```
install.packages("leaps")
library(leaps)

#Question 1 a-c
bestsub <- regsubsets(Outstate ~. , data = College, nvmax = 17)
forward <- regsubsets(Outstate ~. , data = College,
                      nvmax=17, method = "forward")
backward <- regsubsets(Outstate ~. , data = College,
                       nvmax=17, method = "backward")

bestsub.sum <- summary(bestsub)
forward.sum <- summary(forward)
backward.sum <- summary (backward)

names(bestsub.sum)

c(which.max(bestsub.sum$adjr2),
  which.max(forward.sum$adjr2), which.max(backward.sum$adjr2))

c(which.min(bestsub.sum$cp),
  which.min(forward.sum$cp), which.min(backward.sum$cp))

c(which.min(bestsub.sum$bic),
  which.min(forward.sum$bic), which.min(backward.sum$bic))

#Question 1d
coef(bestsub, 15)
coef(bestsub,14)
coef(bestsub,10)

#Question 2
set.seed(1)
train <- sample(c(TRUE, FALSE),nrow(College), rep=TRUE)
test <- (!train)
install.packages("glmnet")
library(glmnet)
features <- model.matrix(Outstate~. , data =College)[,-1]
set.seed(1)
cv.out <- cv.glmnet(features[train,],
                    College$Outstate[train], alpha=0)

#Question 2a
set.seed(1)
bestlam <- cv.out$lambda.min
bestlam

#Question 2b
ridge <- glmnet(x = features[train,],y = College$Outstate[train],
                alpha = 0, lambda = bestlam)
ridge.pred <- predict(ridge, s = bestlam, newx=features[test,])
mean((ridge.pred - College$Outstate[test])^2)
coef(ridge)

#Question 3a
set.seed(1)
cv.out <- cv.glmnet(features[train,],
                    College$Outstate[train], alpha=1)
bestlam <- cv.out$lambda.min
bestlam

#Question 3b
lasso <- glmnet(x = features[train,],y = College$Outstate[train],
                alpha = 1, lambda = bestlam)
lasso.pred <- predict(lasso,s=bestlam,newx=features[test,])
```

```
mean((lasso.pred - College$Outstate[test])^2)
coef(lasso)
```