Tipo de Camas hospitalarias

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Contents

1.PROCESAMIENTO DE LOS DATOS.

- En primer lugar leemos el fichero:

```
camas_tipos<-read.csv("C:/temp/TiposCamasHospitalarias.csv",sep= ",")
```

- Realicemos una breve inspección de los datos

```
str(camas_tipos)
```

```
## 'data.frame':    5850 obs. of  6 variables:
##  $ TIME             : int  2010 2010 2010 2010 2010 2010 2010 2010 2010 2010 ...
##  $ GEO              : Factor w/ 39 levels "Albania","Austria",..: 10 10 10 10 10 10 10 10 10 10 ...
##  $ UNIT             : Factor w/ 3 levels "Inhabitants per ...",..: 2 2 2 2 2 1 1 1 1 1 ...
##  $ FACILITY         : Factor w/ 5 levels "Available beds in hospitals (HP.1)",..: 1 2 5 3 4 1 2 5 3
##  $ Value            : Factor w/ 3548 levels ":","0.00","0.29",..: 1095 1 1 1 1 823 1 1 1 1 ...
##  $ Flag.and.Footnotes: Factor w/ 7 levels "","b","bd","be",..: 1 1 1 1 1 1 1 1 1 1 ...
```

```
colnames(camas_tipos) #Nombre de las variables
```

```
## [1] "TIME"            "GEO"             "UNIT"
## [4] "FACILITY"        "Value"           "Flag.and.Footnotes"
```

```
nrow(camas_tipos) #Número de registros
```

```
## [1] 5850
```

```
ncol(camas_tipos) #Número de variables
```

```
## [1] 6
```

*Observamos las siguientes variables:

- **TIME**: variable cuantitativa. Indica el año en el que se ha realizado la medida, en este caso el valor de la variable "Value". Se ha cargado bien como número entero.
- **GEO**: variable cualitativa. Indica el país o región en el que se ha realizado la medida.Se ha cargado bien como factor.
- **UNIT**: variable cualitativa. Indica la medida de la variable valor.Se ha cargado bien como factor.Número y ratio
- **FACILITY**: variable cualitativa. Indica el tipo de utilidad de las camas hospitalarias.
- **Value**: Variable cuantitativa. Indica el número y ratio de tipos de camas por países.
- **Fal.and.footnotes**. Notas sobre etiquetas. Eliminamos esta columna.

*Años de las mediciones:

```
unique(camas_tipos$TIME)
```

```
##  [1] 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
```

*Paises:

1

```r
unique(camas_tipos$GEO)
```

```
##  [1] European Union - 27 countries (from 2020)
##  [2] European Union - 28 countries (2013-2020)
##  [3] Belgium
##  [4] Bulgaria
##  [5] Czechia
##  [6] Denmark
##  [7] Germany (until 1990 former territory of the FRG)
##  [8] Estonia
##  [9] Ireland
## [10] Greece
## [11] Spain
## [12] France
## [13] Croatia
## [14] Italy
## [15] Cyprus
## [16] Latvia
## [17] Lithuania
## [18] Luxembourg
## [19] Hungary
## [20] Malta
## [21] Netherlands
## [22] Austria
## [23] Poland
## [24] Portugal
## [25] Romania
## [26] Slovenia
## [27] Slovakia
## [28] Finland
## [29] Sweden
## [30] Iceland
## [31] Liechtenstein
## [32] Norway
## [33] Switzerland
## [34] United Kingdom
## [35] Montenegro
## [36] North Macedonia
## [37] Albania
## [38] Serbia
## [39] Turkey
## 39 Levels: Albania Austria Belgium Bulgaria Croatia Cyprus Czechia ... United Kingdom
```

*Unidad de las mediciones:

```r
unique(camas_tipos$UNIT)
```

```
## [1] Number                          Inhabitants per ...
## [3] Per hundred thousand inhabitants
## Levels: Inhabitants per ... Number Per hundred thousand inhabitants
```

- Tipo de camas.

```r
unique(camas_tipos$FACILITY)
```

```
## [1] Available beds in hospitals (HP.1)
```

2

```
## [2] Curative care beds in hospitals (HP.1)
## [3] Rehabilitative care beds in hospitals (HP.1)
## [4] Long-term care beds in hospitals (HP.1)
## [5] Other beds in hospitals (HP.1)
## 5 Levels: Available beds in hospitals (HP.1) ...
```

- Eliminamos la columna Fal.and.footnotes.

```
camas_tipos<-camas_tipos[,-6]
```

- Tendríamos que convertir la columna Value a numérico porque se ha cargado como factor y es erróneo. El resto de variables tienen el tipo correcto.

```
camas_tipos$Value<-as.character(camas_tipos$Value)
camas_tipos$Value<-(gsub(',','.',camas_tipos$Value) )
camas_tipos$Value<-(gsub(' ','',camas_tipos$Value) )
camas_tipos$Value<-as.numeric(camas_tipos$Value)
```

```
## Warning: NAs introducidos por coerción
```

- Comprobamos que valores tenemos en la columna **Value**:

```
table(camas_tipos$Value, useNA = "ifany")
```

```
##
##        0     0.29      0.3     0.88     0.89      0.9     0.93
##      485        2        4        1        1        2        1
##     0.96     0.98     1.06     1.09     1.23     1.33     1.43
##        1        1        1        1        1        1        1
##     1.72     1.91     2.03     2.08     2.13     2.14     2.35
##        1        1        1        1        1        1        1
##     2.37     2.38     2.39      2.4     2.47     2.48      2.5
##        1        1        2        1        1        1        1
##     2.51     2.52     2.53     2.55     2.59      2.6     2.61
##        3        1        1        1        1        1        1
##     2.67     2.73     2.82     2.83     2.87      2.9     2.91
##        1        2        1        1        2        1        1
##     2.92     2.93     3.03     3.08     3.11     3.15     3.32
##        2        1        2        1        1        1        1
##     3.38     3.39     3.46     3.47     3.51     3.56     3.57
##        1        1        1        1        1        1        1
##      3.6     3.61     3.63     3.68     3.69     3.71     3.72
##        1        1        1        2        1        1        4
##     3.73     3.74     3.78      3.8     3.87     3.92     3.93
##        1        1        1        1        1        1        1
##     3.97     4.03     4.13     4.15     4.17      4.2     4.22
##        1        1        1        1        1        1        1
##     4.25     4.27      4.3     4.31     4.32     4.33     4.84
##        1        1        1        1        1        1        1
##     4.92     4.93        5      5.2      5.3     5.59     5.61
##        1        1        1        1        2        1        1
##     5.62     5.63     5.65     5.68     5.74     6.67     6.93
##        3        2        1        1        1        1        1
##     7.18     7.38     7.54     7.79     7.82     7.83     7.91
##        1        1        1        1        1        1        1
##     8.13     8.45     8.68     8.71     8.79     8.88     9.07
##        1        1        1        1        1        1        1
```

```
##      9.19      9.31      9.32      9.43      9.57      9.64      9.68
##         1         1         1         1         1         1         1
##      9.69       9.7      9.71      9.72      9.73      9.74      9.76
##         2         2         1         1         1         1         1
##      9.95      9.98        10      10.2     10.23     10.24     10.28
##         1         1         3         1         1         1         1
##     10.69     10.73      10.8     10.83     10.93     11.18     11.21
##         2         1         1         1         1         1         1
##     11.24     11.43     11.54     11.74     12.32     12.47     12.52
##         1         1         1         1         2         1         1
##     12.59      12.6     12.71     12.73     12.79     12.81     13.11
##         1         1         1         1         1         1         1
##     13.61     13.93        14     14.08      14.1     14.13     14.28
##         1         1         1         1         1         2         1
##     14.38     14.52     14.53     14.55     14.59     14.63     14.65
##         1         1         1         1         1         1         1
##     14.66     14.68     14.75     14.76     14.91     14.92     14.97
##         1         2         1         1         1         1         1
##     14.98        15     15.06     15.11     15.12     15.21     15.27
##         1         2         1         1         1         1         1
##     15.47     15.54     15.63     15.69     15.83     15.84     15.91
##         1         1         1         2         1         1         2
##     15.94     15.95     16.08     16.25     16.44     16.45     16.48
##         1         1         1         1         1         1         1
##     16.54     16.66     16.69     16.71     16.89     16.97        17
##         1         2         1         1         1         1         1
##     17.28     17.63     17.68     17.83     17.86     18.13     18.19
##         1         1         1         1         1         1         1
##     18.43     18.74     18.83     19.02     19.04     19.24     19.33
##         1         1         1         1         1         1         1
##     19.47     19.75     19.81     20.08        21     21.19     21.26
##         1         1         1         1         6         1         1
##     21.32     21.52     22.03     22.09     22.31     22.41     22.84
##         1         1         1         1         1         1         1
##     23.12     23.33     23.65     23.74     24.05     25.31     25.77
##         1         1         1         1         1         1         1
##     25.81     25.95        26     26.53     30.83     32.68     33.34
##         1         1         1         1         1         1         1
##     33.69     34.15     34.23     34.53     34.59     34.61     34.91
##         1         1         1         1         1         1         1
##     35.36     35.44     35.57     36.51     36.91     37.11     37.51
##         1         1         1         1         1         1         1
##     37.57     38.12     38.44     38.73     38.77     38.87     38.92
##         1         2         1         1         1         1         1
##        39      39.1     39.21     39.36     39.45     39.69      39.7
##         3         1         1         1         1         1         1
##        40     40.05      40.1      40.2      40.4     40.58     40.67
##         1         1         2         1         1         1         1
##     40.68      40.7     40.78     40.81     40.85     40.89      40.9
##         1         1         1         1         1         1         1
##     40.92     40.98     41.23     41.31      41.4     41.44     41.51
##         1         1         1         1         1         1         1
##     41.57        42      42.1     42.25      42.3     42.37     43.03
##         1         1         1         1         1         1         1
```

```
##     43.35    43.7   43.76   43.79   43.93   44.02   44.88
##         1       1       1       1       1       1       1
##     44.93   45.23   45.36   45.46   45.98      46   46.06
##         1       1       1       1       1       1       1
##     46.34   46.41   46.49   47.06   47.12   47.17   47.54
##         1       1       1       1       1       1       1
##     47.71   48.27    48.3   48.96   49.11   49.25    49.7
##         1       1       1       1       1       1       1
##     49.74   50.22   50.76    50.8   50.93   51.06   51.18
##         1       1       1       1       1       1       1
##     51.72   51.76   52.23   52.26   52.36   52.57   52.67
##         1       1       1       1       1       1       1
##     52.83   53.14   53.18   53.33   53.35   53.46   53.78
##         1       1       1       1       1       1       1
##     53.89    54.1   54.46   55.28   55.35   55.66   55.72
##         1       1       1       1       1       1       1
##     55.94      56   56.94   57.47   57.67   57.82   57.97
##         1       1       1       2       1       1       1
##        58   58.37   58.97   59.21   59.52   59.98      60
##         1       1       1       1       1       1       4
##     60.33   60.57   60.64   60.72   60.73      61      62
##         1       1       1       1       1       5       1
##     62.12   62.92      63   63.08   63.74      64   64.05
##         1       1       7       1       1       1       1
##     64.26   64.32   64.36   64.71      65   65.99   66.29
##         1       1       1       1       2       1       1
##     66.37   66.46      67   67.27   67.99   68.36   68.57
##         1       1       2       1       1       1       1
##     69.78   69.99   70.87   71.96   72.08   72.48   72.86
##         1       1       1       1       1       1       1
##     73.63   73.95    74.2   75.04   75.93   76.21    76.3
##         1       1       1       1       1       1       1
##     76.51   77.47      78   78.09   78.23   80.43   82.28
##         1       1       3       1       1       1       1
##     82.69   83.01   83.47   83.77   83.89   84.12   84.28
##         1       1       1       2       1       1       1
##     84.58   84.62   84.68      85   85.41    85.5   85.64
##         1       1       1       1       1       1       1
##     85.71   85.84   85.93   86.12    86.2   86.22   86.26
##         1       1       1       1       1       1       2
##     86.27    86.3   86.32   86.41   86.94   86.98   87.14
##         1       1       1       1       1       1       1
##     87.23   87.26   87.27   87.44   87.59   87.98   88.04
##         1       1       1       1       1       1       1
##     88.05   88.08   88.32   88.42   88.71    89.3   89.34
##         1       1       1       1       1       1       1
##      89.9      90   90.24   90.67      91   91.32   91.88
##         1       1       1       1       2       1       1
##     91.99   92.08    92.3   92.39   92.49   93.01    94.6
##         1       1       1       1       1       1       1
##     95.14   95.62    95.7   95.92   95.97   96.87   96.89
##         1       1       1       1       1       1       1
##     97.01   97.07   97.27   97.54   97.75   97.97    98.3
##         1       1       1       1       1       1       1
```

```
##      98.7    99.61   100.33   100.54   101.16   101.97      102
##         1        1        1        1        1        2        1
##    102.29   102.33   102.34   102.93   102.97      103   103.02
##         1        1        1        1        1        3        1
##    103.63   103.86   104.34   106.49   106.57      107      109
##         1        1        1        1        1        1        1
##    110.33      111    111.1   111.16      112      113   113.03
##         1        1        1        1        1        1        1
##    113.26   114.05   114.46   115.21   115.68      116   116.13
##         1        1        1        1        1        6        1
##    116.39   116.94   117.69      118   119.36   119.57   119.96
##         1        1        1        1        1        1        1
##    120.06    120.1   120.11   120.36   120.81   121.53   121.56
##         1        1        1        1        1        1        1
##    121.58   122.06   122.07   122.11   122.27   122.46   122.95
##         1        1        1        1        1        1        1
##     123.9      124   124.03   124.96      125   125.11   125.41
##         1        2        1        1        1        1        1
##    125.64      126   126.04   126.22   127.53   127.58   127.68
##         1        1        1        1        1        1        1
##       128   128.54      129   130.27   130.31   130.66   130.81
##         1        1        3        1        1        1        1
##    131.47   131.86      132   132.12   132.68      134   134.16
##         1        1        2        1        1        1        1
##    134.31   134.52   134.75      135   135.75      136    136.7
##         1        1        1        1        1        1        1
##    136.75      137   137.08   137.52   137.56   137.67      138
##         1        1        1        1        1        1        2
##    138.22   138.96   139.24   139.58      140   140.26      141
##         1        1        1        1        4        1        1
##    141.58      142    142.1   142.47   142.59   142.83   142.84
##         1        1        1        1        1        1        1
##    142.98   143.18   143.51   143.55    144.3   145.09    146.2
##         1        1        1        1        1        1        1
##     146.7      147   147.25   148.44      149   149.22   149.44
##         1        1        1        1        2        1        1
##    149.78   149.85   149.99   150.05   150.14   150.59   150.72
##         1        1        2        1        1        1        1
##    150.83   150.88   150.89    150.9   150.97    151.1   151.13
##         1        1        1        1        1        1        1
##    151.24   151.29   151.32   151.61   152.14   152.38   152.49
##         1        1        1        1        1        1        1
##    152.71   152.98      153    154.7   155.06   155.43   155.55
##         1        1        1        1        2        2        1
##     155.6   156.84      157   157.24   157.62    157.7   157.74
##         1        1        2        1        1        1        1
##    158.07   158.12   158.14   158.47   158.67      159   159.08
##         1        1        1        1        1        1        2
##     159.1   159.11   159.26   159.44    159.9   159.91   159.95
##         1        1        1        1        1        1        1
##    160.03   160.13   160.38   160.75      161   161.08   161.14
##         2        1        1        1        1        1        1
##    161.37   161.75      162   162.12   162.25   162.38   162.88
##         1        1        1        1        1        1        1
```

```
##      163   163.01   163.08   163.59   163.68   163.77   163.86
##        1        1        1        1        1        2        1
##   163.93   164.49   164.66   164.94      165   165.05   165.12
##        1        1        1        2        1        1        1
##   165.28   165.79    165.8      166   166.25    166.4    166.8
##        2        1        1        2        1        1        1
##      167   167.08   167.22      168   168.04   168.58    168.7
##        1        1        1        3        1        1        1
##      169   169.18   169.25   169.31   169.89   169.92   170.07
##        1        1        1        1        1        1        1
##    170.3   170.59   170.64   170.83   170.87    170.9   171.05
##        1        1        1        1        1        1        1
##   171.46   171.81   171.87      172   172.31   172.42   172.85
##        1        1        1        1        1        1        1
##   172.89   173.02   173.49    173.5      174   174.18   174.54
##        1        2        1        1        1        1        1
##   174.83   175.52   175.55   175.61   175.97   176.09   176.57
##        1        1        1        1        1        1        1
##   176.77   176.89      177   177.23   177.54   177.65   177.67
##        1        1        3        1        1        1        1
##   177.86   178.17    178.3    178.7   178.82   178.88      179
##        1        1        1        1        1        1        2
##    179.2   179.41   179.51   179.64   179.76   180.24   180.52
##        1        1        1        1        1        1        1
##   180.97      181   181.11   181.85   182.03   182.07   182.13
##        1        1        2        1        1        1        1
##      183   183.43   183.59   183.79   183.94      184   184.19
##        2        1        2        1        1        1        1
##   184.75   185.04   185.22   185.51   185.76   185.93   186.31
##        1        1        1        1        1        1        1
##    186.6      187   187.73   188.52   188.64   188.74   189.21
##        1        1        1        1        1        1        1
##   189.45   189.55   189.61   190.36    190.7   191.78   191.83
##        1        1        1        1        2        1        1
##   192.28   192.62   192.63   192.79   192.91   193.37   193.56
##        1        1        1        1        1        1        1
##   193.59   193.97   194.06   194.35   194.82   195.22   195.29
##        1        1        1        1        1        1        1
##    195.6   195.78   195.87   196.56   196.75   196.77   197.91
##        1        1        1        1        1        1        1
##   198.12   198.35   198.73   198.74   198.97   199.78   199.79
##        1        1        1        1        1        1        1
##   199.81   199.82      200   200.64   200.66   201.01   201.33
##        1        1       10        1        1        1        1
##   201.63   201.72   201.82   201.88   202.01   202.25   202.71
##        1        1        1        1        2        1        1
##   203.35   203.39   203.41   203.55   203.59   203.78   204.46
##        1        1        1        1        1        1        1
##   204.56   204.99      205   205.13   205.25   206.07   206.13
##        1        1        4        1        1        1        1
##   206.19   206.94   207.88      208   208.08   208.36   208.68
##        1        1        1        2        1        1        1
##   209.42   210.09   210.16      211   211.21   211.24   211.42
##        1        1        1        1        1        1        1
```

```
##    211.97    211.98       212    212.45    212.46    212.79       213
##         1         1         1         1         1         1         1
##    213.31    213.79    213.81    214.08    214.51    214.81     214.9
##         1         1         1         1         1         1         1
##    215.33    215.46    216.09    216.25    216.29    216.54    216.66
##         1         1         1         1         1         1         1
##    217.82    217.83    217.93    218.06    218.65     218.7    219.14
##         1         1         1         1         1         1         1
##    219.68       220    220.04    220.39    220.62    220.75    221.19
##         1         2         1         1         1         1         2
##    221.53    221.82    221.85    221.88    221.93       222    222.34
##         1         1         1         1         1         1         1
##    222.86    222.96    223.19     223.3    223.47    223.99    224.29
##         1         1         1         1         1         1         1
##     224.7    224.91    224.95    225.84    226.25    227.09    227.49
##         1         1         1         1         1         1         1
##     227.9    228.22    228.78    229.71    230.17    230.75       232
##         1         1         1         1         1         1         1
##     232.1    232.33    232.55       233    233.22    233.48    233.64
##         1         1         1         2         1         1         1
##    233.68     233.8    233.89    234.15    234.18    234.27    234.61
##         1         1         1         1         1         1         1
##    234.77       235    235.01    235.18    235.52    235.76    235.92
##         1         1         1         1         1         2         1
##    235.97    236.65       237     237.1    237.24    237.58     237.9
##         1         2         1         1         1         1         1
##    238.01    238.02    238.07    238.23    238.38    238.73    238.96
##         1         1         1         1         1         1         1
##    239.69    239.71    240.26       241    241.34    241.39    241.64
##         1         2         1         1         1         1         1
##    241.67    241.88       242    242.19     242.7    242.95    242.97
##         1         1         1         1         1         1         1
##    243.11    243.38    243.94    244.32     244.4    244.59    245.12
##         1         1         1         1         1         1         1
##    245.66    245.75     245.9       246    246.25    246.93    247.13
##         1         1         1         1         1         1         1
##    247.63       248    248.05    248.09    248.61    248.82    249.27
##         1         1         2         1         1         1         1
##    249.54    249.56    249.58    249.67       250    250.36     250.6
##         1         2         1         1         1         1         1
##    251.02    251.19    251.45    251.66    251.67    251.72    252.34
##         1         1         1         1         1         1         1
##    252.39    252.46    252.71    253.01    253.28    253.54    253.62
##         1         1         1         1         1         1         1
##     253.7    253.79     254.2    254.22    254.23    254.36    254.42
##         1         1         1         1         1         1         1
##    254.69    255.55       256    256.47    256.97       257    257.12
##         1         1         2         1         1         2         1
##     257.4    257.48    258.07    258.54       259    259.16     259.3
##         1         1         1         1         1         1         1
##    259.62    259.66    259.71     260.1    260.42    260.83       261
##         1         1         1         1         1         1         1
##    261.06    261.45    261.78    261.82    262.05    262.08    262.18
##         1         1         1         1         2         1         1
```

```
##   262.36   262.47   262.59   263.47    263.6      264   264.19
##        1        1        1        1        1        1        1
##   264.21   264.92   265.31   265.42   265.46   265.67   265.82
##        1        1        1        2        1        1        1
##   265.83   265.88   266.14   266.19    266.4      267   267.39
##        1        1        1        1        1        1        1
##   267.48   267.99   268.03   268.72   268.83   268.88   269.96
##        1        1        1        1        1        1        1
##   270.04   270.08   270.64   270.98   271.39   271.54   271.72
##        1        1        1        1        1        1        1
##   272.31   272.39   272.59   272.61   272.67   272.76   272.94
##        1        1        1        1        2        1        1
##   272.97      273   273.49   273.77   274.46   274.57   274.69
##        1        2        2        1        1        1        1
##   275.01   275.12   275.68   276.87   277.27   277.28   277.47
##        1        1        1        1        1        1        1
##   277.52   277.56   277.78   277.79   278.09   278.15   278.59
##        1        1        1        1        1        1        1
##   278.98   279.23   279.45   279.51   279.53   280.11   280.41
##        1        1        1        1        1        1        2
##   280.75   280.91   281.23   281.31   281.72   282.19    283.5
##        1        1        1        1        1        1        1
##   283.62    283.9   284.05   284.31   284.49   284.63   284.77
##        1        1        1        1        1        1        2
##   284.88   285.31   285.34   285.36   285.54   285.89   285.97
##        1        1        1        1        1        1        1
##   286.19   286.55   287.14   287.48   287.66   288.24   288.44
##        1        1        1        1        1        1        1
##   288.87   288.94   288.97   289.85   289.98   290.24   290.27
##        1        2        1        1        1        1        1
##      291   291.08   291.34   291.63   291.83      292   292.01
##        1        1        1        1        2        1        1
##   292.26   292.64   292.76    292.8   292.88      293   293.17
##        1        1        2        2        1        1        1
##    293.3   293.38   293.59   293.61   294.15   294.62   294.69
##        1        2        1        1        2        1        1
##    294.7   294.73   294.75   295.15   295.46   295.94   296.02
##        1        1        1        1        1        1        1
##   296.34   296.55   296.59   296.61   296.63   296.88      297
##        1        1        1        1        1        1        1
##   297.02   297.15   297.39   297.43   297.47   297.63   297.92
##        1        1        1        1        1        1        1
##   297.95   297.99   298.93   299.06   299.09   299.35   299.51
##        1        1        1        1        1        1        1
##      300    300.4   300.87      301   301.29   301.55   301.96
##        2        1        1        1        1        1        1
##      302   302.81   302.84   302.95   303.14   303.27   303.81
##        1        1        1        2        1        1        1
##   303.82   303.94   304.12   304.13   304.63   304.79   305.17
##        1        1        1        1        1        1        1
##   305.35   306.15   306.35    306.7   307.06   307.53   307.63
##        1        1        1        1        1        1        1
##   307.69   307.88   307.96   308.08   308.58   309.01   309.35
##        1        1        1        1        1        1        1
```

```
## 310.42   310.93   311.21   311.35   311.44   311.69   311.95
##      1        1        1        1        1        1        1
## 311.96   312.52   312.94   312.95   313.32   313.37   313.47
##      1        1        1        1        1        1        1
##    314   314.05    314.4   314.57   314.75   314.94   315.25
##      2        1        1        1        1        1        1
##  315.9   316.14   316.31   316.55   317.21   317.52   317.72
##      1        1        1        1        1        1        1
##  317.9      318   318.07   318.42   319.01   319.11   319.16
##      1        1        1        1        1        1        1
## 319.54   319.55   319.98   320.56   320.83   321.09   321.18
##      1        1        1        2        1        1        1
## 321.33   321.61   322.15   323.26   323.62   324.07   324.59
##      1        1        1        1        1        1        1
## 324.72    324.8      325   325.07   325.17   325.67   326.05
##      1        1        1        1        1        1        1
## 326.43   326.64   327.49   327.68      328   328.09   328.26
##      1        1        1        1        1        1        1
## 328.81   328.82   329.01   329.14   329.16   329.73   329.88
##      1        1        1        1        1        1        1
##    330   330.09   330.21   330.24   331.17   331.62   331.91
##      1        2        1        1        1        1        1
## 332.37   332.89      333   333.88      334   334.05   334.34
##      1        1        1        1        1        1        1
## 334.38   334.52   335.59   335.63   335.66   335.99   336.16
##      1        1        1        1        1        1        1
## 336.22   336.26   336.53   336.68   336.84   337.12   337.14
##      1        1        1        1        1        1        1
## 337.17   337.21   337.45   337.81    337.9   338.45   338.81
##      1        1        1        1        1        1        1
##    339   339.27    339.3   339.33   339.34   339.42   339.96
##      2        1        1        1        1        1        2
##    340   340.58   340.61   340.86   340.95      341    341.1
##      1        1        1        2        1        2        1
## 341.44   341.53   341.58   341.71      342   342.16   342.46
##      1        2        2        1        1        1        1
## 342.67    342.9      343   343.24   343.55   344.51   344.55
##      2        1        1        1        1        1        1
## 344.85      345   345.01   346.05   346.09   346.17   346.69
##      1        2        1        1        2        1        1
## 346.93   347.63   347.85   348.26   348.98      349   349.42
##      1        1        1        1        1        1        1
## 349.69   349.79   350.21   350.43   350.46    350.5   351.02
##      1        1        1        1        1        1        1
## 351.17   351.33   351.51   351.73   352.05   352.24   352.58
##      2        1        1        1        1        1        1
## 352.74   354.37   354.96      355   355.48   355.58   355.99
##      1        1        1        1        1        1        1
## 356.18   356.62      357   357.75   357.77   357.84   358.13
##      1        2        1        1        1        1        1
## 358.44   358.95   359.52   359.59   359.98      360   360.28
##      1        1        1        1        1        1        1
## 360.33    360.4   360.65   360.66   361.18   362.73   363.47
##      1        1        1        1        1        1        1
```

```
##  363.62  364.04  364.21  364.35  365.27  365.64  366.33
##       1       1       1       1       1       2       1
##  366.38  366.62  366.75  366.82  366.84  367.12  367.23
##       1       1       2       1       1       1       1
##  368.02  368.27  368.47  369.03  369.49  370.26  370.31
##       1       1       1       1       1       1       1
##  370.43  371.92  371.99  372.14  373.09  373.15  373.86
##       1       1       1       1       1       1       1
##  373.99  375.38  375.67  375.74     376  376.11  376.18
##       1       1       1       1       1       1       1
##  376.19  376.41   376.7  376.76  376.91  377.47  378.48
##       1       1       1       2       1       1       1
##  378.51  379.36  379.56  380.83     381  381.16  381.42
##       1       1       1       1       1       1       1
##  381.56   381.6  381.61  381.94     382  382.48  383.05
##       1       1       1       1       1       1       1
##  383.14  383.39     384  384.47  385.05  385.12  385.18
##       1       1       1       1       1       1       1
##  385.65  385.86   386.1  386.78  387.49  388.39   388.5
##       1       1       1       1       1       1       1
##  388.92     389  389.15  389.92  390.62  390.63  391.31
##       1       1       1       1       1       1       1
##  392.64  393.06  393.15  393.34  393.37  393.39  394.03
##       1       1       1       1       1       1       1
##  394.17  394.29  394.41  394.82  395.24  395.71   396.1
##       1       1       1       1       1       1       1
##  396.22  396.29  397.26  397.34  397.36  397.69  398.11
##       1       1       1       1       1       1       1
##  398.38  399.04  399.42  400.53  400.68   400.7  400.71
##       1       1       1       1       1       1       1
##  400.74  401.17   401.9  402.24  403.09  403.14  403.83
##       1       1       1       1       1       2       1
##  404.65  404.98   406.1  406.67  406.92  407.07  407.97
##       1       1       1       1       1       1       1
##  408.84  409.16   409.3  409.93  410.89  411.34  411.57
##       1       1       1       1       1       1       1
##  411.61  412.03  412.89     413  413.43  413.78  413.85
##       1       1       1       1       1       1       1
##  414.27  414.35     415     416  416.21     417  417.16
##       1       1       1       1       1       1       2
##  417.21  418.49  418.88   419.5  419.77  420.05  420.13
##       1       1       1       1       1       1       1
##  420.16  420.35  420.91  421.51  421.76  422.56  423.78
##       1       1       1       1       1       2       1
##  423.86  424.16   424.6   425.2  425.51  425.95  426.24
##       1       2       1       1       1       1       1
##  426.85  427.02  427.09  427.55  427.71  427.94  428.01
##       1       1       1       1       1       1       1
##  428.31  428.78     430  430.02  430.41  430.84  433.37
##       1       1       1       1       1       1       1
##  434.47  435.33     436     437  437.11  438.18  438.79
##       1       1       2       1       1       1       1
##  439.57  440.36  441.98     442  442.79     444  444.54
##       1       1       1       1       1       3       1
```

```
##    444.62    445.03    445.86       446    446.45    447.48    447.83
##         1         1         1         1         1         1         1
##    448.04    448.51    448.71    449.77    450.59     450.7    450.76
##         1         1         1         1         1         1         1
##    450.81    451.41     452.1    453.01    453.27    453.74       454
##         1         1         2         1         1         1         1
##    454.46     455.2    456.33    457.24    457.35       458     458.6
##         1         1         1         1         1         1         1
##    458.86    459.07    459.09    461.55    461.81       462    462.34
##         1         1         1         1         1         1         1
##    462.43    462.76       464    464.12     464.4    465.34    465.54
##         1         1         1         1         1         1         1
##       466    466.18    467.11    467.71    467.74     468.8    469.49
##         1         1         1         1         1         1         1
##    469.96    470.68     470.7    471.74    471.76       473    473.39
##         1         1         1         1         1         1         1
##    473.46    475.84    475.98     477.5       479    479.21    479.93
##         1         1         1         1         1         1         1
##    480.58    481.04    483.23    484.98    485.14    485.27    487.21
##         1         1         1         1         1         1         1
##     487.5    487.83    488.86       489    489.09    490.73    491.18
##         1         1         1         1         1         1         1
##    491.27    491.61    491.67    491.76    493.33    494.43    495.03
##         1         1         1         1         1         1         2
##    495.35    495.48    495.74    495.97     496.7    497.48    498.35
##         1         1         1         1         1         1         1
##    498.41    500.01    500.45    500.49    500.53    500.55    502.59
##         1         1         1         1         1         1         1
##    503.17    503.19       504    504.15    504.74       505    505.29
##         1         1         1         1         1         1         1
##    508.21    508.26    508.74    510.54    510.77    511.24    512.07
##         1         1         1         1         1         1         1
##    512.24    513.28       514    514.54    515.31    515.55    516.56
##         1         1         3         1         1         1         1
##    516.64    517.15    518.38    518.69       519    519.14    519.16
##         1         1         1         1         1         1         1
##    520.07    521.29    521.42    524.37    524.39    525.33    527.39
##         1         1         1         1         1         1         1
##    527.58    527.83     528.5       529    529.83    530.11    530.46
##         1         1         1         2         1         1         1
##    532.69    534.76       535    535.92    536.74       537    537.84
##         1         1         1         1         1         1         1
##    538.33    539.04    539.89    540.41    541.26       542    542.93
##         1         1         1         1         1         1         1
##    543.66    544.11    544.69     544.7    545.16       546    546.45
##         1         1         1         1         1         1         1
##    549.06    549.25    549.35    549.91    552.14    552.15    552.48
##         1         1         1         1         1         1         1
##    552.58    553.97    554.81     556.3    556.67    557.07    557.37
##         1         1         1         1         1         1         1
##    558.02    559.03    559.23    559.59    560.86    561.25    562.24
##         1         1         1         1         1         1         1
##    562.84    562.91    563.24    564.25    565.33    565.71    566.35
##         1         1         1         1         1         1         1
```

```
##      567.9    568.28    569.45    569.62    569.72    571.97    572.94
##          1         1         1         1         1         1         1
##     574.14    574.73    576.38     576.4    577.96    577.97       578
##          1         1         1         1         1         1         1
##      578.4    578.52    579.98       580    580.34       581    581.85
##          1         1         1         1         1         1         1
##     582.05    583.22    584.62    585.15    585.24    585.38       586
##          1         1         1         1         1         1         1
##     586.04    586.21       587    587.18       588     588.5    588.63
##          1         1         1         1         2         1         1
##     590.62    590.85    591.08    592.76    593.18    595.08    598.02
##          1         1         1         1         1         1         1
##     598.52    599.54    600.95     601.5    603.13    603.17    605.03
##          1         1         1         1         1         1         1
##     605.05    605.62    605.88    606.29     607.3    607.93       610
##          1         1         1         2         1         1         1
##     610.29    610.61    610.96       611     611.3    613.18    613.46
##          1         2         1         1         1         1         1
##     613.94    615.83    616.34    616.82    618.26    619.68    620.58
##          1         1         1         1         1         1         1
##     620.83    622.07    623.52    624.48     624.9       625     625.2
##          1         1         1         1         2         1         1
##     625.34    625.39    627.18    627.89    628.49    628.54     628.6
##          1         1         1         1         1         1         2
##     630.23    631.03    632.35    632.44    632.63       633    633.94
##          1         1         1         1         1         1         1
##     634.12    634.45    635.99    636.96    637.59       640    642.68
##          1         1         1         1         1         1         1
##     642.88    643.39     643.4    644.92       646     646.4       650
##          1         1         1         2         1         1         1
##        652    653.69    654.84    655.78    656.25     657.3     659.6
##          2         1         1         1         1         1         1
##     660.84    660.98    661.22    661.66    661.82    662.38     662.7
##          1         1         1         1         1         1         1
##     662.74    662.79    662.98    663.47    664.04    666.03    666.45
##          1         1         1         1         1         1         1
##     666.69    666.72    667.31    667.63    669.16    670.16    671.15
##          1         1         1         1         1         1         1
##     673.66       675    679.12    681.64    683.99    689.21       692
##          1         1         1         1         1         1         1
##     693.02    696.61    696.83    698.43       699    699.41    700.07
##          1         1         1         1         1         1         1
##     700.15    701.29     701.9       702    703.73       705    706.32
##          1         1         1         1         1         1         1
##        709    712.98    716.43    718.18    719.65     723.5    726.38
##          1         1         1         1         1         1         1
##     726.95    727.16       728    729.52       731    731.25    731.52
##          1         1         1         1         1         1         1
##        736    736.62    742.14     743.4    744.57     745.4       750
##          1         1         1         1         1         1         1
##        753    753.68       756    756.91       758    758.39    760.61
##          1         1         1         1         1         1         1
##        763    764.46    765.33    767.39    767.63     775.2    777.94
##          2         1         1         1         1         1         1
```

```
##       778     783.18     783.81     784.13        786        790     792.28
##         1          1          1          1          1          1          1
##       793     793.39     795.94     796.65      797.4     799.28        800
##         1          1          1          1          1          1          2
##    800.23     806.26        807     807.07        809     813.31      816.6
##         1          1          1          1          1          1          1
##    817.84     818.94        819      819.2     819.27        820        822
##         1          1          1          1          1          1          1
##     822.5     822.64     822.82        826        827     827.77        828
##         1          1          1          1          1          1          1
##    830.87     832.56     832.65     832.94     833.62        835     836.31
##         1          1          1          1          1          1          1
##    837.84        842        844        845      849.7        853     855.15
##         1          1          1          1          1          2          1
##    859.18     861.08        862     864.44        865        866        867
##         1          1          1          1          1          1          2
##    867.96        868     873.64     876.81        877        879     882.95
##         1          1          1          1          1          1          1
##     884.7        888        899      899.6     906.37        937     938.35
##         1          1          1          1          1          1          1
##       947     958.38        960      962.8     964.95     970.68     971.13
##         1          1          1          1          1          1          1
##     971.5     977.14     977.21     977.61     980.67        982     988.49
##         1          1          1          1          2          1          1
##    994.67     996.69        998    1003.87       1006       1009    1013.22
##         1          1          1          1          1          1          1
##      1014    1017.28    1020.76    1022.97     1025.2    1028.03    1030.22
##         1          1          1          1          1          1          1
##   1030.87       1032    1032.07    1032.31       1035       1041       1042
##         1          1          1          1          1          1          1
##   1042.55       1043    1045.83       1047       1050       1051    1051.03
##         1          1          1          1          2          1          1
##      1052    1057.12       1074       1075    1075.21       1080    1081.17
##         1          1          1          1          1          1          1
##   1082.33    1085.97    1087.11    1088.37    1095.08    1102.95    1108.18
##         1          1          1          1          1          1          1
##   1112.32       1119    1119.37    1119.85    1127.29    1130.94    1132.25
##         1          2          1          1          1          1          1
##   1135.37    1135.65     1135.9    1136.67       1140    1141.73     1143.6
##         1          1          1          1          1          1          1
##   1145.89    1146.02    1146.39    1147.63    1149.72    1150.17     1157.3
##         1          1          1          1          1          1          1
##   1158.49    1158.74       1159     1159.2    1159.27    1159.84    1160.13
##         1          1          2          1          1          1          1
##   1161.16    1163.71    1164.98       1165    1166.79    1167.61    1170.79
##         1          1          1          2          1          1          1
##   1180.91       1181    1181.73    1182.25    1186.59    1191.98    1193.69
##         1          2          1          1          1          1          1
##   1193.72    1198.05       1203     1204.7       1209    1209.27       1210
##         1          1          1          1          1          1          1
##      1213    1215.29       1217       1222    1243.25       1249       1254
##         1          1          1          2          1          1          1
##      1272    1278.32       1279    1280.57       1289    1290.81       1293
##         1          1          1          1          1          1          1
```

```
##      1305    1306.95    1310.61    1312.24    1316.99       1331    1332.71
##         1          1          1          1          1          1          1
##   1347.62       1348       1350       1351       1352    1352.18       1353
##         1          1          1          2          1          1          1
##      1355    1358.22    1372.48    1379.75       1380    1387.26    1389.69
##         1          1          1          1          1          1          1
##      1390       1398       1400    1410.95       1411    1428.83    1433.17
##         1          1          1          1          1          1          1
##   1458.36    1462.94       1467    1470.85       1474       1479       1486
##         1          1          1          1          1          1          1
##   1486.59    1492.54       1499       1503    1504.67    1506.78     1508.5
##         1          1          1          2          1          1          1
##   1515.37       1526       1543       1545    1545.28       1546       1548
##         1          1          1          1          1          1          1
##      1553    1553.74    1554.66    1556.17       1557     1561.4       1567
##         1          1          1          1          1          1          1
##   1568.88     1585.2     1589.4       1594       1597    1609.84       1619
##         1          1          1          1          1          1          1
##    1623.1       1635    1637.58     1646.5       1647    1647.01    1649.12
##         1          1          1          1          1          1          1
##   1650.88       1654    1657.56     1663.6       1667    1667.28       1668
##         1          2          1          1          1          1          1
##   1680.07       1682    1688.96       1691       1694       1695    1695.68
##         1          1          1          1          1          1          1
##      1697       1700       1708       1710     1713.1       1714       1717
##         1          1          1          1          1          1          2
##      1722    1724.92       1728    1729.44       1732    1734.12       1736
##         1          1          1          1          1          1          1
##      1739    1739.96       1740    1740.11    1749.16       1751       1753
##         1          1          1          1          1          1          1
##   1756.29     1758.1       1759       1760       1769       1773       1774
##         1          1          1          1          2          1          1
##   1787.55       1788    1794.67       1796    1796.74    1798.96       1800
##         1          1          1          1          1          1          1
##   1806.65       1808    1808.98    1810.47       1824       1826       1832
##         1          1          1          1          1          1          1
##   1836.17    1848.52    1855.51    1859.51    1870.52       1874    1874.55
##         1          1          1          1          1          1          1
##   1874.95       1876    1880.32       1881    1881.84    1892.98     1898.5
##         1          1          1          1          1          1          1
##    1902.2       1904    1909.71    1913.43    1914.66       1932    1932.02
##         1          1          1          1          1          1          1
##   1933.48       1946       1949    1953.92    1958.38    1963.53    1968.57
##         1          1          1          1          1          1          1
##   1970.06       1977       1979    1991.43       1994       2009    2010.28
##         1          1          1          1          1          1          1
##   2011.91       2030    2030.42       2033       2034    2036.22       2038
##         1          1          1          1          1          1          1
##      2041       2042     2042.4       2065     2070.6     2071.6       2072
##         1          1          1          1          1          1          1
##      2075       2078       2086       2088       2091     2095.9       2098
##         1          1          1          1          1          1          1
##      2099       2101    2103.36       2105       2111       2118    2119.79
##         1          1          1          1          1          1          1
```

```
## 2122.23    2123 2125.15    2127 2151.08 2154.56 2158.09
##       1       1       1       1       1       1       1
## 2170.99 2173.98    2175    2194  2199.9  2204.6 2211.11
##       1       1       1       1       1       1       1
## 2225.74 2228.26    2248    2251 2271.72    2275 2276.28
##       1       1       1       2       1       1       1
## 2283.62 2285.25 2288.29    2296    2297 2306.66 2323.99
##       1       1       1       2       1       1       1
##    2360 2360.07 2363.91 2367.03 2375.35  2380.7    2403
##       1       1       1       1       1       1       1
## 2405.42    2408 2408.85 2413.19 2415.17    2416  2420.8
##       1       1       1       1       1       1       1
## 2425.51    2430    2435 2439.94 2443.77 2445.26 2445.59
##       1       1       1       1       1       1       1
##    2446 2448.01 2450.27 2452.17 2456.87 2457.93  2458.7
##       3       1       1       1       1       1       1
##    2461  2464.5    2466 2475.13    2477    2484 2487.35
##       1       1       3       1       1       1       1
## 2493.73 2493.99    2496 2496.95 2499.75    2500    2513
##       1       1       1       1       1       1       1
##    2517 2518.68 2519.65    2524 2534.88 2540.37 2550.44
##       1       1       1       1       1       1       1
## 2557.37 2569.56 2572.96 2579.35 2582.04 2601.51    2615
##       1       1       1       1       1       1       1
## 2623.11 2623.41    2644    2657 2661.95 2666.21    2675
##       1       1       1       1       1       1       1
## 2694.73  2709.2    2721    2736 2738.66    2740    2780
##       1       1       1       2       1       1       1
##    2804    2810    2811 2811.26 2821.76 2828.11 2864.14
##       1       2       1       1       1       1       1
##    2872 2889.33 2890.75    2895 2896.31    2904    2912
##       2       1       1       2       1       1       2
##    2918 2921.57    2922 2928.51    2938    2943    2958
##       2       1       2       1       2       1       2
## 2968.49    2988    2990 2999.69 3059.68 3243.28    3664
##       1       2       2       1       1       1       1
##    3683 3769.07    3782 3846.27 3853.79 3874.66 3880.07
##       1       1       1       1       1       1       1
##    3887    3888    3906    3931    3940    3943 3951.32
##       1       1       1       1       1       1       1
##    3999    4007    4017 4028.15    4075    4082    4118
##       1       1       1       1       1       2       1
##    4119    4145    4152 4157.16 4212.41 4227.51    4251
##       1       1       1       1       1       1       1
##    4257    4268    4285  4286.2 4324.91    4357    4360
##       1       1       1       1       1       1       1
##    4362 4378.06    4409    4434    4444 4461.97 4483.08
##       1       1       1       1       1       1       1
## 4526.12    4529    4539 4540.16    4572    4608    4624
##       1       1       1       1       1       1       1
##    4627    4636 4647.92 4689.42 4703.79 4719.57    4725
##       1       1       1       1       1       1       1
##    4824    4832    4835    4841    4847 4980.98    5002
##       1       1       1       1       1       1       1
```

```
##      5023   5048.27   5063.71      5086      5093   5135.31      5156
##         1         1         1         1         1         1         1
##   5172.84      5176      5178    5196.6   5251.02   5257.96      5271
##         1         1         1         1         1         1         1
##   5309.69   5336.63      5349      5363   5425.28      5463      5499
##         1         1         1         1         1         1         1
##   5515.11   5598.74      5603   5607.65   5656.26   5673.06      5694
##         1         1         1         1         1         1         1
##      5708      5721   5786.37      5832      5839      5876      5877
##         1         1         1         1         1         1         1
##      5878    5892.1   5920.68      5937      5964   5983.96   5992.67
##         1         1         1         1         1         1         1
##   6000.65   6002.73      6013   6045.76      6046      6063   6066.82
##         1         1         1         1         1         1         1
##      6069   6077.68   6083.58      6088      6092      6116      6130
##         1         1         1         1         1         1         1
##   6153.86      6157      6164      6169      6175      6181      6183
##         1         1         1         1         1         1         1
##      6185      6196      6198      6202   6218.49      6252      6261
##         1         1         1         1         1         1         1
##   6268.98   6271.74   6283.39   6284.84      6292   6314.34   6316.27
##         1         1         1         1         1         1         1
##      6325      6331      6365   6372.85   6373.16    6399.5      6407
##         1         1         1         1         1         1         1
##      6414   6434.59   6465.13      6524   6550.55      6552      6570
##         1         1         1         1         1         1         1
##   6576.45      6581      6584      6597    6613.2   6617.07   6641.58
##         1         1         1         1         1         1         1
##    6677.2      6681   6681.81      6700   6701.02    6707.1      6717
##         1         1         1         1         1         1         1
##      6738      6748      6759   6773.31   6779.75   6814.12   6814.17
##         1         1         1         1         1         1         1
##      6819      6821   6821.04   6828.03   6837.09   6855.58   6873.27
##         1         1         1         1         1         1         1
##   6883.47   6887.27      6933   6955.09   7002.89      7022      7053
##         1         1         1         1         1         1         1
##      7071   7076.67   7078.14   7090.04      7100   7100.25      7114
##         1         1         1         1         1         1         1
##      7141   7177.69      7242      7286      7294      7309      7345
##         1         1         1         1         1         1         1
##   7346.81      7369      7375      7433      7466      7500      7600
##         1         1         1         1         1         1         2
##   7628.23      7651   7806.11   7821.12      7838   7854.67    7869.5
##         1         1         1         1         1         1         1
##   7934.82   7939.74   7986.42   8020.93    8114.7   8118.34      8366
##         1         1         1         1         1         1         2
##      8374      8418      8432      8451   8517.13      8526      8574
##         1         1         1         1         1         1         1
##      8600      8616      8650   8661.78      8686      8698      8700
##         1         1         1         1         1         1         1
##      8708      8717      8740   8751.45      8759      8766      8811
##         1         1         1         1         1         1         1
##      8878      8879   8897.02      8919   8919.06   8942.68      8943
##         1         1         1         1         1         1         1
```

```
##      8956      9059      9076      9084      9088      9144   9152.48
##         1         1         1         1         1         1         1
##      9177      9183   9236.25   9262.35      9266      9279      9280
##         1         1         1         1         1         1         1
##      9294      9315   9322.27      9349   9350.72   9351.14      9356
##         1         1         1         1         1         1         1
##      9367      9377      9434      9493      9584   9727.52   9764.08
##         1         1         1         1         1         1         1
##    9776.9      9790   9808.63  10017.03  10054.59     10105     10162
##         1         1         1         1         1         1         1
##  10242.91     10264  10264.21  10276.13  10285.79  10299.77  10304.43
##         1         1         1         1         1         1         1
##     10308   10309.9  10317.66  10325.21  10331.94  10369.47     10402
##         1         1         1         1         1         1         1
##     10444  10451.91     10489     10498     10587     10596  10608.12
##         1         1         1         1         1         1         1
##  10729.48     10742     10812  10882.49     10885     11005  11021.74
##         1         1         1         1         1         1         1
##     11053     11116     11164     11208     11241     11244     11261
##         1         1         1         1         1         1         1
##  11264.73     11279     11288  11375.12     11405     11417     11476
##         1         2         1         1         1         1         1
##  11485.49  11518.52     11555     11673     11692     11837  11839.77
##         1         1         1         1         1         1         1
##     11920     11932     11941     11952     11972     11980     11989
##         1         1         1         1         1         1         1
##     12008     12028     12035     12064     12111     12196  12305.37
##         1         1         1         1         1         1         1
##     12429     12434     12583     12587  12647.22  12774.66  12790.14
##         1         1         1         1         1         1         1
##  12834.72     12850     12931     13197  13267.63     13369  13555.15
##         1         1         1         1         1         1         1
##     13560     13659     13730  13935.94     13962     14073     14077
##         1         1         1         1         1         1         1
##     14279     14337     14380  14426.64     14461     14473     14475
##         1         1         1         1         1         1         2
##     14531     14621     14646     14735     14764     14776     14861
##         1         1         1         1         1         1         1
##     14871     14896     14947  14984.25     15037     15051     15070
##         1         1         1         1         1         1         1
##     15073     15174     15377     15397     15436     15667     15910
##         1         1         1         1         1         1         1
##     15929     16040     16135     16613     16646     16732     16853
##         1         1         1         1         1         1         1
##     16860     16867     16885     16967     16974     17029     17085
##         1         1         1         1         1         1         1
##     17212     17241     17433  17433.55     17525     17599  17615.78
##         1         1         2         1         1         1         1
##     17633  17700.21  17758.22  17775.69  17789.06     17794  17802.08
##         1         1         1         1         1         1         1
##   17802.5  17813.69     17814   17878.4     18003     18025     18072
##         1         1         1         1         1         1         1
##     18118     18399     18548     18636     18737     18748     18760
##         1         1         1         1         1         1         1
```

```
##    18865.02    18884.2       18936       18992       18996       19059       19193
##           1           1           1           1           1           1           1
##    19233.58       19277       19405       19512       19519       19600       19751
##           1           1           1           1           1           1           1
##       19921       19928       19937    20005.54    20019.74       20191       20217
##           1           1           1           1           1           1           1
##       20236       20264    20278.67    20342.12       20359       20451       20469
##           1           1           1           1           1           1           1
##    20476.61       20496       20558       20589     20657.4       20668       20742
##           1           1           1           1           1           1           1
##       20778       20821       21044       21300       21364    21367.63       21372
##           1           1           1           1           1           1           1
##       21628    21753.95       21835       21938       22131    22171.07       22190
##           1           1           1           1           1           1           1
##       22246    22246.69       22448       22511    22763.26       22830       22874
##           1           1           1           1           1           1           1
##       22878       22899       22917       22960     23010.9    23103.59       23172
##           1           1           1           1           1           1           1
##    23174.54    23183.51    23209.09    23245.89    23393.78     23398.9       23404
##           1           1           1           1           1           1           1
##       23409    23425.81    23552.47       23606    23669.46    23813.29       23854
##           1           1           1           1           1           1           1
##    23904.34       23938    23968.41    24098.42    24220.92       24234       24413
##           1           1           1           1           1           1           1
##       24506       24560       24586    24607.62       24724       24741    24811.77
##           1           1           1           1           1           1           1
##       24831       24836       24847    24893.98       24933       25019       25043
##           1           1           1           1           1           1           1
##       25119       25129       25131    25215.45    25289.75    25477.35       25487
##           1           1           1           1           1           1           1
##    25516.56     25516.9       25566    25860.15     26201.3    26348.76       26441
##           1           1           1           1           1           1           1
##    26454.35       26493       26499       26613       26642       26692    26713.15
##           1           1           1           1           1           1           1
##     26781.6    26856.91    26869.33    26882.56       26905    26937.81    27120.22
##           1           1           1           1           1           1           1
##    27152.04       27178    27191.71       27544    27701.72       27709       27808
##           1           1           1           1           1           1           1
##    28032.78     28090.9    28475.06       28685    28778.94    28930.06       29136
##           1           1           1           1           1           1           1
##    29457.17    29572.05       29751    30150.45       30698       30708       30804
##           1           1           1           1           1           1           1
##       30822       30901       30962     31026.1       31081       31172       31238
##           1           1           1           1           1           1           1
##       31240       31348       31396       31412       31416       31507       31639
##           1           1           2           1           1           1           2
##       31659    31724.72       31803       31963       32029    32134.38    32423.37
##           1           1           1           1           1           1           1
##       32454       32473       32539       32552       32578       32585       32596
##           1           1           1           1           1           1           1
##       32598       32658       32663       32704       32805    33027.25    33043.51
##           1           1           1           1           1           1           1
##       33447       33483       33558       33821       33850     34095.3    34202.88
##           1           1           1           1           1           1           1
```

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```
## 34244.96 34315.35 34485.93    34522    34571    34679    34787
##        1        1        1        1        1        1        1
## 34844.95    34850    34862    34890 34901.47    34953    35037
##        1        1        1        1        1        1        1
##    35125 35350.03    35429    35478 35504.53    35601    35646
##        1        1        1        1        1        1        1
##    35815 36644.67 36654.44 37419.53    38090 38380.02    38470
##        1        1        1        1        1        1        1
## 38515.91    38624 38670.82    38747    38764    38999    39011
##        1        1        1        1        1        1        1
##    39171    39176 39231.67    39232    39254    39276    39299
##        1        1        1        1        1        1        1
##    39330    39377    39395    39396    39399    39401    39458
##        1        1        1        1        1        1        1
##    39594 39600.76 39619.64    39783  39789.8 39821.03 39822.21
##        1        1        1        1        1        1        1
##    39937  39939.8    40155 40288.68    40385 40471.06    40638
##        1        1        1        1        1        1        1
##    40664    40781    40883    41221    41625 41626.75    41727
##        1        1        1        1        1        1        1
##    41803 41837.16  41863.3    41883    41998 42002.75 42132.57
##        1        1        1        1        1        1        1
##    42200    42537    42542 42596.65    42851    42990    43136
##        1        1        1        1        1        1        1
##    43367    43524    43531    43646    43773    43870    43894
##        1        1        1        1        1        1        1
##    44047    44345    44461    44503    44680    45053    45267
##        1        1        1        1        1        1        1
##    45273    45639    45945    46160    46323    46510    46649
##        1        1        1        1        1        1        1
## 46660.47    46863 46950.05    47276    47293    47391    47587
##        1        1        1        1        1        1        1
##    47920 47988.91    48187    48308    48472    48860    48934
##        1        1        1        1        1        1        1
##    49100 49205.06    49385    49395    49522    49692    49792
##        1        1        1        1        1        1        1
##    49828    50270    50541    50967    51189    51504    51505
##        1        1        1        1        1        1        1
##    51816    51933 52253.02    52744    53173    54547    55377
##        1        1        1        1        1        1        1
##    56014    56136    56758    56927    56950    57248    57335
##        1        1        1        1        1        1        1
## 57449.27    57503    57622    57863    58001    58025    58090
##        1        1        1        1        1        1        1
##  58243.6    58519    58531    58777    58879    59117    59422
##        1        1        1        1        1        1        1
##    59482    59993    60824    61757    62301    62573    63020
##        1        1        1        1        1        1        1
##    63080 63962.27    64008    64248    64285    64339    64417
##        1        1        1        1        1        1        1
##    64423    64691    64805    64815    64825    64838    64907
##        1        1        1        1        1        1        1
##    64948    65138    65314    65590    65753    66148    66477
##        1        1        1        1        1        1        1
```

```
##      66645      66655      66785      67461      67549      68555      68702
##          1          1          1          1          1          1          1
##      68713      68843      68910      69449      69621      69793   70132.35
##          1          1          1          1          1          1          1
##      70214      70270      70313      70351      70419      70462      71669
##          1          1          1          1          1          1          1
##      71818      72842      74136   75220.62      76413   81480.87   91586.08
##          1          1          1          1          1          1          1
##   94447.34      97909      98101      98925      99547      99707     100506
##          1          1          1          1          1          1          1
##     101226     101776  102394.84     102635     102899     102913     103434
##          1          1          1          1          1          1          1
##     104032   104201.4     104820     105514     105550     105593     105725
##          1          1          1          1          1          1          1
##  107509.05  111167.21  111337.71  112405.63     113264     113689  114127.18
##          1          1          1          1          1          1          1
##     114275     114781     115208     116207     116286     116841     118413
##          1          1          1          1          1          1          1
##     130970     132303     133354     133619     134572     134736     134763
##          1          1          1          1          1          1          1
##     134998     135691     137867     137877     138153     138368     138581
##          1          1          1          1          1          1          1
##     139061     139895     142394     144951     156216     158874     158891
##          1          1          1          1          1          1          1
##     160085     161349  163873.04     164266     165013     165223     165384
##          1          1          1          1          1          1          1
##     165657  165844.39     166889     167589     168934     168968     169384
##          1          1          1          1          1          1          1
##     169995     170544     171724     173770     176324     176791     178841
##          1          1          1          1          1          1          1
##     179773     179796     181972     183831     184230     186617     186722
##          1          1          1          1          1          1          1
##     188082     188342     188545     188696     189587     189753     192315
##          1          1          1          1          1          1          1
##     192548     192731     194065     194504     195189     198063     198503
##          1          1          1          1          1          1          1
##     199474     199953     200072     200239     202031     203662     203723
##          1          1          1          1          1          1          1
##     204887     206619     206836     207610     208854     209648     210003
##          1          1          1          1          1          1          1
##     213510     214828     215980     216599     217771     219968     222031
##          1          1          1          1          1          1          1
##     223324     223386     224385     225863     229009     231913     248239
##          1          1          1          1          1          1          1
##     251383     251456     251537     251904     252029     252136     252281
##          1          1          1          1          1          1          1
##     252352  332504.95  334326.57  336110.57  337875.36  339551.24  341149.14
##          1          1          1          1          1          1          1
##     395670     399865     404248     408245     410921     413206     414204
##          1          1          1          1          1          1          1
##     414840     416710  430429.58  431231.16   433663.6  435487.75     497182
##          1          1          1          1          1          1          1
##     498718     499351     500671     500680     501475     502029     502749
##          1          1          1          1          1          1          1
```

```
##     661448       663941       664364       666337       667560       670443       672573
##          1            1            1            1            1            1            1
##     674473 1752982.04 1766413.61 1776380.63 1785397.07 1787037.26  1797782.9
##          1            1            1            1            1            1            1
## 1813611.78 2401257.05 2413032.69 2426864.09 2439106.34 2447557.62 2462652.98
##          1            1            1            1            1            1            1
## 2483347.75  2500151.9    2527925 2567101.44 2580621.69 2595798.09 2609101.34
##          1            1            1            1            1            1            1
## 2623881.62 2639443.98 2662188.75  2682123.9    2711756        <NA>
##          1            1            1            1            1        1604
```

- Observamos que tenemos **1604 valores perdidos**.Guardamos en la variable **idx** los índices de los registros con valores **NA** de la variable **Value**.

```
idx<-which(is.na(camas_tipos$Value))
length(idx)
```

```
## [1] 1604
```

- Grafiquemos la información que contiene la variable **Value**

```
library(ggplot2)
library(scales)
g = ggplot(camas_tipos, aes(TIME, fill=is.na(Value)) ) +
labs(title = "Valores Nulos")+ylab("") +
theme(plot.title = element_text(size = rel(2), colour = "blue"))

g+geom_bar(position="dodge") + scale_fill_manual(values = alpha(c("orange", "blue"), 1)) +
theme(axis.title.x = element_text(face="bold", size=10))
```

Valores Nulos
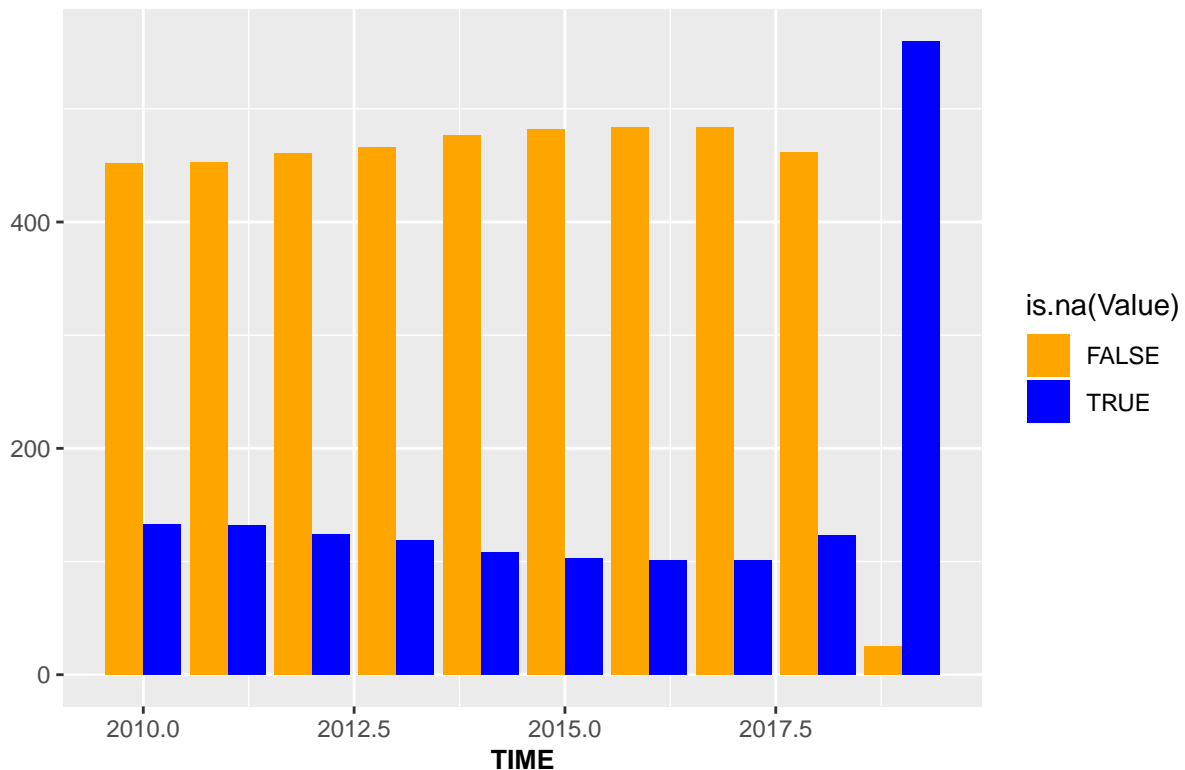
- En caso de detectar algún valor anómalo (en nuestro caso los NAS) en las variables tendríamos que realizar una imputación de esos valores o bien sustituyéndolos por la media o usando el algoritmo KNN (k-Nearest Neighbour) con los 3 vecinos más cercanos usando la distancia que consideremos, en este caso usaremos Gower(Mediana), por ser una medida más robusa frente a extremos.

```r
library(VIM)
```

```
## Loading required package: colorspace
```

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

```
## VIM is ready to use.
```

```
## Suggestions and bug-reports can be submitted at: https://github.com/statistikat/VIM/issues
```

```
##
## Attaching package: 'VIM'
```

```
## The following object is masked from 'package:datasets':
##
##     sleep
```

```r
output<-kNN(camas_tipos, variable=c("Value"),k=3)
camas_tipos<-output
```

- Comprobamos que no tenemos valores nulos después de la imputación

```r
g = ggplot(camas_tipos, aes(TIME, fill=is.na(Value)) ) +
labs(title = "Valores Nulos")+ylab("") +
theme(plot.title = element_text(size = rel(2), colour = "blue"))
```

```
g+geom_bar(position="dodge") + scale_fill_manual(values = alpha(c("orange", "blue"), 1)) +
theme(axis.title.x = element_text(face="bold", size=10))
```
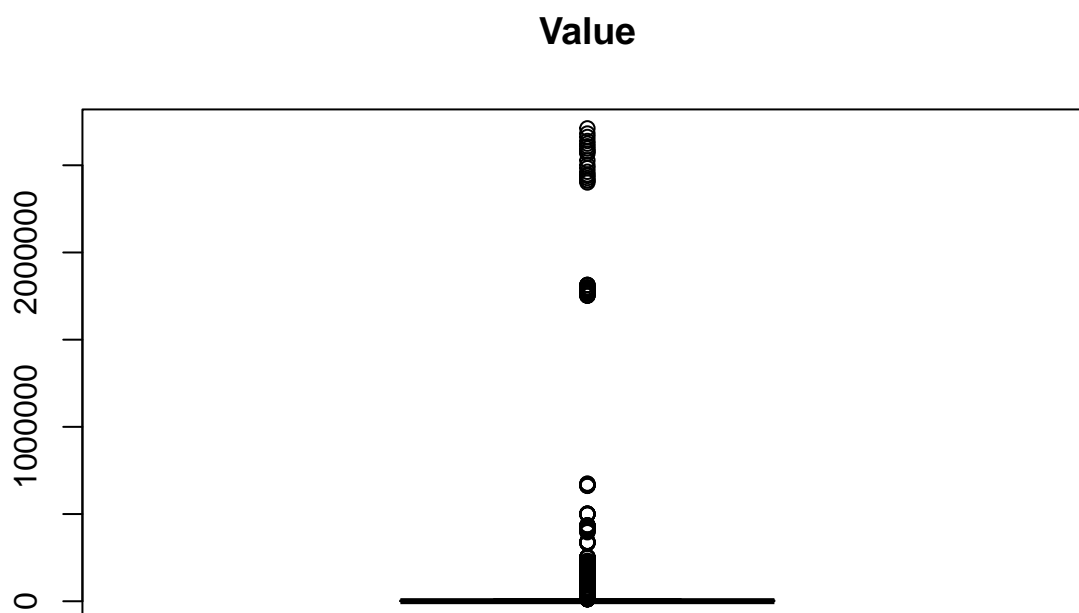
Valores Nulos
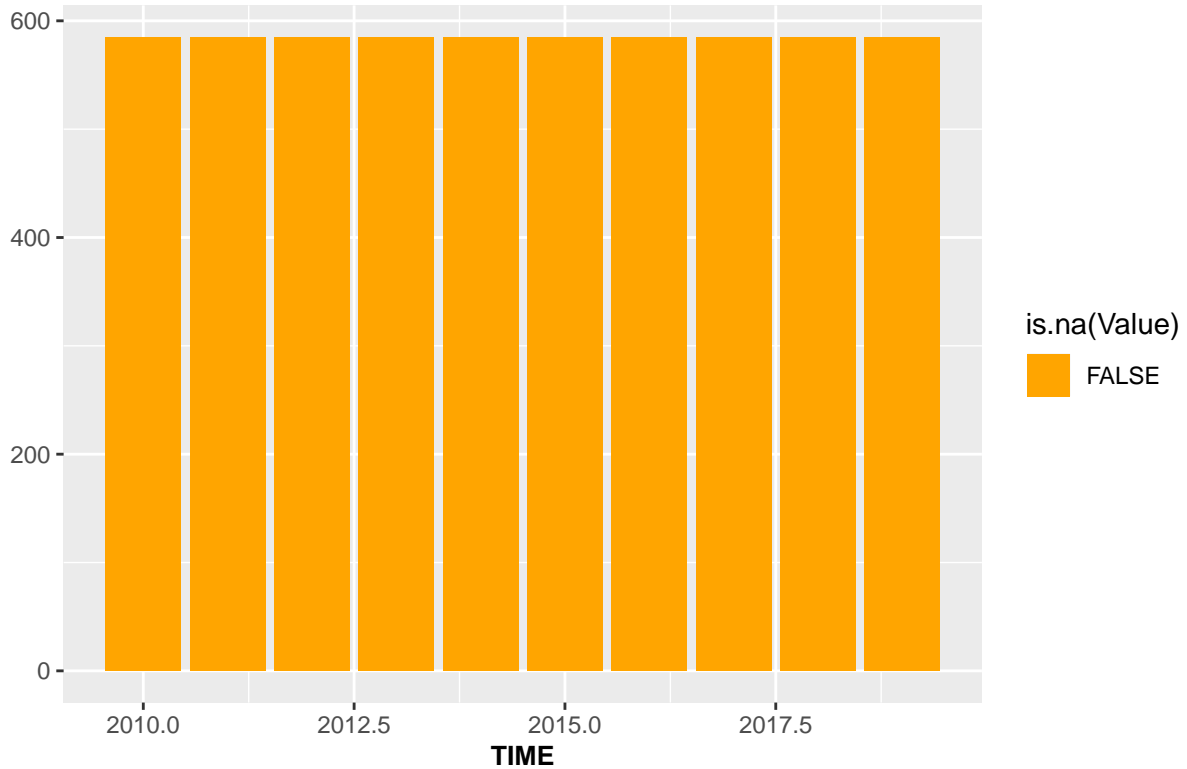
- Con el siguiente gráfico, observaremos que la variable **Value** tiene outliers o valores extremos

```
boxplot(camas_tipos$Value, main="Value")
```

Value

- Por otro lado, revisamos para el resto de columnas si tenemos valores NA.(desconocidos o perdidos)

```r
table(camas_tipos$TIME, useNA = "ifany")
```

```
##
## 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
##  585  585  585  585  585  585  585  585  585  585
```

```r
table(camas_tipos$GEO, useNA = "ifany")
```

```
##
##                                         Albania
##                                             150
##                                         Austria
##                                             150
##                                         Belgium
##                                             150
##                                        Bulgaria
##                                             150
##                                         Croatia
##                                             150
##                                          Cyprus
##                                             150
##                                         Czechia
##                                             150
##                                         Denmark
##                                             150
##                                         Estonia
```

```
##                                                      150
##          European Union - 27 countries (from 2020)
##                                                      150
##          European Union - 28 countries (2013-2020)
##                                                      150
##                                              Finland
##                                                      150
##                                               France
##                                                      150
## Germany (until 1990 former territory of the FRG)
##                                                      150
##                                               Greece
##                                                      150
##                                              Hungary
##                                                      150
##                                              Iceland
##                                                      150
##                                              Ireland
##                                                      150
##                                                Italy
##                                                      150
##                                               Latvia
##                                                      150
##                                        Liechtenstein
##                                                      150
##                                            Lithuania
##                                                      150
##                                           Luxembourg
##                                                      150
##                                                Malta
##                                                      150
##                                           Montenegro
##                                                      150
##                                          Netherlands
##                                                      150
##                                      North Macedonia
##                                                      150
##                                               Norway
##                                                      150
##                                               Poland
##                                                      150
##                                             Portugal
##                                                      150
##                                              Romania
##                                                      150
##                                               Serbia
##                                                      150
##                                             Slovakia
##                                                      150
##                                             Slovenia
##                                                      150
##                                                Spain
##                                                      150
##                                               Sweden
```

```
##                                              150
## Switzerland
##                                              150
## Turkey
##                                              150
## United Kingdom
##                                              150
```

```
table(camas_tipos$UNIT, useNA = "ifany")
```

```
##
##             Inhabitants per ...                        Number
##                            1950                          1950
## Per hundred thousand inhabitants
##                            1950
```

```
table(camas_tipos$FACILITY, useNA = "ifany")
```

```
##
##          Available beds in hospitals (HP.1)
##                                        1170
##        Curative care beds in hospitals (HP.1)
##                                        1170
##      Long-term care beds in hospitals (HP.1)
##                                        1170
##            Other beds in hospitals (HP.1)
##                                        1170
## Rehabilitative care beds in hospitals (HP.1)
##                                        1170
```

Observamos que no existen ahora valores perdidos después de la imputación.La suma de las cantidades de cada variable, suman el total.

- Finalmente, creamos un fichero con toda la información corregida.

```
write.csv(camas_tipos, file="TiposCamasHospitalarias_clean.csv", row.names = FALSE)
```