

STA 121 ASSIGNMENT

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Procedure:

This is a program demonstrating simple random sampling using R. To start, I used the ***set.seed()*** function to make sure that it's the same sequence of random numbers that are generated every time the code is run. Then, I used the ***runif()*** function to generate a random sequence of 30 scores.

I took 100 samples of size 5 from the population and use the sample to plot a histogram of the data distribution. The population mean is also indicated on the histogram. Finally, using R built in functions I generated the population mean, standard deviation and standard error.

Code:

```
#for reproducibility
set.seed(42)

#generate 30 random scores
scores <- runif(30, min = 0, max=100)

#creating 100 samples
samples <- replicate(100, sample(scores, size = 5, replace = FALSE))

#generate the sample means
sample_means <- apply(samples, 2, mean)

#print first 10 sample means
print(sample_means[1:10])

#plot histogram
hist(sample_means, main = "Histogram of sample means",
```

```

xlab = "Sample Mean",
col = "skyblue",
border = "white",
breaks = 10)

#get population mean, SD and SE
population_mean <- mean(scores)
population_sd <- sd(scores)
population_se <- population_sd/sqrt(length(scores))

cat("population mean: ", population_mean, "\n")
cat("population SD: ", population_sd, "\n")
cat("population SE: ", population_se, "\n")

#displays the population mean on the histogram
abline(v = population_mean, col = "red", lwd = 2, lty = 2)
legend("topright", legend = c("Population Mean"),
col= c("red"), lty = c(2), lwd = c(2))

```

Output:

```

> source("c:\\Users\\user\\Desktop\\sta 121\\assignment1.r", encoding = "UTF-8$
[1] 56.47905 70.76985 41.60658 53.26126 62.35636 86.64059 51.61922 65.09696
[9] 50.29569 87.89481
population mean: 61.38931
population SD: 29.22915
population SE: 5.336488
>

```

Graph

