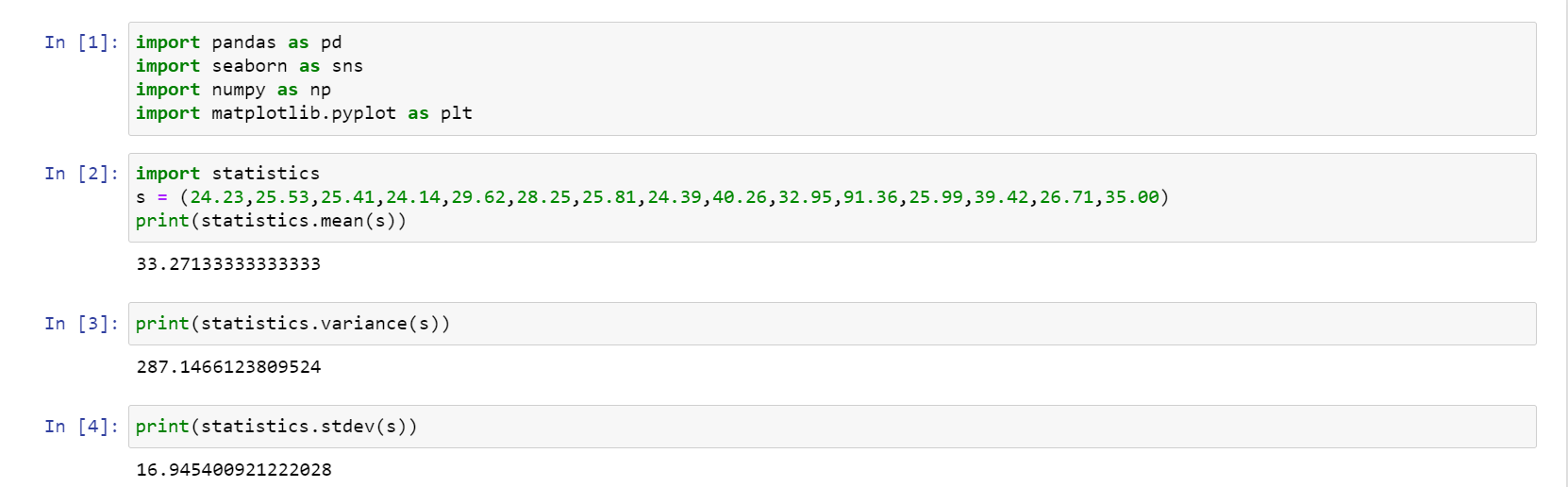
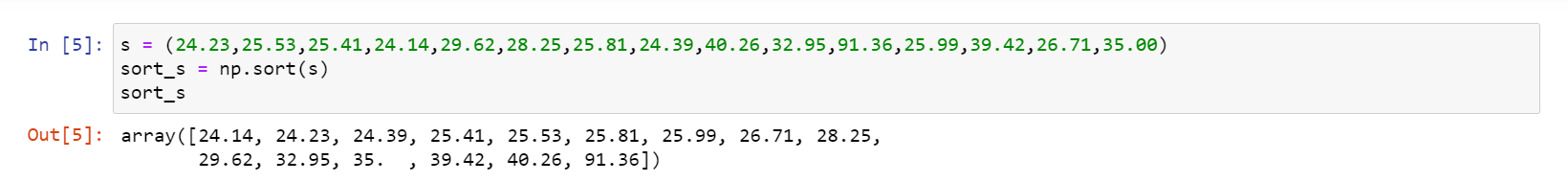
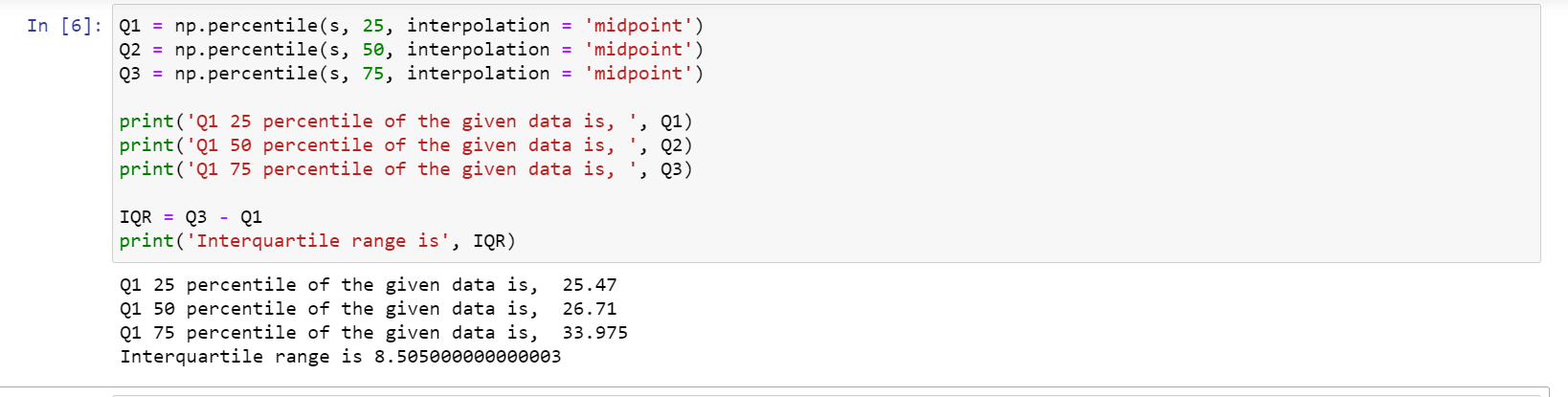
**Topics: Descriptive Statistics and Probability**

1. Look at the data given below. Plot the data, find the outliers and find out

|  |  |
| --- | --- |
| **Name of company** | **Measure X** |
| Allied Signal | 24.23% |
| Bankers Trust | 25.53% |
| General Mills | 25.41% |
| ITT Industries | 24.14% |
| J.P.Morgan & Co. | 29.62% |
| Lehman Brothers | 28.25% |
| Marriott | 25.81% |
| MCI | 24.39% |
| Merrill Lynch | 40.26% |
| Microsoft | 32.95% |
| Morgan Stanley | 91.36% |
| Sun Microsystems | 25.99% |
| Travelers | 39.42% |
| US Airways | 26.71% |
| Warner-Lambert | 35.00% |











|  |  |  |  |
| --- | --- | --- | --- |
| **Mean** | **Variance** | **Standard Deviation** | **Morgan Stanley** |
| **33.27** | **287.146** | **16.9454** | **91.36% is a outlier** |



Answer the following three questions based on the box-plot above.

1. What is inter-quartile range of this dataset? (please approximate the numbers) In one line, explain what this value implies.

Ans.

Inter-quartile range is the range between upper quartile (Q3) and lower quartile (Q1).

IQR= Q3-Q1= 12-5 = 7

50% of the data lies between IQR.

1. What can we say about the skewness of this dataset?

Ans.

From the above boxplot we can say that the distribution of X is positively skewed.

1. If it was found that the data point with the value 25 is actually 2.5, how would the new box-plot be affected?

Ans .

* If it was found that the data point is actually 2.5 instead of 25, the outlier in the boxplot will be removed.
* We may get changed mean and median value over there. May be mean approximately equal to the median value in this case.

Where the median shifts or not depends on the size of the data.

* It will reduce the right skewness of the data.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans. We need to have actual data to get the exact value of the mode. The mode can lie between 4 and 10 because there are many values in this range but this is just an assumption. The 2 bars of the same height doesn’t indicate mode every time. By observing we can say that Mode lies in between 4 to 8.

1. Comment on the skewness of the dataset.

Ans. Data is positively skewed or right skewed.

1. Suppose that the above histogram and the box-plot in question 2 are plotted for the same dataset. Explain how these graphs complement each other in providing information about any dataset.

Ans:

* In Histogram we are able to get the modal value but not exactly the median value. But in case of the Boxplot we can obtain the median value. Looking either of the plot we can comment on the distribution of the data. In histogram its little bit difficult to comment outlier, whereas in boxplot we can see the outlier in dot or oval shape.
* Looking at the histogram we can’t comment the Interquartile range (major 50% of the data) but in case of boxplot we can define the Inter quartile Range.
* By looking the above histogram and boxplot we can confirm an outlier at 25 in Y value. Both the plots indicate the Positive skewness of the dataset.

1. AT&T was running commercials in 1990 aimed at luring back customers who had switched to one of the other long-distance phone service providers. One such commercial shows a businessman trying to reach Phoenix and mistakenly getting Fiji, where a half-naked native on a beach responds incomprehensibly in Polynesian. When asked about this advertisement, AT&T admitted that the portrayed incident did not actually take place but added that this was an enactment of something that “could happen.” Suppose that one in 200 long-distance telephone calls is misdirected. What is the probability that at least one in five attempted telephone calls reaches the wrong number? (Assume independence of attempts.)

Ans.

P(x) = ⁿCₓpˣqⁿ⁻ˣ

Let us consider the probability of 1 call misdirected out of 200 as event A.

Probability of occurring of event P= 1/200.

     Probability of call not Misdirecting is (q)= 1-P = 1 - 1/200 = 199/200

Number of Calls (n) = 5

At least one in five attempted telephone calls reaches the wrong number

= 1 - none of the call reaches the wrong number

= 1 - P(0)

= 1 - ⁵C₀(1/200)⁰(199/200)⁵⁻⁰

= 1 - (199/200)⁵

= 0.02475

**Probability that at least one in five attempted telephone calls reaches the wrong number = 0.02475.**

1. Returns on a certain business venture, to the nearest $1,000, are known to follow the following probability distribution

|  |  |
| --- | --- |
| x | P(x) |
| -2,000 | 0.1 |
| -1,000 | 0.1 |
| 0 | 0.2 |
| 1000 | 0.2 |
| 2000 | 0.3 |
| 3000 | 0.1 |

1. What is the most likely monetary outcome of the business venture?

Ans.

The most likely outcome of this business venture is a return of $2000 as it has the highest probability of occurrence.

1. Is the venture likely to be successful? Explain

Ans.

Success of the venture can be defined in multiple ways. But based on the data provided, we can look at positive returns as a measure of success.

The probability distribution gives us an idea about the long-term chances of earning given values of returns (indicated by x). therefore, there is a 60%

1. What is the long-term average earning of business ventures of this kind? Explain

Ans.

From the above question requirement we have to consider similar business ventures of this type whose distribution of the returns is similar to this venture. In that case we say that the expected value of returns to this particular venture is the required average.

(-2000\*0.1)+(-1000\*0.1)+(0\*0.2)+(1000\*0.2)+(2000 \*0.3)+(3000\*0.1)=800

Therefore the long-term average earning for these type of ventures would be around $800.

1. What is the good measure of the risk involved in a venture of this kind? Compute this measure

Ans)

Risk stems from the possible variability in the expected returns. Therefore a good measure to evaluate the risk for a venture of this kind would be variance or standard deviation of the variable X.

> print(sd(x))

[1] 1870.829

> print(var(x))

[1] 3500000

The large value of standard deviation of $1870 is considered along with the average returns of $800 indicates that this venture is highly risky.

