**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% |

Ans:-

https://github.com/CM-007/DS\_ASS/blob/8f5a63551c8014cabb03104d3b2fad1180e76fd6/Ass02\_Descriptive\_Statistics\_and\_Probability01.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.

Ans:-

UQ=12,LQ=5

IQR =UQ-LQ=12-5

IQR=7

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

Ans:-

Positive 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?

Ans:-

Then the No outlier present in this data .



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans:-

The mode of this data set lie approximately between 4 to 8.

1. Comment on the skewness of the dataset.

Ans:-

Positive skewed data.

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:-

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.)

Ans:-

If 1 in 200 long-distance telephone calls are getting misdirected.  
 Probability of call misdirecting = 1/200

Probability of call not Misdirecting = 1-1/200 = 199/200

The probability for at least one in five attempted telephone calls reaches the wrong number, Number of Calls =5, n = 5, p = 1/200, q = 199/200

P(x) = at least one in five attempted telephone calls reaches the wrong number

P(x) = ⁿCₓ pˣ qⁿ⁻ˣ

P(x) = (nCx) (p^x) (q^n-x)

As we know, nCr = n! / r! \* (n - r)!

P(1) = (5C1)\*(1/200)^1 \*(199/200)^5-1

So, P(1) = 0.0245037

Therefore, The probability that at least one in five attempted telephone calls reaches the wrong number is 0.0245.

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 monetary outcome of the business venture is 2000$.

As we see in table that the probability of getting 2000$ is 0.3 which is maximum as compared to other.

1. Is the venture likely to be successful? Explain

Ans:-

Yes, the venture will make profit.

P(x>0)+ P(x>1000)+ P(x>2000)+ P(x>3000)

= 0.2+0.2+0.3+0.1

= 0.8.

This shows that this venture have 80% of chance to be making profit.

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

Ans:-

The long-term average earning expected value

= Sum(X\*P(X))

= 0.8\*1000

=800$

Which means on an average the return will be 800$.

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

Ans:-

The good measure of the risk involved in a venture of this kind depends on the Variability in the distribution.

Higher variance means more chances of risk.

Var(X)= E(X^2)-(E(X)^2)

= 2800000-(800\*800)

=2160000.