ASSIGNMENT 2 ESTIMATION AND CONFIDENCE INTERVALS BASIC STATISTICS LEVEL 2

Scenario

A manufacturer of print-heads for personal computers is interested in estimating the mean durability of their print-heads in terms of the number of characters printed before failure. To assess this, the manufacturer conducts a study on a small sample of print-heads due to the destructive nature of the testing process.

Data

A total of 15 print-heads were randomly selected and tested until failure. The durability of each print-head (in millions of characters) was recorded as follows:

1.13, 1.55, 1.43, 0.92, 1.25, 1.36, 1.32, 0.85, 1.07, 1.48, 1.20, 1.33, 1.18, 1.22, 1.29

Assignment Tasks

a. Build 99% Confidence Interval Using Sample Standard Deviation

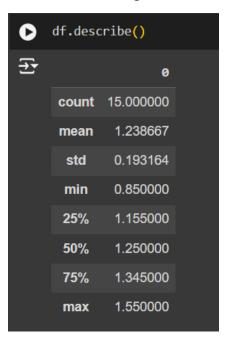
Assuming the sample is representative of the population, construct a 99% confidence interval for the mean number of characters printed before the printhead fails using the sample standard deviation. Explain the steps you take and the rationale behind using the t-distribution for this task.

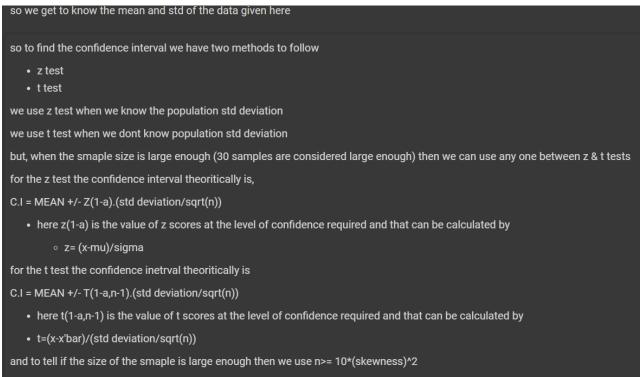
b. Build 99% Confidence Interval Using Known Population Standard Deviation

If it were known that the population standard deviation is 0.2 million characters, construct a 99% confidence interval for the mean number of characters printed before failure.

```
import numpy as np
import pandas as pd
from scipy import stats
import warnings
warnings.filterwarnings("ignore")
```

So we imported the libraries and know we use store the given data points into a Data Frame and use the describe method to obtain the mean and standard deviation in one go





```
a. Build 99% Confidence interval Using Sample Standard Deviation Assuming the sample is representative of the population, construct a 99% confidence interval for the mean number of characters printed before the print-head fails using the sample standard deviation. Explain the steps you take and the rationale behind using the t-distribution for this task.

[] ci=stats.norm.interval(0.99, | loc-df.mean(), | loc-df.mean(), | print("mean at 90% confidence inetval is: ",np.-round(ci,4))

[] mean at 90% confidence inetval is: [[1.1002] | | loc-df.mean(), | loc-df.mea
```

(1.0849765022200415, 1.3924234977799583)

the range of mean characters printed at a confidence of 99% with 0.2 standard deviation is 1.08 mil to 1.39 mil