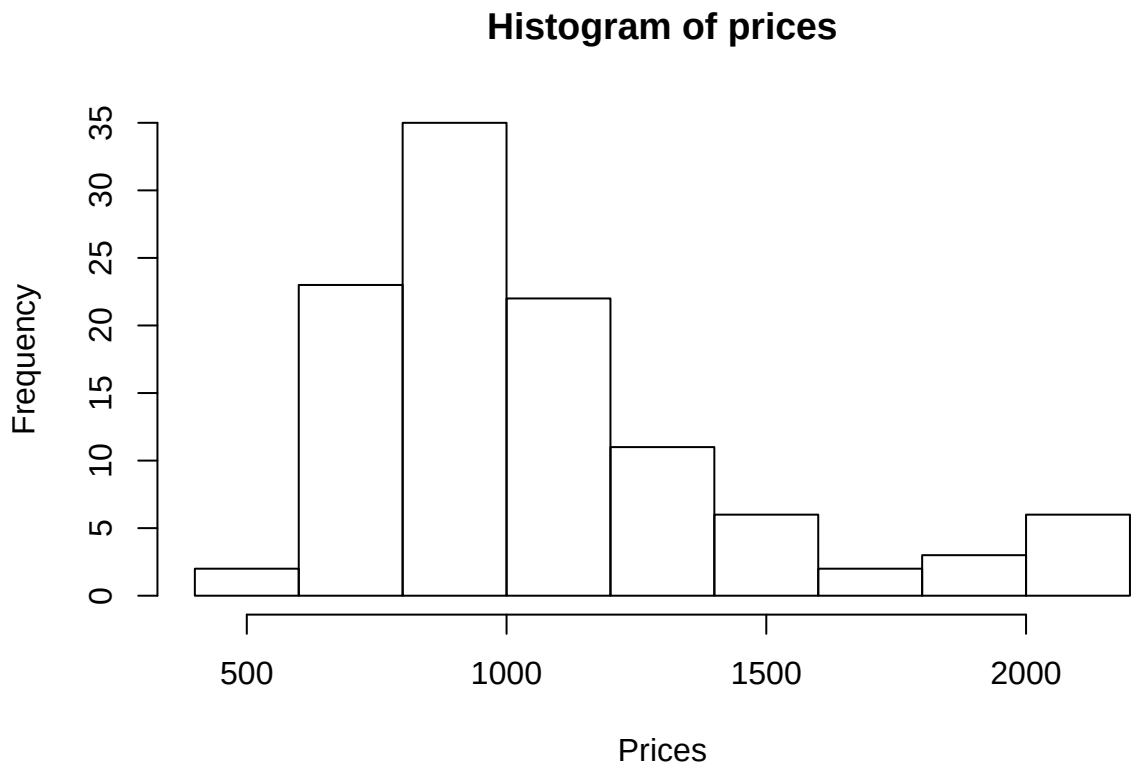
Bootstrap, jackknife and confidence intervals

Histogram of Price

From the distribution of histogram, it looks like gamma distribution

```
prices1 <- read.csv2("prices1.csv")
n <- nrow(prices1)

hist(prices1$Price, main = "Histogram of prices", xlab="Prices")
```

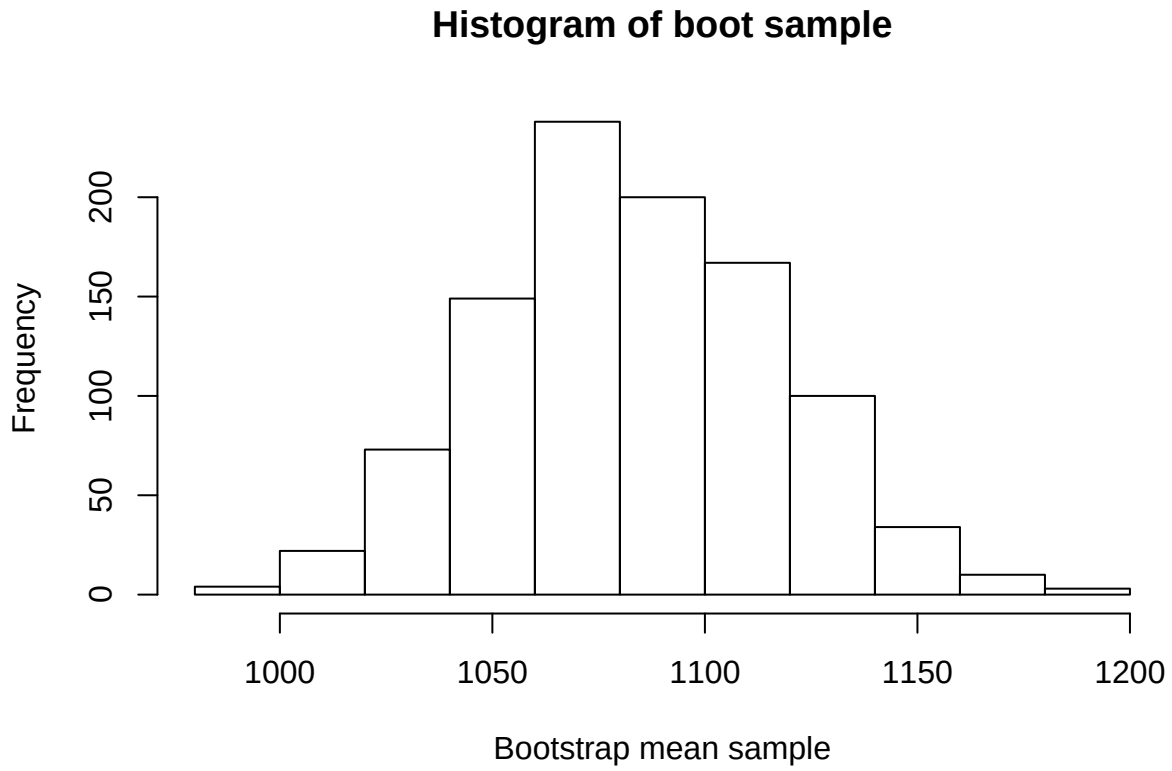



```
samp_mean <- sum(prices1$Price)/n
cat("\n\nMean price is:",samp_mean)
```

```
Mean price is: 1080.473
```

Bootstrap to estimate the parameter

The histogram plot of mean using non paramteric boot sample seems to be normal distribution.




```
Bootstrap bias correction: 1077.877


Variance: 1156.683
95% confidence interval for the mean price using bootstrap percentile:
BOOTSTRAP CONFIDENCE INTERVAL CALCULATIONS
Based on 1000 bootstrap replicates

CALL :
boot.ci(boot.out = bootsample, conf = 0.95, type = "perc")

Intervals :
Level     Percentile
95%   (1020, 1153 )
Calculations and Intervals on Original Scale


95% confidence interval for the mean price using bootstrap Bca:
BOOTSTRAP CONFIDENCE INTERVAL CALCULATIONS
```

```
Based on 1000 bootstrap replicates

CALL :
boot.ci(boot.out = bootsample, conf = 0.95, type = "bca")

Intervals :
Level       BCa
95%   (1021, 1153 )
Calculations and Intervals on Original Scale



95% confidence interval for the mean price using first order normal approximation:

BOOTSTRAP CONFIDENCE INTERVAL CALCULATIONS
Based on 1000 bootstrap replicates

CALL :
boot.ci(boot.out = bootsample, conf = 0.95, type = "norm")

Intervals :
Level      Normal
95%   (1012, 1144 )
Calculations and Intervals on Original Scale
```

Variance of the mean price using the jackknife and compare with bootstrap

The variance of mean price by bootstrap varies beacause of the random sampling and jackknife variance is same.

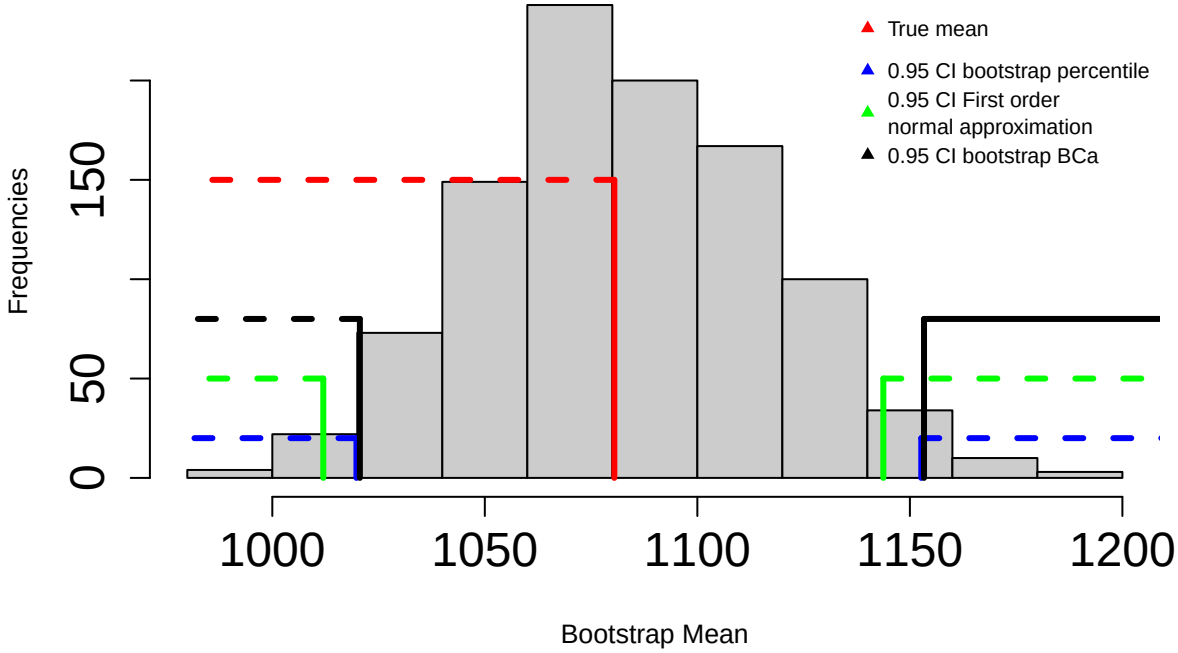
```
Variance using Jackknife: 1320.911
```

Compare the confidence intervals obtained

From the length and figure, it seems that the actual mean price is contained in all various CI but the lenght of CI under 1st normal approximation seems to be least which might suggest we can use it to say about mean with

Table 1: Comparison of various confidence interval

	Length
Percentile	132.8865
BCa	132.7264
1st order normal	131.7528



more confidence

Below table compares the length of three 95% confidence interval type .

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