Assignment 3 and 4

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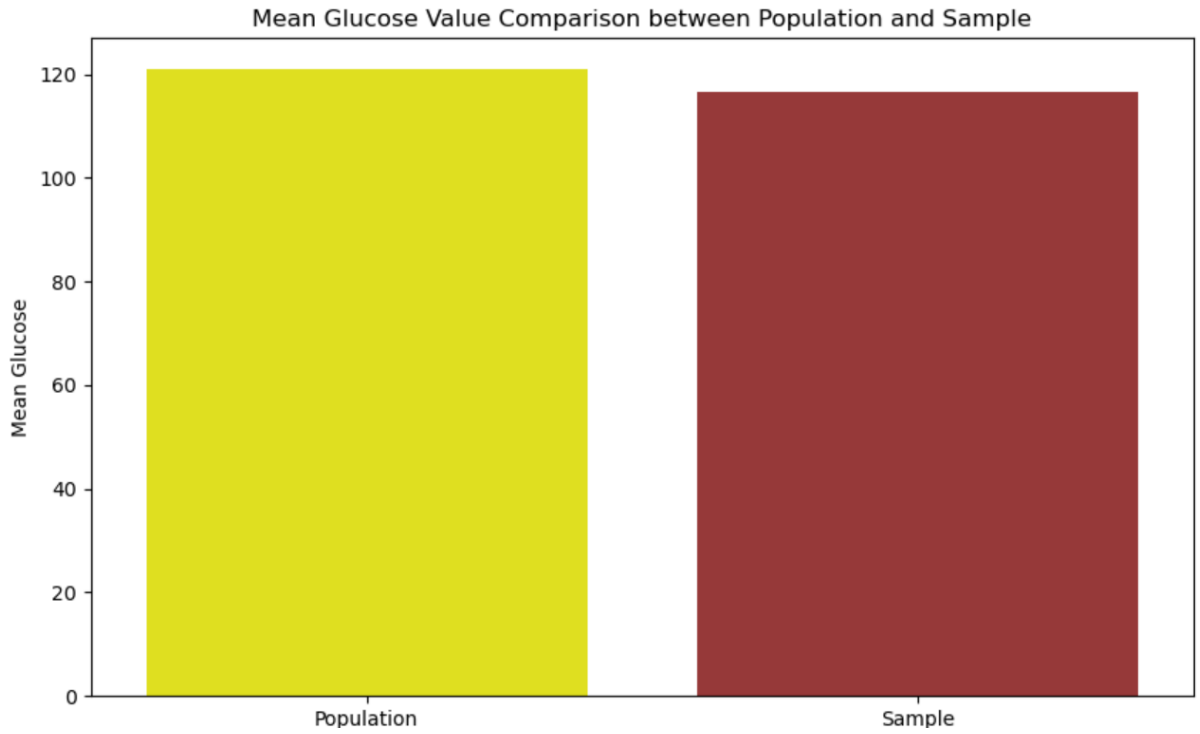
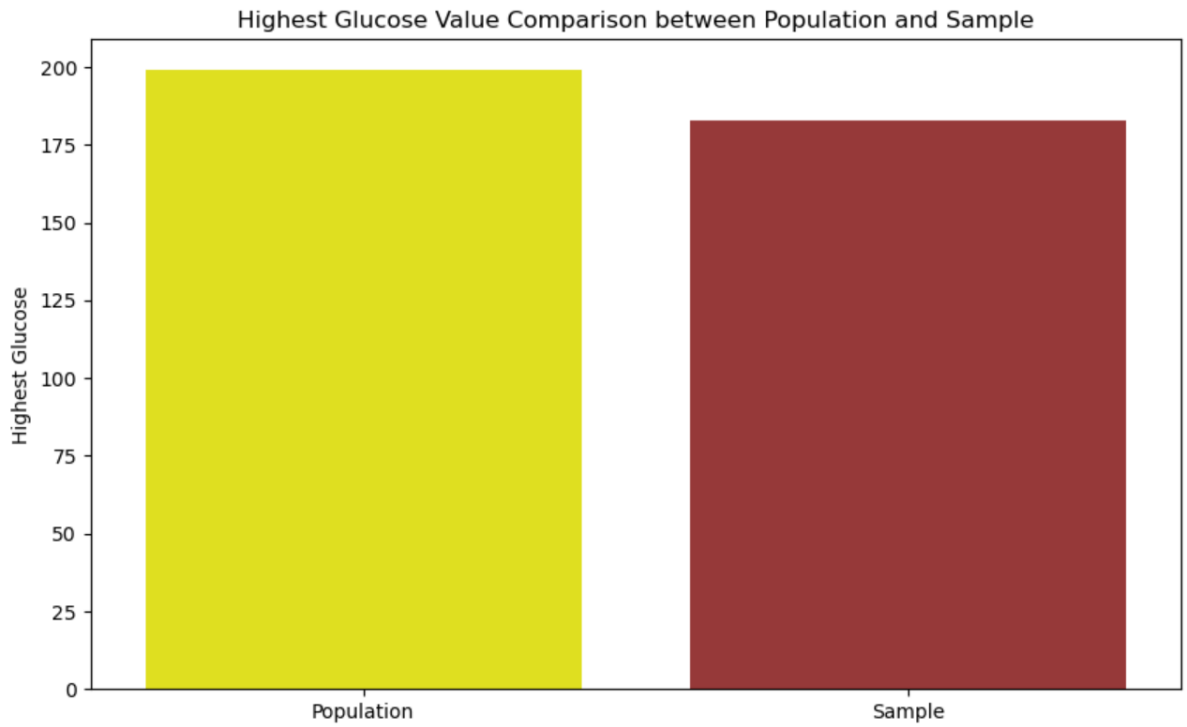
2 a)




**Mean Glucose Value Comparison:**

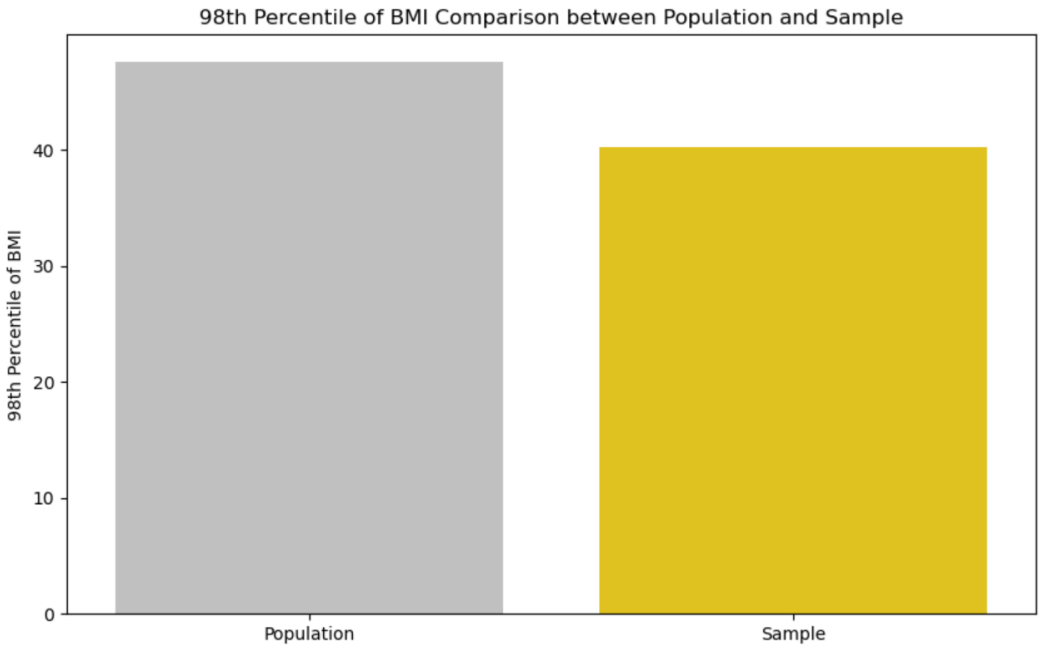
Population Mean Glucose: This is the average blood sugar level for each of the 768 patients included in the analysis.
Sample Mean Glucose: This is the average blood sugar level among the 25 patients who were randomly selected as a subset of the population.
The comparison of the sample's and population's mean glucose readings is shown in a bar plot. The sample mean glucose value appears to be greater than the population mean glucose value based on the plot. This could mean that a subset of the population with higher glucose levels was used to randomly choose the sample, or it could just mean that random chance was at play.




**Highest Glucose Value Comparison:**

Population Maximum Glucose: Out of the 768 patients in the dataset, this is the highest glucose level ever measured.
Sample Maximum Glucose: This is the highest amount of glucose ever measured in the randomly selected group of 25 patients.
The highest glucose readings in the population and sample are contrasted using a bar plot. It appears that in this instance, the sample's maximum glucose value is lower than the population's highest glucose value. Once more, this might be the result of pure chance or the particular patient subset that was included in the sample.
In terms of mean and highest glucose values, these visualizations compare the population and the sample overall, providing insights into the characteristics of the sampled subset compared to the entire population.

2 b)




The graph shows a comparison of a randomly selected subset's BMI (body mass index) with the population's 98th percentile. These are the conclusions drawn from the given code:

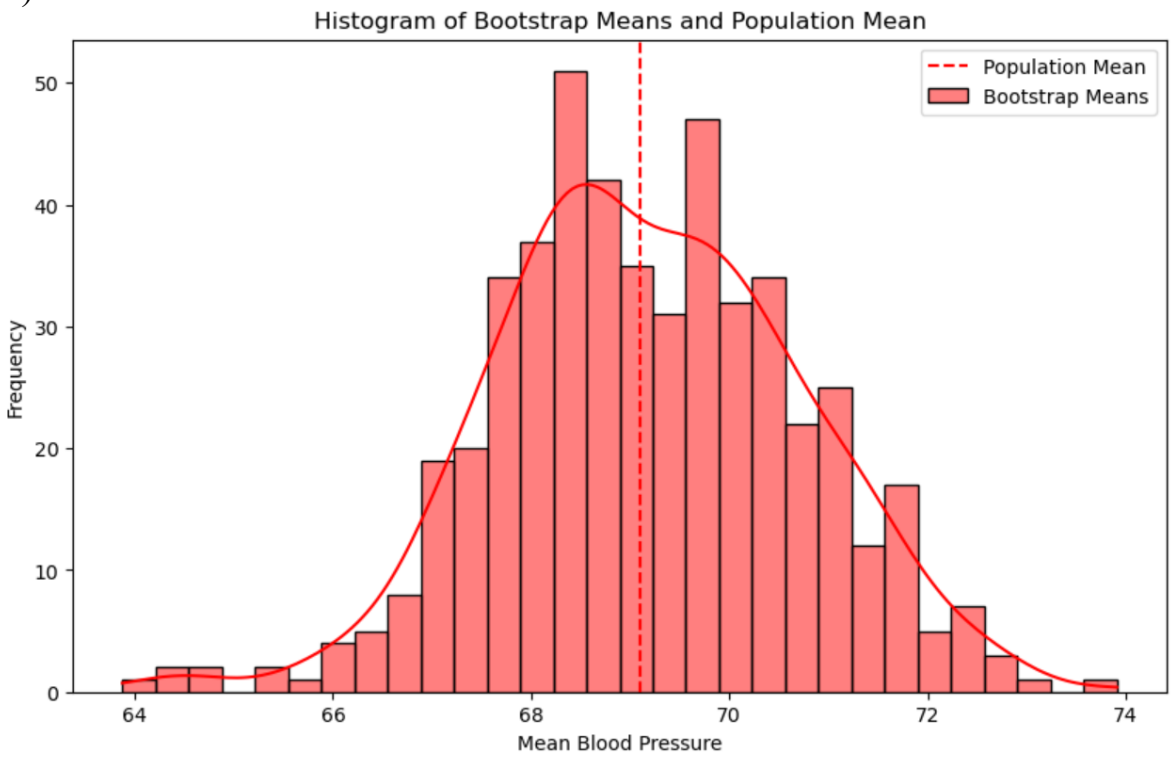
Population 98th Percentile of BMI: This figure shows the average BMI of the 768 patients in the sample at the 98th percentile.

Sample 98th Percentile of BMI: This figure shows the BMI in the randomly selected subgroup of 25 patients from the population at the 98th percentile.

By comparing these two results, the bar plot sheds light on the extremely high BMI.

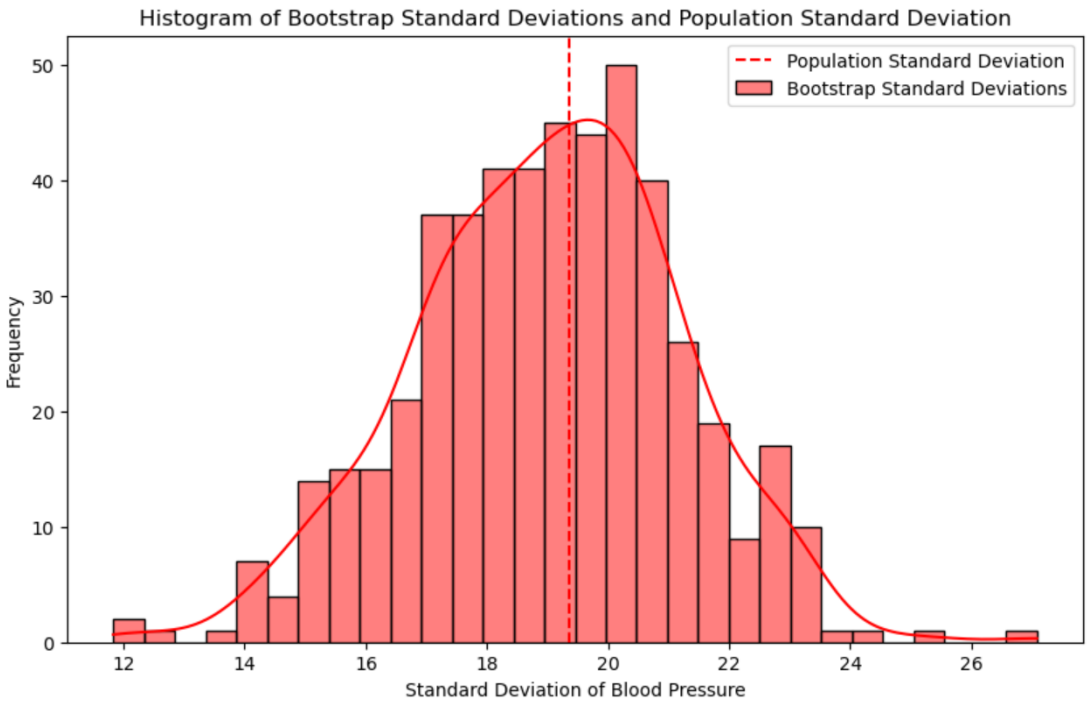
The population is represented by "silver," and the sample is represented by "gold": The bar plot indicates that the sample's BMI, at the 98th percentile, is greater than the population's BMI. This implies that, in comparison to the total population, the subset of the 25 individuals that were randomly selected may have a higher proportion of extreme BMI values.

2 c)



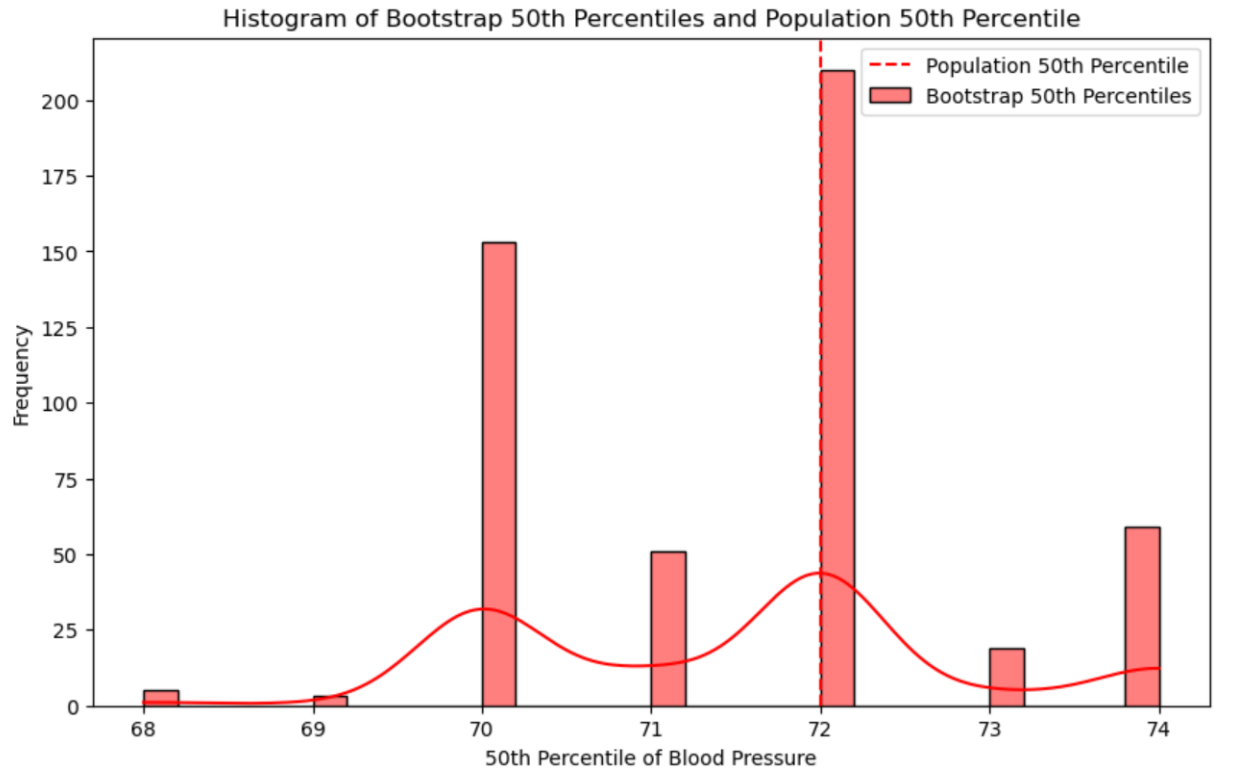

Histogram of Bootstrap Means and Population Mean:

The histogram displays a comparison between the population mean of blood pressure and the distribution of bootstrap means, which are estimated from 500 bootstrap samples.
The mean blood pressure of the population is shown by the vertical dashed line.
It may be inferred from the histogram that the bootstrap estimates are consistent with the population mean because the bootstrap means seem to be centered around it.




Histogram of Bootstrap Standard Deviations and Population Standard Deviation:

This histogram contrasts the population standard deviation of blood pressure with the distribution of bootstrap standard deviations, which are calculated from 500 bootstrap samples.
The blood pressure standard deviation for the population is shown by the vertical dashed line.
The histogram shows the relationship between the population standard deviation and the bootstrap standard deviation's variability.




Histogram of Bootstrap 50th Percentiles and Population 50th Percentile:

This histogram shows a comparison between the population 50th percentile and the distribution of bootstrap estimates for the blood pressure's 50th percentile (median).
The population's 50th percentile for blood pressure is represented by the vertical dashed line.
The histogram shows how the population median and the median estimate from bootstrap samples differ from one another.