1.

a) Problem:

The target population is the fuel consumption per fill-up for car S of Professor Stringer. The attribute of interest is the average fuel consumption at any given fill-up of car S. The problem is descriptive since the problem is to determine the average fuel consumption at any given fill-up of car S.

Plan: Each time Professor Stringer uses car S and drive to somewhere near his home and drive around his normal amount, the data, including car, km, gas, and date should be recorded. Furthermore, to reduce other factors' influences, we should try to keep other factors constant. To be specific, different weather conditions would cause different fuel consumptions. Rain and snow would cause the road hard for Professor Stringer to drive the car, which may cause more fuel consumption. Also, the speed that Professor Stringer drives each time should try to be the same.

Data:

Generally, we collect 20 sets of data, including four variates. These four variates are car, km, gas, date, whose types respectively are categorical, continuous, continuous, ordinal. To be specific, car represents the type of car that Professor Stringer drives each time, km represents the kilometers driven by Professor Stringer each time, gas represents the fuel consumption each time Professor Stringer uses, and date represents the day that Professor Stringer drives the car.

Analysis:

Because we hope to get the average gas consumption at any given fill-up of car S, we would calculate the average value of the gas consumption data we get. By question 3 in assignment 1, we get that the $\hat{\mu}$ = 46.8599. Also, we have the median of the fuel consumption per fill-up is 50.6625, the variance of the fuel consumption per fill-up is 118.1176969, the standard deviation of the fuel consumption per fill-up is 10.8681966, and the range of the fuel consumption per fill-up is from 20.03 to 60.174.

Conclusion:

We conclude that the average gas consumption at any given fill-up of car S is approximately 46.8599. The drawbacks of the study include measurement error. Because Professor Stringer just observed the fuel consumption and writes it down, it is hard to get accurate fuel consumption data. Moreover, the sample size is small, which causes the estimate is subject to a high degree of uncertainty.

b) For the problem part, Professor Stringer did poorly on this assignment since he did not clearly state the problem he would research. However, he did it well on assignment 1 by question 4 because it states that we are interested in making inferences about the average gas consumption of car S, per fill-up. For the plan part, he did well on describing how the units are selected and how the variates would be measured based on this assignment. Also, the population and what variates should be collected are clearly stated based on assignment 1. However, he did poorly on providing many details to make the plan precise and well-rounded. For example, he does not control other factors like weather, destinations, time points. This is because snow and rain would cause the road hard to drive, different locations or different time points may cause diverse roads, which would affect the fuel consumption and kilometers driven. Thirdly, data are collected and shown on the page 2 of this assignment. However, he did poorly on collecting a large amount of data. Small sample size would cause large deviations. Furthermore, he did poorly on analysis and conclusion because he did not analyze data by using any numerical and graphical methods and he did not draw any conclusion about the average fuel consumption at any given fill-up of car S.