Stat 6559 / 4690
Winter 2023
Assignment #1 Due in class on Wed, MARCH 1, 2023

Problem I: The following defects data collected from the last month's inspection reports for a particular type of tank. Construct a Pareto diagram and discuss the results.

Type of defects	Frequency
Parts damaged	34
Machine problem	29
supplied parts rusted	13
Masking insufficient	17
Misaligned weld	2
Processing out of order	4
unfinished fairing	3
incorrect dimension	36
Adhesive failure	6
Paint out of limits	10
improper test procedure	1

Problem II: Fifty soft drink bottles of a specific brand are collected from one day production and measured its net weight, which are given below: The specification limits for this brand are (16 ± 0.5oz)

15.8	16.3	16.2	16.1	16.6
16.3	15.9	15.9	16.2	16.4
16.1	16.2	16.5	16.4	16.3
16.3	16.2	15.9	16.4	16.2
16.1	16.1	16.4	16.5	16.0
16.1	15.8	16.7	16.6	16.4
16.1	16.3	16.5	16.1	16.5
16.2	16.1	16.2	16.1	16.3
16.3	16.2	16.4	16.3	16.5
16.6	16.3	16.4	16.1	16.5

1. Estimate the mean and standard deviation
2. Draw a histogram with superimposing the specification limits. Interpret the histogram focussing on how to improve the process.
3. Draw normal probability plot to justify your answer in (2)
4. Assuming the normality, estimate the sigma level of the process
5. Estimate the percentage of soft drink bottle out side the lower specification and upper specification.
6. Since the soft drink bottles fell outside the upper specification are quite large, it is decided to lower the process mean setting by 0.2 units. If you are the production manager, how many bottles of drink you need to produce to get 10000 accepted bottles, with new process mean setting, but same standard deviation.

Problem III: The manager of the local hospital came to know about the SIX SIGMA methodology and overmuch interested to implement it in his hospital. You are hired to do a sample project as data scientist how to improve customer service quality. Since customer satisfaction is an important parameter for assessment, identify one or two quality characteristics related to the customer satisfaction. Explain how you can measure the quality characteristics you have identified.

Problem IV: Perform an exploratory data analysis of the "IRIS Data". Give your interpretations / comments on each analysis you performed.