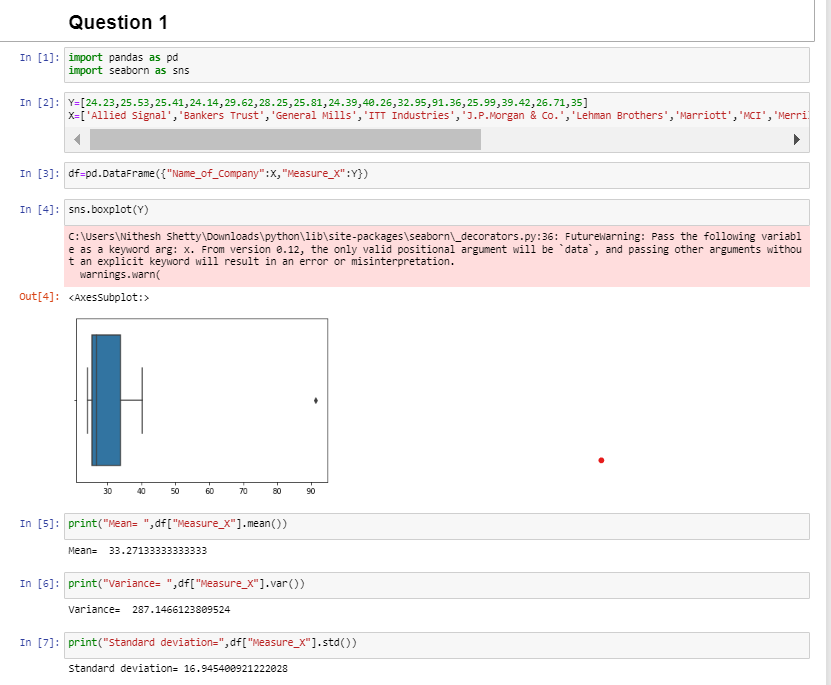
**Topics: Descriptive Statistics and Probability**

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% |

**Solution:**



We can observe from the boxplot that ‘Morgan Stanley’ is an outlier in the dataset.

Mean= 33.27

Variance= 287.14

Standard deviation= 16.94



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.

**Sol: IQR=(Q3-Q1)=12-5=7**

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

**Sol**:Data is said to be right 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?

**Sol**: There will be no outlier in the plot if the 25 is corrected as 2.5.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**Sol:** Mode lies between 5 and 10

1. Comment on the skewness of the dataset.

**Sol:** Data is 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.

**Sol:** They both are right-skewed and both have outliers, the median can be easily visualized in box plot where as in histogram mode is more visible.

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.)

**Sol:** Probability of misdirecting call p = 1/200

**N=5**

at least one in five attempted telephone calls reaches the wrong number=

P(x) = ⁿCₓpˣqⁿ⁻ˣ

1-P(X)

1-5C0 \* 0.0050 \* (199/200)5

=0.024

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?

**Sol:**Most likely monetory outcome is 2000

1. Is the venture likely to be successful? Explain

**Sol:** Probability of business making profit=P(X>0)=P(1000)+P(2000)+P(3000)=0.2+0.3+0.1=0.6. Hence chances are high that the venture will succeed.

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

**Sol: Long term average=E(X)=(-2000\*0.1)+(-1000\*0.1)+(0\*0.2)+(1000\*0.2)+(2000\*0.3)+(3000\*0.1)=$800**

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

Measure of risk will be dicided based on variance=E(X2)-E(X)2

=**(-20002\*0.1)+(-10002\*0.1)+(02\*0.2)+(10002\*0.2)+(20002\*0.3)+(30002\*0.1)=**

2800000-8002=2160000

Variance is high Hence greater risk.