**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:- Q1\_ans.pynb files

In the box plot Morgan Stanley 91.36% is outliers.

Mean= 33.27, variance= 287.15 , standard Deviation= 16.95

2.



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:- Approximately

LQ= 5 , UQ= 12

IQR= UQ-LQ= 12-5= 7

IQR= 7

Second quantile range is the median value.

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

Ans:- From the above plot we see that the median is closer to the lower bound of the box, and the upper whisker is longer than the lower one, it indicates that the distribution is right-skewed (the skewness is positive).

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:- In that case there would be no Outliers on the given dataset because of the outlier the data had positive skewness it will reduce and the data will normal distributed



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 in between approximately between 4 to 8.

1. Comment on the skewness of the dataset.

Ans:- This data is Right- skewd.

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. Mean> median

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:- Given that one in 200 long distance telephone calls reaches the wrong number.

If 1 in 200 long-distance telephone calls are getting misdirected=

Probability of call Misdirecting  p = 1/200

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

Number of Calls = 5

P(x) = ⁿCₓpˣqⁿ⁻ˣ

n = 5

p = 1/200

q = 199/200

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

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 |
|  |  |

Ans:- The calculation would be :

Expected return = (-2000x0.1)+(-1000x0.1)+(0x0.2)+(1000x0.2)+(2000x0.3)+(3000X0.1)

Expected return of value= -200-100+0+200+600+300

=800

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

P(X)= 0.3 for x=2000

So most likely outcome is 2000.

1. Is the venture likely to be successful? Explain

Yes, the probability that the venture will make more than 0 or a profit p(x>0)+p(x>1000)+p(x>2000)+p(x=3000) = 0.2+0.2+0.3+0.1 = 0.8 this states that there is a good 80% chances for this venture to be making a profit

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

The Expected return value = 800

which means on an average the returns will be + 800$(including all losses and gain over the time period)

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

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 .