

# Assignment1

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```
## Loading in required packages.  
library(ISLR)  
## Warning: package 'ISLR' was built under R version 4.0.3  
library(dplyr)
```

```
##  
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':  
##  
##     filter, lag
```

```
## The following objects are masked from 'package:base':  
##  
##     intersect, setdiff, setequal, union
```

```
## Warning: package 'dplyr' was built under R version 4.0.2  
## Warning: replacing previous import 'vctrs::data_frame' by 'tibble::data_frame'  
## when loading 'dplyr'  
##  
## Attaching package: 'dplyr'  
## The following objects are masked from 'package:stats':  
##  
##     filter, lag  
## The following objects are masked from 'package:base':  
##  
##     intersect, setdiff, setequal, union  
library(glmnet)
```

```
## Loading required package: Matrix
```

```
## Loaded glmnet 4.1-6
```

```
## Warning: package 'glmnet' was built under R version 4.0.2  
## Loading required package: Matrix  
## Loaded glmnet 4.0-2  
library(caret)
```

```
## Loading required package: ggplot2
```

```
## Loading required package: lattice
```

```
## Warning: package 'caret' was built under R version 4.0.3
## Loading required package: lattice
## Loading required package: ggplot2
## Warning: package 'ggplot2' was built under R version 4.0.2
```

```
## Creating dataset with only the fields needed
Carseats_Filtered <- Carseats %>% select("Sales", "Price",
"Advertising", "Population", "Age", "Income", "Education")
features = Carseats_Filtered %>% select("Price", "Advertising", "Population", "Age", "Income", "Education") ##features
target = Carseats_Filtered %>% select("Sales") ##target
x = as.matrix(features) ##features into matrix
y = as.matrix(target) ##target into matrix
```

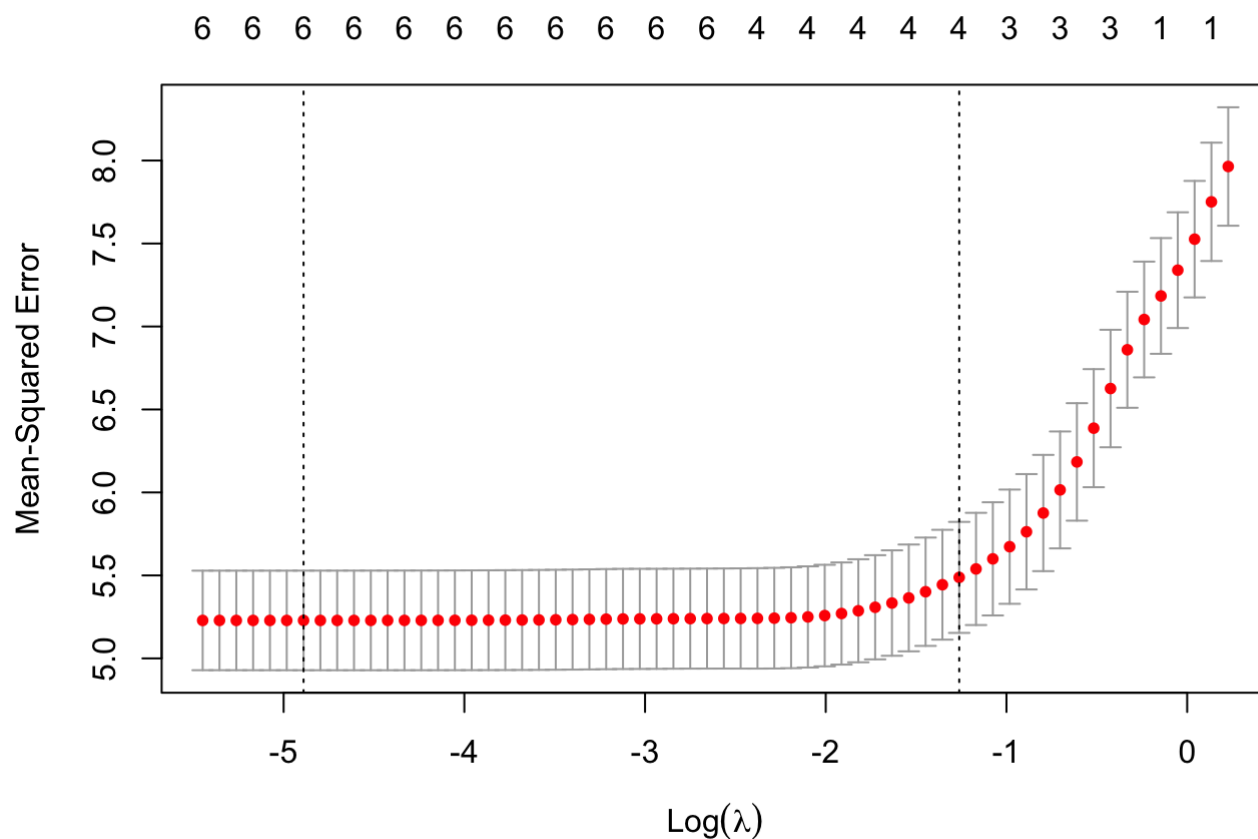
```
## scaling data
preprocessParams<-preProcess(x, method = c("center", "scale"))
x <- predict(preprocessParams, x)
summary(x) #to verify means are 0
```

```
##      Price      Advertising      Population      Age
## Min.      : -3.87702   Min.      : -0.9977   Min.      : -1.72918   Min.      : -1.74827
## 1st Qu.: -0.66711   1st Qu.: -0.9977   1st Qu.: -0.85387   1st Qu.: -0.83779
## Median :  0.05089   Median : -0.2459   Median :  0.04858   Median :  0.07268
## Mean    :  0.00000   Mean    :  0.0000   Mean    :  0.00000   Mean    :  0.00000
## 3rd Qu.:  0.64219   3rd Qu.:  0.8067   3rd Qu.:  0.90693   3rd Qu.:  0.78255
## Max.    :  3.17633   Max.    :  3.3630   Max.    :  1.65671   Max.    :  1.64673
##      Income      Education
## Min.      : -1.70290   Min.      : -1.48825
## 1st Qu.: -0.92573   1st Qu.: -0.72504
## Median :  0.01224   Median :  0.03816
## Mean    :  0.00000   Mean    :  0.00000
## 3rd Qu.:  0.79834   3rd Qu.:  0.80137
## Max.    :  1.83458   Max.    :  1.56457
```

```
set.seed(100) #to verify repeatability
cv_model = cv.glmnet(x, y, alpha = 1) #to get best lambda
best_lambda <- cv_model$lambda.min
best_lambda
```

```
## [1] 0.007523649
```

```
plot(cv_model)
```



```
best_model <- glmnet(x, y, alpha = 1, lambda = best_lambda)
coef(best_model) #coefficients of best lambda
```

```
## 7 x 1 sparse Matrix of class "dgCMatrix"
##              s0
## (Intercept)  7.49632500
## Price       -1.35016474
## Advertising  0.82366231
## Population  -0.12567987
## Age         -0.78479602
## Income       0.28681276
## Education   -0.08763526
```

```
cat("This is the best lambda value according to my model:", best_lambda)
```

```
## This is the best lambda value according to my model: 0.007523649
```

```
qb3a_model <- glmnet(x, y, alpha = 1, lambda = 0.01) #QB3
coef(qb3a_model)
```

```
## 7 x 1 sparse Matrix of class "dgCMatrix"
##                               s0
## (Intercept)  7.49632500
## Price       -1.34733223
## Advertising  0.82026088
## Population  -0.12187685
## Age         -0.78190633
## Income      0.28488631
## Education   -0.08502707
```

```
qb3b_model <- glmnet(x, y, alpha = 1, lambda = 0.1) #QB3
coef(qb3b_model)
```

```
## 7 x 1 sparse Matrix of class "dgCMatrix"
##                               s0
## (Intercept)  7.4963250
## Price       -1.2447745
## Advertising  0.7007230
## Population   .
## Age         -0.6775428
## Income      0.2139222
## Education   .
```

```
set.seed(100)
qb4_model = cv.glmnet(x, y, alpha = 0.6) #QB4
qb4_lambda <- qb4_model$lambda.min
qb4_lambda
```

```
## [1] 0.01510377
```

```
coef(qb4_model)
```

```
## 7 x 1 sparse Matrix of class "dgCMatrix"
##                               s1
## (Intercept)  7.49632500
## Price       -1.00308979
## Advertising  0.50961747
## Population   .
## Age         -0.46754305
## Income      0.07689493
## Education   .
```