**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% |

* Attached the Assignmentlevel2.ipynb



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.

* Solution: The IQR = Q3-Q1, Q3 = 12.5, Q1 = 5, it implies that 50% of the data set lies between the range from 5 to 12.5 approximately.

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

* Solution: This is right skewed data

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?

* Solution : There will be no outlier. The range might be changed depending on the dataset.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

* Solution: The mode will be present between 5 to 10

1. Comment on the skewness of the dataset.

* Solution: This is a right skewed data because it has long tail towards right side.

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.

Solution: The mode will be present between 5 to 10. This is a right skewed data because it has long tail towards right side. And also have outlier of 25.

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.)

* Solution: Let X be the number of misdirected calls in five attempts.

Then X follows a binomial distribution with parameters

n=5 and p=1/200.

The probability of at least one misdirected call is equal to 1 minus the probability of no misdirected calls in five attempts,

which can be calculated as follows:

P(X >= 1) = 1 - P(X = 0)

= 1 - (1-p)^n

= 1 - (1-1/200)^5

= 0.02439 (approx.)

Therefore, the probability that at least one in five attempted telephone calls reaches the wrong number is approximately 0.02439, or about 2.44%.

* Attached Assignmentlevel2.ipynb with Question No: 2

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?

* Solution: The most likely monetary outcome of the business venture can be determined by finding the value of x that has the highest probability P(x). In this case, the highest probability is 0.3 which corresponds to x = 2000. Therefore, the most likely monetary outcome of the business venture is $2,000.

1. Is the venture likely to be successful? Explain

* Solution: The venture is likely to be successful since the probability of earning a positive return (x > 0) is 0.6 which is higher than the probability of earning a negative return (x < 0) which is 0.4.

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

* Solution: The long-term average earning of business ventures of this kind can be calculated as the expected value of x.

The expected value can be calculated by summing the product of each possible outcome with its probability, or by multiplying each outcome by its probability and then summing the results.

Expected value = (-2000)(0.1) + (-1000)(0.1) + (0)(0.2) + (1000)(0.2) + (2000)(0.3) + (3000)(0.1) = $1000

Therefore, the long-term average earning of business ventures of this kind is $1,000.

* Attached Assignmentlevel2.ipynb with Question No:3

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

* Solution: One good measure of the risk involved in a venture of this kind is the standard deviation of the distribution. The standard deviation measures the variability or spread of the distribution. A higher standard deviation indicates greater variability or risk.