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]  9.420931  9.983531  9.135964  9.587847 11.481492 10.187405 10.094128
##  [8]  9.519798  8.587458  9.939198
```

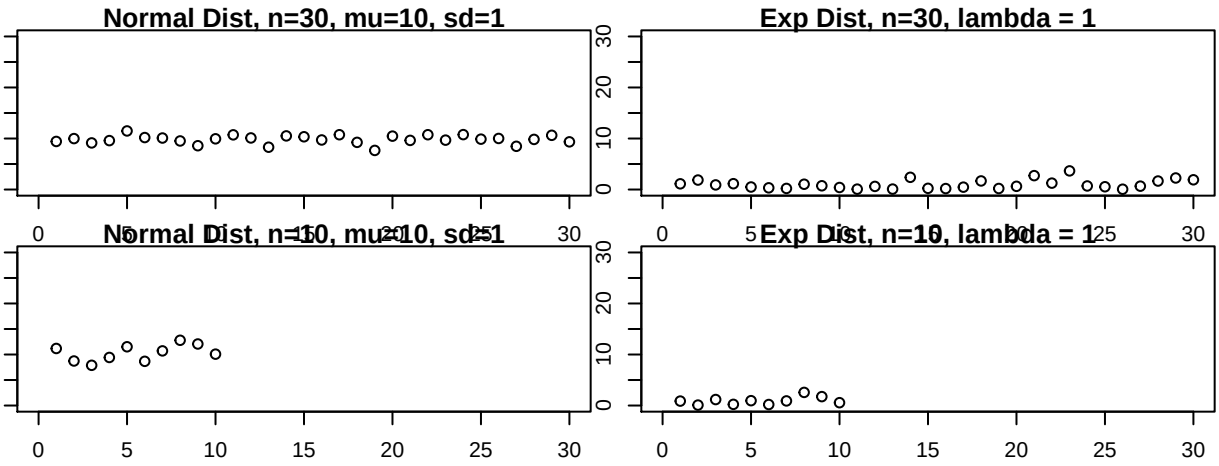
```
##  [1] 11.181161  8.728223  7.883285  9.420395 11.514188  8.663655 10.709956
##  [8] 12.789509 12.063946 10.069376
```

```
##  [1] 1.1191417 1.8574191 0.9042926 1.1420260 0.4944841 0.3313183 0.2144880
##  [8] 1.0375497 0.7346692 0.3961188
```

```
##  [1] 0.8706582 0.0884667 1.1736376 0.2299111 0.9524257 0.1956777 0.9056157
##  [8] 2.5709169 1.7447080 0.5569709
```

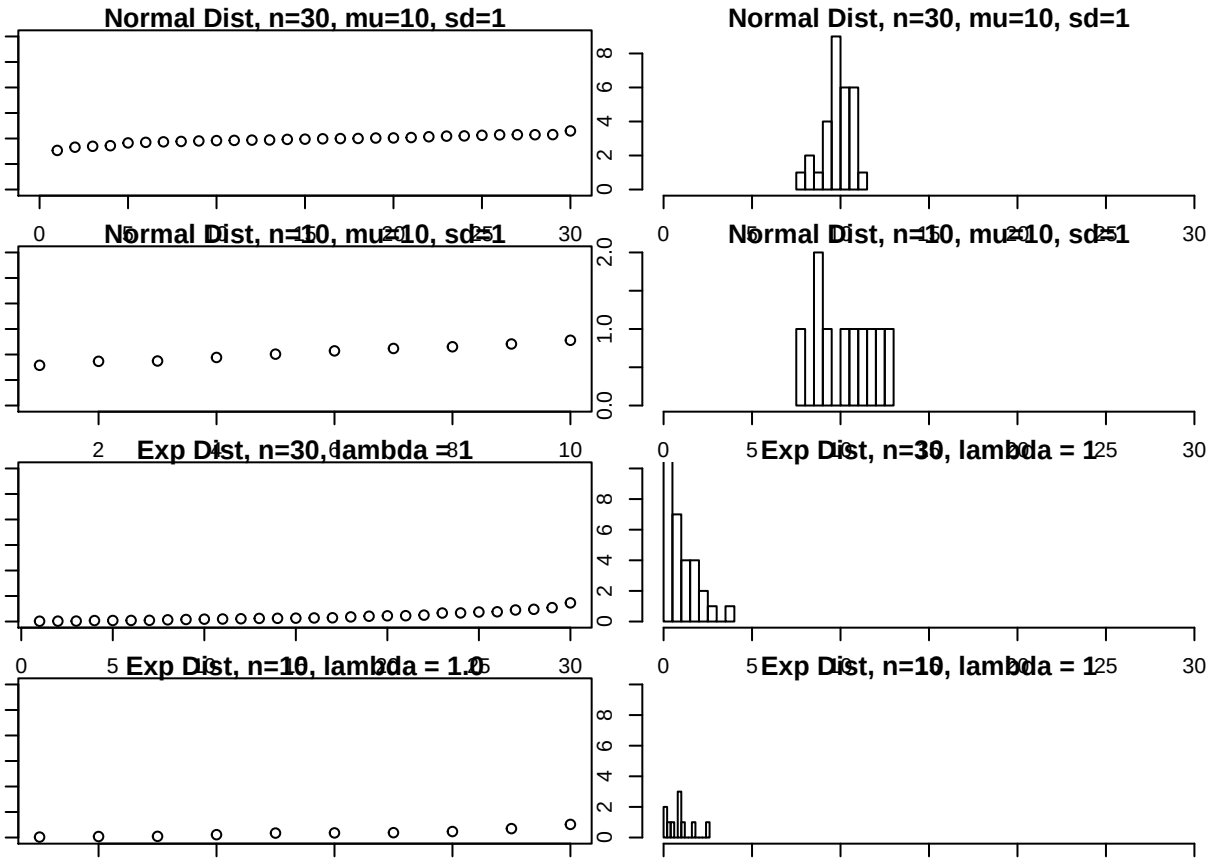
Explore the data with Plot of the normal and exponential sample datasets

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



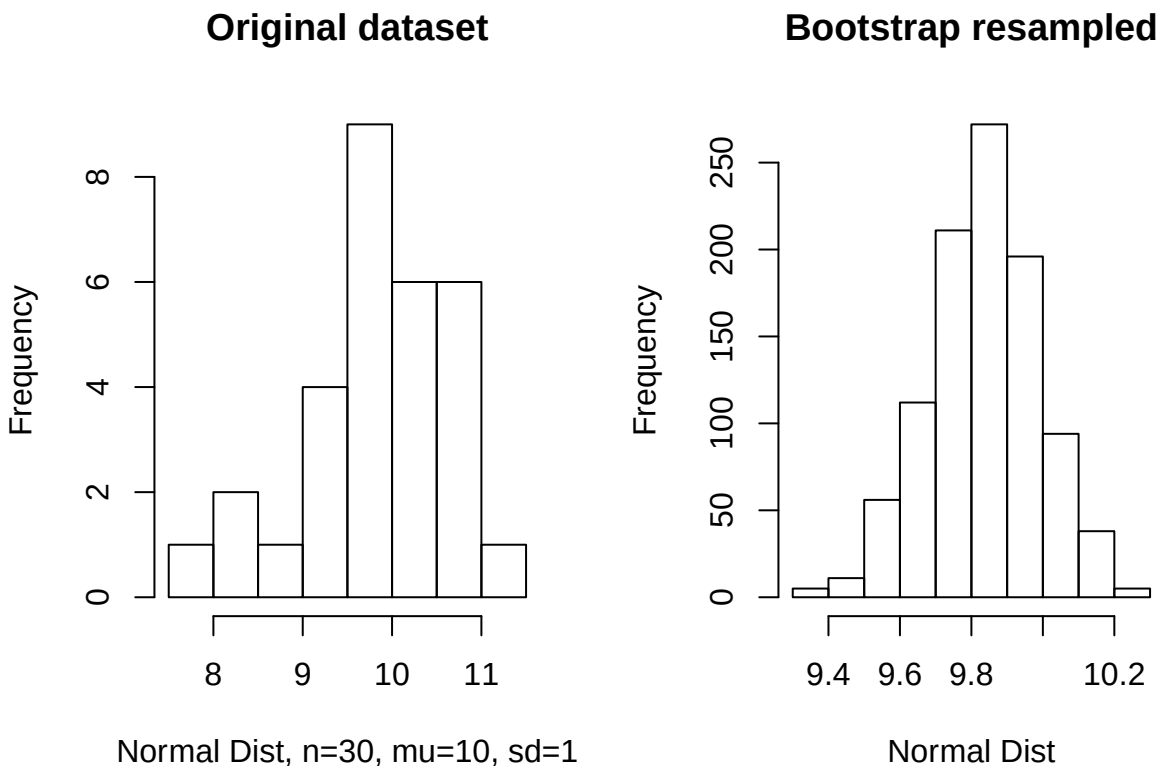
Sort the records ascending and plot again. Include histograms

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] 9.82341
```



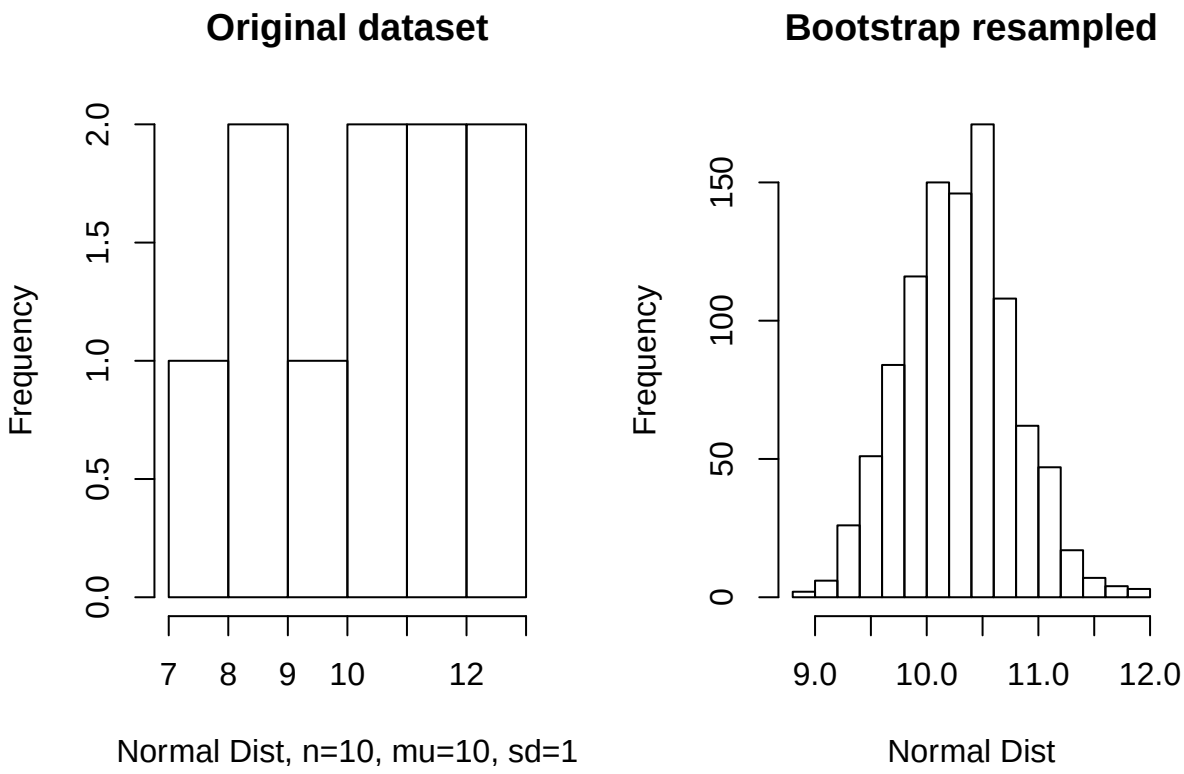

```
## [1] "Original dataset"
```

```
##   vars  n mean   sd median trimmed  mad  min   max range  skew kurtosis
## 1    1 30 9.82 0.83   9.91    9.89 0.78 7.66 11.48  3.82 -0.57     0.11
##     se
## 1 0.15
```

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

```
##   vars    n mean   sd median trimmed  mad  min   max range  skew kurtosis
## 1    1 1000 9.83 0.15   9.84    9.84 0.15 9.37 10.28  0.91 -0.14    -0.04
##   se
## 1  0
```

```
## [1] 10.30237
```



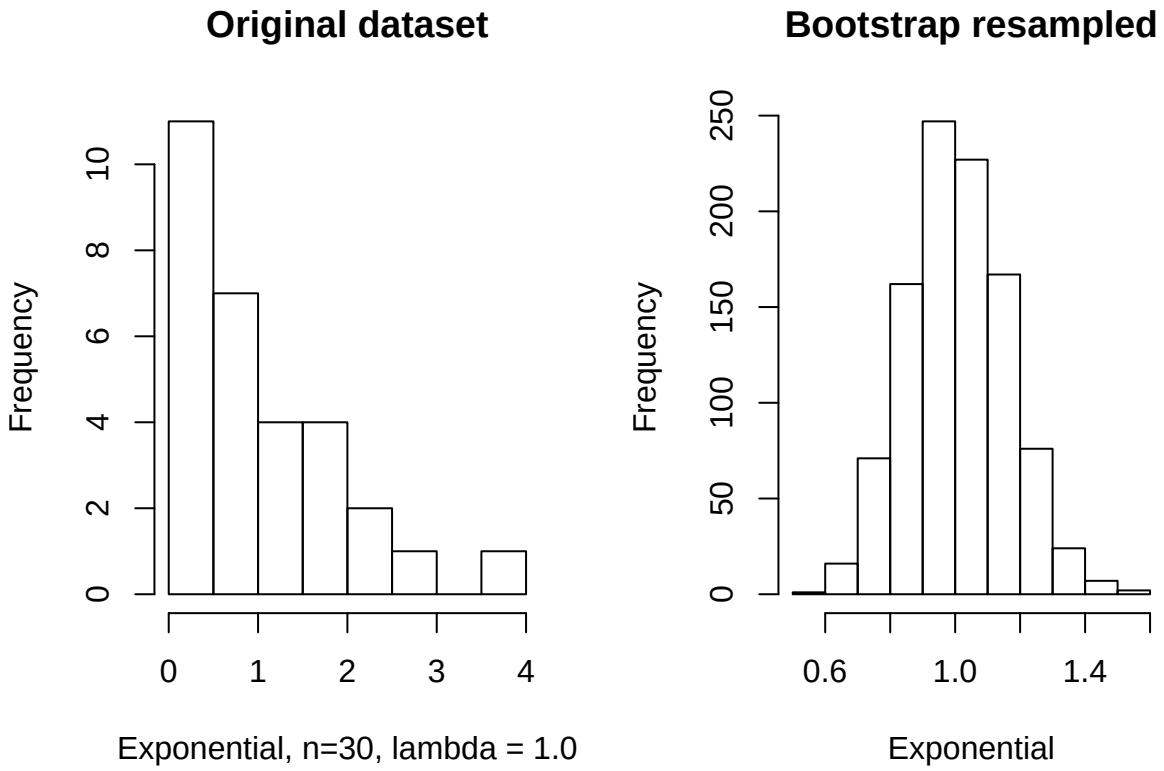

```
## [1] "Original dataset"
```

```
##   vars  n mean   sd median trimmed  mad  min   max range skew kurtosis
## 1    1 10 10.3 1.62  10.39   10.29 2.07 7.88 12.79  4.91 0.01    -1.56
##     se
## 1 0.51
```

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

```
##   vars    n  mean   sd median trimmed  mad  min   max range skew kurtosis
## 1    1 1000 10.29 0.49   10.3   10.28 0.49 8.92 11.87  2.95 0.12    -0.06
##     se
## 1 0.02
```

```
## [1] 1.00803
```



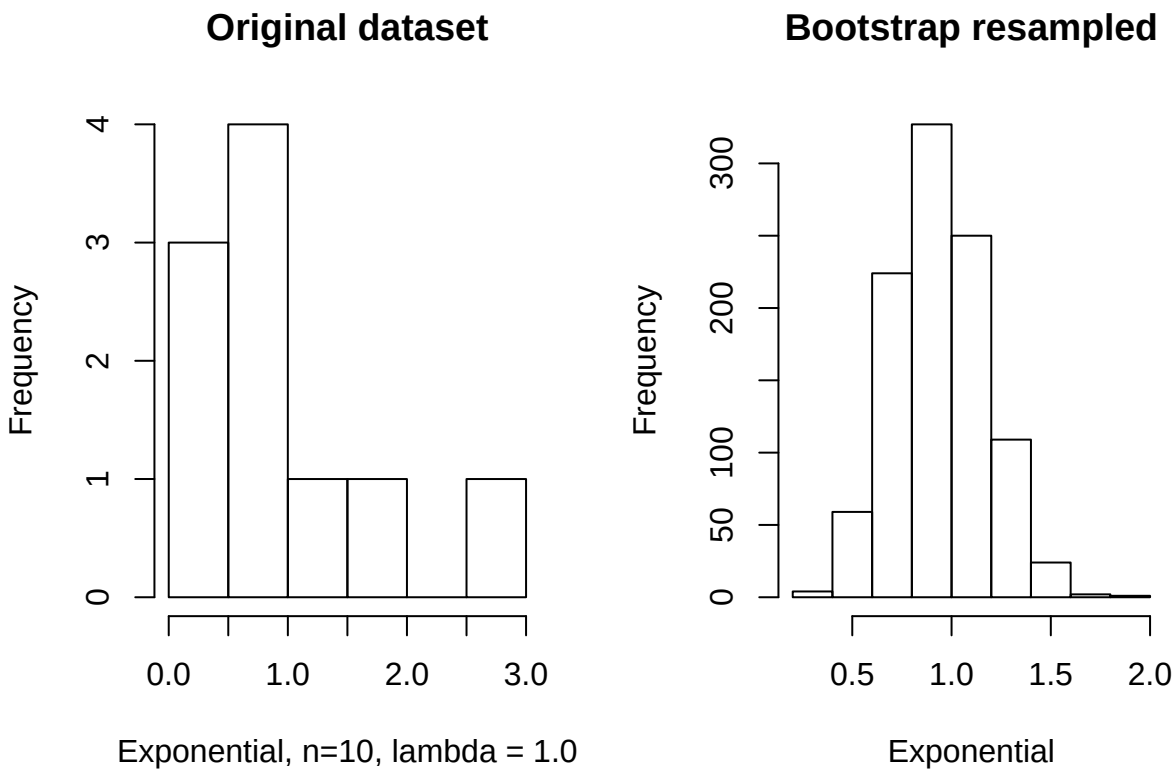

```
## [1] "Original dataset"
```

```
##   vars  n mean  sd median trimmed  mad  min  max range skew kurtosis   se
## 1    1 30 1.01 0.9   0.68    0.88 0.69 0.06 3.65  3.59 1.14     0.61 0.16
```

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

```
##   vars    n mean   sd median trimmed  mad  min  max range skew kurtosis se
## 1    1 1000 1.01 0.16      1       1 0.16 0.59 1.57  0.98 0.21     0.02  0
```

```
## [1] 0.9288988
```




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

```
##   vars  n mean   sd median trimmed  mad  min  max range skew kurtosis   se
## 1    1 10 0.93 0.77   0.89    0.83 0.73 0.09 2.57  2.48  0.8    -0.47 0.24
```

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

```
##   vars    n mean   sd median trimmed  mad min  max range skew kurtosis
## 1    1 1000 0.94 0.23   0.93    0.94 0.23 0.3 1.87  1.57 0.23     0.04
##     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.