# **Assignment 2**

## The Dow Jones Industrial average (DJIA) and the Standard and Poor’s S&P 500 index are both used as measures of overall movement in the stock market. The DJIA is based on the price movements of 30 large companies; the S&P 500 is an index composed of 500 stocks. The following table shows closing price for 10 weeks for DJIA and S&P 500.

|  |  |  |
| --- | --- | --- |
| Date | Dow Jones | S&P 500 |
| 11-Feb | 10425 | 1387 |
| 18-Feb | 10220 | 1346 |
| 25-Feb | 9862 | 1333 |
| 31-Mar | 10367 | 1409 |
| 10-Mar | 9929 | 1395 |
| 17-Mar | 10595 | 1464 |
| 24-Mar | 11113 | 1527 |
| 31-Mar | 10922 | 1499 |
| 07-Apr | 11111 | 1516 |
| 14-Apr | 10306 | 1357 |

## Compute the sample correlation coefficient for the data shown in the above table.

## Comment on the correlation, do they have a close association?

## Ted & Associates conducted a study of service times at the drive-up window of fast-food restaurants. The average time between placing an order and receiving the order at KFC’s restaurant is 2.78 minutes. Assume that the waiting time follows exponential distribution.

## What is the probability that a customer’s service time is less than 2 minutes?

## What percentage of the customers’ service time will be more than 5 minutes?

## A customer has been waiting for 3 minutes after placing an order, what is the expected value of residual (remaining) waiting time?

## ‘ABC Market’, a media marketing firm based in Mumbai, has contracted with a company to market its products. The company wants its TV, Radio and newspaper advertising to reach different numbers of customers within three age- groups: over 40, between 25 and 40, and under 25 years old.

One minute of TV commercial time costs INR 90,000 and will reach (for every minute of advertisement) an average of 180,000 viewers in the over-40 group, 90,000 customers in the 25 to 40 group and 120,000 in the under-25 group.

One minute of Radio time costs INR25000 and will reach (per every minute of advertisement) 40000 listeners in the over-40 age group, 80,000 in the 25-to-40 age group, and 100,000 in the under-25 group.

Advertisement in newspapers at the cost of INR 24,000 per centimeter (Column length) will reach 60,000 internet users in the over-40 age-group, 40000 in the 25 to 40 age group and 70,000 in the under-25 group.

The company wants to have a minimum exposure of 1000,000 in the over-40 group, 800,000 in the 25-40 age-group; the Company did not have any requirement for the age group less than 25 years.

1. Formulate an appropriate linear programming model and solve it graphically to find out the minimum cost that is required to meet the constraints. Identify the optimal number of minutes of advertisements in TV, Radio and column length in centimeters in newspapers.
2. By how much the cost will increase if the minimum exposure in the over-40 age group in increased by another 1000 people?

What will be the impact on the cost if ‘ABC Market’ decides to advertise in TV?

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