RLisbonaMSDS6306_Week4_BootstrapSampling

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Create the normal and exponential sample datasets

Use rnorm and rexp to create some sample datasets

Print the datasets, inlcude the first 10 records from each dataset

```
##  [1] 10.477509  8.975158 11.560227  8.905613  9.067715  9.289651 11.696547
##  [8] 10.099063  9.477168 10.367362
```

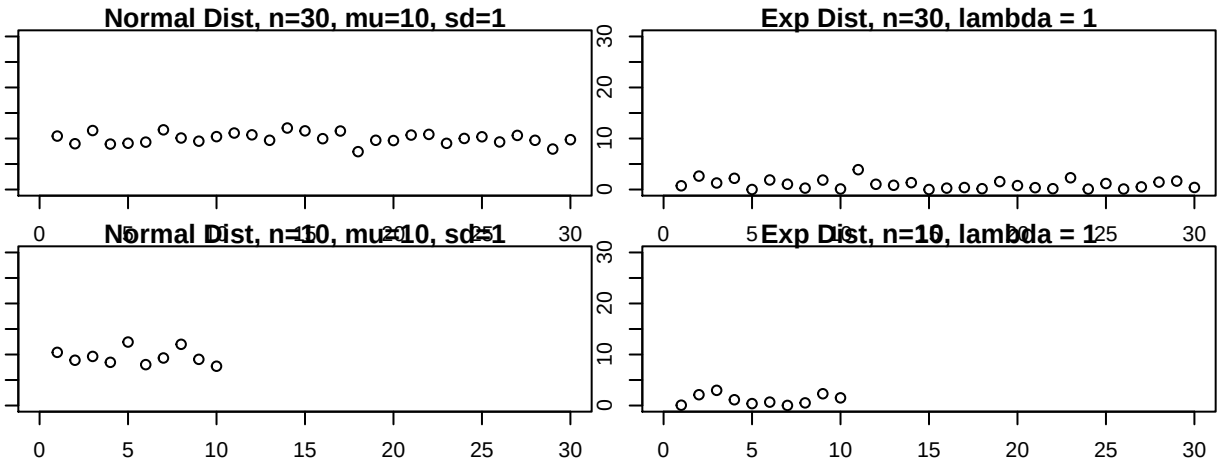
```
##  [1] 10.420229  8.873135  9.620543  8.468136 12.442250  8.014530  9.315546
##  [8] 11.999559  9.053778  7.702295
```

```
##  [1] 0.73143820 2.63086324 1.28065547 2.19954540 0.00479028 1.87168999
##  [7] 1.04191649 0.27118047 1.85264248 0.10722223
```

```
##  [1] 0.06753096 2.11728439 2.97678428 1.13116010 0.37469663 0.66730997
##  [7] 0.02094424 0.51798450 2.30835659 1.50322578
```

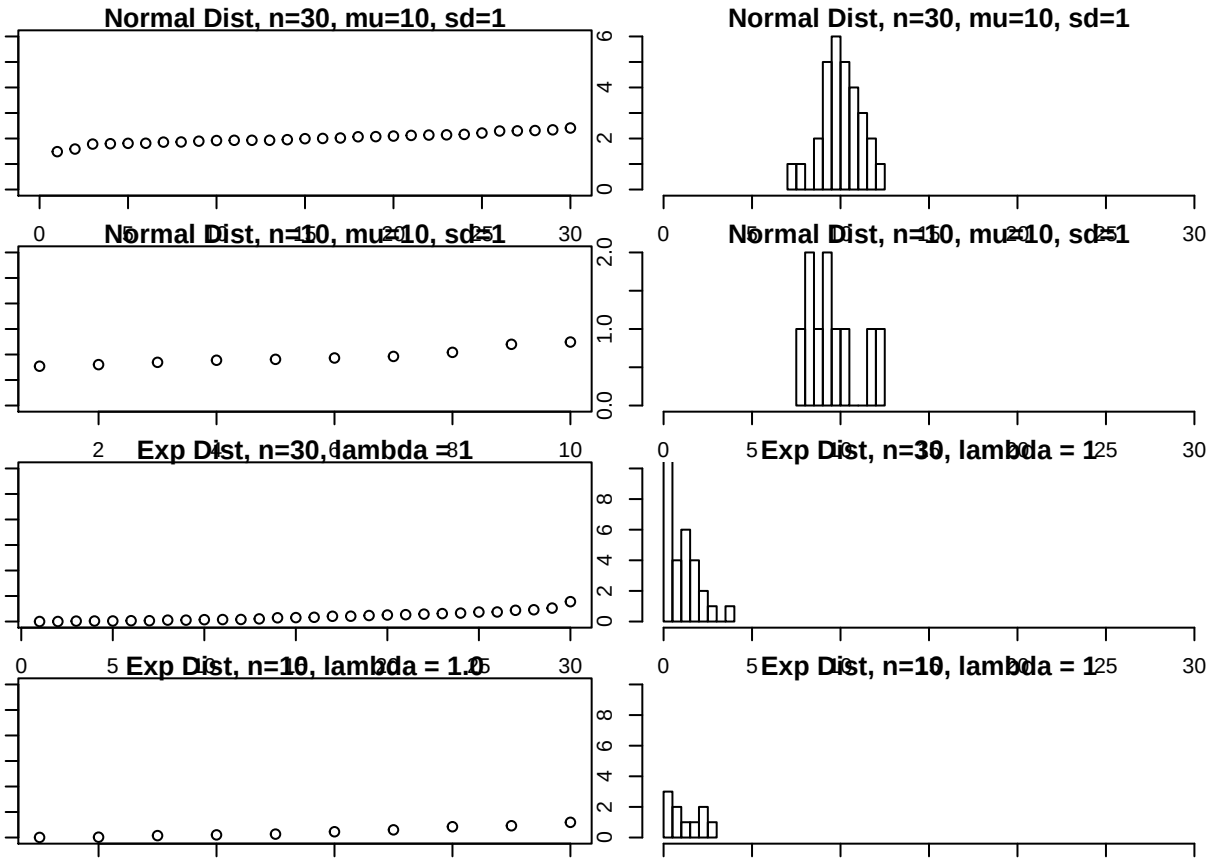
Explore the data with Plot of the normal and exponential sample datasets

Use plot and hist to compare the datasets set x and y limits to make it easier to compare plots



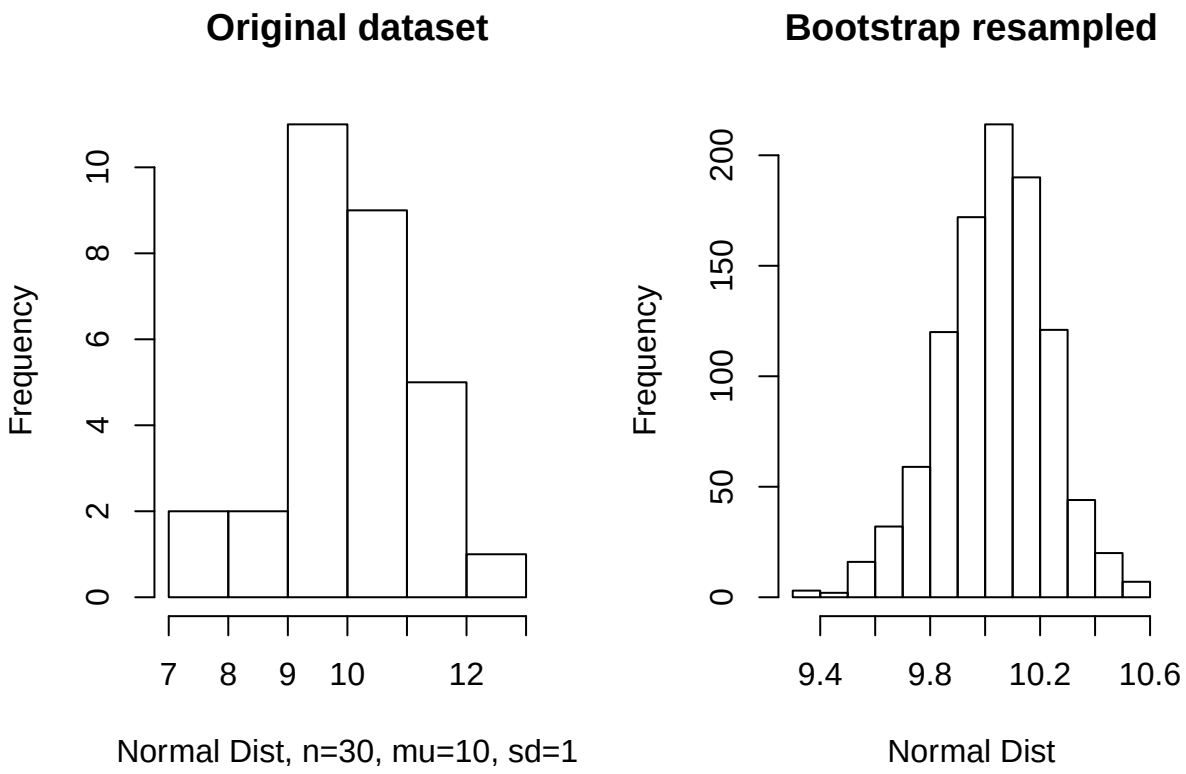
Sort the records ascending and plot again. Include histograms

set x and y limits to make it easier to compare plots



Resample the datasets, compare original histogram to resampled histogram # notice that the resampled histograms closely resemble a normal distribution, illustrating the central limit theorem

```
## [1] 10.03915
```



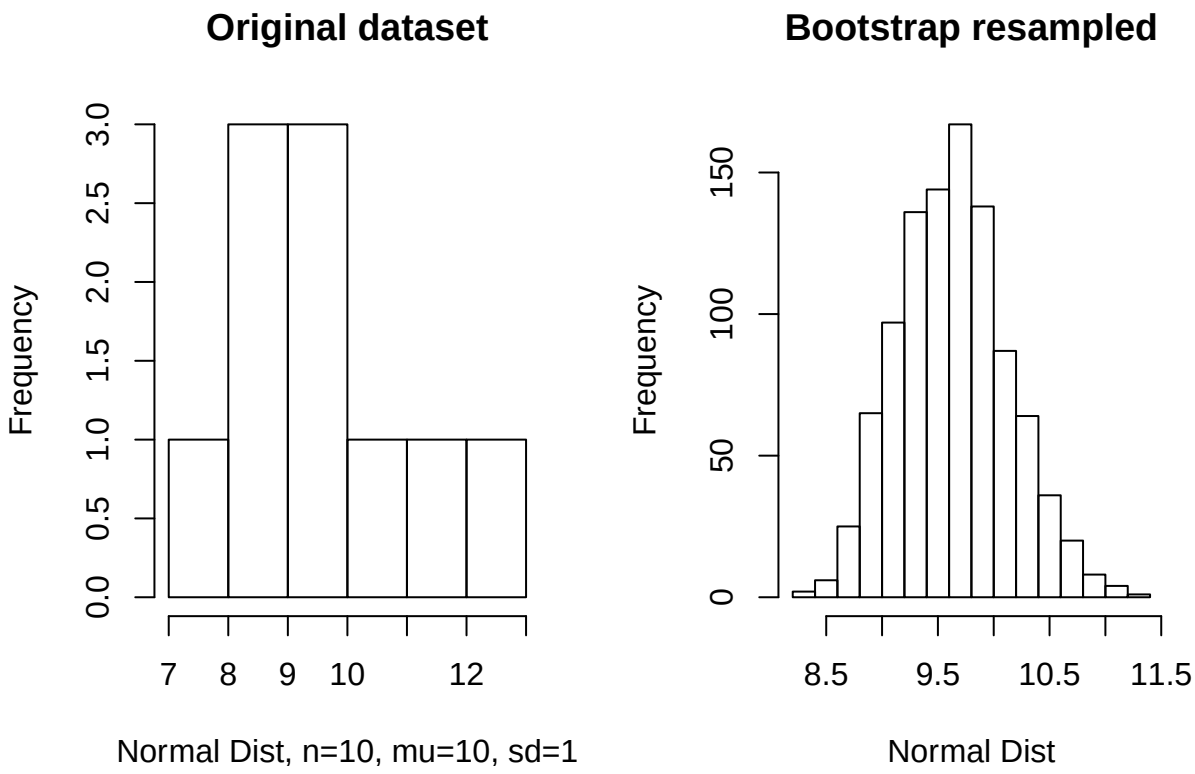

```
## [1] "Original dataset"
```

```
##   vars  n  mean   sd median trimmed  mad  min   max range  skew kurtosis
## 1    1 30 10.04 1.09   9.99   10.07 1.03 7.42 12.05  4.63 -0.22    -0.32
##    se
## 1 0.2
```

```
## [1] "Resampled dataset"
```

```
##   vars    n  mean   sd median trimmed mad min   max range  skew kurtosis
## 1    1 1000 10.04 0.19  10.05   10.04 0.2 9.3 10.56  1.25 -0.28     0.21
##     se
## 1 0.01
```

```
## [1] 9.591
```



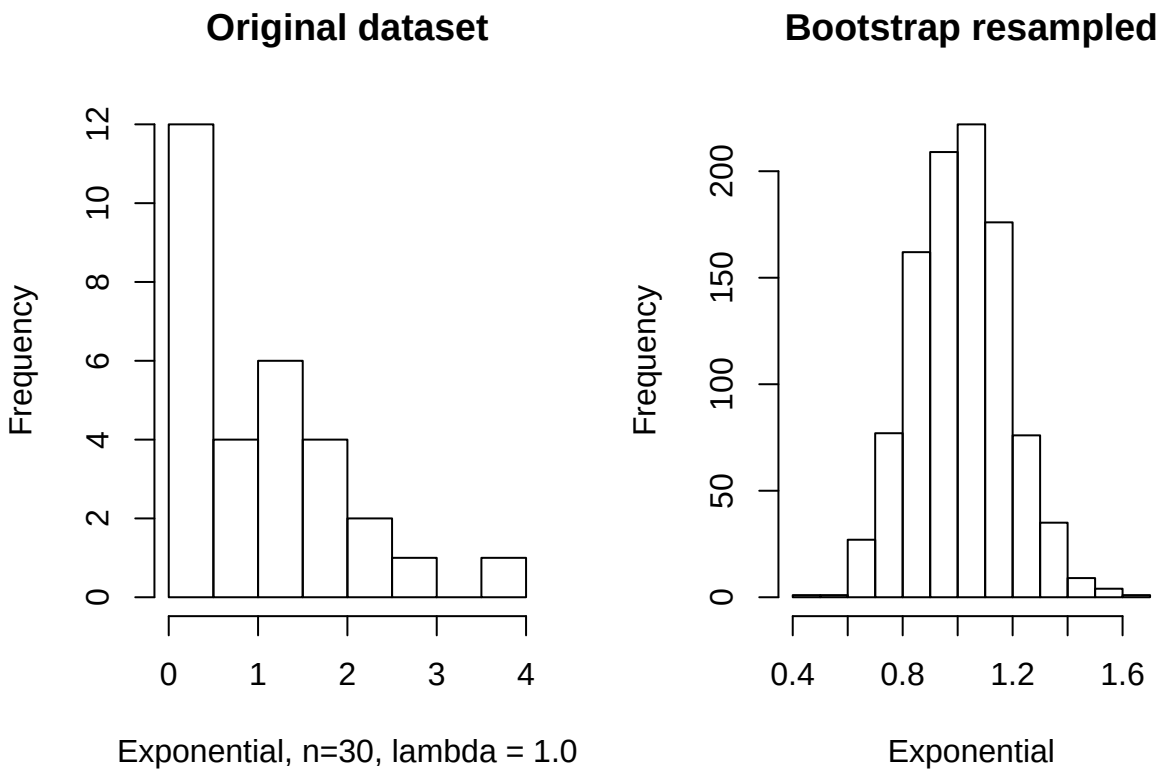

```
## [1] "Original dataset"
```

```
##   vars  n mean   sd median trimmed mad min   max range skew kurtosis  se
## 1    1 10 9.59 1.59   9.18    9.47 1.4 7.7 12.44  4.74 0.62    -1.12 0.5
```

```
## [1] "Resampled dataset"
```

```
##   vars    n mean   sd median trimmed  mad  min   max range skew kurtosis
## 1    1 1000 9.64 0.49   9.63    9.63 0.48 8.33 11.27  2.94 0.25     -0.1
##     se
## 1 0.02
```

```
## [1] 1.014516
```



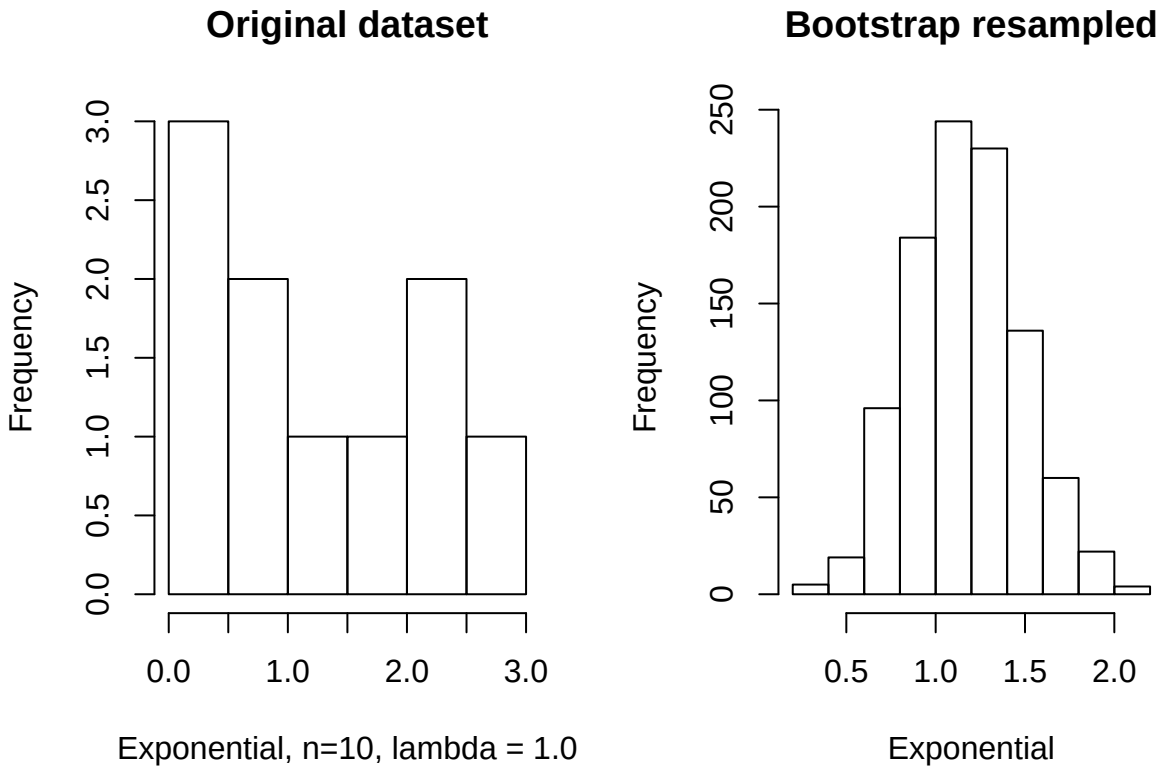

```
## [1] "Original dataset"
```

```
##   vars  n mean   sd median trimmed  mad min  max range skew kurtosis   se
## 1    1 30 1.01 0.93    0.8     0.9 0.95   0 3.89  3.89 1.08     0.87 0.17
```

```
## [1] "Resampled dataset"
```

```
##   vars    n mean   sd median trimmed  mad  min  max range skew kurtosis
## 1    1 1000 1.01 0.17   1.01    1.01 0.17 0.48 1.68   1.2 0.18     0.14
##     se
## 1 0.01
```

```
## [1] 1.168528
```




```
## [1] "Original dataset"
```

```
##   vars  n mean   sd median trimmed  mad  min  max range skew kurtosis   se
## 1    1 10 1.17 1.02    0.9    1.09 1.06 0.02 2.98  2.96 0.42    -1.44 0.32
```

```
## [1] "Resampled dataset"
```

```
##   vars    n mean   sd median trimmed  mad  min  max range skew kurtosis
## 1    1 1000 1.17 0.31   1.16    1.16 0.32 0.26 2.17   1.9 0.14    -0.14
##     se
## 1 0.01
```

Conclusion

The bootstrap method can be used to create a sample distribution from small data sets that approximates a normal sample from the original population , demonstrating the central limit theorem.