

Naive Bayes: Predicting Personal Loan

Contents

Problem Statement	1
Data Preparation	1
Questions	189

Problem Statement

Among these 5000 customers of UniversalBank, only 480 (= 9.6%) accepted the personal loan that was offered to them in the earlier campaign. In this exercise, we focus on two predictors: Online (whether or not the customer is an active user of online banking services) and Credit Card (abbreviated CC below) (does the customer hold a credit card issued by the bank), and the outcome Personal Loan

Data Preparation

```
getwd()
```

```
## [1] "C:/Users/Mukht/OneDrive/Desktop/Kent State University/College of Business Admin-Bus. Analytics I"
```

```
setwd("C:\\Users\\Mukht\\OneDrive\\Desktop\\Kent State University\\College of Business Admin-Bus. Analy
```

```
Assignment3_UpdatedNew<-read.csv("UniversalBank.csv")
str(Assignment3_UpdatedNew)
```

```
## 'data.frame':    5000 obs. of  12 variables:
## $ Age           : int  25 45 39 35 35 37 53 50 35 34 ...
## $ Experience     : int  1 19 15 9 8 13 27 24 10 9 ...
## $ Income         : int  49 34 11 100 45 29 72 22 81 180 ...
## $ Family         : int  4 3 1 1 4 4 2 1 3 1 ...
## $ CCAvg          : num  1.6 1.5 1 2.7 1 0.4 1.5 0.3 0.6 8.9 ...
## $ Education_2    : int  1 1 1 0 0 0 0 0 0 0 ...
## $ Mortgage       : int  0 0 0 0 0 155 0 0 104 0 ...
## $ Personal.Loan  : int  0 0 0 0 0 0 0 0 0 1 ...
## $ Securities.Account: int  1 1 0 0 0 0 0 0 0 0 ...
## $ CD.Account     : int  0 0 0 0 0 0 0 0 0 0 ...
## $ Online         : int  0 0 0 0 0 1 1 0 1 0 ...
## $ CreditCard     : int  0 0 0 0 1 0 0 1 0 0 ...
```

```
head(Assignment3_UpdatedNew)
```

```
##      Age Experience Income Family CCAvg Education_2 Mortgage Personal.Loan
## 1   25          1     49      4   1.6           1         0         0
## 2   45         19     34      3   1.5           1         0         0
## 3   39         15     11      1   1.0           1         0         0
## 4   35          9    100      1   2.7           0         0         0
## 5   35          8     45      4   1.0           0         0         0
## 6   37         13     29      4   0.4           0        155         0
##      Securities.Account CD.Account Online CreditCard
## 1                1          0      0          0
## 2                1          0      0          0
## 3                0          0      0          0
## 4                0          0      0          0
## 5                0          0      0          1
## 6                0          0      1          0
```

```
library(class)
library(caret)
```

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

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

```
library(lattice)
library(ggplot2)
library(ISLR)
library(pROC)
```

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

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

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

```
##
##      cov, smooth, var
```

```
library(e1071)
```

```
is.na(Assignment3_UpdatedNew[,1:12])
```

```
##      Age Experience Income Family CCAvg Education_2 Mortgage Personal.Loan
## [1,] FALSE      FALSE  FALSE  FALSE FALSE      FALSE      FALSE      FALSE
## [2,] FALSE      FALSE  FALSE  FALSE FALSE      FALSE      FALSE      FALSE
## [3,] FALSE      FALSE  FALSE  FALSE FALSE      FALSE      FALSE      FALSE
## [4,] FALSE      FALSE  FALSE  FALSE FALSE      FALSE      FALSE      FALSE
## [5,] FALSE      FALSE  FALSE  FALSE FALSE      FALSE      FALSE      FALSE
## [6,] FALSE      FALSE  FALSE  FALSE FALSE      FALSE      FALSE      FALSE
```

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

##	[4975,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4976,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4977,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4978,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4979,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4980,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4981,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4982,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4983,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4984,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4985,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4986,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4987,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4988,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4989,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4990,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4991,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4992,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4993,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4994,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4995,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4996,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4997,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4998,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[4999,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[5000,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##		Securities.Account	CD.Account	Online	CreditCard			
##	[1,]	FALSE	FALSE	FALSE	FALSE			
##	[2,]	FALSE	FALSE	FALSE	FALSE			
##	[3,]	FALSE	FALSE	FALSE	FALSE			
##	[4,]	FALSE	FALSE	FALSE	FALSE			
##	[5,]	FALSE	FALSE	FALSE	FALSE			
##	[6,]	FALSE	FALSE	FALSE	FALSE			
##	[7,]	FALSE	FALSE	FALSE	FALSE			
##	[8,]	FALSE	FALSE	FALSE	FALSE			
##	[9,]	FALSE	FALSE	FALSE	FALSE			
##	[10,]	FALSE	FALSE	FALSE	FALSE			
##	[11,]	FALSE	FALSE	FALSE	FALSE			
##	[12,]	FALSE	FALSE	FALSE	FALSE			
##	[13,]	FALSE	FALSE	FALSE	FALSE			
##	[14,]	FALSE	FALSE	FALSE	FALSE			
##	[15,]	FALSE	FALSE	FALSE	FALSE			
##	[16,]	FALSE	FALSE	FALSE	FALSE			
##	[17,]	FALSE	FALSE	FALSE	FALSE			
##	[18,]	FALSE	FALSE	FALSE	FALSE			
##	[19,]	FALSE	FALSE	FALSE	FALSE			
##	[20,]	FALSE	FALSE	FALSE	FALSE			
##	[21,]	FALSE	FALSE	FALSE	FALSE			
##	[22,]	FALSE	FALSE	FALSE	FALSE			
##	[23,]	FALSE	FALSE	FALSE	FALSE			
##	[24,]	FALSE	FALSE	FALSE	FALSE			
##	[25,]	FALSE	FALSE	FALSE	FALSE			
##	[26,]	FALSE	FALSE	FALSE	FALSE			
##	[27,]	FALSE	FALSE	FALSE	FALSE			

##	[28,]	FALSE	FALSE	FALSE	FALSE
##	[29,]	FALSE	FALSE	FALSE	FALSE
##	[30,]	FALSE	FALSE	FALSE	FALSE
##	[31,]	FALSE	FALSE	FALSE	FALSE
##	[32,]	FALSE	FALSE	FALSE	FALSE
##	[33,]	FALSE	FALSE	FALSE	FALSE
##	[34,]	FALSE	FALSE	FALSE	FALSE
##	[35,]	FALSE	FALSE	FALSE	FALSE
##	[36,]	FALSE	FALSE	FALSE	FALSE
##	[37,]	FALSE	FALSE	FALSE	FALSE
##	[38,]	FALSE	FALSE	FALSE	FALSE
##	[39,]	FALSE	FALSE	FALSE	FALSE
##	[40,]	FALSE	FALSE	FALSE	FALSE
##	[41,]	FALSE	FALSE	FALSE	FALSE
##	[42,]	FALSE	FALSE	FALSE	FALSE
##	[43,]	FALSE	FALSE	FALSE	FALSE
##	[44,]	FALSE	FALSE	FALSE	FALSE
##	[45,]	FALSE	FALSE	FALSE	FALSE
##	[46,]	FALSE	FALSE	FALSE	FALSE
##	[47,]	FALSE	FALSE	FALSE	FALSE
##	[48,]	FALSE	FALSE	FALSE	FALSE
##	[49,]	FALSE	FALSE	FALSE	FALSE
##	[50,]	FALSE	FALSE	FALSE	FALSE
##	[51,]	FALSE	FALSE	FALSE	FALSE
##	[52,]	FALSE	FALSE	FALSE	FALSE
##	[53,]	FALSE	FALSE	FALSE	FALSE
##	[54,]	FALSE	FALSE	FALSE	FALSE
##	[55,]	FALSE	FALSE	FALSE	FALSE
##	[56,]	FALSE	FALSE	FALSE	FALSE
##	[57,]	FALSE	FALSE	FALSE	FALSE
##	[58,]	FALSE	FALSE	FALSE	FALSE
##	[59,]	FALSE	FALSE	FALSE	FALSE
##	[60,]	FALSE	FALSE	FALSE	FALSE
##	[61,]	FALSE	FALSE	FALSE	FALSE
##	[62,]	FALSE	FALSE	FALSE	FALSE
##	[63,]	FALSE	FALSE	FALSE	FALSE
##	[64,]	FALSE	FALSE	FALSE	FALSE
##	[65,]	FALSE	FALSE	FALSE	FALSE
##	[66,]	FALSE	FALSE	FALSE	FALSE
##	[67,]	FALSE	FALSE	FALSE	FALSE
##	[68,]	FALSE	FALSE	FALSE	FALSE
##	[69,]	FALSE	FALSE	FALSE	FALSE
##	[70,]	FALSE	FALSE	FALSE	FALSE
##	[71,]	FALSE	FALSE	FALSE	FALSE
##	[72,]	FALSE	FALSE	FALSE	FALSE
##	[73,]	FALSE	FALSE	FALSE	FALSE
##	[74,]	FALSE	FALSE	FALSE	FALSE
##	[75,]	FALSE	FALSE	FALSE	FALSE
##	[76,]	FALSE	FALSE	FALSE	FALSE
##	[77,]	FALSE	FALSE	FALSE	FALSE
##	[78,]	FALSE	FALSE	FALSE	FALSE
##	[79,]	FALSE	FALSE	FALSE	FALSE
##	[80,]	FALSE	FALSE	FALSE	FALSE
##	[81,]	FALSE	FALSE	FALSE	FALSE

##	[82,]	FALSE	FALSE	FALSE	FALSE
##	[83,]	FALSE	FALSE	FALSE	FALSE
##	[84,]	FALSE	FALSE	FALSE	FALSE
##	[85,]	FALSE	FALSE	FALSE	FALSE
##	[86,]	FALSE	FALSE	FALSE	FALSE
##	[87,]	FALSE	FALSE	FALSE	FALSE
##	[88,]	FALSE	FALSE	FALSE	FALSE
##	[89,]	FALSE	FALSE	FALSE	FALSE
##	[90,]	FALSE	FALSE	FALSE	FALSE
##	[91,]	FALSE	FALSE	FALSE	FALSE
##	[92,]	FALSE	FALSE	FALSE	FALSE
##	[93,]	FALSE	FALSE	FALSE	FALSE
##	[94,]	FALSE	FALSE	FALSE	FALSE
##	[95,]	FALSE	FALSE	FALSE	FALSE
##	[96,]	FALSE	FALSE	FALSE	FALSE
##	[97,]	FALSE	FALSE	FALSE	FALSE
##	[98,]	FALSE	FALSE	FALSE	FALSE
##	[99,]	FALSE	FALSE	FALSE	FALSE
##	[100,]	FALSE	FALSE	FALSE	FALSE
##	[101,]	FALSE	FALSE	FALSE	FALSE
##	[102,]	FALSE	FALSE	FALSE	FALSE
##	[103,]	FALSE	FALSE	FALSE	FALSE
##	[104,]	FALSE	FALSE	FALSE	FALSE
##	[105,]	FALSE	FALSE	FALSE	FALSE
##	[106,]	FALSE	FALSE	FALSE	FALSE
##	[107,]	FALSE	FALSE	FALSE	FALSE
##	[108,]	FALSE	FALSE	FALSE	FALSE
##	[109,]	FALSE	FALSE	FALSE	FALSE
##	[110,]	FALSE	FALSE	FALSE	FALSE
##	[111,]	FALSE	FALSE	FALSE	FALSE
##	[112,]	FALSE	FALSE	FALSE	FALSE
##	[113,]	FALSE	FALSE	FALSE	FALSE
##	[114,]	FALSE	FALSE	FALSE	FALSE
##	[115,]	FALSE	FALSE	FALSE	FALSE
##	[116,]	FALSE	FALSE	FALSE	FALSE
##	[117,]	FALSE	FALSE	FALSE	FALSE
##	[118,]	FALSE	FALSE	FALSE	FALSE
##	[119,]	FALSE	FALSE	FALSE	FALSE
##	[120,]	FALSE	FALSE	FALSE	FALSE
##	[121,]	FALSE	FALSE	FALSE	FALSE
##	[122,]	FALSE	FALSE	FALSE	FALSE
##	[123,]	FALSE	FALSE	FALSE	FALSE
##	[124,]	FALSE	FALSE	FALSE	FALSE
##	[125,]	FALSE	FALSE	FALSE	FALSE
##	[126,]	FALSE	FALSE	FALSE	FALSE
##	[127,]	FALSE	FALSE	FALSE	FALSE
##	[128,]	FALSE	FALSE	FALSE	FALSE
##	[129,]	FALSE	FALSE	FALSE	FALSE
##	[130,]	FALSE	FALSE	FALSE	FALSE
##	[131,]	FALSE	FALSE	FALSE	FALSE
##	[132,]	FALSE	FALSE	FALSE	FALSE
##	[133,]	FALSE	FALSE	FALSE	FALSE
##	[134,]	FALSE	FALSE	FALSE	FALSE
##	[135,]	FALSE	FALSE	FALSE	FALSE

##	[136,]	FALSE	FALSE	FALSE	FALSE
##	[137,]	FALSE	FALSE	FALSE	FALSE
##	[138,]	FALSE	FALSE	FALSE	FALSE
##	[139,]	FALSE	FALSE	FALSE	FALSE
##	[140,]	FALSE	FALSE	FALSE	FALSE
##	[141,]	FALSE	FALSE	FALSE	FALSE
##	[142,]	FALSE	FALSE	FALSE	FALSE
##	[143,]	FALSE	FALSE	FALSE	FALSE
##	[144,]	FALSE	FALSE	FALSE	FALSE
##	[145,]	FALSE	FALSE	FALSE	FALSE
##	[146,]	FALSE	FALSE	FALSE	FALSE
##	[147,]	FALSE	FALSE	FALSE	FALSE
##	[148,]	FALSE	FALSE	FALSE	FALSE
##	[149,]	FALSE	FALSE	FALSE	FALSE
##	[150,]	FALSE	FALSE	FALSE	FALSE
##	[151,]	FALSE	FALSE	FALSE	FALSE
##	[152,]	FALSE	FALSE	FALSE	FALSE
##	[153,]	FALSE	FALSE	FALSE	FALSE
##	[154,]	FALSE	FALSE	FALSE	FALSE
##	[155,]	FALSE	FALSE	FALSE	FALSE
##	[156,]	FALSE	FALSE	FALSE	FALSE
##	[157,]	FALSE	FALSE	FALSE	FALSE
##	[158,]	FALSE	FALSE	FALSE	FALSE
##	[159,]	FALSE	FALSE	FALSE	FALSE
##	[160,]	FALSE	FALSE	FALSE	FALSE
##	[161,]	FALSE	FALSE	FALSE	FALSE
##	[162,]	FALSE	FALSE	FALSE	FALSE
##	[163,]	FALSE	FALSE	FALSE	FALSE
##	[164,]	FALSE	FALSE	FALSE	FALSE
##	[165,]	FALSE	FALSE	FALSE	FALSE
##	[166,]	FALSE	FALSE	FALSE	FALSE
##	[167,]	FALSE	FALSE	FALSE	FALSE
##	[168,]	FALSE	FALSE	FALSE	FALSE
##	[169,]	FALSE	FALSE	FALSE	FALSE
##	[170,]	FALSE	FALSE	FALSE	FALSE
##	[171,]	FALSE	FALSE	FALSE	FALSE
##	[172,]	FALSE	FALSE	FALSE	FALSE
##	[173,]	FALSE	FALSE	FALSE	FALSE
##	[174,]	FALSE	FALSE	FALSE	FALSE
##	[175,]	FALSE	FALSE	FALSE	FALSE
##	[176,]	FALSE	FALSE	FALSE	FALSE
##	[177,]	FALSE	FALSE	FALSE	FALSE
##	[178,]	FALSE	FALSE	FALSE	FALSE
##	[179,]	FALSE	FALSE	FALSE	FALSE
##	[180,]	FALSE	FALSE	FALSE	FALSE
##	[181,]	FALSE	FALSE	FALSE	FALSE
##	[182,]	FALSE	FALSE	FALSE	FALSE
##	[183,]	FALSE	FALSE	FALSE	FALSE
##	[184,]	FALSE	FALSE	FALSE	FALSE
##	[185,]	FALSE	FALSE	FALSE	FALSE
##	[186,]	FALSE	FALSE	FALSE	FALSE
##	[187,]	FALSE	FALSE	FALSE	FALSE
##	[188,]	FALSE	FALSE	FALSE	FALSE
##	[189,]	FALSE	FALSE	FALSE	FALSE

##	[190,]	FALSE	FALSE	FALSE	FALSE
##	[191,]	FALSE	FALSE	FALSE	FALSE
##	[192,]	FALSE	FALSE	FALSE	FALSE
##	[193,]	FALSE	FALSE	FALSE	FALSE
##	[194,]	FALSE	FALSE	FALSE	FALSE
##	[195,]	FALSE	FALSE	FALSE	FALSE
##	[196,]	FALSE	FALSE	FALSE	FALSE
##	[197,]	FALSE	FALSE	FALSE	FALSE
##	[198,]	FALSE	FALSE	FALSE	FALSE
##	[199,]	FALSE	FALSE	FALSE	FALSE
##	[200,]	FALSE	FALSE	FALSE	FALSE
##	[201,]	FALSE	FALSE	FALSE	FALSE
##	[202,]	FALSE	FALSE	FALSE	FALSE
##	[203,]	FALSE	FALSE	FALSE	FALSE
##	[204,]	FALSE	FALSE	FALSE	FALSE
##	[205,]	FALSE	FALSE	FALSE	FALSE
##	[206,]	FALSE	FALSE	FALSE	FALSE
##	[207,]	FALSE	FALSE	FALSE	FALSE
##	[208,]	FALSE	FALSE	FALSE	FALSE
##	[209,]	FALSE	FALSE	FALSE	FALSE
##	[210,]	FALSE	FALSE	FALSE	FALSE
##	[211,]	FALSE	FALSE	FALSE	FALSE
##	[212,]	FALSE	FALSE	FALSE	FALSE
##	[213,]	FALSE	FALSE	FALSE	FALSE
##	[214,]	FALSE	FALSE	FALSE	FALSE
##	[215,]	FALSE	FALSE	FALSE	FALSE
##	[216,]	FALSE	FALSE	FALSE	FALSE
##	[217,]	FALSE	FALSE	FALSE	FALSE
##	[218,]	FALSE	FALSE	FALSE	FALSE
##	[219,]	FALSE	FALSE	FALSE	FALSE
##	[220,]	FALSE	FALSE	FALSE	FALSE
##	[221,]	FALSE	FALSE	FALSE	FALSE
##	[222,]	FALSE	FALSE	FALSE	FALSE
##	[223,]	FALSE	FALSE	FALSE	FALSE
##	[224,]	FALSE	FALSE	FALSE	FALSE
##	[225,]	FALSE	FALSE	FALSE	FALSE
##	[226,]	FALSE	FALSE	FALSE	FALSE
##	[227,]	FALSE	FALSE	FALSE	FALSE
##	[228,]	FALSE	FALSE	FALSE	FALSE
##	[229,]	FALSE	FALSE	FALSE	FALSE
##	[230,]	FALSE	FALSE	FALSE	FALSE
##	[231,]	FALSE	FALSE	FALSE	FALSE
##	[232,]	FALSE	FALSE	FALSE	FALSE
##	[233,]	FALSE	FALSE	FALSE	FALSE
##	[234,]	FALSE	FALSE	FALSE	FALSE
##	[235,]	FALSE	FALSE	FALSE	FALSE
##	[236,]	FALSE	FALSE	FALSE	FALSE
##	[237,]	FALSE	FALSE	FALSE	FALSE
##	[238,]	FALSE	FALSE	FALSE	FALSE
##	[239,]	FALSE	FALSE	FALSE	FALSE
##	[240,]	FALSE	FALSE	FALSE	FALSE
##	[241,]	FALSE	FALSE	FALSE	FALSE
##	[242,]	FALSE	FALSE	FALSE	FALSE
##	[243,]	FALSE	FALSE	FALSE	FALSE

##	[244,]	FALSE	FALSE	FALSE	FALSE
##	[245,]	FALSE	FALSE	FALSE	FALSE
##	[246,]	FALSE	FALSE	FALSE	FALSE
##	[247,]	FALSE	FALSE	FALSE	FALSE
##	[248,]	FALSE	FALSE	FALSE	FALSE
##	[249,]	FALSE	FALSE	FALSE	FALSE
##	[250,]	FALSE	FALSE	FALSE	FALSE
##	[251,]	FALSE	FALSE	FALSE	FALSE
##	[252,]	FALSE	FALSE	FALSE	FALSE
##	[253,]	FALSE	FALSE	FALSE	FALSE
##	[254,]	FALSE	FALSE	FALSE	FALSE
##	[255,]	FALSE	FALSE	FALSE	FALSE
##	[256,]	FALSE	FALSE	FALSE	FALSE
##	[257,]	FALSE	FALSE	FALSE	FALSE
##	[258,]	FALSE	FALSE	FALSE	FALSE
##	[259,]	FALSE	FALSE	FALSE	FALSE
##	[260,]	FALSE	FALSE	FALSE	FALSE
##	[261,]	FALSE	FALSE	FALSE	FALSE
##	[262,]	FALSE	FALSE	FALSE	FALSE
##	[263,]	FALSE	FALSE	FALSE	FALSE
##	[264,]	FALSE	FALSE	FALSE	FALSE
##	[265,]	FALSE	FALSE	FALSE	FALSE
##	[266,]	FALSE	FALSE	FALSE	FALSE
##	[267,]	FALSE	FALSE	FALSE	FALSE
##	[268,]	FALSE	FALSE	FALSE	FALSE
##	[269,]	FALSE	FALSE	FALSE	FALSE
##	[270,]	FALSE	FALSE	FALSE	FALSE
##	[271,]	FALSE	FALSE	FALSE	FALSE
##	[272,]	FALSE	FALSE	FALSE	FALSE
##	[273,]	FALSE	FALSE	FALSE	FALSE
##	[274,]	FALSE	FALSE	FALSE	FALSE
##	[275,]	FALSE	FALSE	FALSE	FALSE
##	[276,]	FALSE	FALSE	FALSE	FALSE
##	[277,]	FALSE	FALSE	FALSE	FALSE
##	[278,]	FALSE	FALSE	FALSE	FALSE
##	[279,]	FALSE	FALSE	FALSE	FALSE
##	[280,]	FALSE	FALSE	FALSE	FALSE
##	[281,]	FALSE	FALSE	FALSE	FALSE
##	[282,]	FALSE	FALSE	FALSE	FALSE
##	[283,]	FALSE	FALSE	FALSE	FALSE
##	[284,]	FALSE	FALSE	FALSE	FALSE
##	[285,]	FALSE	FALSE	FALSE	FALSE
##	[286,]	FALSE	FALSE	FALSE	FALSE
##	[287,]	FALSE	FALSE	FALSE	FALSE
##	[288,]	FALSE	FALSE	FALSE	FALSE
##	[289,]	FALSE	FALSE	FALSE	FALSE
##	[290,]	FALSE	FALSE	FALSE	FALSE
##	[291,]	FALSE	FALSE	FALSE	FALSE
##	[292,]	FALSE	FALSE	FALSE	FALSE
##	[293,]	FALSE	FALSE	FALSE	FALSE
##	[294,]	FALSE	FALSE	FALSE	FALSE
##	[295,]	FALSE	FALSE	FALSE	FALSE
##	[296,]	FALSE	FALSE	FALSE	FALSE
##	[297,]	FALSE	FALSE	FALSE	FALSE

##	[298,]	FALSE	FALSE	FALSE	FALSE
##	[299,]	FALSE	FALSE	FALSE	FALSE
##	[300,]	FALSE	FALSE	FALSE	FALSE
##	[301,]	FALSE	FALSE	FALSE	FALSE
##	[302,]	FALSE	FALSE	FALSE	FALSE
##	[303,]	FALSE	FALSE	FALSE	FALSE
##	[304,]	FALSE	FALSE	FALSE	FALSE
##	[305,]	FALSE	FALSE	FALSE	FALSE
##	[306,]	FALSE	FALSE	FALSE	FALSE
##	[307,]	FALSE	FALSE	FALSE	FALSE
##	[308,]	FALSE	FALSE	FALSE	FALSE
##	[309,]	FALSE	FALSE	FALSE	FALSE
##	[310,]	FALSE	FALSE	FALSE	FALSE
##	[311,]	FALSE	FALSE	FALSE	FALSE
##	[312,]	FALSE	FALSE	FALSE	FALSE
##	[313,]	FALSE	FALSE	FALSE	FALSE
##	[314,]	FALSE	FALSE	FALSE	FALSE
##	[315,]	FALSE	FALSE	FALSE	FALSE
##	[316,]	FALSE	FALSE	FALSE	FALSE
##	[317,]	FALSE	FALSE	FALSE	FALSE
##	[318,]	FALSE	FALSE	FALSE	FALSE
##	[319,]	FALSE	FALSE	FALSE	FALSE
##	[320,]	FALSE	FALSE	FALSE	FALSE
##	[321,]	FALSE	FALSE	FALSE	FALSE
##	[322,]	FALSE	FALSE	FALSE	FALSE
##	[323,]	FALSE	FALSE	FALSE	FALSE
##	[324,]	FALSE	FALSE	FALSE	FALSE
##	[325,]	FALSE	FALSE	FALSE	FALSE
##	[326,]	FALSE	FALSE	FALSE	FALSE
##	[327,]	FALSE	FALSE	FALSE	FALSE
##	[328,]	FALSE	FALSE	FALSE	FALSE
##	[329,]	FALSE	FALSE	FALSE	FALSE
##	[330,]	FALSE	FALSE	FALSE	FALSE
##	[331,]	FALSE	FALSE	FALSE	FALSE
##	[332,]	FALSE	FALSE	FALSE	FALSE
##	[333,]	FALSE	FALSE	FALSE	FALSE
##	[334,]	FALSE	FALSE	FALSE	FALSE
##	[335,]	FALSE	FALSE	FALSE	FALSE
##	[336,]	FALSE	FALSE	FALSE	FALSE
##	[337,]	FALSE	FALSE	FALSE	FALSE
##	[338,]	FALSE	FALSE	FALSE	FALSE
##	[339,]	FALSE	FALSE	FALSE	FALSE
##	[340,]	FALSE	FALSE	FALSE	FALSE
##	[341,]	FALSE	FALSE	FALSE	FALSE
##	[342,]	FALSE	FALSE	FALSE	FALSE
##	[343,]	FALSE	FALSE	FALSE	FALSE
##	[344,]	FALSE	FALSE	FALSE	FALSE
##	[345,]	FALSE	FALSE	FALSE	FALSE
##	[346,]	FALSE	FALSE	FALSE	FALSE
##	[347,]	FALSE	FALSE	FALSE	FALSE
##	[348,]	FALSE	FALSE	FALSE	FALSE
##	[349,]	FALSE	FALSE	FALSE	FALSE
##	[350,]	FALSE	FALSE	FALSE	FALSE
##	[351,]	FALSE	FALSE	FALSE	FALSE

##	[352,]	FALSE	FALSE	FALSE	FALSE
##	[353,]	FALSE	FALSE	FALSE	FALSE
##	[354,]	FALSE	FALSE	FALSE	FALSE
##	[355,]	FALSE	FALSE	FALSE	FALSE
##	[356,]	FALSE	FALSE	FALSE	FALSE
##	[357,]	FALSE	FALSE	FALSE	FALSE
##	[358,]	FALSE	FALSE	FALSE	FALSE
##	[359,]	FALSE	FALSE	FALSE	FALSE
##	[360,]	FALSE	FALSE	FALSE	FALSE
##	[361,]	FALSE	FALSE	FALSE	FALSE
##	[362,]	FALSE	FALSE	FALSE	FALSE
##	[363,]	FALSE	FALSE	FALSE	FALSE
##	[364,]	FALSE	FALSE	FALSE	FALSE
##	[365,]	FALSE	FALSE	FALSE	FALSE
##	[366,]	FALSE	FALSE	FALSE	FALSE
##	[367,]	FALSE	FALSE	FALSE	FALSE
##	[368,]	FALSE	FALSE	FALSE	FALSE
##	[369,]	FALSE	FALSE	FALSE	FALSE
##	[370,]	FALSE	FALSE	FALSE	FALSE
##	[371,]	FALSE	FALSE	FALSE	FALSE
##	[372,]	FALSE	FALSE	FALSE	FALSE
##	[373,]	FALSE	FALSE	FALSE	FALSE
##	[374,]	FALSE	FALSE	FALSE	FALSE
##	[375,]	FALSE	FALSE	FALSE	FALSE
##	[376,]	FALSE	FALSE	FALSE	FALSE
##	[377,]	FALSE	FALSE	FALSE	FALSE
##	[378,]	FALSE	FALSE	FALSE	FALSE
##	[379,]	FALSE	FALSE	FALSE	FALSE
##	[380,]	FALSE	FALSE	FALSE	FALSE
##	[381,]	FALSE	FALSE	FALSE	FALSE
##	[382,]	FALSE	FALSE	FALSE	FALSE
##	[383,]	FALSE	FALSE	FALSE	FALSE
##	[384,]	FALSE	FALSE	FALSE	FALSE
##	[385,]	FALSE	FALSE	FALSE	FALSE
##	[386,]	FALSE	FALSE	FALSE	FALSE
##	[387,]	FALSE	FALSE	FALSE	FALSE
##	[388,]	FALSE	FALSE	FALSE	FALSE
##	[389,]	FALSE	FALSE	FALSE	FALSE
##	[390,]	FALSE	FALSE	FALSE	FALSE
##	[391,]	FALSE	FALSE	FALSE	FALSE
##	[392,]	FALSE	FALSE	FALSE	FALSE
##	[393,]	FALSE	FALSE	FALSE	FALSE
##	[394,]	FALSE	FALSE	FALSE	FALSE
##	[395,]	FALSE	FALSE	FALSE	FALSE
##	[396,]	FALSE	FALSE	FALSE	FALSE
##	[397,]	FALSE	FALSE	FALSE	FALSE
##	[398,]	FALSE	FALSE	FALSE	FALSE
##	[399,]	FALSE	FALSE	FALSE	FALSE
##	[400,]	FALSE	FALSE	FALSE	FALSE
##	[401,]	FALSE	FALSE	FALSE	FALSE
##	[402,]	FALSE	FALSE	FALSE	FALSE
##	[403,]	FALSE	FALSE	FALSE	FALSE
##	[404,]	FALSE	FALSE	FALSE	FALSE
##	[405,]	FALSE	FALSE	FALSE	FALSE

##	[406,]	FALSE	FALSE	FALSE	FALSE
##	[407,]	FALSE	FALSE	FALSE	FALSE
##	[408,]	FALSE	FALSE	FALSE	FALSE
##	[409,]	FALSE	FALSE	FALSE	FALSE
##	[410,]	FALSE	FALSE	FALSE	FALSE
##	[411,]	FALSE	FALSE	FALSE	FALSE
##	[412,]	FALSE	FALSE	FALSE	FALSE
##	[413,]	FALSE	FALSE	FALSE	FALSE
##	[414,]	FALSE	FALSE	FALSE	FALSE
##	[415,]	FALSE	FALSE	FALSE	FALSE
##	[416,]	FALSE	FALSE	FALSE	FALSE
##	[417,]	FALSE	FALSE	FALSE	FALSE
##	[418,]	FALSE	FALSE	FALSE	FALSE
##	[419,]	FALSE	FALSE	FALSE	FALSE
##	[420,]	FALSE	FALSE	FALSE	FALSE
##	[421,]	FALSE	FALSE	FALSE	FALSE
##	[422,]	FALSE	FALSE	FALSE	FALSE
##	[423,]	FALSE	FALSE	FALSE	FALSE
##	[424,]	FALSE	FALSE	FALSE	FALSE
##	[425,]	FALSE	FALSE	FALSE	FALSE
##	[426,]	FALSE	FALSE	FALSE	FALSE
##	[427,]	FALSE	FALSE	FALSE	FALSE
##	[428,]	FALSE	FALSE	FALSE	FALSE
##	[429,]	FALSE	FALSE	FALSE	FALSE
##	[430,]	FALSE	FALSE	FALSE	FALSE
##	[431,]	FALSE	FALSE	FALSE	FALSE
##	[432,]	FALSE	FALSE	FALSE	FALSE
##	[433,]	FALSE	FALSE	FALSE	FALSE
##	[434,]	FALSE	FALSE	FALSE	FALSE
##	[435,]	FALSE	FALSE	FALSE	FALSE
##	[436,]	FALSE	FALSE	FALSE	FALSE
##	[437,]	FALSE	FALSE	FALSE	FALSE
##	[438,]	FALSE	FALSE	FALSE	FALSE
##	[439,]	FALSE	FALSE	FALSE	FALSE
##	[440,]	FALSE	FALSE	FALSE	FALSE
##	[441,]	FALSE	FALSE	FALSE	FALSE
##	[442,]	FALSE	FALSE	FALSE	FALSE
##	[443,]	FALSE	FALSE	FALSE	FALSE
##	[444,]	FALSE	FALSE	FALSE	FALSE
##	[445,]	FALSE	FALSE	FALSE	FALSE
##	[446,]	FALSE	FALSE	FALSE	FALSE
##	[447,]	FALSE	FALSE	FALSE	FALSE
##	[448,]	FALSE	FALSE	FALSE	FALSE
##	[449,]	FALSE	FALSE	FALSE	FALSE
##	[450,]	FALSE	FALSE	FALSE	FALSE
##	[451,]	FALSE	FALSE	FALSE	FALSE
##	[452,]	FALSE	FALSE	FALSE	FALSE
##	[453,]	FALSE	FALSE	FALSE	FALSE
##	[454,]	FALSE	FALSE	FALSE	FALSE
##	[455,]	FALSE	FALSE	FALSE	FALSE
##	[456,]	FALSE	FALSE	FALSE	FALSE
##	[457,]	FALSE	FALSE	FALSE	FALSE
##	[458,]	FALSE	FALSE	FALSE	FALSE
##	[459,]	FALSE	FALSE	FALSE	FALSE

##	[460,]	FALSE	FALSE	FALSE	FALSE
##	[461,]	FALSE	FALSE	FALSE	FALSE
##	[462,]	FALSE	FALSE	FALSE	FALSE
##	[463,]	FALSE	FALSE	FALSE	FALSE
##	[464,]	FALSE	FALSE	FALSE	FALSE
##	[465,]	FALSE	FALSE	FALSE	FALSE
##	[466,]	FALSE	FALSE	FALSE	FALSE
##	[467,]	FALSE	FALSE	FALSE	FALSE
##	[468,]	FALSE	FALSE	FALSE	FALSE
##	[469,]	FALSE	FALSE	FALSE	FALSE
##	[470,]	FALSE	FALSE	FALSE	FALSE
##	[471,]	FALSE	FALSE	FALSE	FALSE
##	[472,]	FALSE	FALSE	FALSE	FALSE
##	[473,]	FALSE	FALSE	FALSE	FALSE
##	[474,]	FALSE	FALSE	FALSE	FALSE
##	[475,]	FALSE	FALSE	FALSE	FALSE
##	[476,]	FALSE	FALSE	FALSE	FALSE
##	[477,]	FALSE	FALSE	FALSE	FALSE
##	[478,]	FALSE	FALSE	FALSE	FALSE
##	[479,]	FALSE	FALSE	FALSE	FALSE
##	[480,]	FALSE	FALSE	FALSE	FALSE
##	[481,]	FALSE	FALSE	FALSE	FALSE
##	[482,]	FALSE	FALSE	FALSE	FALSE
##	[483,]	FALSE	FALSE	FALSE	FALSE
##	[484,]	FALSE	FALSE	FALSE	FALSE
##	[485,]	FALSE	FALSE	FALSE	FALSE
##	[486,]	FALSE	FALSE	FALSE	FALSE
##	[487,]	FALSE	FALSE	FALSE	FALSE
##	[488,]	FALSE	FALSE	FALSE	FALSE
##	[489,]	FALSE	FALSE	FALSE	FALSE
##	[490,]	FALSE	FALSE	FALSE	FALSE
##	[491,]	FALSE	FALSE	FALSE	FALSE
##	[492,]	FALSE	FALSE	FALSE	FALSE
##	[493,]	FALSE	FALSE	FALSE	FALSE
##	[494,]	FALSE	FALSE	FALSE	FALSE
##	[495,]	FALSE	FALSE	FALSE	FALSE
##	[496,]	FALSE	FALSE	FALSE	FALSE
##	[497,]	FALSE	FALSE	FALSE	FALSE
##	[498,]	FALSE	FALSE	FALSE	FALSE
##	[499,]	FALSE	FALSE	FALSE	FALSE
##	[500,]	FALSE	FALSE	FALSE	FALSE
##	[501,]	FALSE	FALSE	FALSE	FALSE
##	[502,]	FALSE	FALSE	FALSE	FALSE
##	[503,]	FALSE	FALSE	FALSE	FALSE
##	[504,]	FALSE	FALSE	FALSE	FALSE
##	[505,]	FALSE	FALSE	FALSE	FALSE
##	[506,]	FALSE	FALSE	FALSE	FALSE
##	[507,]	FALSE	FALSE	FALSE	FALSE
##	[508,]	FALSE	FALSE	FALSE	FALSE
##	[509,]	FALSE	FALSE	FALSE	FALSE
##	[510,]	FALSE	FALSE	FALSE	FALSE
##	[511,]	FALSE	FALSE	FALSE	FALSE
##	[512,]	FALSE	FALSE	FALSE	FALSE
##	[513,]	FALSE	FALSE	FALSE	FALSE

##	[514,]	FALSE	FALSE	FALSE	FALSE
##	[515,]	FALSE	FALSE	FALSE	FALSE
##	[516,]	FALSE	FALSE	FALSE	FALSE
##	[517,]	FALSE	FALSE	FALSE	FALSE
##	[518,]	FALSE	FALSE	FALSE	FALSE
##	[519,]	FALSE	FALSE	FALSE	FALSE
##	[520,]	FALSE	FALSE	FALSE	FALSE
##	[521,]	FALSE	FALSE	FALSE	FALSE
##	[522,]	FALSE	FALSE	FALSE	FALSE
##	[523,]	FALSE	FALSE	FALSE	FALSE
##	[524,]	FALSE	FALSE	FALSE	FALSE
##	[525,]	FALSE	FALSE	FALSE	FALSE
##	[526,]	FALSE	FALSE	FALSE	FALSE
##	[527,]	FALSE	FALSE	FALSE	FALSE
##	[528,]	FALSE	FALSE	FALSE	FALSE
##	[529,]	FALSE	FALSE	FALSE	FALSE
##	[530,]	FALSE	FALSE	FALSE	FALSE
##	[531,]	FALSE	FALSE	FALSE	FALSE
##	[532,]	FALSE	FALSE	FALSE	FALSE
##	[533,]	FALSE	FALSE	FALSE	FALSE
##	[534,]	FALSE	FALSE	FALSE	FALSE
##	[535,]	FALSE	FALSE	FALSE	FALSE
##	[536,]	FALSE	FALSE	FALSE	FALSE
##	[537,]	FALSE	FALSE	FALSE	FALSE
##	[538,]	FALSE	FALSE	FALSE	FALSE
##	[539,]	FALSE	FALSE	FALSE	FALSE
##	[540,]	FALSE	FALSE	FALSE	FALSE
##	[541,]	FALSE	FALSE	FALSE	FALSE
##	[542,]	FALSE	FALSE	FALSE	FALSE
##	[543,]	FALSE	FALSE	FALSE	FALSE
##	[544,]	FALSE	FALSE	FALSE	FALSE
##	[545,]	FALSE	FALSE	FALSE	FALSE
##	[546,]	FALSE	FALSE	FALSE	FALSE
##	[547,]	FALSE	FALSE	FALSE	FALSE
##	[548,]	FALSE	FALSE	FALSE	FALSE
##	[549,]	FALSE	FALSE	FALSE	FALSE
##	[550,]	FALSE	FALSE	FALSE	FALSE
##	[551,]	FALSE	FALSE	FALSE	FALSE
##	[552,]	FALSE	FALSE	FALSE	FALSE
##	[553,]	FALSE	FALSE	FALSE	FALSE
##	[554,]	FALSE	FALSE	FALSE	FALSE
##	[555,]	FALSE	FALSE	FALSE	FALSE
##	[556,]	FALSE	FALSE	FALSE	FALSE
##	[557,]	FALSE	FALSE	FALSE	FALSE
##	[558,]	FALSE	FALSE	FALSE	FALSE
##	[559,]	FALSE	FALSE	FALSE	FALSE
##	[560,]	FALSE	FALSE	FALSE	FALSE
##	[561,]	FALSE	FALSE	FALSE	FALSE
##	[562,]	FALSE	FALSE	FALSE	FALSE
##	[563,]	FALSE	FALSE	FALSE	FALSE
##	[564,]	FALSE	FALSE	FALSE	FALSE
##	[565,]	FALSE	FALSE	FALSE	FALSE
##	[566,]	FALSE	FALSE	FALSE	FALSE
##	[567,]	FALSE	FALSE	FALSE	FALSE

##	[568,]	FALSE	FALSE	FALSE	FALSE
##	[569,]	FALSE	FALSE	FALSE	FALSE
##	[570,]	FALSE	FALSE	FALSE	FALSE
##	[571,]	FALSE	FALSE	FALSE	FALSE
##	[572,]	FALSE	FALSE	FALSE	FALSE
##	[573,]	FALSE	FALSE	FALSE	FALSE
##	[574,]	FALSE	FALSE	FALSE	FALSE
##	[575,]	FALSE	FALSE	FALSE	FALSE
##	[576,]	FALSE	FALSE	FALSE	FALSE
##	[577,]	FALSE	FALSE	FALSE	FALSE
##	[578,]	FALSE	FALSE	FALSE	FALSE
##	[579,]	FALSE	FALSE	FALSE	FALSE
##	[580,]	FALSE	FALSE	FALSE	FALSE
##	[581,]	FALSE	FALSE	FALSE	FALSE
##	[582,]	FALSE	FALSE	FALSE	FALSE
##	[583,]	FALSE	FALSE	FALSE	FALSE
##	[584,]	FALSE	FALSE	FALSE	FALSE
##	[585,]	FALSE	FALSE	FALSE	FALSE
##	[586,]	FALSE	FALSE	FALSE	FALSE
##	[587,]	FALSE	FALSE	FALSE	FALSE
##	[588,]	FALSE	FALSE	FALSE	FALSE
##	[589,]	FALSE	FALSE	FALSE	FALSE
##	[590,]	FALSE	FALSE	FALSE	FALSE
##	[591,]	FALSE	FALSE	FALSE	FALSE
##	[592,]	FALSE	FALSE	FALSE	FALSE
##	[593,]	FALSE	FALSE	FALSE	FALSE
##	[594,]	FALSE	FALSE	FALSE	FALSE
##	[595,]	FALSE	FALSE	FALSE	FALSE
##	[596,]	FALSE	FALSE	FALSE	FALSE
##	[597,]	FALSE	FALSE	FALSE	FALSE
##	[598,]	FALSE	FALSE	FALSE	FALSE
##	[599,]	FALSE	FALSE	FALSE	FALSE
##	[600,]	FALSE	FALSE	FALSE	FALSE
##	[601,]	FALSE	FALSE	FALSE	FALSE
##	[602,]	FALSE	FALSE	FALSE	FALSE
##	[603,]	FALSE	FALSE	FALSE	FALSE
##	[604,]	FALSE	FALSE	FALSE	FALSE
##	[605,]	FALSE	FALSE	FALSE	FALSE
##	[606,]	FALSE	FALSE	FALSE	FALSE
##	[607,]	FALSE	FALSE	FALSE	FALSE
##	[608,]	FALSE	FALSE	FALSE	FALSE
##	[609,]	FALSE	FALSE	FALSE	FALSE
##	[610,]	FALSE	FALSE	FALSE	FALSE
##	[611,]	FALSE	FALSE	FALSE	FALSE
##	[612,]	FALSE	FALSE	FALSE	FALSE
##	[613,]	FALSE	FALSE	FALSE	FALSE
##	[614,]	FALSE	FALSE	FALSE	FALSE
##	[615,]	FALSE	FALSE	FALSE	FALSE
##	[616,]	FALSE	FALSE	FALSE	FALSE
##	[617,]	FALSE	FALSE	FALSE	FALSE
##	[618,]	FALSE	FALSE	FALSE	FALSE
##	[619,]	FALSE	FALSE	FALSE	FALSE
##	[620,]	FALSE	FALSE	FALSE	FALSE
##	[621,]	FALSE	FALSE	FALSE	FALSE

##	[622,]	FALSE	FALSE	FALSE	FALSE
##	[623,]	FALSE	FALSE	FALSE	FALSE
##	[624,]	FALSE	FALSE	FALSE	FALSE
##	[625,]	FALSE	FALSE	FALSE	FALSE
##	[626,]	FALSE	FALSE	FALSE	FALSE
##	[627,]	FALSE	FALSE	FALSE	FALSE
##	[628,]	FALSE	FALSE	FALSE	FALSE
##	[629,]	FALSE	FALSE	FALSE	FALSE
##	[630,]	FALSE	FALSE	FALSE	FALSE
##	[631,]	FALSE	FALSE	FALSE	FALSE
##	[632,]	FALSE	FALSE	FALSE	FALSE
##	[633,]	FALSE	FALSE	FALSE	FALSE
##	[634,]	FALSE	FALSE	FALSE	FALSE
##	[635,]	FALSE	FALSE	FALSE	FALSE
##	[636,]	FALSE	FALSE	FALSE	FALSE
##	[637,]	FALSE	FALSE	FALSE	FALSE
##	[638,]	FALSE	FALSE	FALSE	FALSE
##	[639,]	FALSE	FALSE	FALSE	FALSE
##	[640,]	FALSE	FALSE	FALSE	FALSE
##	[641,]	FALSE	FALSE	FALSE	FALSE
##	[642,]	FALSE	FALSE	FALSE	FALSE
##	[643,]	FALSE	FALSE	FALSE	FALSE
##	[644,]	FALSE	FALSE	FALSE	FALSE
##	[645,]	FALSE	FALSE	FALSE	FALSE
##	[646,]	FALSE	FALSE	FALSE	FALSE
##	[647,]	FALSE	FALSE	FALSE	FALSE
##	[648,]	FALSE	FALSE	FALSE	FALSE
##	[649,]	FALSE	FALSE	FALSE	FALSE
##	[650,]	FALSE	FALSE	FALSE	FALSE
##	[651,]	FALSE	FALSE	FALSE	FALSE
##	[652,]	FALSE	FALSE	FALSE	FALSE
##	[653,]	FALSE	FALSE	FALSE	FALSE
##	[654,]	FALSE	FALSE	FALSE	FALSE
##	[655,]	FALSE	FALSE	FALSE	FALSE
##	[656,]	FALSE	FALSE	FALSE	FALSE
##	[657,]	FALSE	FALSE	FALSE	FALSE
##	[658,]	FALSE	FALSE	FALSE	FALSE
##	[659,]	FALSE	FALSE	FALSE	FALSE
##	[660,]	FALSE	FALSE	FALSE	FALSE
##	[661,]	FALSE	FALSE	FALSE	FALSE
##	[662,]	FALSE	FALSE	FALSE	FALSE
##	[663,]	FALSE	FALSE	FALSE	FALSE
##	[664,]	FALSE	FALSE	FALSE	FALSE
##	[665,]	FALSE	FALSE	FALSE	FALSE
##	[666,]	FALSE	FALSE	FALSE	FALSE
##	[667,]	FALSE	FALSE	FALSE	FALSE
##	[668,]	FALSE	FALSE	FALSE	FALSE
##	[669,]	FALSE	FALSE	FALSE	FALSE
##	[670,]	FALSE	FALSE	FALSE	FALSE
##	[671,]	FALSE	FALSE	FALSE	FALSE
##	[672,]	FALSE	FALSE	FALSE	FALSE
##	[673,]	FALSE	FALSE	FALSE	FALSE
##	[674,]	FALSE	FALSE	FALSE	FALSE
##	[675,]	FALSE	FALSE	FALSE	FALSE

##	[676,]	FALSE	FALSE	FALSE	FALSE
##	[677,]	FALSE	FALSE	FALSE	FALSE
##	[678,]	FALSE	FALSE	FALSE	FALSE
##	[679,]	FALSE	FALSE	FALSE	FALSE
##	[680,]	FALSE	FALSE	FALSE	FALSE
##	[681,]	FALSE	FALSE	FALSE	FALSE
##	[682,]	FALSE	FALSE	FALSE	FALSE
##	[683,]	FALSE	FALSE	FALSE	FALSE
##	[684,]	FALSE	FALSE	FALSE	FALSE
##	[685,]	FALSE	FALSE	FALSE	FALSE
##	[686,]	FALSE	FALSE	FALSE	FALSE
##	[687,]	FALSE	FALSE	FALSE	FALSE
##	[688,]	FALSE	FALSE	FALSE	FALSE
##	[689,]	FALSE	FALSE	FALSE	FALSE
##	[690,]	FALSE	FALSE	FALSE	FALSE
##	[691,]	FALSE	FALSE	FALSE	FALSE
##	[692,]	FALSE	FALSE	FALSE	FALSE
##	[693,]	FALSE	FALSE	FALSE	FALSE
##	[694,]	FALSE	FALSE	FALSE	FALSE
##	[695,]	FALSE	FALSE	FALSE	FALSE
##	[696,]	FALSE	FALSE	FALSE	FALSE
##	[697,]	FALSE	FALSE	FALSE	FALSE
##	[698,]	FALSE	FALSE	FALSE	FALSE
##	[699,]	FALSE	FALSE	FALSE	FALSE
##	[700,]	FALSE	FALSE	FALSE	FALSE
##	[701,]	FALSE	FALSE	FALSE	FALSE
##	[702,]	FALSE	FALSE	FALSE	FALSE
##	[703,]	FALSE	FALSE	FALSE	FALSE
##	[704,]	FALSE	FALSE	FALSE	FALSE
##	[705,]	FALSE	FALSE	FALSE	FALSE
##	[706,]	FALSE	FALSE	FALSE	FALSE
##	[707,]	FALSE	FALSE	FALSE	FALSE
##	[708,]	FALSE	FALSE	FALSE	FALSE
##	[709,]	FALSE	FALSE	FALSE	FALSE
##	[710,]	FALSE	FALSE	FALSE	FALSE
##	[711,]	FALSE	FALSE	FALSE	FALSE
##	[712,]	FALSE	FALSE	FALSE	FALSE
##	[713,]	FALSE	FALSE	FALSE	FALSE
##	[714,]	FALSE	FALSE	FALSE	FALSE
##	[715,]	FALSE	FALSE	FALSE	FALSE
##	[716,]	FALSE	FALSE	FALSE	FALSE
##	[717,]	FALSE	FALSE	FALSE	FALSE
##	[718,]	FALSE	FALSE	FALSE	FALSE
##	[719,]	FALSE	FALSE	FALSE	FALSE
##	[720,]	FALSE	FALSE	FALSE	FALSE
##	[721,]	FALSE	FALSE	FALSE	FALSE
##	[722,]	FALSE	FALSE	FALSE	FALSE
##	[723,]	FALSE	FALSE	FALSE	FALSE
##	[724,]	FALSE	FALSE	FALSE	FALSE
##	[725,]	FALSE	FALSE	FALSE	FALSE
##	[726,]	FALSE	FALSE	FALSE	FALSE
##	[727,]	FALSE	FALSE	FALSE	FALSE
##	[728,]	FALSE	FALSE	FALSE	FALSE
##	[729,]	FALSE	FALSE	FALSE	FALSE

##	[730,]	FALSE	FALSE	FALSE	FALSE
##	[731,]	FALSE	FALSE	FALSE	FALSE
##	[732,]	FALSE	FALSE	FALSE	FALSE
##	[733,]	FALSE	FALSE	FALSE	FALSE
##	[734,]	FALSE	FALSE	FALSE	FALSE
##	[735,]	FALSE	FALSE	FALSE	FALSE
##	[736,]	FALSE	FALSE	FALSE	FALSE
##	[737,]	FALSE	FALSE	FALSE	FALSE
##	[738,]	FALSE	FALSE	FALSE	FALSE
##	[739,]	FALSE	FALSE	FALSE	FALSE
##	[740,]	FALSE	FALSE	FALSE	FALSE
##	[741,]	FALSE	FALSE	FALSE	FALSE
##	[742,]	FALSE	FALSE	FALSE	FALSE
##	[743,]	FALSE	FALSE	FALSE	FALSE
##	[744,]	FALSE	FALSE	FALSE	FALSE
##	[745,]	FALSE	FALSE	FALSE	FALSE
##	[746,]	FALSE	FALSE	FALSE	FALSE
##	[747,]	FALSE	FALSE	FALSE	FALSE
##	[748,]	FALSE	FALSE	FALSE	FALSE
##	[749,]	FALSE	FALSE	FALSE	FALSE
##	[750,]	FALSE	FALSE	FALSE	FALSE
##	[751,]	FALSE	FALSE	FALSE	FALSE
##	[752,]	FALSE	FALSE	FALSE	FALSE
##	[753,]	FALSE	FALSE	FALSE	FALSE
##	[754,]	FALSE	FALSE	FALSE	FALSE
##	[755,]	FALSE	FALSE	FALSE	FALSE
##	[756,]	FALSE	FALSE	FALSE	FALSE
##	[757,]	FALSE	FALSE	FALSE	FALSE
##	[758,]	FALSE	FALSE	FALSE	FALSE
##	[759,]	FALSE	FALSE	FALSE	FALSE
##	[760,]	FALSE	FALSE	FALSE	FALSE
##	[761,]	FALSE	FALSE	FALSE	FALSE
##	[762,]	FALSE	FALSE	FALSE	FALSE
##	[763,]	FALSE	FALSE	FALSE	FALSE
##	[764,]	FALSE	FALSE	FALSE	FALSE
##	[765,]	FALSE	FALSE	FALSE	FALSE
##	[766,]	FALSE	FALSE	FALSE	FALSE
##	[767,]	FALSE	FALSE	FALSE	FALSE
##	[768,]	FALSE	FALSE	FALSE	FALSE
##	[769,]	FALSE	FALSE	FALSE	FALSE
##	[770,]	FALSE	FALSE	FALSE	FALSE
##	[771,]	FALSE	FALSE	FALSE	FALSE
##	[772,]	FALSE	FALSE	FALSE	FALSE
##	[773,]	FALSE	FALSE	FALSE	FALSE
##	[774,]	FALSE	FALSE	FALSE	FALSE
##	[775,]	FALSE	FALSE	FALSE	FALSE
##	[776,]	FALSE	FALSE	FALSE	FALSE
##	[777,]	FALSE	FALSE	FALSE	FALSE
##	[778,]	FALSE	FALSE	FALSE	FALSE
##	[779,]	FALSE	FALSE	FALSE	FALSE
##	[780,]	FALSE	FALSE	FALSE	FALSE
##	[781,]	FALSE	FALSE	FALSE	FALSE
##	[782,]	FALSE	FALSE	FALSE	FALSE
##	[783,]	FALSE	FALSE	FALSE	FALSE

##	[784,]	FALSE	FALSE	FALSE	FALSE
##	[785,]	FALSE	FALSE	FALSE	FALSE
##	[786,]	FALSE	FALSE	FALSE	FALSE
##	[787,]	FALSE	FALSE	FALSE	FALSE
##	[788,]	FALSE	FALSE	FALSE	FALSE
##	[789,]	FALSE	FALSE	FALSE	FALSE
##	[790,]	FALSE	FALSE	FALSE	FALSE
##	[791,]	FALSE	FALSE	FALSE	FALSE
##	[792,]	FALSE	FALSE	FALSE	FALSE
##	[793,]	FALSE	FALSE	FALSE	FALSE
##	[794,]	FALSE	FALSE	FALSE	FALSE
##	[795,]	FALSE	FALSE	FALSE	FALSE
##	[796,]	FALSE	FALSE	FALSE	FALSE
##	[797,]	FALSE	FALSE	FALSE	FALSE
##	[798,]	FALSE	FALSE	FALSE	FALSE
##	[799,]	FALSE	FALSE	FALSE	FALSE
##	[800,]	FALSE	FALSE	FALSE	FALSE
##	[801,]	FALSE	FALSE	FALSE	FALSE
##	[802,]	FALSE	FALSE	FALSE	FALSE
##	[803,]	FALSE	FALSE	FALSE	FALSE
##	[804,]	FALSE	FALSE	FALSE	FALSE
##	[805,]	FALSE	FALSE	FALSE	FALSE
##	[806,]	FALSE	FALSE	FALSE	FALSE
##	[807,]	FALSE	FALSE	FALSE	FALSE
##	[808,]	FALSE	FALSE	FALSE	FALSE
##	[809,]	FALSE	FALSE	FALSE	FALSE
##	[810,]	FALSE	FALSE	FALSE	FALSE
##	[811,]	FALSE	FALSE	FALSE	FALSE
##	[812,]	FALSE	FALSE	FALSE	FALSE
##	[813,]	FALSE	FALSE	FALSE	FALSE
##	[814,]	FALSE	FALSE	FALSE	FALSE
##	[815,]	FALSE	FALSE	FALSE	FALSE
##	[816,]	FALSE	FALSE	FALSE	FALSE
##	[817,]	FALSE	FALSE	FALSE	FALSE
##	[818,]	FALSE	FALSE	FALSE	FALSE
##	[819,]	FALSE	FALSE	FALSE	FALSE
##	[820,]	FALSE	FALSE	FALSE	FALSE
##	[821,]	FALSE	FALSE	FALSE	FALSE
##	[822,]	FALSE	FALSE	FALSE	FALSE
##	[823,]	FALSE	FALSE	FALSE	FALSE
##	[824,]	FALSE	FALSE	FALSE	FALSE
##	[825,]	FALSE	FALSE	FALSE	FALSE
##	[826,]	FALSE	FALSE	FALSE	FALSE
##	[827,]	FALSE	FALSE	FALSE	FALSE
##	[828,]	FALSE	FALSE	FALSE	FALSE
##	[829,]	FALSE	FALSE	FALSE	FALSE
##	[830,]	FALSE	FALSE	FALSE	FALSE
##	[831,]	FALSE	FALSE	FALSE	FALSE
##	[832,]	FALSE	FALSE	FALSE	FALSE
##	[833,]	FALSE	FALSE	FALSE	FALSE
##	[834,]	FALSE	FALSE	FALSE	FALSE
##	[835,]	FALSE	FALSE	FALSE	FALSE
##	[836,]	FALSE	FALSE	FALSE	FALSE
##	[837,]	FALSE	FALSE	FALSE	FALSE

##	[838,]	FALSE	FALSE	FALSE	FALSE
##	[839,]	FALSE	FALSE	FALSE	FALSE
##	[840,]	FALSE	FALSE	FALSE	FALSE
##	[841,]	FALSE	FALSE	FALSE	FALSE
##	[842,]	FALSE	FALSE	FALSE	FALSE
##	[843,]	FALSE	FALSE	FALSE	FALSE
##	[844,]	FALSE	FALSE	FALSE	FALSE
##	[845,]	FALSE	FALSE	FALSE	FALSE
##	[846,]	FALSE	FALSE	FALSE	FALSE
##	[847,]	FALSE	FALSE	FALSE	FALSE
##	[848,]	FALSE	FALSE	FALSE	FALSE
##	[849,]	FALSE	FALSE	FALSE	FALSE
##	[850,]	FALSE	FALSE	FALSE	FALSE
##	[851,]	FALSE	FALSE	FALSE	FALSE
##	[852,]	FALSE	FALSE	FALSE	FALSE
##	[853,]	FALSE	FALSE	FALSE	FALSE
##	[854,]	FALSE	FALSE	FALSE	FALSE
##	[855,]	FALSE	FALSE	FALSE	FALSE
##	[856,]	FALSE	FALSE	FALSE	FALSE
##	[857,]	FALSE	FALSE	FALSE	FALSE
##	[858,]	FALSE	FALSE	FALSE	FALSE
##	[859,]	FALSE	FALSE	FALSE	FALSE
##	[860,]	FALSE	FALSE	FALSE	FALSE
##	[861,]	FALSE	FALSE	FALSE	FALSE
##	[862,]	FALSE	FALSE	FALSE	FALSE
##	[863,]	FALSE	FALSE	FALSE	FALSE
##	[864,]	FALSE	FALSE	FALSE	FALSE
##	[865,]	FALSE	FALSE	FALSE	FALSE
##	[866,]	FALSE	FALSE	FALSE	FALSE
##	[867,]	FALSE	FALSE	FALSE	FALSE
##	[868,]	FALSE	FALSE	FALSE	FALSE
##	[869,]	FALSE	FALSE	FALSE	FALSE
##	[870,]	FALSE	FALSE	FALSE	FALSE
##	[871,]	FALSE	FALSE	FALSE	FALSE
##	[872,]	FALSE	FALSE	FALSE	FALSE
##	[873,]	FALSE	FALSE	FALSE	FALSE
##	[874,]	FALSE	FALSE	FALSE	FALSE
##	[875,]	FALSE	FALSE	FALSE	FALSE
##	[876,]	FALSE	FALSE	FALSE	FALSE
##	[877,]	FALSE	FALSE	FALSE	FALSE
##	[878,]	FALSE	FALSE	FALSE	FALSE
##	[879,]	FALSE	FALSE	FALSE	FALSE
##	[880,]	FALSE	FALSE	FALSE	FALSE
##	[881,]	FALSE	FALSE	FALSE	FALSE
##	[882,]	FALSE	FALSE	FALSE	FALSE
##	[883,]	FALSE	FALSE	FALSE	FALSE
##	[884,]	FALSE	FALSE	FALSE	FALSE
##	[885,]	FALSE	FALSE	FALSE	FALSE
##	[886,]	FALSE	FALSE	FALSE	FALSE
##	[887,]	FALSE	FALSE	FALSE	FALSE
##	[888,]	FALSE	FALSE	FALSE	FALSE
##	[889,]	FALSE	FALSE	FALSE	FALSE
##	[890,]	FALSE	FALSE	FALSE	FALSE
##	[891,]	FALSE	FALSE	FALSE	FALSE

##	[892,]	FALSE	FALSE	FALSE	FALSE
##	[893,]	FALSE	FALSE	FALSE	FALSE
##	[894,]	FALSE	FALSE	FALSE	FALSE
##	[895,]	FALSE	FALSE	FALSE	FALSE
##	[896,]	FALSE	FALSE	FALSE	FALSE
##	[897,]	FALSE	FALSE	FALSE	FALSE
##	[898,]	FALSE	FALSE	FALSE	FALSE
##	[899,]	FALSE	FALSE	FALSE	FALSE
##	[900,]	FALSE	FALSE	FALSE	FALSE
##	[901,]	FALSE	FALSE	FALSE	FALSE
##	[902,]	FALSE	FALSE	FALSE	FALSE
##	[903,]	FALSE	FALSE	FALSE	FALSE
##	[904,]	FALSE	FALSE	FALSE	FALSE
##	[905,]	FALSE	FALSE	FALSE	FALSE
##	[906,]	FALSE	FALSE	FALSE	FALSE
##	[907,]	FALSE	FALSE	FALSE	FALSE
##	[908,]	FALSE	FALSE	FALSE	FALSE
##	[909,]	FALSE	FALSE	FALSE	FALSE
##	[910,]	FALSE	FALSE	FALSE	FALSE
##	[911,]	FALSE	FALSE	FALSE	FALSE
##	[912,]	FALSE	FALSE	FALSE	FALSE
##	[913,]	FALSE	FALSE	FALSE	FALSE
##	[914,]	FALSE	FALSE	FALSE	FALSE
##	[915,]	FALSE	FALSE	FALSE	FALSE
##	[916,]	FALSE	FALSE	FALSE	FALSE
##	[917,]	FALSE	FALSE	FALSE	FALSE
##	[918,]	FALSE	FALSE	FALSE	FALSE
##	[919,]	FALSE	FALSE	FALSE	FALSE
##	[920,]	FALSE	FALSE	FALSE	FALSE
##	[921,]	FALSE	FALSE	FALSE	FALSE
##	[922,]	FALSE	FALSE	FALSE	FALSE
##	[923,]	FALSE	FALSE	FALSE	FALSE
##	[924,]	FALSE	FALSE	FALSE	FALSE
##	[925,]	FALSE	FALSE	FALSE	FALSE
##	[926,]	FALSE	FALSE	FALSE	FALSE
##	[927,]	FALSE	FALSE	FALSE	FALSE
##	[928,]	FALSE	FALSE	FALSE	FALSE
##	[929,]	FALSE	FALSE	FALSE	FALSE
##	[930,]	FALSE	FALSE	FALSE	FALSE
##	[931,]	FALSE	FALSE	FALSE	FALSE
##	[932,]	FALSE	FALSE	FALSE	FALSE
##	[933,]	FALSE	FALSE	FALSE	FALSE
##	[934,]	FALSE	FALSE	FALSE	FALSE
##	[935,]	FALSE	FALSE	FALSE	FALSE
##	[936,]	FALSE	FALSE	FALSE	FALSE
##	[937,]	FALSE	FALSE	FALSE	FALSE
##	[938,]	FALSE	FALSE	FALSE	FALSE
##	[939,]	FALSE	FALSE	FALSE	FALSE
##	[940,]	FALSE	FALSE	FALSE	FALSE
##	[941,]	FALSE	FALSE	FALSE	FALSE
##	[942,]	FALSE	FALSE	FALSE	FALSE
##	[943,]	FALSE	FALSE	FALSE	FALSE
##	[944,]	FALSE	FALSE	FALSE	FALSE
##	[945,]	FALSE	FALSE	FALSE	FALSE

##	[946,]	FALSE	FALSE	FALSE	FALSE
##	[947,]	FALSE	FALSE	FALSE	FALSE
##	[948,]	FALSE	FALSE	FALSE	FALSE
##	[949,]	FALSE	FALSE	FALSE	FALSE
##	[950,]	FALSE	FALSE	FALSE	FALSE
##	[951,]	FALSE	FALSE	FALSE	FALSE
##	[952,]	FALSE	FALSE	FALSE	FALSE
##	[953,]	FALSE	FALSE	FALSE	FALSE
##	[954,]	FALSE	FALSE	FALSE	FALSE
##	[955,]	FALSE	FALSE	FALSE	FALSE
##	[956,]	FALSE	FALSE	FALSE	FALSE
##	[957,]	FALSE	FALSE	FALSE	FALSE
##	[958,]	FALSE	FALSE	FALSE	FALSE
##	[959,]	FALSE	FALSE	FALSE	FALSE
##	[960,]	FALSE	FALSE	FALSE	FALSE
##	[961,]	FALSE	FALSE	FALSE	FALSE
##	[962,]	FALSE	FALSE	FALSE	FALSE
##	[963,]	FALSE	FALSE	FALSE	FALSE
##	[964,]	FALSE	FALSE	FALSE	FALSE
##	[965,]	FALSE	FALSE	FALSE	FALSE
##	[966,]	FALSE	FALSE	FALSE	FALSE
##	[967,]	FALSE	FALSE	FALSE	FALSE
##	[968,]	FALSE	FALSE	FALSE	FALSE
##	[969,]	FALSE	FALSE	FALSE	FALSE
##	[970,]	FALSE	FALSE	FALSE	FALSE
##	[971,]	FALSE	FALSE	FALSE	FALSE
##	[972,]	FALSE	FALSE	FALSE	FALSE
##	[973,]	FALSE	FALSE	FALSE	FALSE
##	[974,]	FALSE	FALSE	FALSE	FALSE
##	[975,]	FALSE	FALSE	FALSE	FALSE
##	[976,]	FALSE	FALSE	FALSE	FALSE
##	[977,]	FALSE	FALSE	FALSE	FALSE
##	[978,]	FALSE	FALSE	FALSE	FALSE
##	[979,]	FALSE	FALSE	FALSE	FALSE
##	[980,]	FALSE	FALSE	FALSE	FALSE
##	[981,]	FALSE	FALSE	FALSE	FALSE
##	[982,]	FALSE	FALSE	FALSE	FALSE
##	[983,]	FALSE	FALSE	FALSE	FALSE
##	[984,]	FALSE	FALSE	FALSE	FALSE
##	[985,]	FALSE	FALSE	FALSE	FALSE
##	[986,]	FALSE	FALSE	FALSE	FALSE
##	[987,]	FALSE	FALSE	FALSE	FALSE
##	[988,]	FALSE	FALSE	FALSE	FALSE
##	[989,]	FALSE	FALSE	FALSE	FALSE
##	[990,]	FALSE	FALSE	FALSE	FALSE
##	[991,]	FALSE	FALSE	FALSE	FALSE
##	[992,]	FALSE	FALSE	FALSE	FALSE
##	[993,]	FALSE	FALSE	FALSE	FALSE
##	[994,]	FALSE	FALSE	FALSE	FALSE
##	[995,]	FALSE	FALSE	FALSE	FALSE
##	[996,]	FALSE	FALSE	FALSE	FALSE
##	[997,]	FALSE	FALSE	FALSE	FALSE
##	[998,]	FALSE	FALSE	FALSE	FALSE
##	[999,]	FALSE	FALSE	FALSE	FALSE

## [1000,]	FALSE	FALSE	FALSE	FALSE
## [1001,]	FALSE	FALSE	FALSE	FALSE
## [1002,]	FALSE	FALSE	FALSE	FALSE
## [1003,]	FALSE	FALSE	FALSE	FALSE
## [1004,]	FALSE	FALSE	FALSE	FALSE
## [1005,]	FALSE	FALSE	FALSE	FALSE
## [1006,]	FALSE	FALSE	FALSE	FALSE
## [1007,]	FALSE	FALSE	FALSE	FALSE
## [1008,]	FALSE	FALSE	FALSE	FALSE
## [1009,]	FALSE	FALSE	FALSE	FALSE
## [1010,]	FALSE	FALSE	FALSE	FALSE
## [1011,]	FALSE	FALSE	FALSE	FALSE
## [1012,]	FALSE	FALSE	FALSE	FALSE
## [1013,]	FALSE	FALSE	FALSE	FALSE
## [1014,]	FALSE	FALSE	FALSE	FALSE
## [1015,]	FALSE	FALSE	FALSE	FALSE
## [1016,]	FALSE	FALSE	FALSE	FALSE
## [1017,]	FALSE	FALSE	FALSE	FALSE
## [1018,]	FALSE	FALSE	FALSE	FALSE
## [1019,]	FALSE	FALSE	FALSE	FALSE
## [1020,]	FALSE	FALSE	FALSE	FALSE
## [1021,]	FALSE	FALSE	FALSE	FALSE
## [1022,]	FALSE	FALSE	FALSE	FALSE
## [1023,]	FALSE	FALSE	FALSE	FALSE
## [1024,]	FALSE	FALSE	FALSE	FALSE
## [1025,]	FALSE	FALSE	FALSE	FALSE
## [1026,]	FALSE	FALSE	FALSE	FALSE
## [1027,]	FALSE	FALSE	FALSE	FALSE
## [1028,]	FALSE	FALSE	FALSE	FALSE
## [1029,]	FALSE	FALSE	FALSE	FALSE
## [1030,]	FALSE	FALSE	FALSE	FALSE
## [1031,]	FALSE	FALSE	FALSE	FALSE
## [1032,]	FALSE	FALSE	FALSE	FALSE
## [1033,]	FALSE	FALSE	FALSE	FALSE
## [1034,]	FALSE	FALSE	FALSE	FALSE
## [1035,]	FALSE	FALSE	FALSE	FALSE
## [1036,]	FALSE	FALSE	FALSE	FALSE
## [1037,]	FALSE	FALSE	FALSE	FALSE
## [1038,]	FALSE	FALSE	FALSE	FALSE
## [1039,]	FALSE	FALSE	FALSE	FALSE
## [1040,]	FALSE	FALSE	FALSE	FALSE
## [1041,]	FALSE	FALSE	FALSE	FALSE
## [1042,]	FALSE	FALSE	FALSE	FALSE
## [1043,]	FALSE	FALSE	FALSE	FALSE
## [1044,]	FALSE	FALSE	FALSE	FALSE
## [1045,]	FALSE	FALSE	FALSE	FALSE
## [1046,]	FALSE	FALSE	FALSE	FALSE
## [1047,]	FALSE	FALSE	FALSE	FALSE
## [1048,]	FALSE	FALSE	FALSE	FALSE
## [1049,]	FALSE	FALSE	FALSE	FALSE
## [1050,]	FALSE	FALSE	FALSE	FALSE
## [1051,]	FALSE	FALSE	FALSE	FALSE
## [1052,]	FALSE	FALSE	FALSE	FALSE
## [1053,]	FALSE	FALSE	FALSE	FALSE

[illegible]

## [1108,]	FALSE	FALSE	FALSE	FALSE
## [1109,]	FALSE	FALSE	FALSE	FALSE
## [1110,]	FALSE	FALSE	FALSE	FALSE
## [1111,]	FALSE	FALSE	FALSE	FALSE
## [1112,]	FALSE	FALSE	FALSE	FALSE
## [1113,]	FALSE	FALSE	FALSE	FALSE
## [1114,]	FALSE	FALSE	FALSE	FALSE
## [1115,]	FALSE	FALSE	FALSE	FALSE
## [1116,]	FALSE	FALSE	FALSE	FALSE
## [1117,]	FALSE	FALSE	FALSE	FALSE
## [1118,]	FALSE	FALSE	FALSE	FALSE
## [1119,]	FALSE	FALSE	FALSE	FALSE
## [1120,]	FALSE	FALSE	FALSE	FALSE
## [1121,]	FALSE	FALSE	FALSE	FALSE
## [1122,]	FALSE	FALSE	FALSE	FALSE
## [1123,]	FALSE	FALSE	FALSE	FALSE
## [1124,]	FALSE	FALSE	FALSE	FALSE
## [1125,]	FALSE	FALSE	FALSE	FALSE
## [1126,]	FALSE	FALSE	FALSE	FALSE
## [1127,]	FALSE	FALSE	FALSE	FALSE
## [1128,]	FALSE	FALSE	FALSE	FALSE
## [1129,]	FALSE	FALSE	FALSE	FALSE
## [1130,]	FALSE	FALSE	FALSE	FALSE
## [1131,]	FALSE	FALSE	FALSE	FALSE
## [1132,]	FALSE	FALSE	FALSE	FALSE
## [1133,]	FALSE	FALSE	FALSE	FALSE
## [1134,]	FALSE	FALSE	FALSE	FALSE
## [1135,]	FALSE	FALSE	FALSE	FALSE
## [1136,]	FALSE	FALSE	FALSE	FALSE
## [1137,]	FALSE	FALSE	FALSE	FALSE
## [1138,]	FALSE	FALSE	FALSE	FALSE
## [1139,]	FALSE	FALSE	FALSE	FALSE
## [1140,]	FALSE	FALSE	FALSE	FALSE
## [1141,]	FALSE	FALSE	FALSE	FALSE
## [1142,]	FALSE	FALSE	FALSE	FALSE
## [1143,]	FALSE	FALSE	FALSE	FALSE
## [1144,]	FALSE	FALSE	FALSE	FALSE
## [1145,]	FALSE	FALSE	FALSE	FALSE
## [1146,]	FALSE	FALSE	FALSE	FALSE
## [1147,]	FALSE	FALSE	FALSE	FALSE
## [1148,]	FALSE	FALSE	FALSE	FALSE
## [1149,]	FALSE	FALSE	FALSE	FALSE
## [1150,]	FALSE	FALSE	FALSE	FALSE
## [1151,]	FALSE	FALSE	FALSE	FALSE
## [1152,]	FALSE	FALSE	FALSE	FALSE
## [1153,]	FALSE	FALSE	FALSE	FALSE
## [1154,]	FALSE	FALSE	FALSE	FALSE
## [1155,]	FALSE	FALSE	FALSE	FALSE
## [1156,]	FALSE	FALSE	FALSE	FALSE
## [1157,]	FALSE	FALSE	FALSE	FALSE
## [1158,]	FALSE	FALSE	FALSE	FALSE
## [1159,]	FALSE	FALSE	FALSE	FALSE
## [1160,]	FALSE	FALSE	FALSE	FALSE
## [1161,]	FALSE	FALSE	FALSE	FALSE

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

## [1648,]	FALSE	FALSE	FALSE	FALSE
## [1649,]	FALSE	FALSE	FALSE	FALSE
## [1650,]	FALSE	FALSE	FALSE	FALSE
## [1651,]	FALSE	FALSE	FALSE	FALSE
## [1652,]	FALSE	FALSE	FALSE	FALSE
## [1653,]	FALSE	FALSE	FALSE	FALSE
## [1654,]	FALSE	FALSE	FALSE	FALSE
## [1655,]	FALSE	FALSE	FALSE	FALSE
## [1656,]	FALSE	FALSE	FALSE	FALSE
## [1657,]	FALSE	FALSE	FALSE	FALSE
## [1658,]	FALSE	FALSE	FALSE	FALSE
## [1659,]	FALSE	FALSE	FALSE	FALSE
## [1660,]	FALSE	FALSE	FALSE	FALSE
## [1661,]	FALSE	FALSE	FALSE	FALSE
## [1662,]	FALSE	FALSE	FALSE	FALSE
## [1663,]	FALSE	FALSE	FALSE	FALSE
## [1664,]	FALSE	FALSE	FALSE	FALSE
## [1665,]	FALSE	FALSE	FALSE	FALSE
## [1666,]	FALSE	FALSE	FALSE	FALSE
## [1667,]	FALSE	FALSE	FALSE	FALSE
## [1668,]	FALSE	FALSE	FALSE	FALSE
## [1669,]	FALSE	FALSE	FALSE	FALSE
## [1670,]	FALSE	FALSE	FALSE	FALSE
## [1671,]	FALSE	FALSE	FALSE	FALSE
## [1672,]	FALSE	FALSE	FALSE	FALSE
## [1673,]	FALSE	FALSE	FALSE	FALSE
## [1674,]	FALSE	FALSE	FALSE	FALSE
## [1675,]	FALSE	FALSE	FALSE	FALSE
## [1676,]	FALSE	FALSE	FALSE	FALSE
## [1677,]	FALSE	FALSE	FALSE	FALSE
## [1678,]	FALSE	FALSE	FALSE	FALSE
## [1679,]	FALSE	FALSE	FALSE	FALSE
## [1680,]	FALSE	FALSE	FALSE	FALSE
## [1681,]	FALSE	FALSE	FALSE	FALSE
## [1682,]	FALSE	FALSE	FALSE	FALSE
## [1683,]	FALSE	FALSE	FALSE	FALSE
## [1684,]	FALSE	FALSE	FALSE	FALSE
## [1685,]	FALSE	FALSE	FALSE	FALSE
## [1686,]	FALSE	FALSE	FALSE	FALSE
## [1687,]	FALSE	FALSE	FALSE	FALSE
## [1688,]	FALSE	FALSE	FALSE	FALSE
## [1689,]	FALSE	FALSE	FALSE	FALSE
## [1690,]	FALSE	FALSE	FALSE	FALSE
## [1691,]	FALSE	FALSE	FALSE	FALSE
## [1692,]	FALSE	FALSE	FALSE	FALSE
## [1693,]	FALSE	FALSE	FALSE	FALSE
## [1694,]	FALSE	FALSE	FALSE	FALSE
## [1695,]	FALSE	FALSE	FALSE	FALSE
## [1696,]	FALSE	FALSE	FALSE	FALSE
## [1697,]	FALSE	FALSE	FALSE	FALSE
## [1698,]	FALSE	FALSE	FALSE	FALSE
## [1699,]	FALSE	FALSE	FALSE	FALSE
## [1700,]	FALSE	FALSE	FALSE	FALSE
## [1701,]	FALSE	FALSE	FALSE	FALSE

[illegible]

[illegible]

[illegible]

[illegible]

## [1918,]	FALSE	FALSE	FALSE	FALSE
## [1919,]	FALSE	FALSE	FALSE	FALSE
## [1920,]	FALSE	FALSE	FALSE	FALSE
## [1921,]	FALSE	FALSE	FALSE	FALSE
## [1922,]	FALSE	FALSE	FALSE	FALSE
## [1923,]	FALSE	FALSE	FALSE	FALSE
## [1924,]	FALSE	FALSE	FALSE	FALSE
## [1925,]	FALSE	FALSE	FALSE	FALSE
## [1926,]	FALSE	FALSE	FALSE	FALSE
## [1927,]	FALSE	FALSE	FALSE	FALSE
## [1928,]	FALSE	FALSE	FALSE	FALSE
## [1929,]	FALSE	FALSE	FALSE	FALSE
## [1930,]	FALSE	FALSE	FALSE	FALSE
## [1931,]	FALSE	FALSE	FALSE	FALSE
## [1932,]	FALSE	FALSE	FALSE	FALSE
## [1933,]	FALSE	FALSE	FALSE	FALSE
## [1934,]	FALSE	FALSE	FALSE	FALSE
## [1935,]	FALSE	FALSE	FALSE	FALSE
## [1936,]	FALSE	FALSE	FALSE	FALSE
## [1937,]	FALSE	FALSE	FALSE	FALSE
## [1938,]	FALSE	FALSE	FALSE	FALSE
## [1939,]	FALSE	FALSE	FALSE	FALSE
## [1940,]	FALSE	FALSE	FALSE	FALSE
## [1941,]	FALSE	FALSE	FALSE	FALSE
## [1942,]	FALSE	FALSE	FALSE	FALSE
## [1943,]	FALSE	FALSE	FALSE	FALSE
## [1944,]	FALSE	FALSE	FALSE	FALSE
## [1945,]	FALSE	FALSE	FALSE	FALSE
## [1946,]	FALSE	FALSE	FALSE	FALSE
## [1947,]	FALSE	FALSE	FALSE	FALSE
## [1948,]	FALSE	FALSE	FALSE	FALSE
## [1949,]	FALSE	FALSE	FALSE	FALSE
## [1950,]	FALSE	FALSE	FALSE	FALSE
## [1951,]	FALSE	FALSE	FALSE	FALSE
## [1952,]	FALSE	FALSE	FALSE	FALSE
## [1953,]	FALSE	FALSE	FALSE	FALSE
## [1954,]	FALSE	FALSE	FALSE	FALSE
## [1955,]	FALSE	FALSE	FALSE	FALSE
## [1956,]	FALSE	FALSE	FALSE	FALSE
## [1957,]	FALSE	FALSE	FALSE	FALSE
## [1958,]	FALSE	FALSE	FALSE	FALSE
## [1959,]	FALSE	FALSE	FALSE	FALSE
## [1960,]	FALSE	FALSE	FALSE	FALSE
## [1961,]	FALSE	FALSE	FALSE	FALSE
## [1962,]	FALSE	FALSE	FALSE	FALSE
## [1963,]	FALSE	FALSE	FALSE	FALSE
## [1964,]	FALSE	FALSE	FALSE	FALSE
## [1965,]	FALSE	FALSE	FALSE	FALSE
## [1966,]	FALSE	FALSE	FALSE	FALSE
## [1967,]	FALSE	FALSE	FALSE	FALSE
## [1968,]	FALSE	FALSE	FALSE	FALSE
## [1969,]	FALSE	FALSE	FALSE	FALSE
## [1970,]	FALSE	FALSE	FALSE	FALSE
## [1971,]	FALSE	FALSE	FALSE	FALSE

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

## [2458,]	FALSE	FALSE	FALSE	FALSE
## [2459,]	FALSE	FALSE	FALSE	FALSE
## [2460,]	FALSE	FALSE	FALSE	FALSE
## [2461,]	FALSE	FALSE	FALSE	FALSE
## [2462,]	FALSE	FALSE	FALSE	FALSE
## [2463,]	FALSE	FALSE	FALSE	FALSE
## [2464,]	FALSE	FALSE	FALSE	FALSE
## [2465,]	FALSE	FALSE	FALSE	FALSE
## [2466,]	FALSE	FALSE	FALSE	FALSE
## [2467,]	FALSE	FALSE	FALSE	FALSE
## [2468,]	FALSE	FALSE	FALSE	FALSE
## [2469,]	FALSE	FALSE	FALSE	FALSE
## [2470,]	FALSE	FALSE	FALSE	FALSE
## [2471,]	FALSE	FALSE	FALSE	FALSE
## [2472,]	FALSE	FALSE	FALSE	FALSE
## [2473,]	FALSE	FALSE	FALSE	FALSE
## [2474,]	FALSE	FALSE	FALSE	FALSE
## [2475,]	FALSE	FALSE	FALSE	FALSE
## [2476,]	FALSE	FALSE	FALSE	FALSE
## [2477,]	FALSE	FALSE	FALSE	FALSE
## [2478,]	FALSE	FALSE	FALSE	FALSE
## [2479,]	FALSE	FALSE	FALSE	FALSE
## [2480,]	FALSE	FALSE	FALSE	FALSE
## [2481,]	FALSE	FALSE	FALSE	FALSE
## [2482,]	FALSE	FALSE	FALSE	FALSE
## [2483,]	FALSE	FALSE	FALSE	FALSE
## [2484,]	FALSE	FALSE	FALSE	FALSE
## [2485,]	FALSE	FALSE	FALSE	FALSE
## [2486,]	FALSE	FALSE	FALSE	FALSE
## [2487,]	FALSE	FALSE	FALSE	FALSE
## [2488,]	FALSE	FALSE	FALSE	FALSE
## [2489,]	FALSE	FALSE	FALSE	FALSE
## [2490,]	FALSE	FALSE	FALSE	FALSE
## [2491,]	FALSE	FALSE	FALSE	FALSE
## [2492,]	FALSE	FALSE	FALSE	FALSE
## [2493,]	FALSE	FALSE	FALSE	FALSE
## [2494,]	FALSE	FALSE	FALSE	FALSE
## [2495,]	FALSE	FALSE	FALSE	FALSE
## [2496,]	FALSE	FALSE	FALSE	FALSE
## [2497,]	FALSE	FALSE	FALSE	FALSE
## [2498,]	FALSE	FALSE	FALSE	FALSE
## [2499,]	FALSE	FALSE	FALSE	FALSE
## [2500,]	FALSE	FALSE	FALSE	FALSE
## [2501,]	FALSE	FALSE	FALSE	FALSE
## [2502,]	FALSE	FALSE	FALSE	FALSE
## [2503,]	FALSE	FALSE	FALSE	FALSE
## [2504,]	FALSE	FALSE	FALSE	FALSE
## [2505,]	FALSE	FALSE	FALSE	FALSE
## [2506,]	FALSE	FALSE	FALSE	FALSE
## [2507,]	FALSE	FALSE	FALSE	FALSE
## [2508,]	FALSE	FALSE	FALSE	FALSE
## [2509,]	FALSE	FALSE	FALSE	FALSE
## [2510,]	FALSE	FALSE	FALSE	FALSE
## [2511,]	FALSE	FALSE	FALSE	FALSE

[illegible]

[illegible]

[illegible]

[illegible]

## [2728,]	FALSE	FALSE	FALSE	FALSE
## [2729,]	FALSE	FALSE	FALSE	FALSE
## [2730,]	FALSE	FALSE	FALSE	FALSE
## [2731,]	FALSE	FALSE	FALSE	FALSE
## [2732,]	FALSE	FALSE	FALSE	FALSE
## [2733,]	FALSE	FALSE	FALSE	FALSE
## [2734,]	FALSE	FALSE	FALSE	FALSE
## [2735,]	FALSE	FALSE	FALSE	FALSE
## [2736,]	FALSE	FALSE	FALSE	FALSE
## [2737,]	FALSE	FALSE	FALSE	FALSE
## [2738,]	FALSE	FALSE	FALSE	FALSE
## [2739,]	FALSE	FALSE	FALSE	FALSE
## [2740,]	FALSE	FALSE	FALSE	FALSE
## [2741,]	FALSE	FALSE	FALSE	FALSE
## [2742,]	FALSE	FALSE	FALSE	FALSE
## [2743,]	FALSE	FALSE	FALSE	FALSE
## [2744,]	FALSE	FALSE	FALSE	FALSE
## [2745,]	FALSE	FALSE	FALSE	FALSE
## [2746,]	FALSE	FALSE	FALSE	FALSE
## [2747,]	FALSE	FALSE	FALSE	FALSE
## [2748,]	FALSE	FALSE	FALSE	FALSE
## [2749,]	FALSE	FALSE	FALSE	FALSE
## [2750,]	FALSE	FALSE	FALSE	FALSE
## [2751,]	FALSE	FALSE	FALSE	FALSE
## [2752,]	FALSE	FALSE	FALSE	FALSE
## [2753,]	FALSE	FALSE	FALSE	FALSE
## [2754,]	FALSE	FALSE	FALSE	FALSE
## [2755,]	FALSE	FALSE	FALSE	FALSE
## [2756,]	FALSE	FALSE	FALSE	FALSE
## [2757,]	FALSE	FALSE	FALSE	FALSE
## [2758,]	FALSE	FALSE	FALSE	FALSE
## [2759,]	FALSE	FALSE	FALSE	FALSE
## [2760,]	FALSE	FALSE	FALSE	FALSE
## [2761,]	FALSE	FALSE	FALSE	FALSE
## [2762,]	FALSE	FALSE	FALSE	FALSE
## [2763,]	FALSE	FALSE	FALSE	FALSE
## [2764,]	FALSE	FALSE	FALSE	FALSE
## [2765,]	FALSE	FALSE	FALSE	FALSE
## [2766,]	FALSE	FALSE	FALSE	FALSE
## [2767,]	FALSE	FALSE	FALSE	FALSE
## [2768,]	FALSE	FALSE	FALSE	FALSE
## [2769,]	FALSE	FALSE	FALSE	FALSE
## [2770,]	FALSE	FALSE	FALSE	FALSE
## [2771,]	FALSE	FALSE	FALSE	FALSE
## [2772,]	FALSE	FALSE	FALSE	FALSE
## [2773,]	FALSE	FALSE	FALSE	FALSE
## [2774,]	FALSE	FALSE	FALSE	FALSE
## [2775,]	FALSE	FALSE	FALSE	FALSE
## [2776,]	FALSE	FALSE	FALSE	FALSE
## [2777,]	FALSE	FALSE	FALSE	FALSE
## [2778,]	FALSE	FALSE	FALSE	FALSE
## [2779,]	FALSE	FALSE	FALSE	FALSE
## [2780,]	FALSE	FALSE	FALSE	FALSE
## [2781,]	FALSE	FALSE	FALSE	FALSE

[illegible]

[illegible]

[illegible]

[illegible]

## [2998,]	FALSE	FALSE	FALSE	FALSE
## [2999,]	FALSE	FALSE	FALSE	FALSE
## [3000,]	FALSE	FALSE	FALSE	FALSE
## [3001,]	FALSE	FALSE	FALSE	FALSE
## [3002,]	FALSE	FALSE	FALSE	FALSE
## [3003,]	FALSE	FALSE	FALSE	FALSE
## [3004,]	FALSE	FALSE	FALSE	FALSE
## [3005,]	FALSE	FALSE	FALSE	FALSE
## [3006,]	FALSE	FALSE	FALSE	FALSE
## [3007,]	FALSE	FALSE	FALSE	FALSE
## [3008,]	FALSE	FALSE	FALSE	FALSE
## [3009,]	FALSE	FALSE	FALSE	FALSE
## [3010,]	FALSE	FALSE	FALSE	FALSE
## [3011,]	FALSE	FALSE	FALSE	FALSE
## [3012,]	FALSE	FALSE	FALSE	FALSE
## [3013,]	FALSE	FALSE	FALSE	FALSE
## [3014,]	FALSE	FALSE	FALSE	FALSE
## [3015,]	FALSE	FALSE	FALSE	FALSE
## [3016,]	FALSE	FALSE	FALSE	FALSE
## [3017,]	FALSE	FALSE	FALSE	FALSE
## [3018,]	FALSE	FALSE	FALSE	FALSE
## [3019,]	FALSE	FALSE	FALSE	FALSE
## [3020,]	FALSE	FALSE	FALSE	FALSE
## [3021,]	FALSE	FALSE	FALSE	FALSE
## [3022,]	FALSE	FALSE	FALSE	FALSE
## [3023,]	FALSE	FALSE	FALSE	FALSE
## [3024,]	FALSE	FALSE	FALSE	FALSE
## [3025,]	FALSE	FALSE	FALSE	FALSE
## [3026,]	FALSE	FALSE	FALSE	FALSE
## [3027,]	FALSE	FALSE	FALSE	FALSE
## [3028,]	FALSE	FALSE	FALSE	FALSE
## [3029,]	FALSE	FALSE	FALSE	FALSE
## [3030,]	FALSE	FALSE	FALSE	FALSE
## [3031,]	FALSE	FALSE	FALSE	FALSE
## [3032,]	FALSE	FALSE	FALSE	FALSE
## [3033,]	FALSE	FALSE	FALSE	FALSE
## [3034,]	FALSE	FALSE	FALSE	FALSE
## [3035,]	FALSE	FALSE	FALSE	FALSE
## [3036,]	FALSE	FALSE	FALSE	FALSE
## [3037,]	FALSE	FALSE	FALSE	FALSE
## [3038,]	FALSE	FALSE	FALSE	FALSE
## [3039,]	FALSE	FALSE	FALSE	FALSE
## [3040,]	FALSE	FALSE	FALSE	FALSE
## [3041,]	FALSE	FALSE	FALSE	FALSE
## [3042,]	FALSE	FALSE	FALSE	FALSE
## [3043,]	FALSE	FALSE	FALSE	FALSE
## [3044,]	FALSE	FALSE	FALSE	FALSE
## [3045,]	FALSE	FALSE	FALSE	FALSE
## [3046,]	FALSE	FALSE	FALSE	FALSE
## [3047,]	FALSE	FALSE	FALSE	FALSE
## [3048,]	FALSE	FALSE	FALSE	FALSE
## [3049,]	FALSE	FALSE	FALSE	FALSE
## [3050,]	FALSE	FALSE	FALSE	FALSE
## [3051,]	FALSE	FALSE	FALSE	FALSE

[illegible]

## [3106,]	FALSE	FALSE	FALSE	FALSE
## [3107,]	FALSE	FALSE	FALSE	FALSE
## [3108,]	FALSE	FALSE	FALSE	FALSE
## [3109,]	FALSE	FALSE	FALSE	FALSE
## [3110,]	FALSE	FALSE	FALSE	FALSE
## [3111,]	FALSE	FALSE	FALSE	FALSE
## [3112,]	FALSE	FALSE	FALSE	FALSE
## [3113,]	FALSE	FALSE	FALSE	FALSE
## [3114,]	FALSE	FALSE	FALSE	FALSE
## [3115,]	FALSE	FALSE	FALSE	FALSE
## [3116,]	FALSE	FALSE	FALSE	FALSE
## [3117,]	FALSE	FALSE	FALSE	FALSE
## [3118,]	FALSE	FALSE	FALSE	FALSE
## [3119,]	FALSE	FALSE	FALSE	FALSE
## [3120,]	FALSE	FALSE	FALSE	FALSE
## [3121,]	FALSE	FALSE	FALSE	FALSE
## [3122,]	FALSE	FALSE	FALSE	FALSE
## [3123,]	FALSE	FALSE	FALSE	FALSE
## [3124,]	FALSE	FALSE	FALSE	FALSE
## [3125,]	FALSE	FALSE	FALSE	FALSE
## [3126,]	FALSE	FALSE	FALSE	FALSE
## [3127,]	FALSE	FALSE	FALSE	FALSE
## [3128,]	FALSE	FALSE	FALSE	FALSE
## [3129,]	FALSE	FALSE	FALSE	FALSE
## [3130,]	FALSE	FALSE	FALSE	FALSE
## [3131,]	FALSE	FALSE	FALSE	FALSE
## [3132,]	FALSE	FALSE	FALSE	FALSE
## [3133,]	FALSE	FALSE	FALSE	FALSE
## [3134,]	FALSE	FALSE	FALSE	FALSE
## [3135,]	FALSE	FALSE	FALSE	FALSE
## [3136,]	FALSE	FALSE	FALSE	FALSE
## [3137,]	FALSE	FALSE	FALSE	FALSE
## [3138,]	FALSE	FALSE	FALSE	FALSE
## [3139,]	FALSE	FALSE	FALSE	FALSE
## [3140,]	FALSE	FALSE	FALSE	FALSE
## [3141,]	FALSE	FALSE	FALSE	FALSE
## [3142,]	FALSE	FALSE	FALSE	FALSE
## [3143,]	FALSE	FALSE	FALSE	FALSE
## [3144,]	FALSE	FALSE	FALSE	FALSE
## [3145,]	FALSE	FALSE	FALSE	FALSE
## [3146,]	FALSE	FALSE	FALSE	FALSE
## [3147,]	FALSE	FALSE	FALSE	FALSE
## [3148,]	FALSE	FALSE	FALSE	FALSE
## [3149,]	FALSE	FALSE	FALSE	FALSE
## [3150,]	FALSE	FALSE	FALSE	FALSE
## [3151,]	FALSE	FALSE	FALSE	FALSE
## [3152,]	FALSE	FALSE	FALSE	FALSE
## [3153,]	FALSE	FALSE	FALSE	FALSE
## [3154,]	FALSE	FALSE	FALSE	FALSE
## [3155,]	FALSE	FALSE	FALSE	FALSE
## [3156,]	FALSE	FALSE	FALSE	FALSE
## [3157,]	FALSE	FALSE	FALSE	FALSE
## [3158,]	FALSE	FALSE	FALSE	FALSE
## [3159,]	FALSE	FALSE	FALSE	FALSE

[illegible]

[illegible]

## [3268,]	FALSE	FALSE	FALSE	FALSE
## [3269,]	FALSE	FALSE	FALSE	FALSE
## [3270,]	FALSE	FALSE	FALSE	FALSE
## [3271,]	FALSE	FALSE	FALSE	FALSE
## [3272,]	FALSE	FALSE	FALSE	FALSE
## [3273,]	FALSE	FALSE	FALSE	FALSE
## [3274,]	FALSE	FALSE	FALSE	FALSE
## [3275,]	FALSE	FALSE	FALSE	FALSE
## [3276,]	FALSE	FALSE	FALSE	FALSE
## [3277,]	FALSE	FALSE	FALSE	FALSE
## [3278,]	FALSE	FALSE	FALSE	FALSE
## [3279,]	FALSE	FALSE	FALSE	FALSE
## [3280,]	FALSE	FALSE	FALSE	FALSE
## [3281,]	FALSE	FALSE	FALSE	FALSE
## [3282,]	FALSE	FALSE	FALSE	FALSE
## [3283,]	FALSE	FALSE	FALSE	FALSE
## [3284,]	FALSE	FALSE	FALSE	FALSE
## [3285,]	FALSE	FALSE	FALSE	FALSE
## [3286,]	FALSE	FALSE	FALSE	FALSE
## [3287,]	FALSE	FALSE	FALSE	FALSE
## [3288,]	FALSE	FALSE	FALSE	FALSE
## [3289,]	FALSE	FALSE	FALSE	FALSE
## [3290,]	FALSE	FALSE	FALSE	FALSE
## [3291,]	FALSE	FALSE	FALSE	FALSE
## [3292,]	FALSE	FALSE	FALSE	FALSE
## [3293,]	FALSE	FALSE	FALSE	FALSE
## [3294,]	FALSE	FALSE	FALSE	FALSE
## [3295,]	FALSE	FALSE	FALSE	FALSE
## [3296,]	FALSE	FALSE	FALSE	FALSE
## [3297,]	FALSE	FALSE	FALSE	FALSE
## [3298,]	FALSE	FALSE	FALSE	FALSE
## [3299,]	FALSE	FALSE	FALSE	FALSE
## [3300,]	FALSE	FALSE	FALSE	FALSE
## [3301,]	FALSE	FALSE	FALSE	FALSE
## [3302,]	FALSE	FALSE	FALSE	FALSE
## [3303,]	FALSE	FALSE	FALSE	FALSE
## [3304,]	FALSE	FALSE	FALSE	FALSE
## [3305,]	FALSE	FALSE	FALSE	FALSE
## [3306,]	FALSE	FALSE	FALSE	FALSE
## [3307,]	FALSE	FALSE	FALSE	FALSE
## [3308,]	FALSE	FALSE	FALSE	FALSE
## [3309,]	FALSE	FALSE	FALSE	FALSE
## [3310,]	FALSE	FALSE	FALSE	FALSE
## [3311,]	FALSE	FALSE	FALSE	FALSE
## [3312,]	FALSE	FALSE	FALSE	FALSE
## [3313,]	FALSE	FALSE	FALSE	FALSE
## [3314,]	FALSE	FALSE	FALSE	FALSE
## [3315,]	FALSE	FALSE	FALSE	FALSE
## [3316,]	FALSE	FALSE	FALSE	FALSE
## [3317,]	FALSE	FALSE	FALSE	FALSE
## [3318,]	FALSE	FALSE	FALSE	FALSE
## [3319,]	FALSE	FALSE	FALSE	FALSE
## [3320,]	FALSE	FALSE	FALSE	FALSE
## [3321,]	FALSE	FALSE	FALSE	FALSE

[illegible]

[illegible]

[illegible]

[illegible]

## [3538,]	FALSE	FALSE	FALSE	FALSE
## [3539,]	FALSE	FALSE	FALSE	FALSE
## [3540,]	FALSE	FALSE	FALSE	FALSE
## [3541,]	FALSE	FALSE	FALSE	FALSE
## [3542,]	FALSE	FALSE	FALSE	FALSE
## [3543,]	FALSE	FALSE	FALSE	FALSE
## [3544,]	FALSE	FALSE	FALSE	FALSE
## [3545,]	FALSE	FALSE	FALSE	FALSE
## [3546,]	FALSE	FALSE	FALSE	FALSE
## [3547,]	FALSE	FALSE	FALSE	FALSE
## [3548,]	FALSE	FALSE	FALSE	FALSE
## [3549,]	FALSE	FALSE	FALSE	FALSE
## [3550,]	FALSE	FALSE	FALSE	FALSE
## [3551,]	FALSE	FALSE	FALSE	FALSE
## [3552,]	FALSE	FALSE	FALSE	FALSE
## [3553,]	FALSE	FALSE	FALSE	FALSE
## [3554,]	FALSE	FALSE	FALSE	FALSE
## [3555,]	FALSE	FALSE	FALSE	FALSE
## [3556,]	FALSE	FALSE	FALSE	FALSE
## [3557,]	FALSE	FALSE	FALSE	FALSE
## [3558,]	FALSE	FALSE	FALSE	FALSE
## [3559,]	FALSE	FALSE	FALSE	FALSE
## [3560,]	FALSE	FALSE	FALSE	FALSE
## [3561,]	FALSE	FALSE	FALSE	FALSE
## [3562,]	FALSE	FALSE	FALSE	FALSE
## [3563,]	FALSE	FALSE	FALSE	FALSE
## [3564,]	FALSE	FALSE	FALSE	FALSE
## [3565,]	FALSE	FALSE	FALSE	FALSE
## [3566,]	FALSE	FALSE	FALSE	FALSE
## [3567,]	FALSE	FALSE	FALSE	FALSE
## [3568,]	FALSE	FALSE	FALSE	FALSE
## [3569,]	FALSE	FALSE	FALSE	FALSE
## [3570,]	FALSE	FALSE	FALSE	FALSE
## [3571,]	FALSE	FALSE	FALSE	FALSE
## [3572,]	FALSE	FALSE	FALSE	FALSE
## [3573,]	FALSE	FALSE	FALSE	FALSE
## [3574,]	FALSE	FALSE	FALSE	FALSE
## [3575,]	FALSE	FALSE	FALSE	FALSE
## [3576,]	FALSE	FALSE	FALSE	FALSE
## [3577,]	FALSE	FALSE	FALSE	FALSE
## [3578,]	FALSE	FALSE	FALSE	FALSE
## [3579,]	FALSE	FALSE	FALSE	FALSE
## [3580,]	FALSE	FALSE	FALSE	FALSE
## [3581,]	FALSE	FALSE	FALSE	FALSE
## [3582,]	FALSE	FALSE	FALSE	FALSE
## [3583,]	FALSE	FALSE	FALSE	FALSE
## [3584,]	FALSE	FALSE	FALSE	FALSE
## [3585,]	FALSE	FALSE	FALSE	FALSE
## [3586,]	FALSE	FALSE	FALSE	FALSE
## [3587,]	FALSE	FALSE	FALSE	FALSE
## [3588,]	FALSE	FALSE	FALSE	FALSE
## [3589,]	FALSE	FALSE	FALSE	FALSE
## [3590,]	FALSE	FALSE	FALSE	FALSE
## [3591,]	FALSE	FALSE	FALSE	FALSE

[illegible]

[illegible]

[illegible]

[illegible]

## [3808,]	FALSE	FALSE	FALSE	FALSE
## [3809,]	FALSE	FALSE	FALSE	FALSE
## [3810,]	FALSE	FALSE	FALSE	FALSE
## [3811,]	FALSE	FALSE	FALSE	FALSE
## [3812,]	FALSE	FALSE	FALSE	FALSE
## [3813,]	FALSE	FALSE	FALSE	FALSE
## [3814,]	FALSE	FALSE	FALSE	FALSE
## [3815,]	FALSE	FALSE	FALSE	FALSE
## [3816,]	FALSE	FALSE	FALSE	FALSE
## [3817,]	FALSE	FALSE	FALSE	FALSE
## [3818,]	FALSE	FALSE	FALSE	FALSE
## [3819,]	FALSE	FALSE	FALSE	FALSE
## [3820,]	FALSE	FALSE	FALSE	FALSE
## [3821,]	FALSE	FALSE	FALSE	FALSE
## [3822,]	FALSE	FALSE	FALSE	FALSE
## [3823,]	FALSE	FALSE	FALSE	FALSE
## [3824,]	FALSE	FALSE	FALSE	FALSE
## [3825,]	FALSE	FALSE	FALSE	FALSE
## [3826,]	FALSE	FALSE	FALSE	FALSE
## [3827,]	FALSE	FALSE	FALSE	FALSE
## [3828,]	FALSE	FALSE	FALSE	FALSE
## [3829,]	FALSE	FALSE	FALSE	FALSE
## [3830,]	FALSE	FALSE	FALSE	FALSE
## [3831,]	FALSE	FALSE	FALSE	FALSE
## [3832,]	FALSE	FALSE	FALSE	FALSE
## [3833,]	FALSE	FALSE	FALSE	FALSE
## [3834,]	FALSE	FALSE	FALSE	FALSE
## [3835,]	FALSE	FALSE	FALSE	FALSE
## [3836,]	FALSE	FALSE	FALSE	FALSE
## [3837,]	FALSE	FALSE	FALSE	FALSE
## [3838,]	FALSE	FALSE	FALSE	FALSE
## [3839,]	FALSE	FALSE	FALSE	FALSE
## [3840,]	FALSE	FALSE	FALSE	FALSE
## [3841,]	FALSE	FALSE	FALSE	FALSE
## [3842,]	FALSE	FALSE	FALSE	FALSE
## [3843,]	FALSE	FALSE	FALSE	FALSE
## [3844,]	FALSE	FALSE	FALSE	FALSE
## [3845,]	FALSE	FALSE	FALSE	FALSE
## [3846,]	FALSE	FALSE	FALSE	FALSE
## [3847,]	FALSE	FALSE	FALSE	FALSE
## [3848,]	FALSE	FALSE	FALSE	FALSE
## [3849,]	FALSE	FALSE	FALSE	FALSE
## [3850,]	FALSE	FALSE	FALSE	FALSE
## [3851,]	FALSE	FALSE	FALSE	FALSE
## [3852,]	FALSE	FALSE	FALSE	FALSE
## [3853,]	FALSE	FALSE	FALSE	FALSE
## [3854,]	FALSE	FALSE	FALSE	FALSE
## [3855,]	FALSE	FALSE	FALSE	FALSE
## [3856,]	FALSE	FALSE	FALSE	FALSE
## [3857,]	FALSE	FALSE	FALSE	FALSE
## [3858,]	FALSE	FALSE	FALSE	FALSE
## [3859,]	FALSE	FALSE	FALSE	FALSE
## [3860,]	FALSE	FALSE	FALSE	FALSE
## [3861,]	FALSE	FALSE	FALSE	FALSE

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

## [4348,]	FALSE	FALSE	FALSE	FALSE
## [4349,]	FALSE	FALSE	FALSE	FALSE
## [4350,]	FALSE	FALSE	FALSE	FALSE
## [4351,]	FALSE	FALSE	FALSE	FALSE
## [4352,]	FALSE	FALSE	FALSE	FALSE
## [4353,]	FALSE	FALSE	FALSE	FALSE
## [4354,]	FALSE	FALSE	FALSE	FALSE
## [4355,]	FALSE	FALSE	FALSE	FALSE
## [4356,]	FALSE	FALSE	FALSE	FALSE
## [4357,]	FALSE	FALSE	FALSE	FALSE
## [4358,]	FALSE	FALSE	FALSE	FALSE
## [4359,]	FALSE	FALSE	FALSE	FALSE
## [4360,]	FALSE	FALSE	FALSE	FALSE
## [4361,]	FALSE	FALSE	FALSE	FALSE
## [4362,]	FALSE	FALSE	FALSE	FALSE
## [4363,]	FALSE	FALSE	FALSE	FALSE
## [4364,]	FALSE	FALSE	FALSE	FALSE
## [4365,]	FALSE	FALSE	FALSE	FALSE
## [4366,]	FALSE	FALSE	FALSE	FALSE
## [4367,]	FALSE	FALSE	FALSE	FALSE
## [4368,]	FALSE	FALSE	FALSE	FALSE
## [4369,]	FALSE	FALSE	FALSE	FALSE
## [4370,]	FALSE	FALSE	FALSE	FALSE
## [4371,]	FALSE	FALSE	FALSE	FALSE
## [4372,]	FALSE	FALSE	FALSE	FALSE
## [4373,]	FALSE	FALSE	FALSE	FALSE
## [4374,]	FALSE	FALSE	FALSE	FALSE
## [4375,]	FALSE	FALSE	FALSE	FALSE
## [4376,]	FALSE	FALSE	FALSE	FALSE
## [4377,]	FALSE	FALSE	FALSE	FALSE
## [4378,]	FALSE	FALSE	FALSE	FALSE
## [4379,]	FALSE	FALSE	FALSE	FALSE
## [4380,]	FALSE	FALSE	FALSE	FALSE
## [4381,]	FALSE	FALSE	FALSE	FALSE
## [4382,]	FALSE	FALSE	FALSE	FALSE
## [4383,]	FALSE	FALSE	FALSE	FALSE
## [4384,]	FALSE	FALSE	FALSE	FALSE
## [4385,]	FALSE	FALSE	FALSE	FALSE
## [4386,]	FALSE	FALSE	FALSE	FALSE
## [4387,]	FALSE	FALSE	FALSE	FALSE
## [4388,]	FALSE	FALSE	FALSE	FALSE
## [4389,]	FALSE	FALSE	FALSE	FALSE
## [4390,]	FALSE	FALSE	FALSE	FALSE
## [4391,]	FALSE	FALSE	FALSE	FALSE
## [4392,]	FALSE	FALSE	FALSE	FALSE
## [4393,]	FALSE	FALSE	FALSE	FALSE
## [4394,]	FALSE	FALSE	FALSE	FALSE
## [4395,]	FALSE	FALSE	FALSE	FALSE
## [4396,]	FALSE	FALSE	FALSE	FALSE
## [4397,]	FALSE	FALSE	FALSE	FALSE
## [4398,]	FALSE	FALSE	FALSE	FALSE
## [4399,]	FALSE	FALSE	FALSE	FALSE
## [4400,]	FALSE	FALSE	FALSE	FALSE
## [4401,]	FALSE	FALSE	FALSE	FALSE

[illegible]

[illegible]

[illegible]

[illegible]

## [4618,]	FALSE	FALSE	FALSE	FALSE
## [4619,]	FALSE	FALSE	FALSE	FALSE
## [4620,]	FALSE	FALSE	FALSE	FALSE
## [4621,]	FALSE	FALSE	FALSE	FALSE
## [4622,]	FALSE	FALSE	FALSE	FALSE
## [4623,]	FALSE	FALSE	FALSE	FALSE
## [4624,]	FALSE	FALSE	FALSE	FALSE
## [4625,]	FALSE	FALSE	FALSE	FALSE
## [4626,]	FALSE	FALSE	FALSE	FALSE
## [4627,]	FALSE	FALSE	FALSE	FALSE
## [4628,]	FALSE	FALSE	FALSE	FALSE
## [4629,]	FALSE	FALSE	FALSE	FALSE
## [4630,]	FALSE	FALSE	FALSE	FALSE
## [4631,]	FALSE	FALSE	FALSE	FALSE
## [4632,]	FALSE	FALSE	FALSE	FALSE
## [4633,]	FALSE	FALSE	FALSE	FALSE
## [4634,]	FALSE	FALSE	FALSE	FALSE
## [4635,]	FALSE	FALSE	FALSE	FALSE
## [4636,]	FALSE	FALSE	FALSE	FALSE
## [4637,]	FALSE	FALSE	FALSE	FALSE
## [4638,]	FALSE	FALSE	FALSE	FALSE
## [4639,]	FALSE	FALSE	FALSE	FALSE
## [4640,]	FALSE	FALSE	FALSE	FALSE
## [4641,]	FALSE	FALSE	FALSE	FALSE
## [4642,]	FALSE	FALSE	FALSE	FALSE
## [4643,]	FALSE	FALSE	FALSE	FALSE
## [4644,]	FALSE	FALSE	FALSE	FALSE
## [4645,]	FALSE	FALSE	FALSE	FALSE
## [4646,]	FALSE	FALSE	FALSE	FALSE
## [4647,]	FALSE	FALSE	FALSE	FALSE
## [4648,]	FALSE	FALSE	FALSE	FALSE
## [4649,]	FALSE	FALSE	FALSE	FALSE
## [4650,]	FALSE	FALSE	FALSE	FALSE
## [4651,]	FALSE	FALSE	FALSE	FALSE
## [4652,]	FALSE	FALSE	FALSE	FALSE
## [4653,]	FALSE	FALSE	FALSE	FALSE
## [4654,]	FALSE	FALSE	FALSE	FALSE
## [4655,]	FALSE	FALSE	FALSE	FALSE
## [4656,]	FALSE	FALSE	FALSE	FALSE
## [4657,]	FALSE	FALSE	FALSE	FALSE
## [4658,]	FALSE	FALSE	FALSE	FALSE
## [4659,]	FALSE	FALSE	FALSE	FALSE
## [4660,]	FALSE	FALSE	FALSE	FALSE
## [4661,]	FALSE	FALSE	FALSE	FALSE
## [4662,]	FALSE	FALSE	FALSE	FALSE
## [4663,]	FALSE	FALSE	FALSE	FALSE
## [4664,]	FALSE	FALSE	FALSE	FALSE
## [4665,]	FALSE	FALSE	FALSE	FALSE
## [4666,]	FALSE	FALSE	FALSE	FALSE
## [4667,]	FALSE	FALSE	FALSE	FALSE
## [4668,]	FALSE	FALSE	FALSE	FALSE
## [4669,]	FALSE	FALSE	FALSE	FALSE
## [4670,]	FALSE	FALSE	FALSE	FALSE
## [4671,]	FALSE	FALSE	FALSE	FALSE

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

```
## [4996,]          FALSE      FALSE FALSE      FALSE
## [4997,]          FALSE      FALSE FALSE      FALSE
## [4998,]          FALSE      FALSE FALSE      FALSE
## [4999,]          FALSE      FALSE FALSE      FALSE
## [5000,]          FALSE      FALSE FALSE      FALSE
```

```
library(class)
library(caret)
library(lattice)
library(ggplot2)
library(ISLR)
library(pROC)
library(e1071)
summary(Assignment3_UpdatedNew)
```

```
##      Age      Experience      Income      Family
## Min.   :23.00   Min.   : -3.0   Min.    :  8.00   Min.    :1.000
## 1st Qu.:35.00   1st Qu.:10.0   1st Qu.: 39.00   1st Qu.:1.000
## Median :45.00   Median :20.0   Median : 64.00   Median :2.000
## Mean   :45.34   Mean    :20.1   Mean    : 73.77   Mean    :2.396
## 3rd Qu.:55.00   3rd Qu.:30.0   3rd Qu.: 98.00   3rd Qu.:3.000
## Max.   :67.00   Max.    :43.0   Max.    :224.00   Max.    :4.000
##      CCAvg      Education_2      Mortgage      Personal.Loan
## Min.    : 0.000   Min.    :0.0000   Min.    :  0.0   Min.    :0.000
## 1st Qu.: 0.700   1st Qu.:0.0000   1st Qu.:  0.0   1st Qu.:0.000
## Median : 1.500   Median :0.0000   Median :  0.0   Median :0.000
## Mean    : 1.938   Mean    :0.4192   Mean    : 56.5   Mean    :0.096
## 3rd Qu.: 2.500   3rd Qu.:1.0000   3rd Qu.:101.0   3rd Qu.:0.000
## Max.    :10.000   Max.    :1.0000   Max.    :635.0   Max.    :1.000
## Securities.Account  CD.Account      Online      CreditCard
## Min.    :0.0000   Min.    :0.0000   Min.    :0.0000   Min.    :0.000
## 1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:0.000
## Median :0.0000   Median :0.0000   Median :1.0000   Median :0.000
## Mean    :0.1044   Mean    :0.0604   Mean    :0.5968   Mean    :0.294
## 3rd Qu.:0.0000   3rd Qu.:0.0000   3rd Qu.:1.0000   3rd Qu.:1.000
## Max.    :1.0000   Max.    :1.0000   Max.    :1.0000   Max.    :1.000
```

#We need to convert Age, Experience, Income, Family, CCAvg and Mortgage into factors.

```
Assignment3_UpdatedNew$Age<-factor(Assignment3_UpdatedNew$Age )
Assignment3_UpdatedNew$Income<-factor(Assignment3_UpdatedNew$Income)
Assignment3_UpdatedNew$Family<-factor(Assignment3_UpdatedNew$Family)
Assignment3_UpdatedNew$Mortgage<-factor(Assignment3_UpdatedNew$Mortgage)
Assignment3_UpdatedNew$Experience<-factor(Assignment3_UpdatedNew$Experience)
Assignment3_UpdatedNew$Personal.Loan<-factor(Assignment3_UpdatedNew$Personal.Loan)
Assignment3_UpdatedNew$Securities.Account<-factor(Assignment3_UpdatedNew$Securities.Account)
Assignment3_UpdatedNew$CD.Account<-factor(Assignment3_UpdatedNew$CD.Account)
Assignment3_UpdatedNew$Online<-factor(Assignment3_UpdatedNew$Online)
Assignment3_UpdatedNew$CreditCard<-factor(Assignment3_UpdatedNew$CreditCard)
Assignment3_UpdatedNew$Education_2<-factor(Assignment3_UpdatedNew$Education_2)
```

```
str(Assignment3_UpdatedNew)
```

```
## 'data.frame':    5000 obs. of  12 variables:
## $ Age           : Factor w/ 45 levels "23","24","25",...: 3 23 17 13 13 15 31 28 13 12 ...
## $ Experience     : Factor w/ 47 levels "-3","-2","-1",...: 5 23 19 13 12 17 31 28 14 13 ...
## $ Income         : Factor w/ 162 levels "8","9","10","11",...: 34 23 4 75 32 18 53 13 60 139 ...
## $ Family         : Factor w/ 4 levels "1","2","3","4": 4 3 1 1 4 4 2 1 3 1 ...
## $ CCAvg          : num  1.6 1.5 1 2.7 1 0.4 1.5 0.3 0.6 8.9 ...
## $ Education_2    : Factor w/ 2 levels "0","1": 2 2 2 1 1 1 1 1 1 1 ...
## $ Mortgage       : Factor w/ 347 levels "0","75","76",...: 1 1 1 1 1 1 82 1 1 31 1 ...
## $ Personal.Loan  : Factor w/ 2 levels "0","1": 1 1 1 1 1 1 1 1 1 2 ...
## $ Securities.Account: Factor w/ 2 levels "0","1": 2 2 1 1 1 1 1 1 1 1 ...
## $ CD.Account     : Factor w/ 2 levels "0","1": 1 1 1 1 1 1 1 1 1 1 ...
## $ Online         : Factor w/ 2 levels "0","1": 1 1 1 1 1 2 2 1 2 1 ...
## $ CreditCard     : Factor w/ 2 levels "0","1": 1 1 1 1 2 1 1 2 1 1 ...
```

```
head(Assignment3_UpdatedNew)
```

```
##   Age Experience Income Family CCAvg Education_2 Mortgage Personal.Loan
## 1  25          1     49      4   1.6           1          0           0
## 2  45         19     34      3   1.5           1          0           0
## 3  39         15     11      1   1.0           1          0           0
## 4  35          9    100      1   2.7           0          0           0
## 5  35          8     45      4   1.0           0          0           0
## 6  37         13     29      4   0.4           0        155           0
##   Securities.Account CD.Account Online CreditCard
## 1                   1          0      0           0
## 2                   1          0      0           0
## 3                   0          0      0           0
## 4                   0          0      0           0
## 5                   0          0      0           1
## 6                   0          0      1           0
```

Questions

1. Divide the data into 60% training and 40% validation

```
# First select the required variables
selected.var<-c(8, 11, 12)
set.seed(15)
Assignment3_UpdatedNew.tr.in = createDataPartition(Assignment3_UpdatedNew$Personal.Loan,p=0.6, list=FALSE)
Assignment3_UpdatedNew.tr = Assignment3_UpdatedNew[Assignment3_UpdatedNew.tr.in,selected.var]
Assignment3_UpdatedNew.va<-Assignment3_UpdatedNew[-Assignment3_UpdatedNew.tr.in, selected.var] # Validation set
summary(Assignment3_UpdatedNew.tr)
```

```
## Personal.Loan Online CreditCard
## 0:2712         0:1238 0:2128
## 1: 288         1:1762 1: 872
```

```
summary(Assignment3_UpdatedNew.va)
```

```
## Personal.Loan Online CreditCard
## 0:1808 0: 778 0:1402
## 1: 192 1:1222 1: 598
```

#Ans.A -2. Output both a counts table and a proportion table outlining how many and what proportion of Personal Loan that were not accepted and accepted by each of Online uses and credit card users at Universal bank.

We will use prop.table() to output the proportions from counts

```
table(Assignment3_UpdatedNew.tr$Personal.Loan,Assignment3_UpdatedNew.tr$Online)
```

```
##
##      0      1
## 0 1121 1591
## 1  117  171
```

```
table(Assignment3_UpdatedNew.tr$Personal.Loan,Assignment3_UpdatedNew.tr$CreditCard)
```

```
##
##      0      1
## 0 1921  791
## 1  207   81
```

```
prop.table(table(Assignment3_UpdatedNew.tr$Personal.Loan,Assignment3_UpdatedNew.tr$Online),margin = 1)
```

```
##
##      0      1
## 0 0.4133481 0.5866519
## 1 0.4062500 0.5937500
```

```
prop.table(table(Assignment3_UpdatedNew.tr$Personal.Loan,Assignment3_UpdatedNew.tr$CreditCard),margin =
```

```
##
##      0      1
## 0 0.7083333 0.2916667
## 1 0.7187500 0.2812500
```

```
pivotA<-table(Assignment3_UpdatedNew$Personal.Loan,Assignment3_UpdatedNew$Online)
pivotdfa<-as.data.frame(pivotA)
colnames(pivotdfa)<-c("Personal.Loan", "Online")
pivotdfa
```

```
## Personal.Loan Online NA
## 1      0      0 1827
## 2      1      0  189
## 3      0      1 2693
## 4      1      1  291
```

```

pivotB<-table(Assignment3_UpdatedNew$Personal.Loan ,Assignment3_UpdatedNew$CreditCard)
pivotdfb<-as.data.frame(pivotB)
colnames(pivotdfb)<-c("Personal.Loan", "CreditCard")
pivotdfb

```

```

##   Personal.Loan CreditCard   NA
## 1             0           0 3193
## 2             1           0  337
## 3             0           1 1327
## 4             1           1  143

```

This will sum row probabilities to 1

We can also generate the pivot table to generate proportions and counts

```

''r
attach(Assignment3_UpdatedNew.tr)
ftable(Personal.Loan,Online,CreditCard)

##               CreditCard    0    1
## Personal.Loan Online
## 0             0             791  330
##             1             1130  461
## 1             0              82   35
##             1             125   46

```

```

detach(Assignment3_UpdatedNew.tr)
# C-Or
prop.table(ftable(Assignment3_UpdatedNew.tr, row.vars = 1, col.vars = 3), margin = 1)

```

```

##               CreditCard    0    1
## Personal.Loan
## 0             0.7083333 0.2916667
## 1             0.7187500 0.2812500

```

#D- 3. Run the Naive Bayes model to predict the probability of these 5000 customers who will accept Personal Loan or not.

```

library(naivebayes)

```

```

## naivebayes 0.9.7 loaded

```

```

Assignment3_UpdatedNew.nb<-naiveBayes(Personal.Loan~., data = Assignment3_UpdatedNew.tr )
Assignment3_UpdatedNew.nb

```

```

##
## Naive Bayes Classifier for Discrete Predictors

```

```
##
## Call:
## naiveBayes.default(x = X, y = Y, laplace = laplace)
##
## A-priori probabilities:
## Y
##      0      1
## 0.904 0.096
##
## Conditional probabilities:
##      Online
## Y      0      1
## 0 0.4133481 0.5866519
## 1 0.4062500 0.5937500
##
##      CreditCard
## Y      0      1
## 0 0.7083333 0.2916667
## 1 0.7187500 0.2812500
```

```
pred.class<-predict(Assignment3_UpdatedNew.nb,newdata = Assignment3_UpdatedNew.tr)
```

4. Output the confusion matrix and ROC for the validation data

Let us output the confusion matrices for the training and validation sets, and determine the prediction for a (new) test set

```
# Training set
pred.class<-predict(Assignment3_UpdatedNew.nb,newdata = Assignment3_UpdatedNew.tr)
confusionMatrix(pred.class,Assignment3_UpdatedNew.tr$Personal.Loan)
```

```
## Confusion Matrix and Statistics
##
##           Reference
## Prediction    0    1
##           0 2712  288
##           1    0    0
##
##           Accuracy : 0.904
##           95% CI : (0.8929, 0.9143)
##       No Information Rate : 0.904
##       P-Value [Acc > NIR] : 0.5157
##
##           Kappa : 0
##
##  Mcnemar's Test P-Value : <2e-16
##
##           Sensitivity : 1.000
##           Specificity : 0.000
##       Pos Pred Value : 0.904
```



```
##          Neg Pred Value :   NaN
##          Prevalence : 0.904
##          Detection Rate : 0.904
##    Detection Prevalence : 1.000
##          Balanced Accuracy : 0.500
##
##          'Positive' Class : 0
##
```

```
length(pred.class)
```

```
## [1] 3000
```

```
length(Assignment3_UpdatedNew$Personal.Loan)
```

```
## [1] 5000
```

```
# validation
```

```
pred.prob<-predict(Assignment3_UpdatedNew.nb,newdata = Assignment3_UpdatedNew.va,type ="raw") # probabi
```

```
pred.class<-predict(Assignment3_UpdatedNew.nb, newdata = Assignment3_UpdatedNew.va) # class Customers
confusionMatrix(pred.class, Assignment3_UpdatedNew.va$Personal.Loan)
```

```
## Confusion Matrix and Statistics
```

```
##
##          Reference
## Prediction    0    1
##          0 1808  192
##          1    0    0
##
##          Accuracy : 0.904
##          95% CI : (0.8902, 0.9166)
##    No Information Rate : 0.904
##    P-Value [Acc > NIR] : 0.5192
##
##          Kappa : 0
##
##    McNemar's Test P-Value : <2e-16
##
##          Sensitivity : 1.000
##          Specificity : 0.000
##          Pos Pred Value : 0.904
##          Neg Pred Value :   NaN
##          Prevalence : 0.904
##          Detection Rate : 0.904
##    Detection Prevalence : 1.000
##          Balanced Accuracy : 0.500
##
##          'Positive' Class : 0
##
```

```

# For the test set
df<-data.frame(actual = Assignment3_UpdatedNew.va$Personal.Loan, predicted = pred.class, pred.prob)

df[Assignment3_UpdatedNew.va$Online == "OL" & Assignment3_UpdatedNew.va$CreditCard == "CC",]

## [1] actual    predicted X0      X1
## <0 rows> (or 0-length row.names)

```

We will now output the ROC

```

'''r
# Note the delayed probabilities are in column 8

require(pROC)
library(pROC)
roc(Assignment3_UpdatedNew.va$Personal.Loan, pred.prob[,1])

## Setting levels: control = 0, case = 1

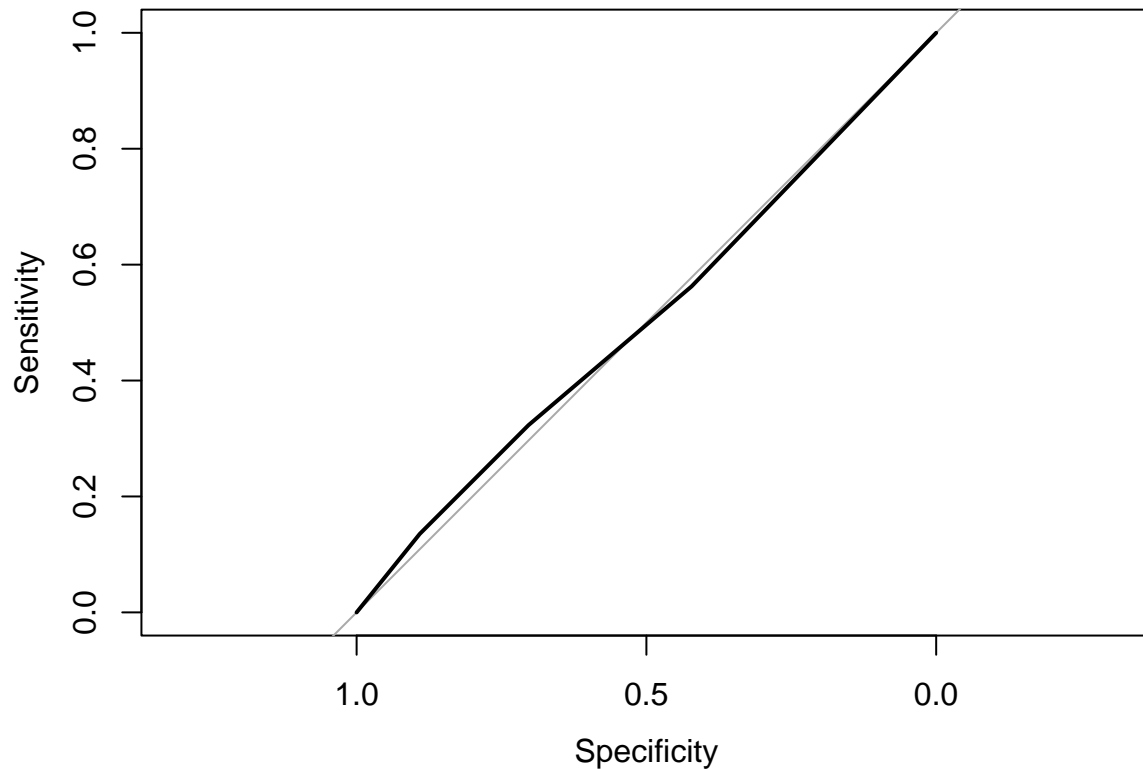
## Setting direction: controls < cases

##
## Call:
## roc.default(response = Assignment3_UpdatedNew.va$Personal.Loan,      predictor = pred.prob[, 1])
##
## Data: pred.prob[, 1] in 1808 controls (Assignment3_UpdatedNew.va$Personal.Loan 0) < 192 cases (Assign
## Area under the curve: 0.5047

plot.roc(Assignment3_UpdatedNew.va$Personal.Loan, pred.prob[,1])

## Setting levels: control = 0, case = 1
## Setting direction: controls < cases

```



```
length(pred.prob)
```

```
## [1] 4000
```

```
str(pred.prob)
```

```
## num [1:2000, 1:2] 0.904 0.904 0.902 0.909 0.904 ...
## - attr(*, "dimnames")=List of 2
## ..$ : NULL
## ..$ : chr [1:2] "0" "1"
```

Most confusion matrices use a threshold of 0.5. We can also output the threshold value that maximizes

```
set.seed(949)
library(caret)
levels(Assignment3_UpdatedNew.tr$Personal.Loan)<-c("No","Yes")
levels(Assignment3_UpdatedNew.tr$Online)<-c("No","Yes")
levels(Assignment3_UpdatedNew.tr$CreditCard)<-c("No","Yes")

levels(Assignment3_UpdatedNew.va$Personal.Loan)<-c("No","Yes")
levels(Assignment3_UpdatedNew.va$Online)<-c("No","Yes")
```

```
levels(Assignment3_UpdatedNew.va$CreditCard)<-c("No","Yes")
```

```
mod0<-train(Personal.Loan ~ ., data = Assignment3_UpdatedNew.tr,  
            method = "rf",  
            metric = "ROC",  
            tuneGrid = data.frame(mtry = 3),  
            ntree = 1000,  
            trControl = trainControl(method = "repeatedcv",  
                                     repeats = 2,  
                                     classProbs = TRUE,  
                                     summaryFunction = twoClassSummary))  
getTrainPerf(mod0)
```

```
## TrainROC TrainSens TrainSpec method  
## 1      0.5      1      0      rf
```

```
roc0<-roc(Assignment3_UpdatedNew.va$Personal.Loan,  
          predict(mod0, Assignment3_UpdatedNew.va, type = "prob")[,1],  
          levels = rev(levels(Assignment3_UpdatedNew.va$Personal.Loan)))
```

```
## Setting direction: controls < cases
```

```
roc0
```

```
##
```

```
## Call:
```

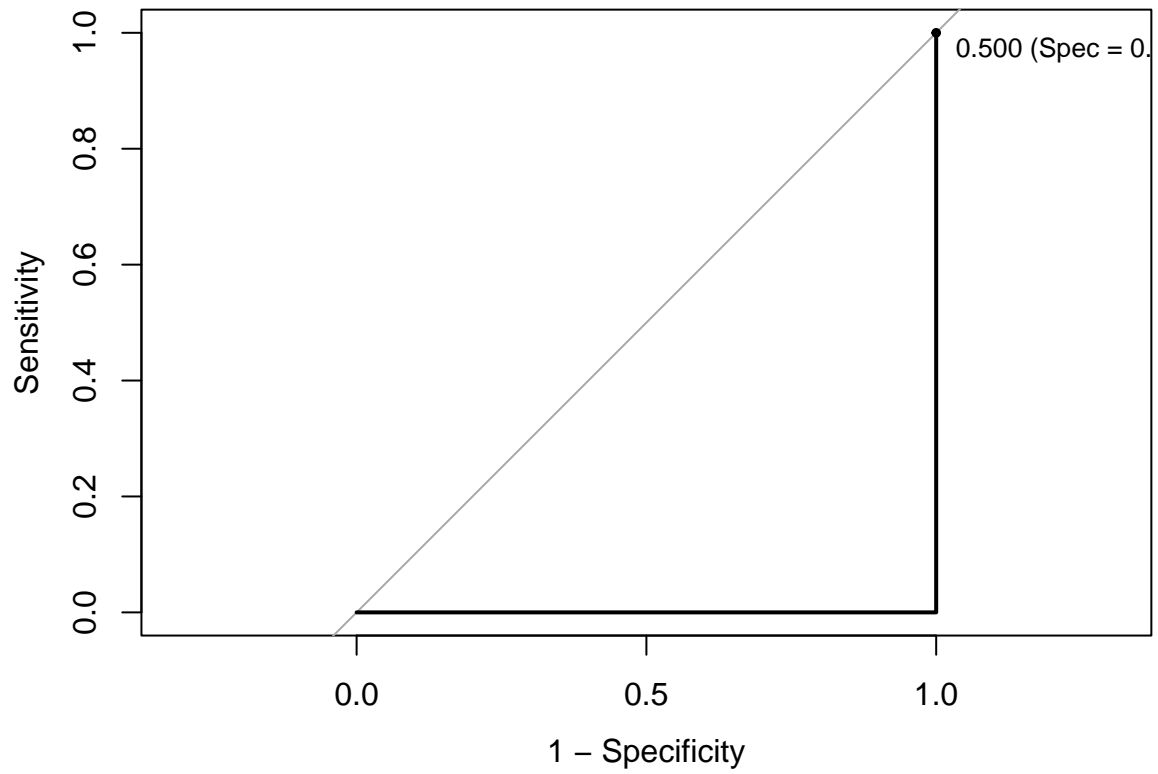
```
## roc.default(response = Assignment3_UpdatedNew.va$Personal.Loan,      predictor = predict(mod0, Assignment3_UpdatedNew.va, type = "prob")[,1],
```

```
##
```

```
## Data: predict(mod0, Assignment3_UpdatedNew.va, type = "prob")[, 1] in 192 controls (Assignment3_UpdatedNew.va$Personal.Loan == "No")
```

```
## Area under the curve: 0.5
```

```
plot(roc0, print.thres = c(.5), type = "S",  
      print.thres.pattern = "%.3f (Spec = %.2f, Sens = %.2f)",  
      print.thres.cex = .8,  
      legacy.axes = TRUE)
```



```
head(Assignment3_UpdatedNew.tr)
```

```
##      Personal.Loan Online CreditCard
## 1          No      No      No
## 3          No      No      No
## 5          No      No      Yes
## 6          No     Yes      No
## 9          No     Yes      No
## 10         Yes      No      No
```

```
““
```