Bootstrap

```
##Correlation Coefficient##

> library("boot")
> school <- 1:15
> lsat <- c(576,635,558,578,666,580,555,661,651,605,653,575,545,572,594)
> gpa <- c(3.39, 3.30, 2.81, 3.03, 3.44, 3.07, 3.00, 3.43, 3.36, 3.13, 3.12,
+ 2.74, 2.76, 2.88, 2.96)
> law.data <- data.frame(School=school, LSAT=lsat, GPA=gpa)
> correl<-function(data,indices)
+ {
+  data<-law.data[indices,]
+  cor(data[,2],data[,3])
+ }
> boot.obj1 <- boot(law.data, correl, 1000)
> boot.obj1

ORDINARY NONPARAMETRIC BOOTSTRAP


Call:
boot(data = law.data, statistic = correl, R = 1000)


Bootstrap Statistics :
     original      bias    std. error
t1* 0.7763745 0.001594048   0.1247075

> boot.ci(boot.obj1,type=c("norm","perc","bca"),conf=c(0.90,0.95))
BOOTSTRAP CONFIDENCE INTERVAL CALCULATIONS
Based on 1000 bootstrap replicates

CALL :
boot.ci(boot.out = boot.obj1, conf = c(0.9, 0.95), type = c("norm",
    "perc", "bca"))

Intervals :
Level      Normal              Percentile            BCa
90%   ( 0.5697,  0.9799 )   ( 0.5486,  0.9467 )   ( 0.4649,  0.9241 )
95%   ( 0.5304,  1.0192 )   ( 0.5012,  0.9607 )   ( 0.3583,  0.9401 )
Calculations and Intervals on Original Scale
Some BCa intervals may be unstable


##Regression Coefficients##

> regcoef<-function(data,indices)
+ {
+  data<-law.data[indices,]
+ mod<-lm(LSAT~GPA,data)
+ coef(mod)
+ }
> boot.obj2 <- boot(law.data,regcoef,1000)
> boot.obj2

ORDINARY NONPARAMETRIC BOOTSTRAP


Call:
boot(data = law.data, statistic = regcoef, R = 1000)
```

```
Bootstrap Statistics :
    original     bias    std. error
t1* 187.8996  0.5929063    86.14086
t2* 133.2509 -0.3224196    28.86596
> boot.ci(boot.obj2,type=c("norm","perc","bca"),conf=c(0.90,0.95))
BOOTSTRAP CONFIDENCE INTERVAL CALCULATIONS
Based on 1000 bootstrap replicates

CALL :
boot.ci(boot.out = boot.obj2, conf = c(0.9, 0.95), type = c("norm",
    "perc", "bca"))

Intervals :
Level      Normal             Percentile            BCa
90%   ( 45.6, 329.0 )   ( 53.8, 342.8 )   ( 73.5, 384.6 )
95%   ( 18.5, 356.1 )   ( 39.3, 381.5 )   ( 56.9, 428.4 )
Calculations and Intervals on Original Scale
Some BCa intervals may be unstable
```