Assignment1

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Task 1

```
# Question-1
# Load the dataset

# 1. Load the dataset EurostatCrime2015.csv. Notice that the first column of the csv
#file contains the names of the countries that must be read as row names [Hint: Load
#in the file using the function read.csv]. [0.5]
data=read.csv("EurostatCrime2015.csv", header = TRUE)
```

```
#2. What is the size and the structure of this dataset? [0.3]
print(ncol(data))
```

```
## [1] 8
```

```
print(nrow(data))
```

```
## [1] 41
```

```
#3. Produce appropriate commands to answer the following questions:
#(i) Add a new column called Sex.crime which contains the sum of all the crimes
#that have a sexual component: Rape, Sexual.assault and Sexual.violence
#[1]

data$"Sexual.Crime"  <- rowSums(cbind(data$"Sexual.assault", data$"Sexual.violence", data$"Rape"), na.r
print(data)
```

```
##                                                                X
## 1                                                        Albania
## 2                                                        Austria
## 3                                                        Belgium
## 4                                          Bosnia and Herzegovina
## 5                                                       Bulgaria
## 6                                                        Croatia
## 7                                                         Cyprus
## 8                                                 Czech Republic
## 9                                                        Denmark
## 10                                           England and Wales
## 11                                                       Estonia
## 12                                                       Finland
## 13                          Former Yugoslav Republic of Macedonia, the
## 14                                                        France
## 15                                                       Germany
## 16                                                        Greece
## 17                                                       Hungary
```

```
## 18                                                                 Iceland
## 19                                                                 Ireland
## 20                                                                   Italy
## 21 Kosovo (under United Nations Security Council Resolution 1244/99)
## 22                                                                 Latvia
## 23                                                           Liechtenstein
## 24                                                              Lithuania
## 25                                                             Luxembourg
## 26                                                                   Malta
## 27                                                              Montenegro
## 28                                                             Netherlands
## 29                                                  Northern Ireland (UK)
## 30                                                                 Norway
## 31                                                                 Poland
## 32                                                               Portugal
## 33                                                                Romania
## 34                                                               Scotland
## 35                                                                 Serbia
## 36                                                               Slovakia
## 37                                                               Slovenia
## 38                                                                  Spain
## 39                                                                 Sweden
## 40                                                            Switzerland
## 41                                                                 Turkey
##    Assault Intentional.homicide  Rape Robbery Sexual.assault
## 1       NA                   NA    NA      NA             NA
## 2    40.36                 0.49 13.18   39.83          27.39
## 3   603.26                 1.96 25.50  196.68          65.92
## 4       NA                   NA    NA      NA             NA
## 5    34.99                 1.79  1.65   27.02           6.72
## 6    19.03                 0.88  6.11   31.03           8.21
## 7    16.65                 1.42  2.36   10.98           9.45
## 8   148.69                 0.80  5.67   19.19           7.79
## 9    25.80                 0.81 18.57   35.94          19.88
## 10  744.32                   NA 62.07   88.27             NA
## 11   7.45                 3.19 12.24   25.63           9.35
## 12   28.22                 1.61 19.23   28.33          31.74
## 13      NA                   NA    NA      NA             NA
## 14  367.19                 1.53 19.49  157.79          30.06
## 15  156.90                 0.81  8.65   55.01          33.55
## 16   14.96                 0.79  1.12   39.75           3.52
## 17  127.80                 1.00  3.84   14.64           2.45
## 18   25.83                 0.91 54.09   16.10             NA
## 19  321.48                 1.32 11.62   55.63          34.74
## 20  105.34                 0.77    NA   57.68           6.58
## 21      NA                   NA    NA      NA             NA
## 22   26.89                 4.08  3.02   39.22          10.62
## 23  329.18                 0.00  2.68    8.03          42.82
## 24    7.33                 5.75  5.31   54.43           7.46
## 25  108.00                 0.89 12.08   98.41          51.16
## 26   42.62                 0.93  5.36   56.37          18.87
## 27   22.50                 2.73  0.80   25.08           3.38
## 28  282.21                   NA  7.07   56.89          36.45
## 29   65.29                 1.25 38.66   43.85         116.89
```

```
## 30      NA                   NA    NA      NA             NA
## 31   14.52                 0.75  3.24   21.42           1.40
## 32    4.52                 0.96  3.61  149.13          21.24
## 33    1.50                 1.46  5.11   16.90           3.24
## 34      NA                   NA    NA      NA         145.04
## 35   16.05                 1.28  0.86   42.59           3.91
## 36   35.05                 0.89  1.60    9.94          10.29
## 37   74.65                 0.97  2.04   11.25          10.47
## 38   62.55                 0.65  2.65  139.03          18.60
## 39   47.52                 1.15 56.88   86.80         120.79
## 40    7.48                 0.69  6.46   39.80          26.44
## 41      NA                   NA    NA      NA             NA
##    Sexual.violence   Theft Sexual.Crime
## 1               NA      NA         0.00
## 2            40.57 1586.92        81.14
## 3            91.42 1660.42       182.84
## 4               NA      NA         0.00
## 5             8.37  531.99        16.74
## 6            14.32  320.62        28.64
## 7            11.81  108.38        23.62
## 8            13.47 1319.87        26.93
## 9            38.45 3436.13        76.90
## 10              NA 2215.82        62.07
## 11           21.60  863.51        43.19
## 12           50.97 1781.22       101.94
## 13              NA      NA         0.00
## 14           49.54 1846.91        99.09
## 15           42.20 1646.84        84.40
## 16            4.64  923.72         9.28
## 17            6.28 1031.67        12.57
## 18              NA 1225.16        54.09
## 19           46.36 1500.60        92.72
## 20              NA 1719.49         6.58
## 21              NA      NA         0.00
## 22           13.64  976.14        27.28
## 23           45.50  516.51        91.00
## 24           12.77  688.78        25.54
## 25           63.24 1650.74       126.48
## 26           24.22 2015.40        48.45
## 27            4.18  132.94         8.36
## 28           43.52 3219.39        87.04
## 29          155.54 1300.20       311.09
## 30              NA      NA         0.00
## 31            4.64  363.54         9.28
## 32           24.86  832.95        49.71
## 33            8.35  545.72        16.70
## 34              NA      NA       145.04
## 35            4.76  317.71         9.53
## 36           11.90  444.37        23.79
## 37           12.51 1105.16        25.02
## 38           21.25  442.96        42.50
## 39          177.67 3828.01       355.34
## 40           32.90 1772.66        65.80
## 41              NA      NA         0.00
```

```r
#(ii) remove the columns Rape, Sexual.assault and Sexual.violence. [1]

data_new <- subset(data, select = -c(Rape, Sexual.assault, Sexual.violence))
```

```r
#4. Work with the dataset you created in question (3ii), and list the countries that
# contain any missing data.
data_new[!complete.cases(data_new),1]
```

```
## [1] Albania
## [2] Bosnia and Herzegovina
## [3] England and Wales
## [4] Former Yugoslav Republic of Macedonia, the
## [5] Kosovo (under United Nations Security Council Resolution 1244/99)
## [6] Netherlands
## [7] Norway
## [8] Scotland
## [9] Turkey
## 41 Levels: Albania Austria Belgium Bosnia and Herzegovina ... Turkey
```

```r
# 5. Remove the countries with missing data from the dataframe.
data_filtered<- na.omit(data_new)
data_filtered
```

```
##                          X Assault Intentional.homicide Robbery   Theft
## 2                  Austria   40.36                 0.49   39.83 1586.92
## 3                  Belgium  603.26                 1.96  196.68 1660.42
## 5                 Bulgaria   34.99                 1.79   27.02  531.99
## 6                  Croatia   19.03                 0.88   31.03  320.62
## 7                   Cyprus   16.65                 1.42   10.98  108.38
## 8           Czech Republic  148.69                 0.80   19.19 1319.87
## 9                  Denmark   25.80                 0.81   35.94 3436.13
## 11                 Estonia    7.45                 3.19   25.63  863.51
## 12                 Finland   28.22                 1.61   28.33 1781.22
## 14                  France  367.19                 1.53  157.79 1846.91
## 15                 Germany  156.90                 0.81   55.01 1646.84
## 16                  Greece   14.96                 0.79   39.75  923.72
## 17                 Hungary  127.80                 1.00   14.64 1031.67
## 18                 Iceland   25.83                 0.91   16.10 1225.16
## 19                 Ireland  321.48                 1.32   55.63 1500.60
## 20                   Italy  105.34                 0.77   57.68 1719.49
## 22                  Latvia   26.89                 4.08   39.22  976.14
## 23           Liechtenstein  329.18                 0.00    8.03  516.51
## 24               Lithuania    7.33                 5.75   54.43  688.78
## 25              Luxembourg  108.00                 0.89   98.41 1650.74
## 26                   Malta   42.62                 0.93   56.37 2015.40
## 27              Montenegro   22.50                 2.73   25.08  132.94
## 29 Northern Ireland (UK)   65.29                 1.25   43.85 1300.20
## 31                  Poland   14.52                 0.75   21.42  363.54
## 32                Portugal    4.52                 0.96  149.13  832.95
## 33                 Romania    1.50                 1.46   16.90  545.72
## 35                  Serbia   16.05                 1.28   42.59  317.71
## 36                Slovakia   35.05                 0.89    9.94  444.37
```

```
## 37              Slovenia   74.65                0.97   11.25 1105.16
## 38                 Spain   62.55                0.65  139.03  442.96
## 39                Sweden   47.52                1.15   86.80 3828.01
## 40           Switzerland    7.48                0.69   39.80 1772.66
##    Sexual.Crime
## 2         81.14
## 3        182.84
## 5         16.74
## 6         28.64
## 7         23.62
## 8         26.93
## 9         76.90
## 11        43.19
## 12       101.94
## 14        99.09
## 15        84.40
## 16         9.28
## 17        12.57
## 18        54.09
## 19        92.72
## 20         6.58
## 22        27.28
## 23        91.00
## 24        25.54
## 25       126.48
## 26        48.45
## 27         8.36
## 29       311.09
## 31         9.28
## 32        49.71
## 33        16.70
## 35         9.53
## 36        23.79
## 37        25.02
## 38        42.50
## 39       355.34
## 40        65.80
```

```r
# 6. What is the size of this new dataframe?
print(ncol(data_filtered))
```

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

```r
print(nrow(data_filtered))
```

```
## [1] 32
```

Task 2

```r
# TASK-2

# 1. According to these data what was the most common crime in Ireland in 2015?

ireland <- data_filtered[data_filtered$X == "Ireland",]
#print(ireland_data)

max_value <- apply(ireland[,2:6],1,max)
 # get column name whos value is the max value
print("Most Common Crime in Ireland:")
```

```
## [1] "Most Common Crime in Ireland:"
```

```r
print(colnames(ireland)[which(ireland==max_value, arr.ind=TRUE)][2])
```

```
## [1] "Theft"
```

```r
#print(max_value)
```

```r
# 2. And the 3 least common crimes in Ireland in 2015?

print("The 3 Least common crimes in Ireland in 2015 ascending order:")
```

```
## [1] "The 3 Least common crimes in Ireland in 2015 ascending order:"
```

```r
minimum <- apply(ireland[,2:6],1,min)
print(colnames(ireland)[which(ireland==minimum, arr.ind=TRUE)][2])
```

```
## [1] "Intentional.homicide"
```

```r
ireland_new <- subset(ireland, select = -c(Intentional.homicide))
minimum <- apply(ireland_new[,2:5],1,min)
print(colnames(ireland_new)[which(ireland_new==minimum, arr.ind=TRUE)][2])
```

```
## [1] "Robbery"
```

```r
ireland_new <- subset(ireland_new, select = -c(Robbery))
minimum <- apply(ireland_new[,2:4],1,min)
print(colnames(ireland_new)[which(ireland_new==minimum, arr.ind=TRUE)][2])
```

```
## [1] "Sexual.Crime"
```

```r
#3. Which country have the highest record of offences (per hundred thousand inhabitants)?
data_filtered$total_offences =
  data_filtered$Assault +
  data_filtered$Theft +
  data_filtered$Intentional.homicide +
  data_filtered$Sexual.Crime

max_offences <- max(data_filtered$total_offences)
print(max_offences)
```

```
## [1] 4232.02
```

```
indexOf_country_max_offences = rownames(data_filtered)[which(data_filtered==max_offences, arr.ind = TRU

country <- data_filtered$X[which(data_filtered$total_offences==max_offences)]
country
```

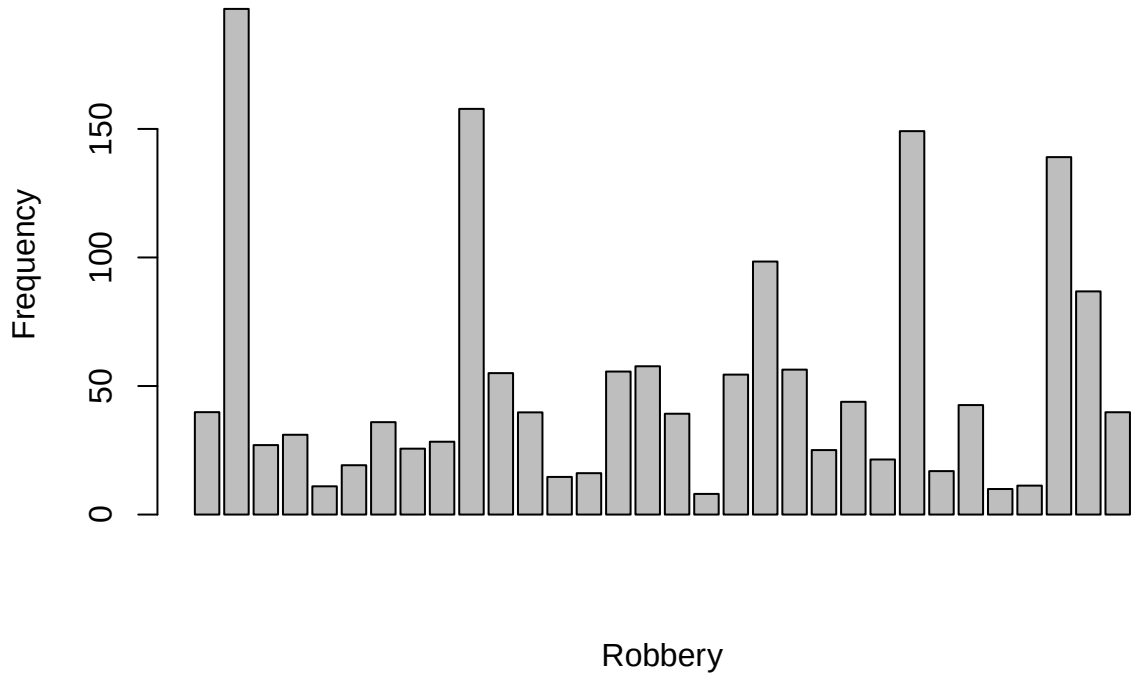
```
## [1] Sweden
## 41 Levels: Albania Austria Belgium Bosnia and Herzegovina ... Turkey
```

```
sprintf("Country with the highest record of offences: %s", country)
```

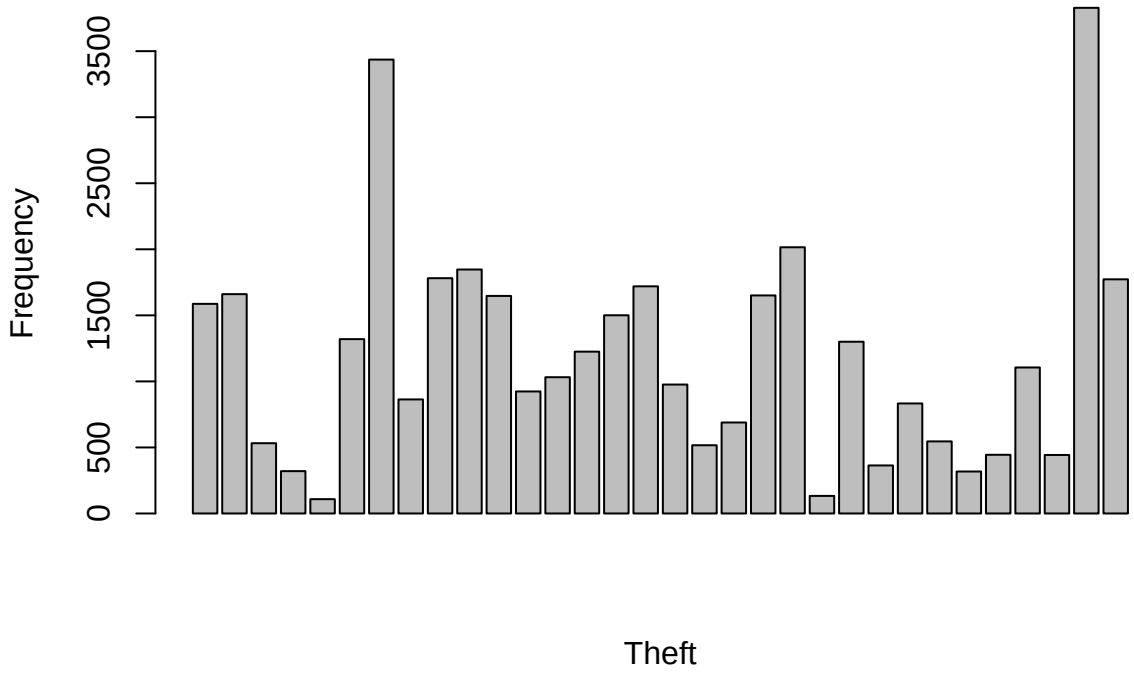
```
## [1] "Country with the highest record of offences: Sweden"
```

Task 3

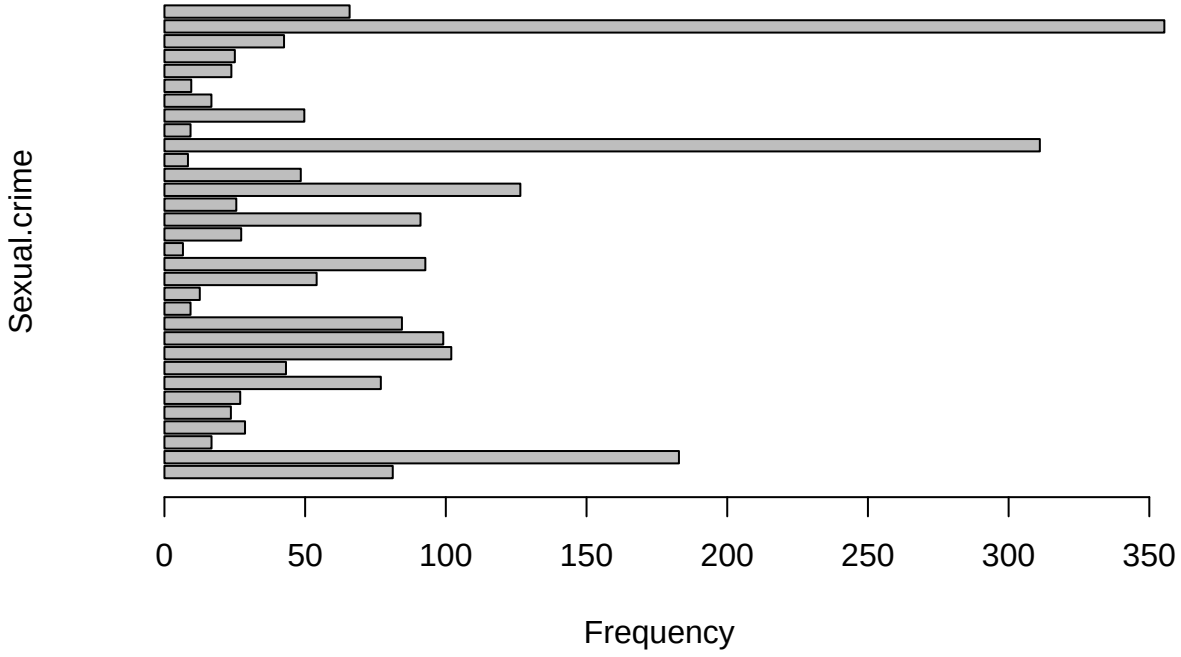
```
Robbery <- data_filtered$Robbery
barplot(Robbery, xlab = "Robbery", ylab="Frequency")
```



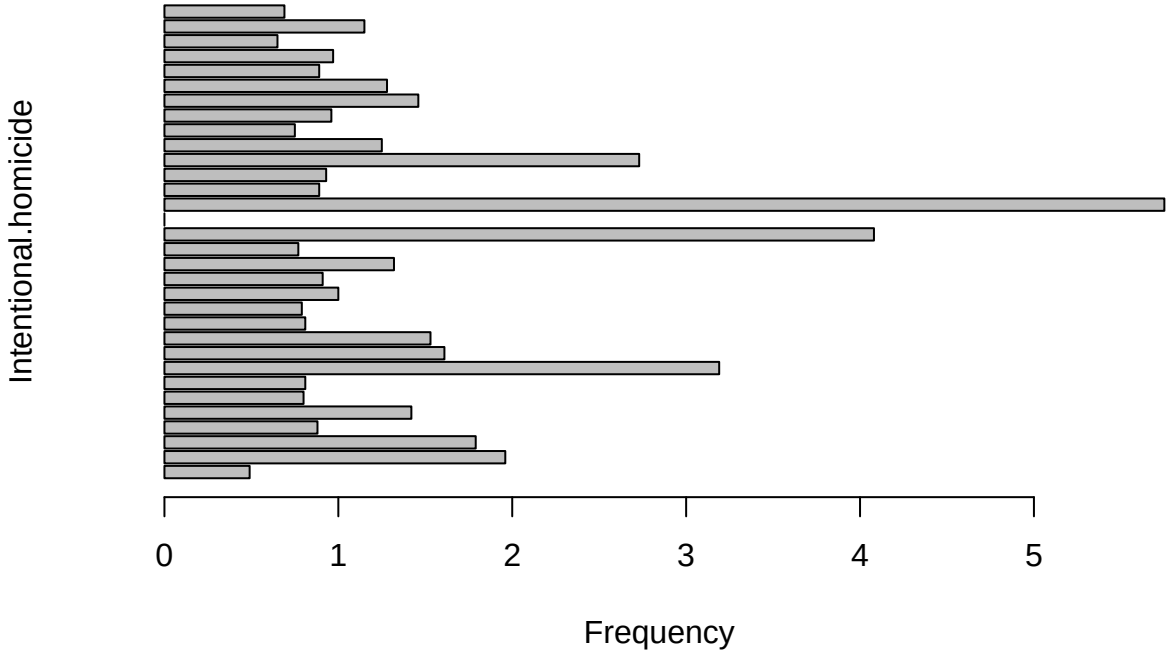
```r
Theft <- data_filtered$Theft
barplot(Theft, xlab = "Theft", ylab="Frequency")
```




```r
SexualCrime <- data_filtered$Sexual.Crime
barplot(SexualCrime,horiz=TRUE, ylab = "Sexual.crime", xlab="Frequency")
```




```
Intentional.homicide <- data_filtered$Intentional.homicide
barplot(Intentional.homicide, ylab = "Intentional.homicide",horiz=TRUE, xlab="Frequency")
```


Intentional.homicide
0
1
2
3
4
5
Frequency