```
R version 3.2.3 (2015-12-10) -- "Wooden Christmas-Tree"
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Platform: x86_64-w64-mingw32/x64 (64-bit)

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R 是個合作計劃，有許多人為之做出了貢獻。
用 'contributors()' 來看詳細的情況並且
用 'citation()' 會告訴您如何在出版品中正確地參照 R 或 R 套件。

用 'demo()' 來看一些示範程式，用 'help()' 來檢視線上輔助檔案，或
用 'help.start()' 透過 HTML 瀏覽器來看輔助檔案。
用 'q()' 離開 R。

[Previously saved workspace restored]

>
> dataset <- read.csv("C:/Users/James/Desktop/data_for_class.csv",header=TRUE)
>
> dat <- dataset
>
> miles <- dat$MILES
> income <- dat$INCOME
> age <- dat$AGE
> kids <- dat$KIDS
>
> lse <- lm(miles~income+age+kids)
> summary(lse)

Call:
lm(formula = miles ~ income + age + kids)

Residuals:
     Min        1Q    Median        3Q       Max
 -1198.14   -295.31     17.98    287.54   1549.41

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -391.548    169.775   -2.306   0.0221 *
income        14.201      1.800    7.889 2.10e-13 ***
age           15.741      3.757    4.189 4.23e-05 ***
kids         -81.826     27.130   -3.016   0.0029 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 452.3 on 196 degrees of freedom
Multiple R-squared:  0.3406,    Adjusted R-squared:  0.3305
F-statistic: 33.75 on 3 and 196 DF,  p-value: < 2.2e-16

>
> y <- as.matrix(miles)
> X <- cbind(1,income,age,kids)
> b <- crossprod(solve(crossprod(X,X)),crossprod(X,y))
> e <- y-X%*%b
> summary(e)
       V1
 Min.   :-1198.14
 1st Qu.: -295.31
 Median :   17.98
 Mean   :    0.00
 3rd Qu.:  287.54
 Max.   : 1549.41
>
> n <- nrow(X)
> i <- as.matrix(X[,1])
> m0 <- diag(n)-i%*%solve(crossprod(i,i))%*%t(i)
>
> tss <- t(y)%*%m0%*%y
> rss <- crossprod(e,e)
> ess <- tss-rss
>
```

```
> R2  <- ess/tss
> R2
          [,1]
[1,] 0.3406051
>
> k <- ncol(X)
> nmk <- n-k
> nmk
[1] 196
>
> adjR2 <- (1-k)/nmk+(n-1)/nmk*R2
> adjR2
          [,1]
[1,] 0.3305123
>
> s2 <- as.numeric(rss/nmk)
>
> s <- s2^0.5
> s
[1] 452.3125
>
> VCOV <- s2*solve(crossprod(X,X))
>
> var <- diag(VCOV)
>
> se <- var^0.5
>
> trat <- b/se
>
> pvt <- 2*pt(-abs(trat),df=nmk)
>
> results <- cbind(b,se,trat,pvt)
> colnames(results) <- c("Estimate","Std. Error","t value","Pr(>|t|)")
> rownames(results) <- c("intercept","income","age","kids")
> round(results,digits=4)
          Estimate Std. Error t value Pr(>|t|)
intercept -391.5480   169.7752 -2.3063   0.0221
income      14.2013     1.8003  7.8885   0.0000
age         15.7409     3.7574  4.1893   0.0000
kids       -81.8264    27.1296 -3.0161   0.0029
>
> q <- ncol(X)-1
> q
[1] 3
>
> null <- matrix(0:0,q)
> ikm1 <- diag(q)
> R <- cbind(null,ikm1)
>
> r <- matrix(0:0,q)
>
> Rbetamr <- R%*%b-r
>
> F <- t(Rbetamr)%*%solve(R%*% VCOV %*%t(R))%*%Rbetamr/q
> F
          [,1]
[1,] 33.7474
>
> pvF <- 1-pf(F,df1=q,df2=nmk)
> pvF
      [,1]
[1,]     0
>
```