AE10 - Uncertainty

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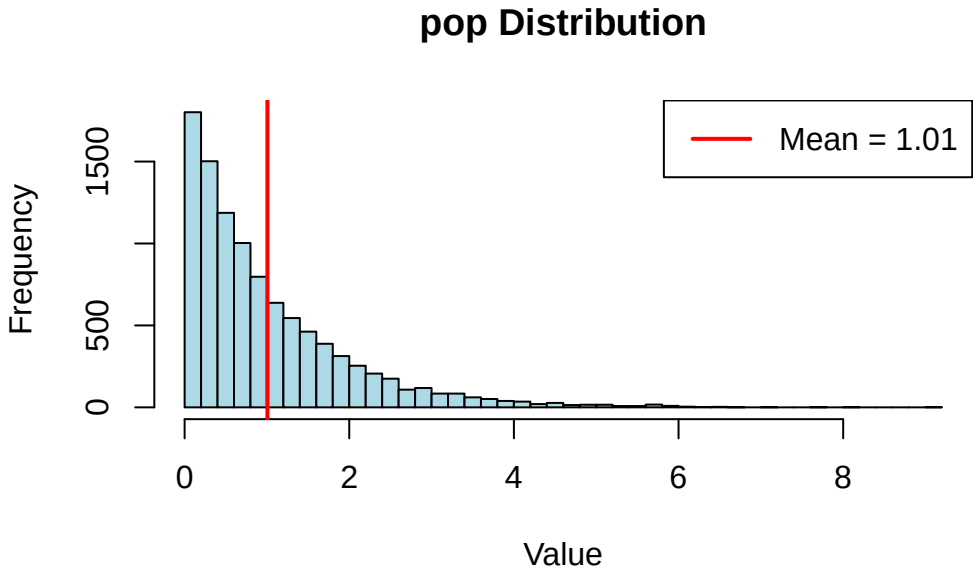
```
# load packages
library(tidyverse)
library(tidymodels)
library(distributional)
library(ggdist)
library(readr)

everest <- read_csv("~/Downloads/DSC-260/csv_data/everest.csv")

# set theme for ggplot2
ggplot2::theme_set(ggplot2::theme_minimal(base_size = 16))
```

AE10-A

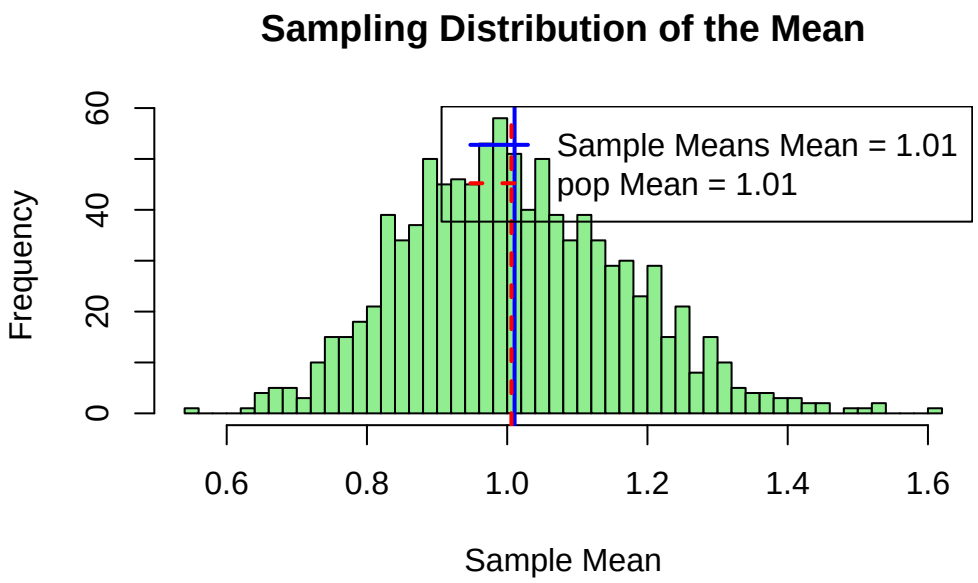
```
set.seed(344567)

pop <- rexp(10000, rate = 1)

pop_mean <- mean(pop)

pop_sd <- sd(pop)

hist(pop, breaks = 50, col = "lightblue", main = "pop Distribution", xlab = "Value")
abline(v = pop_mean, col = "red", lwd = 2)
legend("topright", legend = paste("Mean =", round(pop_mean, 2)), col = "red", lwd = 2)
```




```
sample1 <- sample(pop, size = 40)
sample1_mean <- mean(sample1)
sample1_sd <- sd(sample1)

cat("Sample mean:", sample1_mean, "\nSample SD:", sample1_sd, "\n\n")
```

```
Sample mean: 1.155018
Sample SD: 1.376084
```

```
sample_means <- replicate(1000, {
  s <- sample(pop, size = 40)
  mean(s)
})

sampling_mean <- mean(sample_means)
sampling_sd <- sd(sample_means)

hist(sample_means, breaks = 40, col = "lightgreen", main = "Sampling Distribution of the Mean
abline(v = sampling_mean, col = "blue", lwd = 2)
abline(v = pop_mean, col = "red", lwd = 2, lty = 2)
legend("topright", legend = c(paste("Sample Means Mean =", round(sampling_mean, 2)),
                              paste("pop Mean =", round(pop_mean, 2))),
       col = c("blue", "red"), lwd = 2, lty = c(1, 2))
```



AE10-B

```
quantile(everest$highpoint_metres, probs = c(0.025, 0.975), na.rm = TRUE)
```

```
 2.5% 97.5%
 6200  8850
```

```
t.test(highpoint_metres ~ sex, data = everest, conf.level = 0.95)
```

```
    Welch Two Sample t-test

data:  highpoint_metres by sex
t = -4.6136, df = 1370.6, p-value = 4.326e-06
alternative hypothesis: true difference in means between group F and group M is not equal to
95 percent confidence interval:
 -176.06535  -71.01027
sample estimates:
mean in group F mean in group M
       8264.694        8388.232
```

The last part won't run for some reason, and it's driving me insane.