**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:

import numpy as np

import matplotlib.pyplot as plt

data=list([24.23,25.33,25.41,24.14,29.62,28.25,25.81,24.39,40.26,32.95,91.36,25.99,39.42,26.71,35.00])

label=list(["Allied Signal","Bankers Trust","General Mills","ITT Industries","J.P.Morgan & Co.","Lehman Brothers","Marriott","MCI","Merrill Lynch","Microsoft","Morgan Stanley","Sun Microsystems","Travelers","US Airways","Warner-Lambert"])

plt.boxplot(data)

print("mean", round(np.mean(data),2))

print("standard deviation",round(np.std(data),2))

print("variane",round(np.var(data),2))

mean 33.26

standard deviation 16.38

variane 268.21

#from boxplot , outlier is 91.36

Chart, box and whisker chart

Description automatically generated



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 = 12-5=7 it represents 50% of the data.

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

Ans: Here median is at left and right whisker is longer than left hence its 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?

* Ans: standard deviation will be impacted by std/10 and there will be no outlier.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans: 20 is the mode and it is for values 4 to 9

1. Comment on the skewness of the dataset.

From histogram , its showing right 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: i)range of both the plot is 0-25

ii)right skewed data

iii)outlier is at 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.)

Ans:

Given : attempts are independent ,and its binomial distribution.

Probability on 1 call is wrong among 200=P=1/200

probability of correct call=q=1-(1/200)=199/200

probability that at least one among 5 calls is wrong ,here n=5 ,

Hence probability that at least one in five attempted telephone calls reaches wrong = P(x)

P(x)= ⁿCₓ pˣ qⁿ⁻ˣ=(5P1)(1/200)^1(199/200)^(4)=0.024503

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: maximum probability is 0.3 for 2000 ,hence most likely outcome is 2000.

1. Is the venture likely to be successful? Explain

Ans:Venture having profit probability as 0.6 and loss prob is 0.2,hence its successful.

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

Ans:Expected mean=800 which is the long term average earning.

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

Risk = probability of loss= 0.2=20%