

Assignment
Data Collection and visualization
Total points: 40

Using MS Excel, create the **following 4 Charts**. Submit only one workbook containing all charts each in a separate sheet. You present the datasets next to the charts.

1- Pareto Chart

The following table shows data collected by a fast-food restaurant to identify the most common reasons for customer complaints over the past month. Create the Pareto Chart for this table and add the cumulative values line to the chart.

Category	Number of Complaints
Cold food	5
Incorrect order	15
Long waiting times	12
Poor customer service	8
Food quality issues	10
Dirty facilities	5
Billing errors	20
Lack of available menu items	6
Unfriendly staff	4
Noisy environment	8

2- Histogram Chart

A university wants to analyze the distribution of student ages in one of its departments to better understand the demographics of its student body. Using the provided data on the distribution of student ages in the department, create a Histogram Chart to visualize the age distribution.

Age Group	Number of Students
30-32	20
24-26	45
21-23	50
18-20	35
33-35	15
27-29	30

3- Scatter Chart

A research team is investigating the relationship between the number of hours students spend studying per week and their exam scores in a particular course. Using the provided data on the number of hours students spend studying per week and their corresponding exam scores, create a Scatter Chart to visualize the relationship between the two variables. Plot the number of hours studied per week on the x-axis and the exam scores on the y-axis.

- explain the type of the correlation between the two variables.
- add a trend line to the Scatter Chart to illustrate the overall trend or relationship between study hours and exam scores.

Hours Studied per Week	Exam Score
5	65
7	70
10	85
8	75
12	90
6.5	68
9	80
11	88
4	60
6.5	72
8.5	78
13	92
7.5	74
9.5	82
14	95
3	55
5.5	67
11.5	86
6	71
8	76

4- Control Chart

The following table shows data collected by a software development team to monitor the number of bugs found in their software releases to ensure quality control and stability. Using the table, create the Control Chart to monitor the quality of software releases over time. Plot the release numbers on the x-axis and the number of bugs on the y-axis. Additionally, include control limits on the chart to identify variations in the number of bugs found in each release. Calculation:

- ⇒ Calculate the mean (average) of the number of bugs.
- ⇒ Calculate the standard deviation (σ) of the number of bugs.
- ⇒ Calculate the CL (Center Line) as the mean.
- ⇒ Calculate the LCL (Lower Control Limit) as $CL - (3 * \sigma)$.
- ⇒ Calculate the UCL (Upper Control Limit) as $CL + (3 * \sigma)$.

Release Number	Number of Bugs
1	20
2	15
3	10
4	40
5	30
6	21
7	36
8	14
9	13
10	15
11	33
12	12
13	14
14	27
15	25
16	16
17	14
18	37
19	22
20	25