

# Homework 4

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```
library(ISLR)
library(mlbench)
library(caret)
```

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

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

```
library(rpart)
library(rpart.plot)
library(party)
```

```
## Loading required package: grid
```

```
## Loading required package: mvtnorm
```

```
## Loading required package: modeltools
```

```
## Loading required package: stats4
```

```
## Loading required package: strucchange
```

```
## Loading required package: zoo
```

```
##
## Attaching package: 'zoo'
```

```
## The following objects are masked from 'package:base':
##
##   as.Date, as.Date.numeric
```

```
## Loading required package: sandwich
```

```
library(partykit)
```

```
## Loading required package: libcoin
```

```
##
## Attaching package: 'partykit'
```

```
## The following objects are masked from 'package:party':  
##  
##   cforest, ctree, ctree_control, edge_simple, mob, mob_control,  
##   node_barplot, node_bivplot, node_boxplot, node_inner, node_surv,  
##   node_terminal, varimp
```

```
library(plotmo)
```

```
## Loading required package: Formula
```

```
## Loading required package: plotrix
```

```
## Loading required package: TeachingDemos
```

```
library(pROC)
```

```
## Type 'citation("pROC")' for a citation.
```

```
##  
## Attaching package: 'pROC'
```

```
## The following objects are masked from 'package:stats':  
##  
##   cov, smooth, var
```

```
library(randomForest)
```

```
## randomForest 4.6-14
```

```
## Type rfNews() to see new features/changes/bug fixes.
```

```
##  
## Attaching package: 'randomForest'
```

```
## The following object is masked from 'package:ggplot2':  
##  
##   margin
```

```
library(ranger)
```

```
##  
## Attaching package: 'ranger'
```

```
## The following object is masked from 'package:randomForest':  
##  
##   importance
```

```

library(gbm)

## Loaded gbm 2.1.8

library(pdp)
library(lasso2)

## R Package to solve regression problems while imposing
##   an L1 constraint on the parameters. Based on S-plus Release 2.1
## Copyright (C) 1998, 1999
## Justin Lokhorst   <jlokhors@stats.adelaide.edu.au>
## Berwin A. Turlach <bturlach@stats.adelaide.edu.au>
## Bill Venables     <wvenable@stats.adelaide.edu.au>
##
## Copyright (C) 2002
## Martin Maechler   <maechler@stat.math.ethz.ch>

library(tidyverse) # data manipulation

## -- Attaching packages ----- tidyverse 1.3.0 --

## v tibble  3.0.6      v dplyr    1.0.4
## v tidyr   1.1.2      v stringr 1.4.0
## v readr   1.4.0      v forcats 0.5.1
## v purrr   0.3.4

## -- Conflicts ----- tidyverse_conflicts() --
## x stringr::boundary() masks strucchange::boundary()
## x dplyr::combine()     masks randomForest::combine()
## x dplyr::filter()      masks stats::filter()
## x dplyr::lag()          masks stats::lag()
## x purrr::lift()         masks caret::lift()
## x randomForest::margin() masks ggplot2::margin()
## x purrr::partial()     masks pdp::partial()

library(ISLR) # data Problem 2
library(patchwork)

```