Project 1
STAT 355

Sabbir AHMED

March 12, 2017

1 Objective

To determine the atomic weight of magnesium via its reaction with oxygen and to study the stoichiometry of the reaction (as defined in 1.1):

1.1 Definitions

Stoichiometry The relationship between the relative quantities of substances taking part in a reaction or forming a compound, typically a ratio of whole integers.

Atomic mass The mass of an atom of a chemical element expressed in atomic mass units. It is approximately equivalent to the number of protons and neutrons in the atom (the mass number) or to the average number allowing for the relative abundances of different isotopes.

2 Part 1

1000 random numbers were generated using a Bernoulli random variable with n = 20, p = 0.4

```R
# main.R
# initializing variables
x <- 20
N <- 1000
p <- 0.4
generatedData <- rbinom(N, x, p)
```

2.1 Distribution

Distribution of the data was plotted with a histogram using ggplot2

```R
# plot a histogram
ggplot() + aes(generatedData) + geom_histogram(binwidth=1, colour="black", fill="white")
```

2.2 Mean, Variance, and Standard Deviation

The mean, variance and standard deviation of the data were computed with the following snippet

```R
# print out the mean, variance and standard deviation
paste("Mean:", signif(mean(generatedData), digits=4),
    "| Variance:", signif(var(generatedData), digits=4),
    "| Standard Deviation:", signif(sqrt(var(generatedData)), digits=4))
```
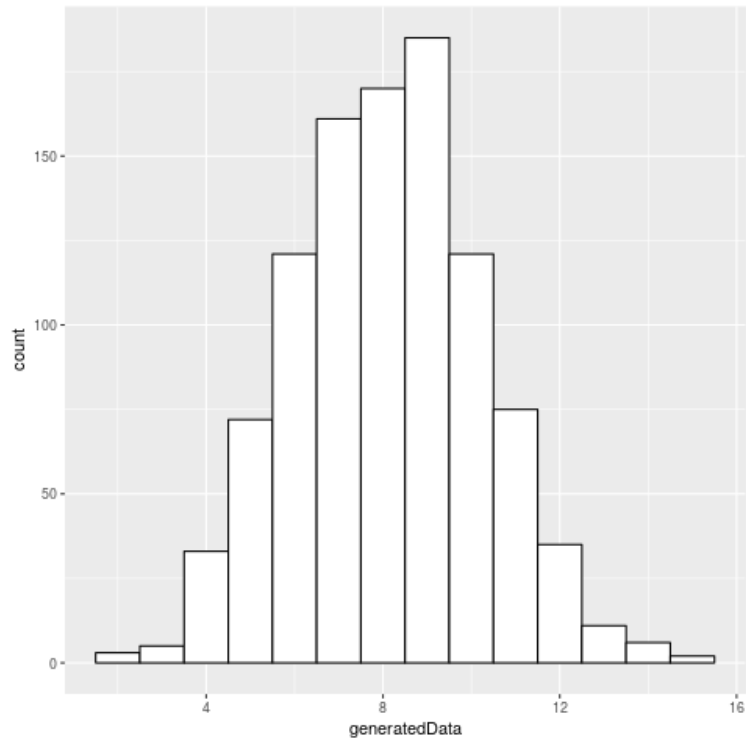
Figure 1: Histogram of the Generated Data

2.3 Summary

Summary statistics were generated with the following snippet

```
# print out the summary statistics
summary(generatedData)
```