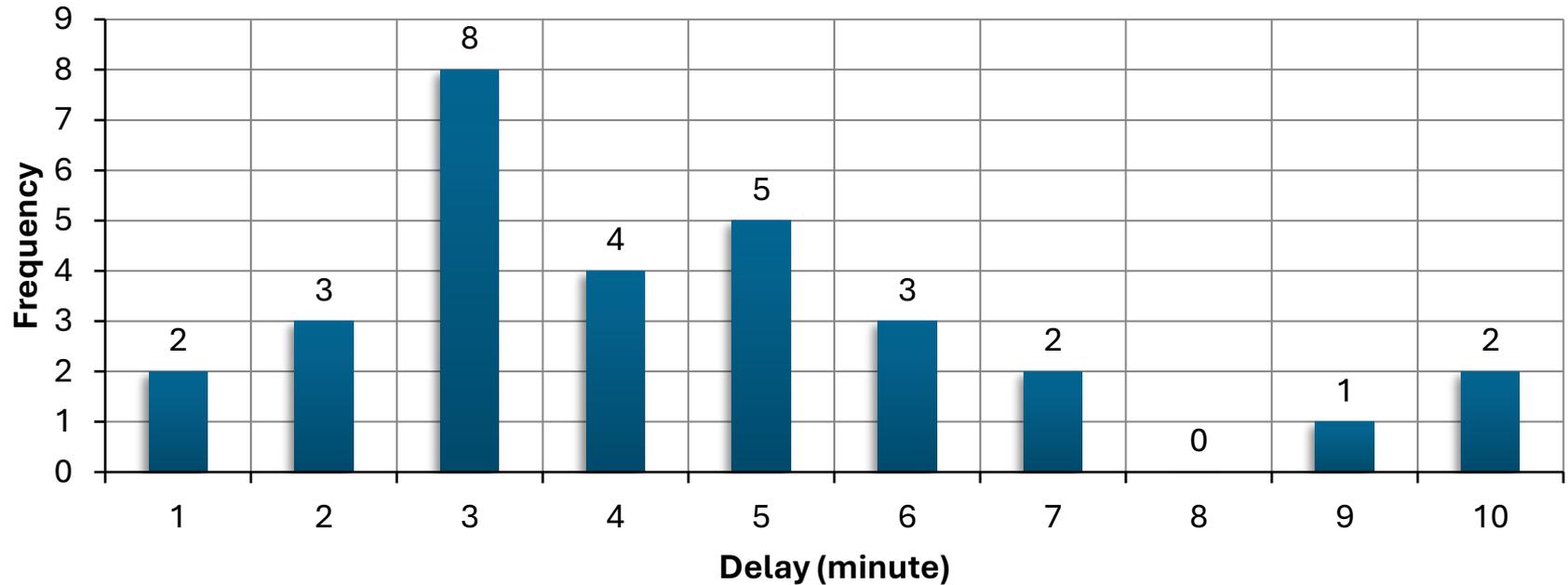
Histogram

Delays of bus arrival
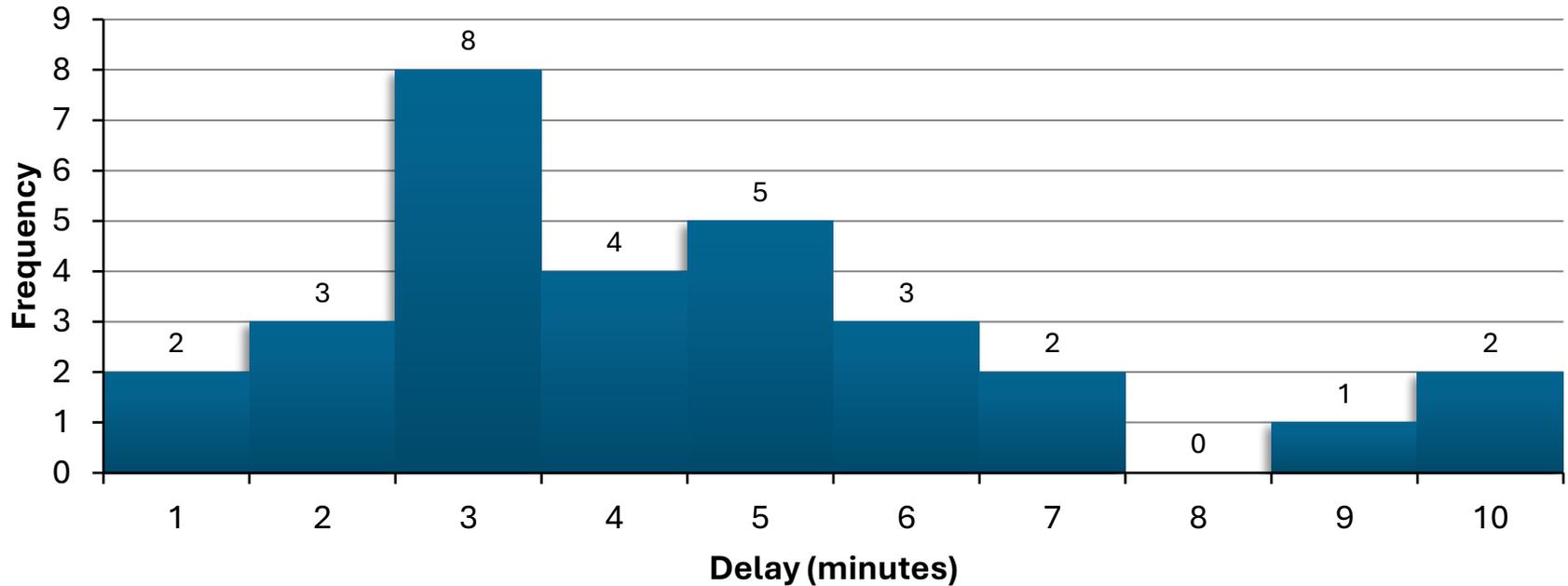
Histogram

Delays of bus arrival
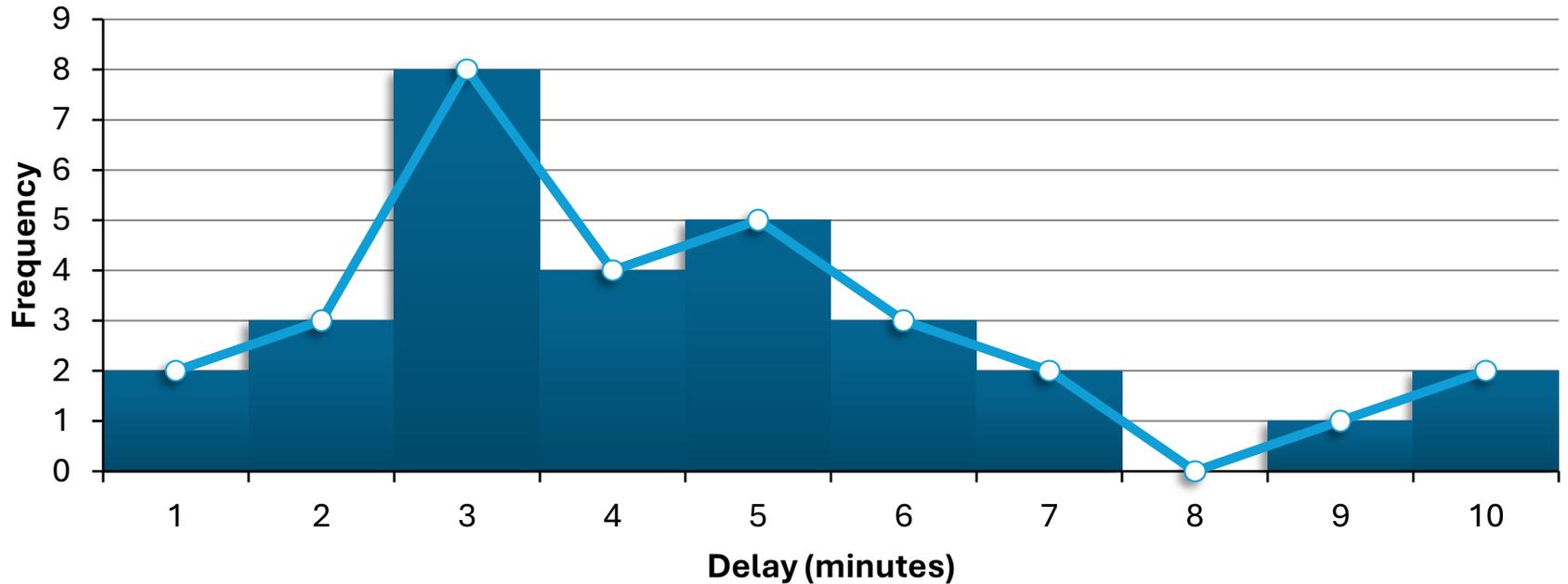
Frequency Table

Delay (minutes)	Frequency	Relative frequency	Percentage
1	2	0.07	7%
2	3	0.10	10%
3	8	0.27	27%
4	4	0.13	13%
5	5	0.17	17%
6	3	0.10	10%
7	2	0.07	7%
8	0	0.00	0%
9	1	0.03	3%
10	2	0.07	7%
Σ	30	1	100%

Histogram

Delays of bus arrival
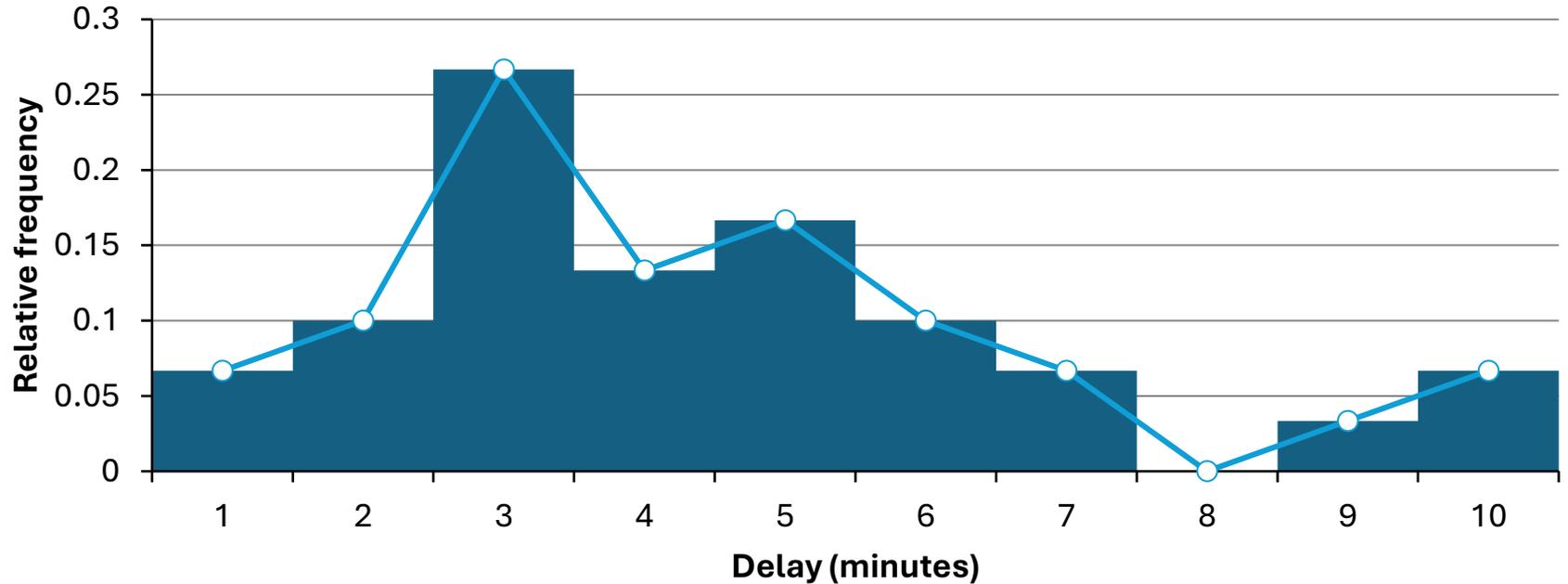
Month	Number	Date 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Σ
Jan-03	1	1						1	1				1					1				1			1	1			1				9
Feb-03	2				1		1					1			1				1	1	1												7
Mar-03	3			1																									1			1	3
Apr-03	4								1						1						1										1		4
May-03	5						1	1																									2
Jun-03	6		1										1	1	1												1						5
Jul-03	7													1	1												1						3
Aug-03	8	1				1				1									1						1		1					1	7
Sep-03	9													1								1											2
Oct-03	10			1				1							1				1					1			1						6
Nov-03	11											1				1				1					1					1			5
Dec-03	12					1		1				1																					3
Jan-04	13	1	1						1	1							1	1	1					1	1					1			10
Feb-04	14																				1												1
Mar-04	15			1		1		1		1		1		1		1		1		1		1											10
Apr-04	16																								1	1	1						3
May-04	17		1												1														1				3
Jun-04	18																														1	1	2
Jul-04	19							1	1	1	1	1																					5
Aug-04	20																1																1
Sep-04	21	1	1	1	1																												4
Oct-04	22								1				1						1				1					1	1				6
Nov-04	23		1		1														1			1											4
Dec-04	24																		1	1	1												3
Jan-05	25					1	1						1							1				1									5
Feb-05	26										1		1						1				1			1			1				6
Mar-05	27													1			1								1								3
Apr-05	28				1		1			1										1	1												5
May-05	29																												1	1	1		3
Jun-05	30		1	1									1		1																		4

Data Organization and Presentation

Table on the left depicts record of failures on PAM water supply

Use tables and charts to present those data.

Data can be downloaded from

https://istiarto.staff.ugm.ac.id/index.php/kuliah/sarjana-s1/statistics-and-probability/

Statistics and Probability

Data Organization and Presentation