Tutorial -2
MA 605

1) In the daily cases csv. Plot the time graph of the infected fraction of population. Infected vs Time (in months). Do this for Delhi, Mumbai and Kolkata.
   Compare these graphs.
   a) What do you infer from these graphs?
   b) Calculate the variance of the infected array.
   (Hint: Infected fraction = (Confirmed - recovered - death)/ Population
   Susceptible = (Population - Confirmed)/Population Removed = (Recovered + Death)/ Population
   (Extra work: Plot the time graph of susceptible and removed population and compare With the infected fraction of the population. Plot all these in a single plane. Do this for Delhi and Mumbai)

2) In the Mobility.csv for 2021. Plot the following
   a) Retail mobility of Delhi and Mumbai. Compare them in the same plane.
   b) Transit mobility of Delhi and Mumbai. Compare them in the same plane.
   c) What do you infer from these graphs?
   d) Calculate the IQR in each case (Interquartile range).
   e) What is the expected value of Retail and Transit mobility in Delhi and Mumbai?

   Note: In descriptive statistics, the interquartile range (IQR) is a measure of statistical dispersion. It is the spread of the data or observations. The IQR may also be called the mid spread, middle 50%, or H-spread. It is defined as the spread difference between the 75th and 25th percentiles of the data. The lower quartile corresponds with the 25th percentile and the upper quartile corresponds with the 75th percentile, so IQR = $Q_3 - Q_1$.

   First, take the median of the data.
   Then Q3(median of the lower half of the data)-Q1(median of the upper half of the data)

3) In the vaccination data set. Do the following
   a) Plot the vaccination coverage of Delhi and Mumbai. (Basically, for each city you have to plot % of people vaccinated with first dose and % of people vaccinated with second dose in the same plane)
   b) Calculate the correlation of first dose coverage with the following -
      i) Sites / Area of city
      ii) Sessions / Area of city
      iii) Grocery and pharma mobility
      What can you infer from these correlations?
   c) Find the state/ UT with the highest vaccination coverage (first dose).

(Population of Delhi: 20,591,874 , Population of Mumbai : 20,667,656
Area of Delhi: 1400 sq. km , Area of Mumbai : 670 sq.km)