Assignment 4 Report

a)

It is calculated to find the sample's mean glucose value (sample\_mean\_glucose).   
The sample's maximum glucose value (sample\_max\_glucose) is ascertained.  
In a similar manner, population\_mean\_glucose and population\_max\_glucose—the population's mean and maximum glucose values—are determined. To compare the mean and maximum glucose values between the sample and the population as a whole, a bar chart is made.   
"Mean\_Glucose" and "Highest\_Glucose" are the variables that are represented by the x-axis.  
The readings for glucose are displayed on the y-axis. For every variable, two sets of bars are plotted: a population set and a sample set.   
Which color relates to the population and sample data is shown in the legend.

A graph of a bar chart

Description automatically generated with medium confidence

The following are some notes regarding the graph:   
  
The sample's mean glucose level is lower than the population's mean glucose level.  
The sample's maximum glucose level is less than the population's highest glucose level.

whether the sample's glucose values accurately represent the population by comparing the sample statistics with the population data.   
A close match between the population and sample statistics indicates that the sample is a good representation of the population.  
Sample bias or variability may be indicated if there are notable discrepancies between population and sample statistics.

b)

Using NumPy's percentile function, the 98th percentile BMI value for the sample (sample\_98th\_percentile\_bmi) is computed.   
Likewise, the population's 98th percentile BMI value (population\_98th\_percentile\_bmi) is computed.  
Comparing Bar Charts:   
  
  
To compare the 98th percentile BMI values between the sample and the total population visually, a bar chart is made.   
'98th Percentile BMI' is the variable represented by the x-axis.   
The values of the BMI are shown on the y-axis.   
For every variable, two sets of bars are plotted: a population set and a sample set.

A screenshot of a graph

Description automatically generated

Displays a comparison of a sample's and a population's 98th percentile Body Mass Index (BMI). The sample's BMI is below the 98th percentile, although the population's BMI is greater.

c)

To compare the population statistics with the bootstrap sample statistics, three subplots are made.   
A histogram comparing the means of the bootstrap samples with the population mean is shown in the first subplot.  
A histogram comparing the standard deviations of the bootstrap samples and the population standard deviation is displayed in the second subplot.   
  
A histogram comparing the bootstrap sample 98th percentiles with the population 98th percentile is shown in the third subplot.   
Vertical dashed lines show the matching population data for each subplot.

A screenshot of a graph

Description automatically generated

"Mean Blood Pressure" displays three blood pressure visualizations: the 98th percentile, the standard deviation, and the mean blood pressure. A bootstrap sample is compared to the population mean, standard deviation, and 98th percentile in each graphic.   
  
The following are some notes regarding the graphs:  
Mean Blood Pressure: The bootstrap sample's mean blood pressure is comparable to the population mean.   
Blood Pressure Standard Deviation: The bootstrap sample's blood pressure standard deviation is comparable to the population standard deviation.   
98th percentile for Blood Pressure: The bootstrap sample's 98th percentile for blood pressure is comparable to the population's 98th percentile.