

Q1 .

Python datatypes are more indicative of the computer interpretation of the data. That is, they describe how the computer stores this data and how it treats it during computation. Python datatypes give very little, if at all any, indication about what type of information that is stored in this datatype.

The types taught in class describe what kind of information is held. Does it have any order, is it continuous, and other such questions are answered. These types have no information about how they will be stored in a computer and how one can perform computations on them.

Q2 .

- a. Exploratory
- b. Descriptive
- c. Exploratory
- d. Descriptive
- e. Prescriptive
- f. Predictive
- g. Exploratory

Q3 .

- a. Here are two datasets that can be used for the task:

<https://www.kaggle.com/borismarjanovic/price-volume-data-for-all-us-stocks-etfs>, <https://knoema.com/INPGINDCRE2019/performance-of-eight-core-industries-in-india>

The first dataset has stock price history of American stocks and the second one has information about the performance (production, growth etc.) of major Indian industries. If these were datasets of the same country and of the same timeline, the following data analysis can be done:

One can plot the price of various stocks against the performance of a particular industry and find which stocks follow the trend of the sector in either a leading or lagging manner. (exploratory)

We can then find statistical data to quantify how well a particular stock can behave as a bellwether stock. This can include finding a factor by which the stock prices should be scaled to approximate the sector performance, and then calculate the mean squared error between what the

stock prices suggest to be the performance vs. what the actual performance is. However, we must also take care of possible leads or lags with respect to time in the two trends. (descriptive)

The stocks with the closest approximation can be prescribed/recommended as bellwether stocks for that particular sector. (prescriptive)

No predictive data analysis needs to be done.

- b. I could not find any datasets pertaining to this question, and hence the data analyses suggested are hypothetical.

Exploratory analysis can be done to find out and compare the expected costs of building the roads, the area of land that they will use for construction, the type of land on which the road is being built (e.g. Are mangroves being cut down), and other environmental factors that come into play.

We can then perform descriptive data analysis to quantify and calculate how bad the construction of the road is for the local environment.

Predictive analysis will be used to calculate how busy the road will be and whether it will cause air pollution in excess which is likely to affect the local animals and civilians.

Finally, a prescriptive analysis will be done, taking into account all the above factors and then recommending one particular road, which is less harmful in most ways.

- c. Datasets found:

[https://www.cdc.gov/nchs/data\\_access/vitalstatsonline.htm#Mortality\\_Multiple](https://www.cdc.gov/nchs/data_access/vitalstatsonline.htm#Mortality_Multiple)

The above link contains several datasets which carry information of the mother's health, the parents' financial and marital status, the place of birth, and the infant's health.

One can explore this data and create plots to find out major reasons for neonatal death. We can see if there are particular regions in the state where this number is strikingly high.

Descriptive data analysis can be done to find statistics about the mean number of deaths given a particular trait and region.

Based on this, predictive data analysis can be performed to find out the likelihood that such a death will occur given specific condition, and this can be used to find out regions where there is higher need of resources.

Furthermore, prescriptive data analysis can be done to recommend which hospitals should be allocated how many resources, and to suggest the hospitals to take extra measures when particular traits are observed.