TECNOLÓGICO NACIONAL DE MEXICO

INSTITUTO TECNOLOGICO DE TIJUANA

SUBDIRECCIÓN ACADÉMICA

DEPARTAMENTO DE INGENIERÍA EN SISTEMAS COMPUTACIONALES

SEMESTRE FEBRERO-JUNIO 2022

MATERIA:

Minería de datos.

UNIDAD 3

Practica 3

Regresión lineal

DOCENTE:

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Tijuana BC 19 de mayo del 2022

Importamos el archivo csv.

```
getwd()
setwd("D:/Escuela/Semestre 9/Mineria de
datos/DataMining/MachineLearning/LogisticRegression")
getwd()

# Importing the dataset

dataset <- read.csv('Social_Network_Ads.csv')
dataset <- dataset[, 3:5]
```

Se divide el conjunto de datos en el conjunto de entrenamiento y de prueba y se instala el paquete de datos de caTools:

```
# Splitting the dataset into the Training set and Test set
# Install.packages('caTools')

library(caTools)
set.seed(123)
split <- sample.split(dataset$Purchased, SplitRatio = 0.75)
training_set <- subset(dataset, split == TRUE)
test_set <- subset(dataset, split == FALSE)
```

Escala de las características

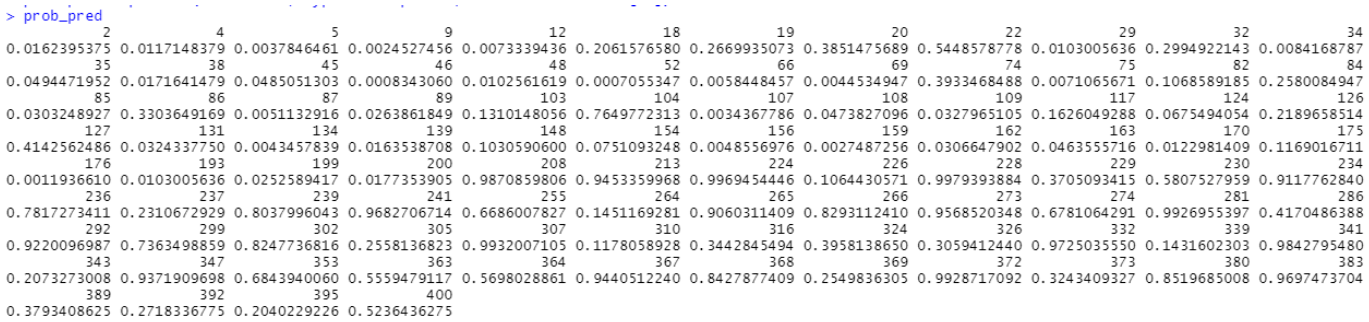
```
training_set[, 1:2] <- scale(training_set[, 1:2])
test_set[, 1:2] <- scale(test_set[, 1:2])
```

Ajustes de la regresión logística al conjunto de entrenamiento:

```
classifier = glm(formula = Purchased ~ .,
family = binomial,
data = training_set)
```

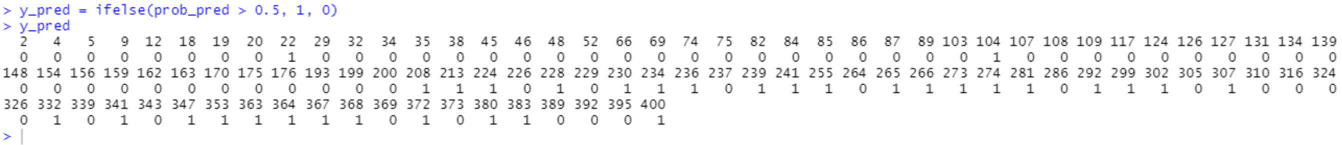
Se predicen los resultados del conjunto de pruebas:

```
prob_pred = predict(classifier, type = 'response', newdata = test_set[-3])
prob_pred
```



```
> prob_pred
           2            4            5            9           12           18           19           20           22           29           32           34 
0.0162395375 0.0117148379 0.0037846461 0.0024527456 0.0073339436 0.2061576580 0.2669935073 0.3851475689 0.5448578778 0.0103005636 0.2994922143 0.0084168787 
          35           38           45           46           48           52           66           69           74           75           82           84 
0.0494471952 0.0171641479 0.0485051303 0.0008343060 0.0102561619 0.0007055347 0.0058448457 0.0044534947 0.3933468488 0.0071065671 0.1068589185 0.2580084947 
          85           86           87           89          103          104          107          108          109          117          124          126 
0.0303248927 0.3303649169 0.0051132916 0.0263861849 0.1310148056 0.7649772313 0.0034367786 0.0473827096 0.0327965105 0.1626049288 0.0675494054 0.2189658514 
         127          131          134          139          148          154          156          159          162          163          170          175 
0.4142562486 0.0324337750 0.0043457839 0.0163538708 0.1030590600 0.0751093248 0.0048556976 0.0027487256 0.0306647902 0.0463555716 0.0122981409 0.1169016711 
         176          193          199          200          208          213          224          226          228          229          230          234 
0.0011936610 0.0103005636 0.0252589417 0.0177353905 0.9870859806 0.9453359968 0.9969454446 0.1064430571 0.9979393884 0.3705093415 0.5807527959 0.9117762840 
         236          237          239          241          255          264          265          266          273          274          281          286 
0.7817273411 0.2310672929 0.8037996043 0.9682706714 0.6686007827 0.1451169281 0.9060311409 0.8293112410 0.9568520348 0.6781064291 0.9926955397 0.4170486388 
         292          299          302          305          307          310          316          324          326          332          339          341 
0.9220096987 0.7363498859 0.8247736816 0.2558136823 0.9932007105 0.1178058928 0.3442845494 0.3958138650 0.3059412440 0.9725035550 0.1431602303 0.9842795480 
         343          347          353          363          364          367          368          369          372          373          380          383 
0.2073273008 0.9371909698 0.6843940060 0.5559479117 0.5698028861 0.9440512240 0.8427877409 0.2549836305 0.9928717092 0.3243409327 0.8519685008 0.9697473704 
         389          392          395          400 
0.3793408625 0.2718336775 0.2040229226 0.5236436275 
```

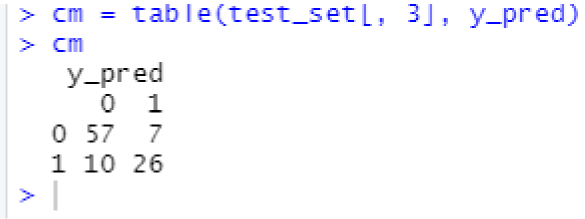
y_pred = ifelse(prob_pred > 0.5, 1, 0)
y_pred



```
> y_pred = ifelse(prob_pred > 0.5, 1, 0)
> y_pred
  2   4   5   9  12  18  19  20  22  29  32  34  35  38  45  46  48  52  66  69  74  75  82  84  85  86  87  89 103 104 107 108 109 117 124 126 127 131 134 139 
  0   0   0   0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0 
148 154 156 159 162 163 170 175 176 193 199 200 208 213 224 226 228 229 230 234 236 237 239 241 255 264 265 266 273 274 281 286 292 299 302 305 307 310 316 324 
  0   0   0   0   0   0   0   0   0   0   0   0   1   1   1   0   1   0   1   1   1   0   1   1   1   0   1   1   1   1   1   0   1   1   1   0   1   0   0   0 
326 332 339 341 343 347 353 363 364 367 368 369 372 373 380 383 389 392 395 400 
  0   1   0   1   0   1   1   1   1   1   1   0   1   0   1   1   0   0   0   1 
> |
```

Hacer la métrica de confusión

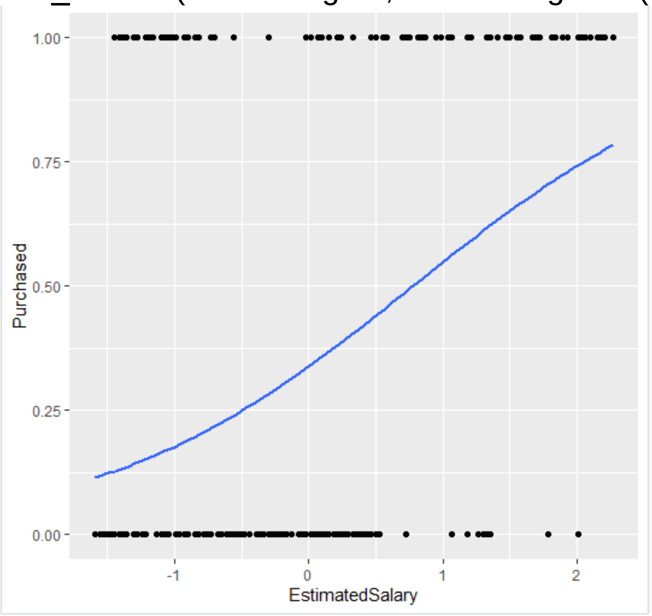
cm = table(test_set[, 3], y_pred)
cm



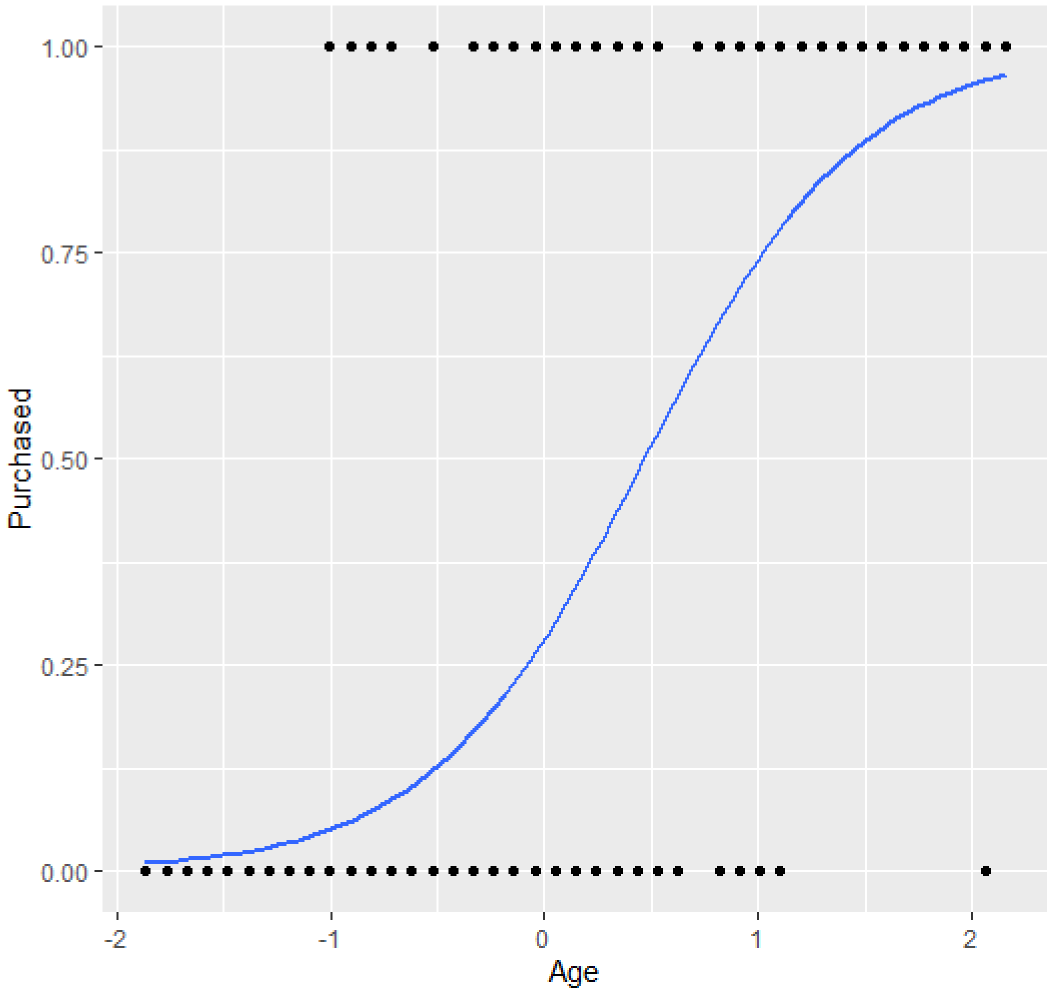
```
> cm = table(test_set[, 3], y_pred)
> cm
   y_pred
     0  1
  0 57  7
  1 10 26
> |
```

Librería ggplot2

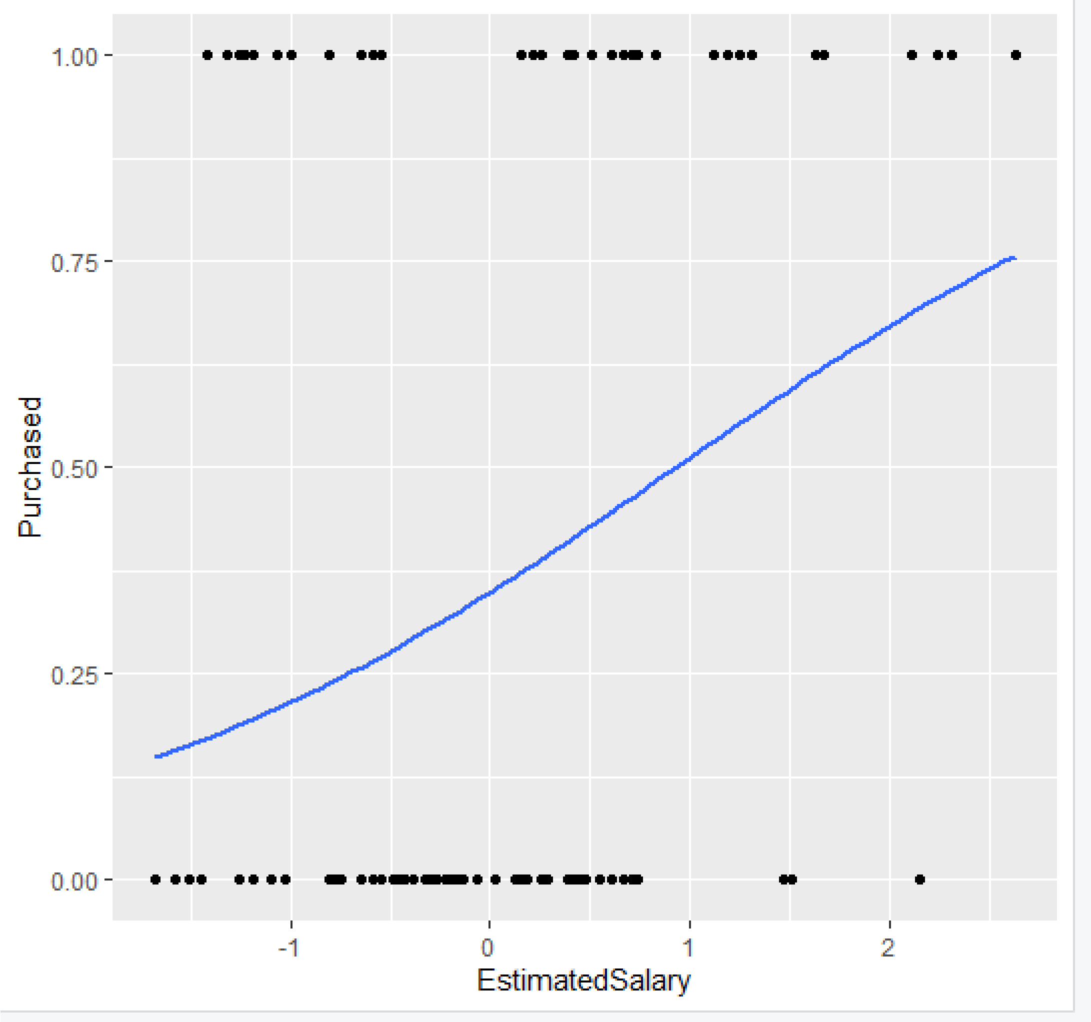
library(ggplot2)
ggplot(training_set, aes(x=EstimatedSalary, y=Purchased)) + geom_point() +
stat_smooth(method="glm", method.args=list(family="binomial"), se=FALSE)



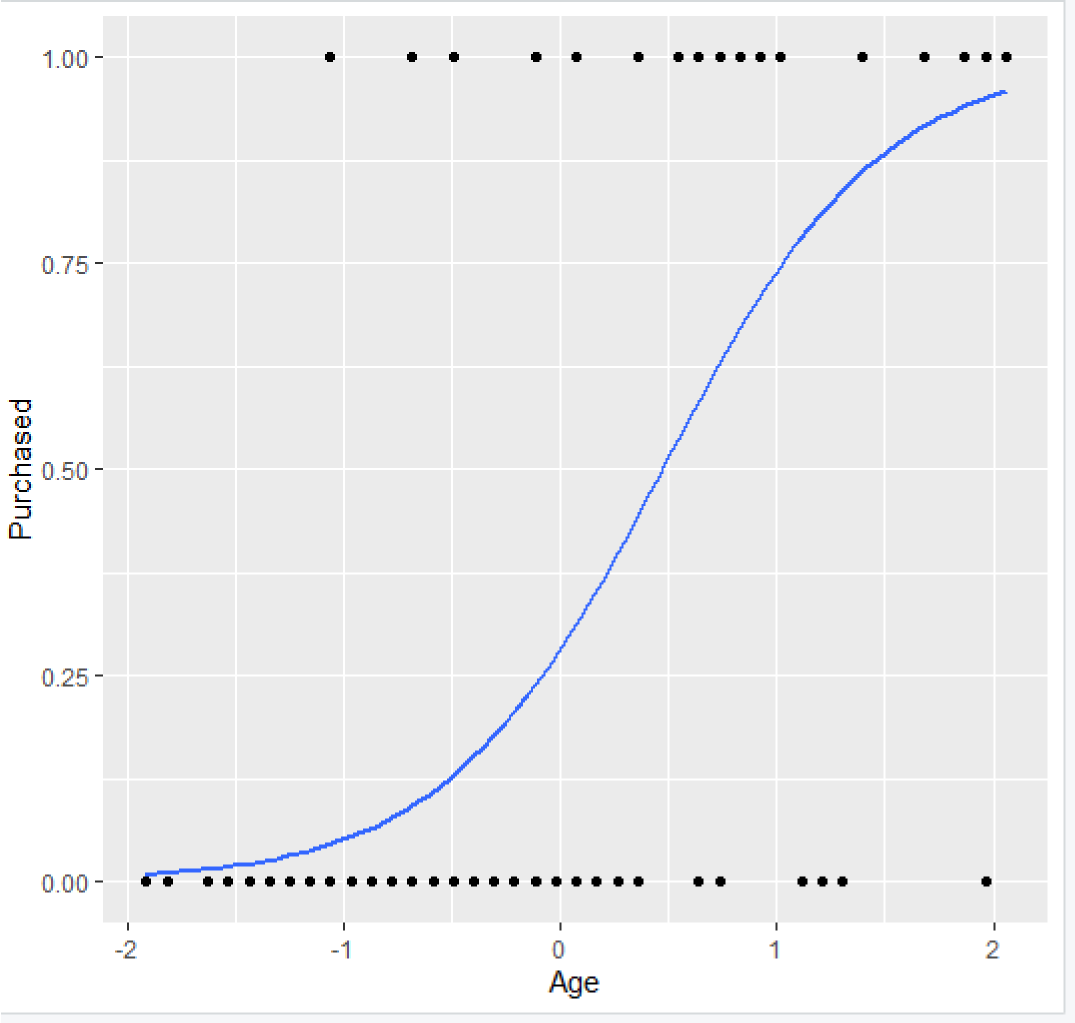
```
ggplot(training_set, aes(x=Age, y=Purchased)) + geom_point() +
stat_smooth(method="glm", method.args=list(family="binomial"), se=FALSE)
```



```
ggplot(test_set, aes(x=EstimatedSalary, y=Purchased)) + geom_point() +
stat_smooth(method="glm", method.args=list(family="binomial"), se=FALSE)
```



```
ggplot(test_set, aes(x=Age, y=Purchased)) + geom_point() +
stat_smooth(method="glm", method.args=list(family="binomial"), se=FALSE)
```

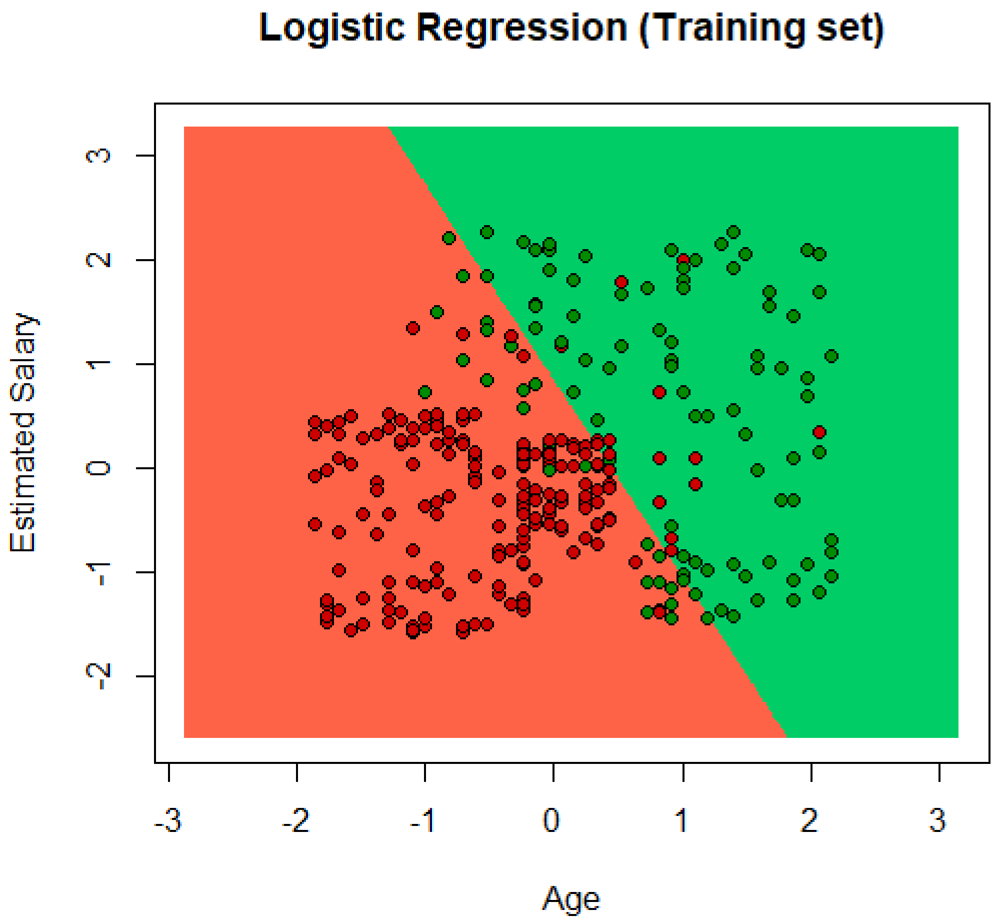


Se muestra una visualización de los resultados obtenidos del conjunto de entrenamiento:

```
library(ElemStatLearn)
set = training_set
X1 = seq(min(set[, 1]) - 1, max(set[, 1]) + 1, by = 0.01)
X2 = seq(min(set[, 2]) - 1, max(set[, 2]) + 1, by = 0.01)
grid_set = expand.grid(X1, X2)
colnames(grid_set) = c('Age', 'EstimatedSalary')
prob_set = predict(classifier, type = 'response', newdata = grid_set)
y_grid = ifelse(prob_set > 0.5, 1, 0)
plot(set[, -3],
main = 'Logistic Regression (Training set)',
xlab = 'Age', ylab = 'Estimated Salary',
xlim = range(X1), ylim = range(X2))
contour(X1, X2, matrix(as.numeric(y_grid), length(X1), length(X2)), add = TRUE)
points(grid_set, pch = '.', col = ifelse(y_grid == 1, 'springgreen3', 'tomato'))
points(set, pch = 21, bg = ifelse(set[, 3] == 1, 'green4', 'red3'))
```

Se muestra una visualización de los resultados obtenidos del conjunto de pruebas:

```
library(ElemStatLearn)
set = test_set
X1 = seq(min(set[, 1]) - 1, max(set[, 1]) + 1, by = 0.01)
X2 = seq(min(set[, 2]) - 1, max(set[, 2]) + 1, by = 0.01)
grid_set = expand.grid(X1, X2)
colnames(grid_set) = c('Age', 'EstimatedSalary')
prob_set = predict(classifier, type = 'response', newdata = grid_set)
y_grid = ifelse(prob_set > 0.5, 1, 0)
plot(set[, -3],
main = 'Logistic Regression (Test set)',
xlab = 'Age', ylab = 'Estimated Salary',
xlim = range(X1), ylim = range(X2))
contour(X1, X2, matrix(as.numeric(y_grid), length(X1), length(X2)), add = TRUE)
points(grid_set, pch = '.', col = ifelse(y_grid == 1, 'springgreen3', 'tomato'))
points(set, pch = 21, bg = ifelse(set[, 3] == 1, 'green4', 'red3'))
```


Logistic Regression (Training set)
Estimated Salary
-2
-1
0
1
2
3
-3
-2
-1
0
1
2
3
Age