**Umadevi Betageri – Assignment 2**

**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:

A graph with a bar

Description automatically generated A diagram of a diagram

Description automatically generated

Form the above plot we can see that there is one outlier in the dataset i.e., 91.360 which is maximum value.

mean μ = 33.2713

var σ = 287.1466

std σ^2 = 16.945



Answer the following three questions based on the boxplot above.

#### Where would the mode of this dataset lie?

#### Ans: Around 5 – 7

#### Comment on the skewness of the dataset.

#### Ans: Data is right skewed.

#### Suppose that the above histogram and the boxplot in question 2 are plotted for the same dataset. Explain how these graphs complement each other in providing information about any dataset.

#### Ans: Since the data is right skewed by histogram, we can say that there are outliers on the right side, but we cannot say how many outliers are there. Box plot of the same data can tell us exactly how many outliers are there.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans: Around 5 – 10

1. Comment on the skewness of the dataset.

Ans: Data is right skewed.

1. Suppose that the above histogram and the boxplot in question 2 are plotted for the same dataset. Explain how these graphs complement each other in providing information about any dataset.

Ans: Since the data is right skewed by histogram, we can say that there are outliers on the right side, but we cannot say how many outliers are there. Box plot of the same data can tell us exactly how many outliers are there.

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: Probability of 1 in 200 long-distance telephone calls are getting misdirected is   
P(M) = 1/200

Probability of calls are not getting misdirected is

P(C) = 1-1/200 = 199/200

P(x) = ⁿCₓ pˣ qⁿ⁻ˣ

n = 5, p = 1/200, q = 199/200

The probability for at least one in 5 attempted telephone calls reaches the wrong number.

P(at least 1 in 5 misdirected) = 1  -  none of the call reaches the wrong number

P(at least 1 in 5 misdirected) = 1  - P(0)

P(at least 1 in 5 misdirected) = 1   -  ⁵C₀ x (1/200)⁰ x (199/200)⁵⁻⁰

P(at least 1 in 5 misdirected) = 1 −(199/200)⁵

P(at least 1 in 5 misdirected) = 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 |

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

Ans: The most likely monetary outcome is 2000 since it has the highest probability of 0.3.

1. Is the venture likely to be successful? Explain

Ans: Yes, the venture is likely to be successful since the probability of getting more than 0 profit is 0.2 + 0.2 + 0.3 + 0.1 = 0.8.

80% chances are there that the venture is profitable.

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

Ans: The long-term average is Expected value.

Expected value = Sum (X \* P(X))

= -2000 x 0.1 + (-1000) x 0.1 + 0 x 0.2 + 1000 x 0.2 + 2000 x 0.3 + 3000 x 0.1 = 800

The long-term average earning of business ventures of this kind would 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 would be variance in the distribution. Higher Variance higher is chances of risks involved.

Var (X) = E(X^2) – (E(X)) ^ 2

= ((-2000)^2 x 0.1 + (-1000)^2 x 0.1 + 0 x 0.2 + (1000)^2 x 0.2 + (2000)^2 x 0.3 + (3000)^2 x 0.1) – (-2000 x 0.1 + (-1000) x 0.1 + 0 x 0.2 + 1000 x 0.2 + 2000 x 0.3 + 3000 x 0.1)^2

= 2800000 – 640000

= 2160000