RLisbonaMSDS6306_Week4_BootstrapSampling

Randy Lisbona

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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] 10.978449  9.600447  9.077400 11.016972  9.609442 10.233979  9.772277
##  [8]  8.866906 10.159644 10.047040
```

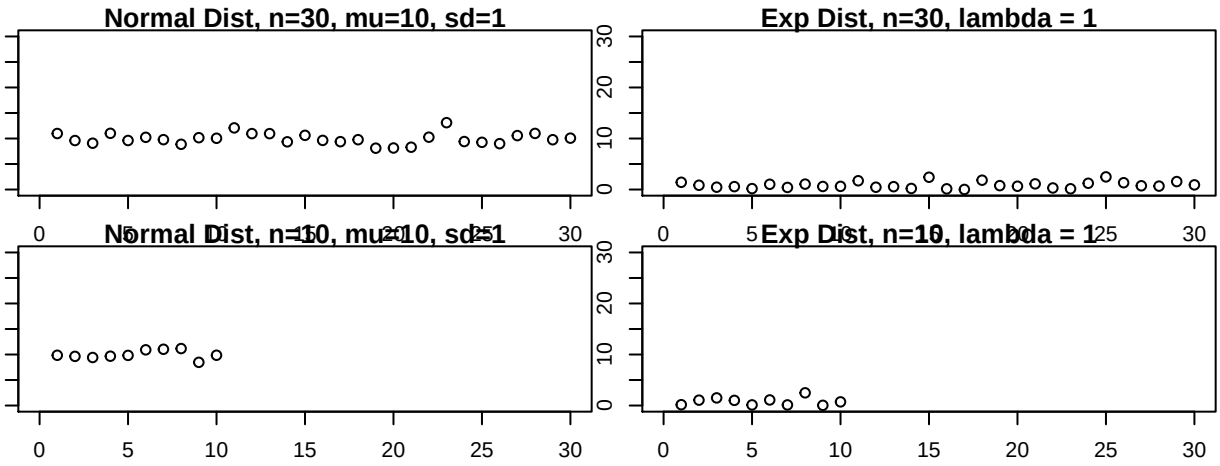
```
##  [1]  9.852206  9.638908  9.411705  9.669724  9.825816 10.915540 11.029339
##  [8] 11.165246  8.466899  9.855739
```

```
##  [1] 1.4189498 0.8384651 0.4591219 0.5711621 0.1840979 1.0276650 0.4072722
##  [8] 1.0598983 0.5947772 0.6174126
```

```
##  [1] 0.16345893 1.05564859 1.49615674 1.00903392 0.12300560 1.09452246
##  [7] 0.11882815 2.48624635 0.04335545 0.71491675
```

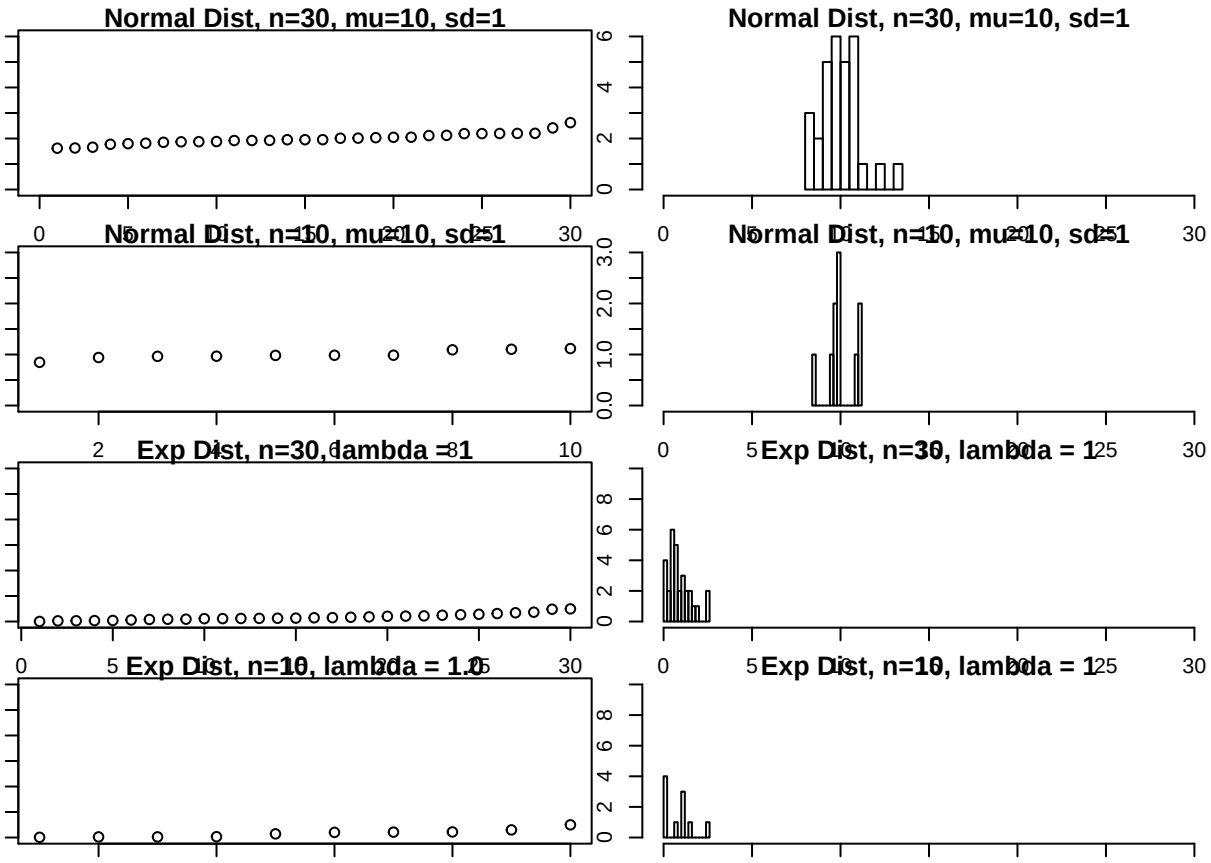
Explore the data with Plot of the normal and exponential sample datasets

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



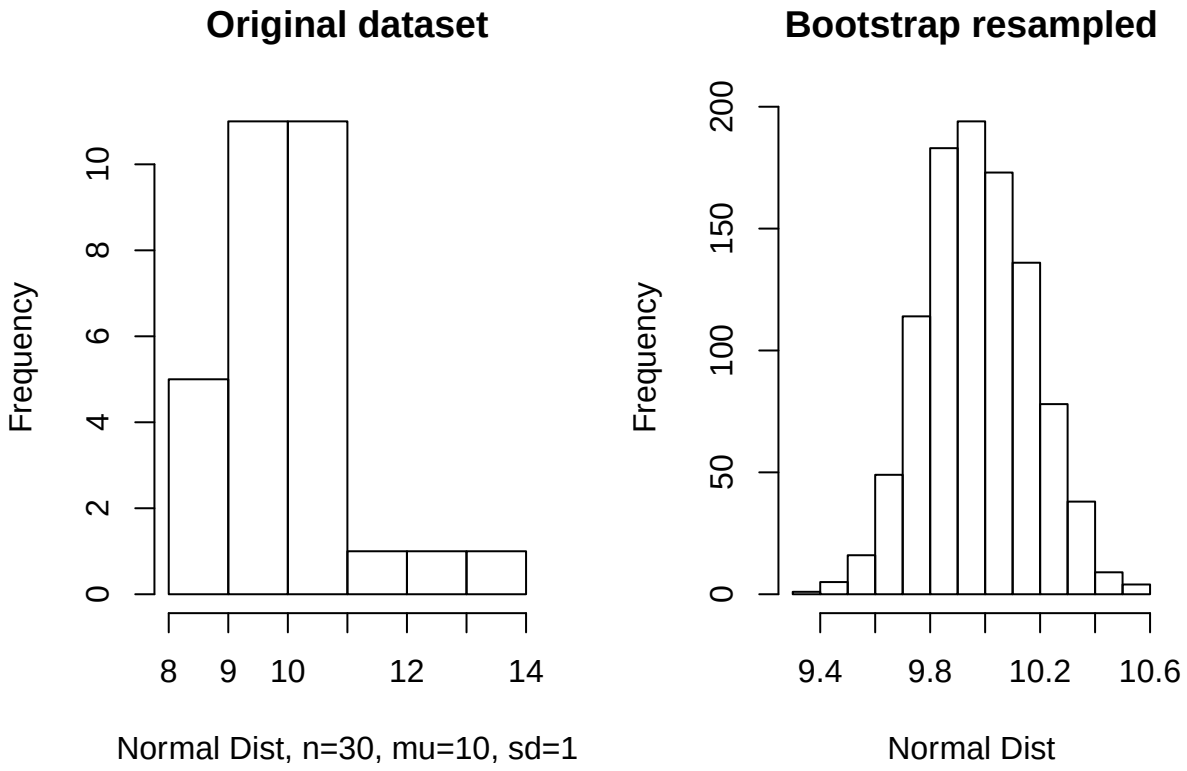
Sort the records ascending and plot again. Include histograms

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] 9.968056
```



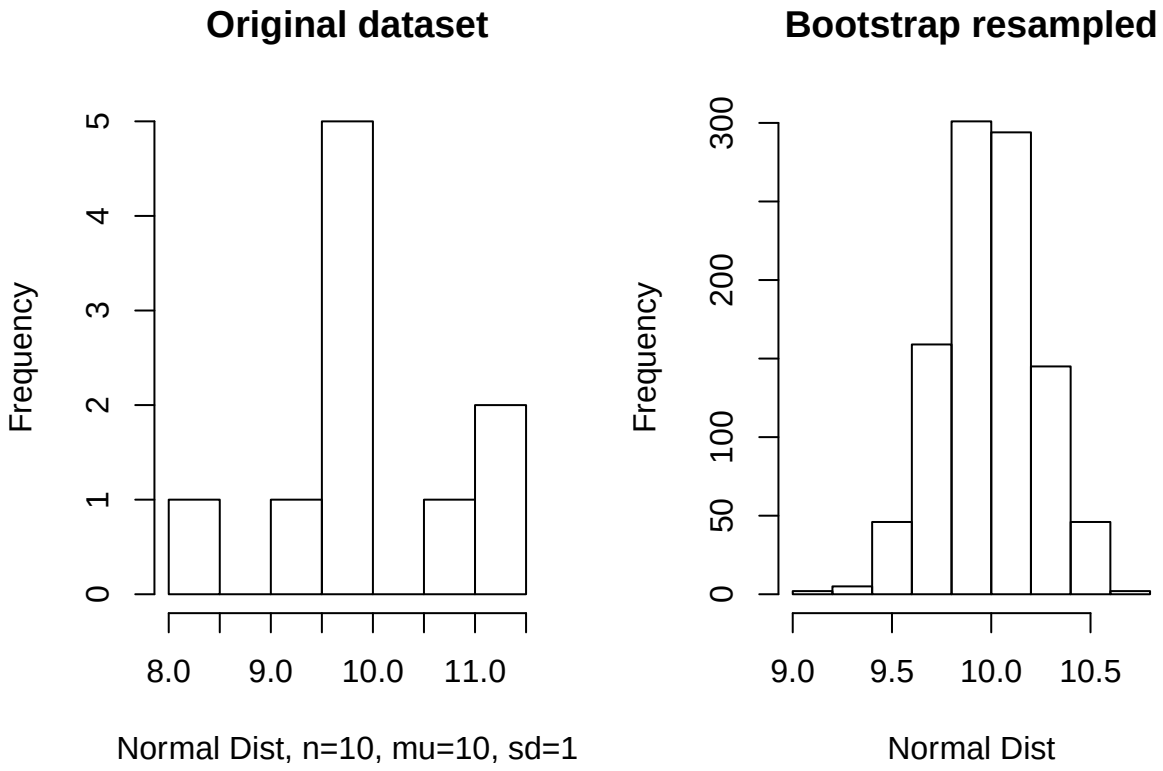

```
## [1] "Original dataset"
```

```
##   vars  n mean  sd median trimmed mad min  max range skew kurtosis  se
## 1    1 30 9.97 1.1   9.77    9.93 0.9 8.1 13.1     5 0.61     0.58 0.2
```

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

```
##   vars    n mean   sd median trimmed mad  min   max range skew kurtosis
## 1    1 1000 9.97 0.19   9.97    9.97 0.2 9.39 10.56  1.17 0.08    -0.22
##     se
## 1 0.01
```

```
## [1] 9.983112
```



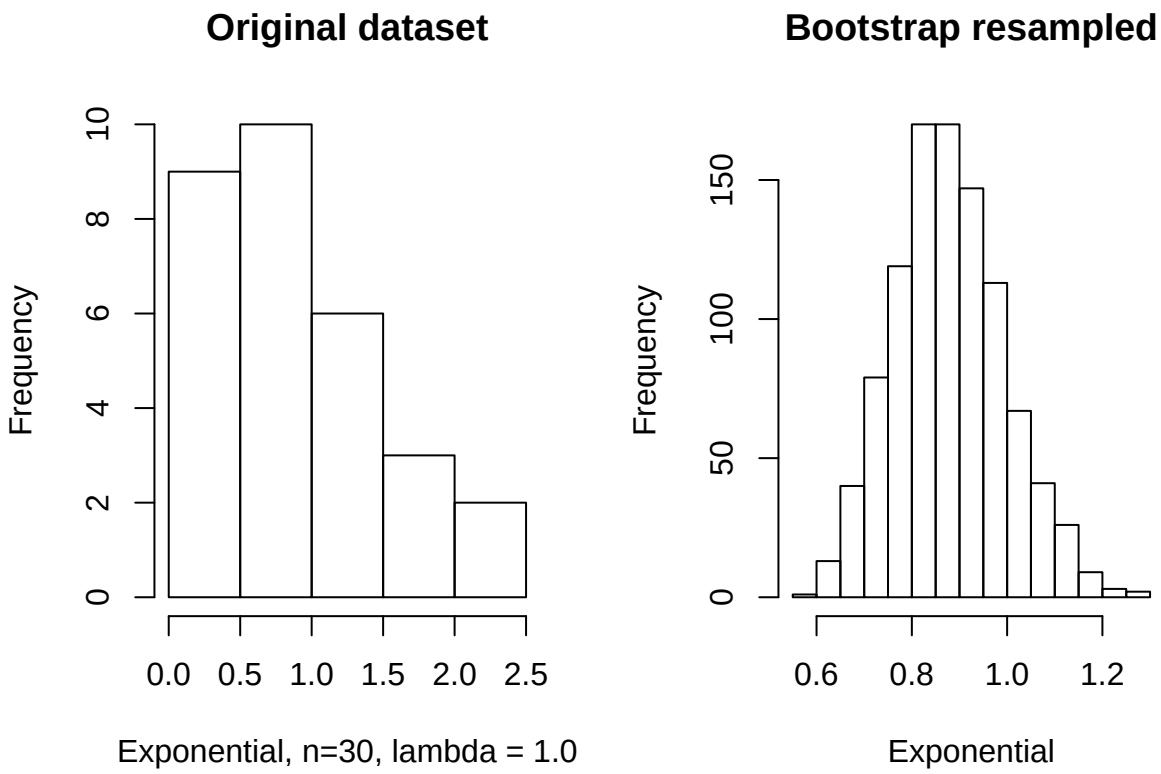

```
## [1] "Original dataset"
```

```
##   vars  n mean   sd median trimmed  mad  min   max range  skew kurtosis
## 1    1 10 9.98 0.83   9.84   10.02 0.47 8.47 11.17   2.7 -0.02    -1.07
##     se
## 1 0.26
```

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

```
##   vars    n mean   sd median trimmed  mad  min   max range  skew kurtosis
## 1    1 1000 9.99 0.24     10    9.99 0.23 9.08 10.65  1.57 -0.11     0.04
##     se
## 1 0.01
```

```
## [1] 0.879468
```



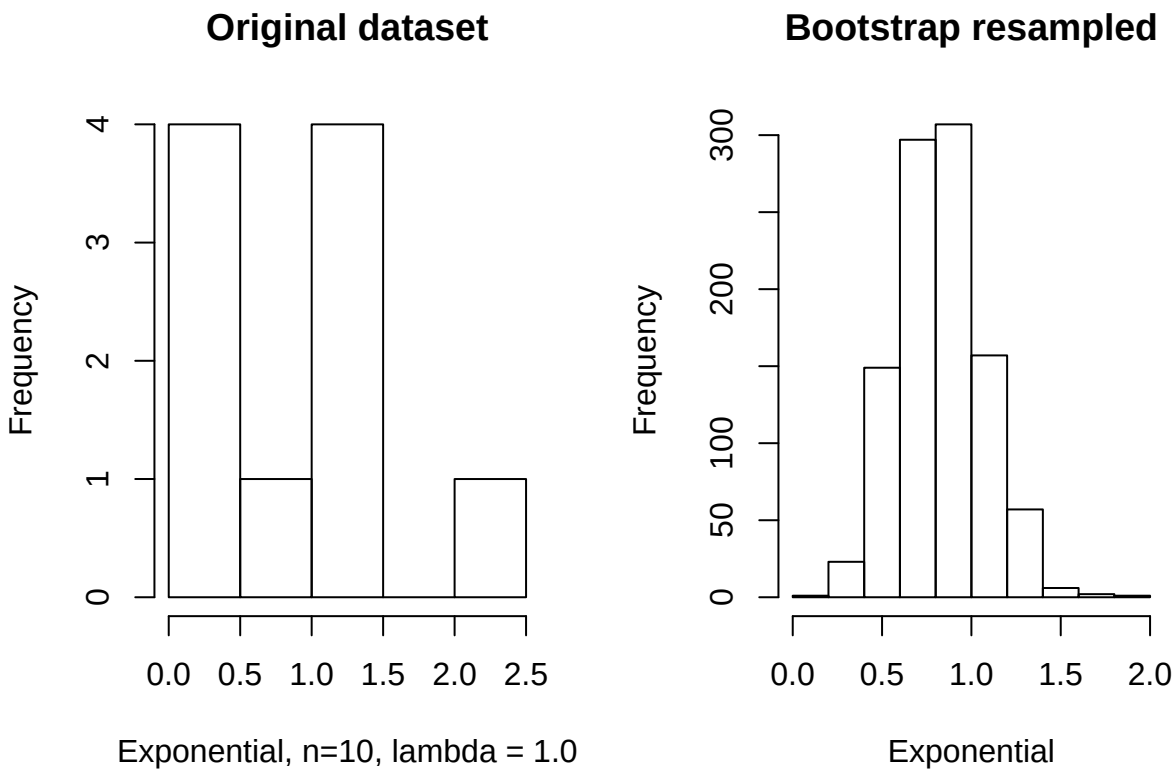

```
## [1] "Original dataset"
```

```
##   vars  n mean   sd median trimmed  mad  min  max range skew kurtosis   se
## 1    1 30 0.88 0.64    0.7    0.81 0.56 0.02 2.48  2.46  0.9      0.1 0.12
```

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

```
##   vars    n mean   sd median trimmed  mad  min  max range skew kurtosis se
## 1    1 1000 0.88 0.12   0.87    0.88 0.11 0.59 1.26  0.67 0.31    -0.06  0
```

```
## [1] 0.8305173
```




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

```
##   vars  n mean   sd median trimmed  mad  min  max range skew kurtosis   se
## 1    1 10 0.83 0.78   0.86    0.72 0.99 0.04 2.49  2.44 0.72    -0.57 0.25
```

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

```
##   vars    n mean   sd median trimmed  mad min  max range skew kurtosis
## 1    1 1000 0.83 0.23   0.82    0.82 0.23 0.2 1.86  1.67 0.34     0.25
##     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.