

# Tables

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Table 1 : Sommaire des variables quantitatives du jeu de données

```
summary(cars[-8]) # the last column is not included as it is a textual variable
```

```
##      mpg      cylinders      cubicinches      hp
## Min.   :10.00   Min.     :3.00   Min.      : 68.0   Min.     : 46.0
## 1st Qu.:16.90   1st Qu.:4.00   1st Qu.:101.0   1st Qu.: 75.0
## Median :22.00   Median :6.00   Median :156.0   Median : 95.0
## Mean   :23.14   Mean    :5.59   Mean    :201.1   Mean    :106.4
## 3rd Qu.:28.80   3rd Qu.:8.00   3rd Qu.:302.0   3rd Qu.:138.0
## Max.   :46.60   Max.     :8.00   Max.     :455.0   Max.     :230.0
##      weightlbs      time.to.60      year
## Min.     :1613   Min.      : 8.00   Min.      :1971
## 1st Qu.:2246   1st Qu.:14.00   1st Qu.:1974
## Median :2835   Median :16.00   Median :1977
## Mean    :3005   Mean    :15.55   Mean    :1977
## 3rd Qu.:3664   3rd Qu.:17.00   3rd Qu.:1980
## Max.    :4997   Max.     :25.00   Max.     :1983
```

Table 2 : Quantiles

```
apply(cars[1:7], MARGIN=2, FUN=quantile, probs=seq(0, 1, 0.1))
```

```
##      mpg cylinders cubicinches hp weightlbs time.to.60 year
## 0%   10.0         3          68 46      1613         8 1971
## 10%  14.0         4          90 65      1985        12 1972
## 20%  16.0         4          98 72      2155        13 1973
## 30%  18.0         4         112 81      2372        14 1974
## 40%  19.8         4         122 88      2634        15 1976
## 50%  22.0         6         156 95      2835        16 1977
## 60%  24.3         6         225 103     3150        16 1978
## 70%  27.0         6         250 120     3459        17 1979
## 80%  30.0         8         318 145     3850        18 1980
## 90%  34.0         8         351 165     4295        19 1982
## 100% 46.6         8         455 230     4997        25 1983
```

Table 3 : Table de contingence de la variable brand

```
prop.table(table(cars$brand))
```

```
##
```

```
##      Europe      Japan      US
## 0.1839080 0.1954023 0.6206897
```

Table 4 : Sommaire des variables par marque

```
lapply(split(cars[-8], cars$brand), psych::describe)
```

```
## $` Europe`
##           vars  n    mean    sd median trimmed   mad   min   max
## mpg           1 48   27.51   6.99   26.0   26.87   4.45  16.2  44.3
## cylinders      2 48    4.15   0.46    4.0    4.03   0.00   4.0   6.0
## cubicinches    3 48  108.58  22.42   99.5  106.08  16.31  68.0  183.0
## hp             4 48   79.96  21.25   77.5   79.17  15.57  46.0  133.0
## weightlbs      5 48 2426.33 489.49 2250.0 2378.82 464.05 1825.0 3820.0
## time.to.60     6 48   17.17   3.30   16.0   16.82   2.97  12.0  25.0
## year           7 48 1976.33   3.16 1976.0 1976.33   3.71 1971.0 1983.0
##           range skew kurtosis    se
## mpg           28.1 0.95    0.38 1.01
## cylinders      2.0 3.08    8.67 0.07
## cubicinches   115.0 1.23    1.88 3.24
## hp            87.0 0.34   -0.45 3.07
## weightlbs    1995.0 0.87   -0.03 70.65
## time.to.60    13.0 0.88   -0.23 0.48
## year          12.0 0.10   -1.04 0.46
##
## $` Japan`
##           vars  n    mean    sd median trimmed   mad   min   max
## mpg           1 51   30.22   6.12   31.6   30.26   5.34   18  46.6
## cylinders      2 51    4.16   0.64    4.0    4.00   0.00    3   6.0
## cubicinches    3 51  104.22  24.75   97.0  101.29  17.79   70 168.0
## hp             4 51   79.31  19.10   74.0   77.59  20.76   52 132.0
## weightlbs      5 51 2229.04 345.98 2155.0 2213.88 289.11 1613 2930.0
## time.to.60     6 51   16.41   1.80   17.0   16.49   1.48   11  19.0
## year           7 51 1978.22   3.57 1979.0 1978.46   4.45 1971 1983.0
##           range skew kurtosis    se
## mpg           28.6 -0.05   -0.28 0.86
## cylinders      3.0 2.06    3.98 0.09
## cubicinches    98.0 0.98    0.22 3.47
## hp            80.0 0.71   -0.32 2.67
## weightlbs    1317.0 0.33   -0.78 48.45
## time.to.60     8.0 -0.43   -0.03 0.25
## year          12.0 -0.47   -1.07 0.50
##
## $` US`
##           vars  n    mean    sd median trimmed   mad   min   max range
## mpg           1 162   19.63   6.24   18.0   18.86   5.93   10   39   29
## cylinders      2 162    6.47   1.62    6.0    6.58   2.97    4    8    4
## cubicinches    3 162  259.02  99.53  250.0  258.57 125.28   86  455  369
## hp             4 162  122.70  41.18  110.0  119.10  44.48   63  230  167
## weightlbs      5 162 3421.53 775.75 3434.5 3430.18 980.00 1800 4997 3197
## time.to.60     6 162   14.80   2.81   15.0   14.75   2.97    8   22   14
## year           7 162 1976.52   3.70 1976.0 1976.44   4.45 1971 1983   12
##           skew kurtosis    se
```

```
## mpg          1.04      0.51  0.49
## cylinders    -0.45     -1.34  0.13
## cubicinches -0.02     -1.00  7.82
## hp           0.65     -0.39  3.24
## weightlbs   -0.05     -0.94 60.95
## time.to.60   0.09     -0.37  0.22
## year        0.16     -1.10  0.29
```

**Table 5 : Table des corrélations des variables quantitatives du jeu de données**

```
print(cars.correlations)
```

```
##           mpg cylinders cubicinches      hp weightlbs
## mpg      1.0000000 -0.7767099 -0.8036361 -0.7749050 -0.8246487
## cylinders -0.7767099  1.0000000  0.9512776  0.8451547  0.8954644
## cubicinches -0.8036361  0.9512776  1.0000000  0.9060188  0.9295842
## hp        -0.7749050  0.8451547  0.9060188  1.0000000  0.8608429
## weightlbs -0.8246487  0.8954644  0.9295842  0.8608429  1.0000000
## time.to.60  0.5090697 -0.5781607 -0.6084126 -0.7448731 -0.4808463
## year       0.5504405 -0.3222394 -0.3500258 -0.3838692 -0.2689919
##           time.to.60      year
## mpg      0.5090697  0.5504405
## cylinders -0.5781607 -0.3222394
## cubicinches -0.6084126 -0.3500258
## hp        -0.7448731 -0.3838692
## weightlbs -0.4808463 -0.2689919
## time.to.60  1.0000000  0.3123106
## year       0.3123106  1.0000000
```

**Table 6 : Corrélations du jeu de données ordonnées par valeurs absolues**

```
print(getOrderedCorrelations(cars.correlations))
```

```
##           Var1      Var2      Freq
## 1 cubicinches cylinders 0.9512776
## 2 weightlbs cubicinches 0.9295842
## 3 hp cubicinches 0.9060188
## 4 weightlbs cylinders 0.8954644
## 5 weightlbs hp 0.8608429
## 6 hp cylinders 0.8451547
## 7 weightlbs mpg -0.8246487
## 8 cubicinches mpg -0.8036361
## 9 cylinders mpg -0.7767099
## 10 hp mpg -0.7749050
## 11 time.to.60 hp -0.7448731
## 12 time.to.60 cubicinches -0.6084126
## 13 time.to.60 cylinders -0.5781607
## 14 year mpg 0.5504405
## 15 time.to.60 mpg 0.5090697
```

**Table 7 : Table de contingence des marques en fonction du résultat de K-moyennes avec  $k = 3$**

```
afficher_table_contingence_clusters(cars$brand, cars.kmeans.cluster3$cluster)
```

```
## Valeurs absolues :
##      1  2  3
## Europe 15  1 32
## Japan   9  0 42
## US      67 68 27
## tot     91 69 101
##
## Valeurs relatives :
##      1      2      3
## Europe 5.747126 0.3831418 12.26054
## Japan  3.448276 0.0000000 16.09195
## US     25.670498 26.0536398 10.34483
## tot    34.865900 26.4367816 38.69732
```

**Table 8 : Table de contingence des marques en fonction du résultat de K-moyennes avec  $k = 2$**

```
afficher_table_contingence_clusters(cars.combined.brand, cars.kmeans.cluster2$cluster)
```

```
## Valeurs absolues :
##      1  2
## Non-US  4 95
## US      99 63
## tot    103 158
##
## Valeurs relatives :
##      1      2
## Non-US 1.532567 36.39847
## US     37.931034 24.13793
## tot    39.463602 60.53640
```

**Table 9 : Table de contingence des résultats des coupes 2 et 4 par rapport aux marques**

```
# on coupe au niveau 4 et affichons les tables de contingences
cut_affiche_table_contingence(cars.hc.ward, c(2, 4), cars$brand)
```

```
##
## Cut = 2
## Valeurs absolues :
##      1  2
## Europe  0 48
## Japan   0 51
## US      76 86
## tot     76 185
##
```

```
## Valeurs relatives :
##           1      2
## Europe  0.00000 18.39080
## Japan   0.00000 19.54023
## US      29.11877 32.95019
## tot     29.11877 70.88123
##
## Cut = 4
## Valeurs absolues :
##           1  2  3  4
## Europe  0 11 34  3
## Japan   0 22 24  5
## US      76 23 16 47
## tot     76 56 74 55
##
## Valeurs relatives :
##           1      2      3      4
## Europe  0.00000  4.214559 13.026820  1.149425
## Japan   0.00000  8.429119  9.195402  1.915709
## US      29.11877  8.812261  6.130268 18.007663
## tot     29.11877 21.455939 28.352490 21.072797
```

**Table 10 :** Table de contingence des résultats de la coupe 4 par rapport aux marques combinées

```
cut_affiche_table_contingence(cars.hc.ward, 4, cars.combined.brand)
```

```
##
## Cut = 4
## Valeurs absolues :
##           1  2  3  4
## Non-US  0 33 58  8
## US      76 23 16 47
## tot     76 56 74 55
##
## Valeurs relatives :
##           1      2      3      4
## Non-US  0.00000 12.643678 22.222222  3.065134
## US      29.11877  8.812261  6.130268 18.007663
## tot     29.11877 21.455939 28.352490 21.072797
```

**Table 11 :** Sommaire des résultats de la PCA sur le jeu de données

```
summary(cars.pca)
```

```
##           Length Class  Mode
## eig         21    -none- numeric
## var          4    -none- list
## ind          4    -none- list
## svd          3    -none- list
## quali.sup    5    -none- list
## call        10    -none- list
```

Table 12 : Description des axes à partir de la HCPC

```
cars.hcpc$desc.axes$quanti
```

```
## $`1`
##          v.test Mean in category Overall mean sd in category Overall sd
## Dim.5    4.468494      0.09994713 -2.994226e-17    0.2505145  0.3511117
## Dim.2   -2.241659     -0.13458944  4.712998e-17    1.0509209  0.9424916
## Dim.3   -3.549992     -0.18014658 -5.150999e-18    0.7682080  0.7965899
## Dim.1  -13.376212     -1.91468420 -5.072571e-17    0.7682329  2.2469849
##          p.value
## Dim.5 7.877219e-06
## Dim.2 2.498340e-02
## Dim.3 3.852427e-04
## Dim.1 8.328541e-41
##
## $`2`
##          v.test Mean in category Overall mean sd in category Overall sd
## Dim.3    5.581473      0.4940008 -5.150999e-18    0.8539504  0.7965899
## Dim.4   -3.298822     -0.1611767 -7.711876e-17    0.3581235  0.4397433
## Dim.5   -5.302783     -0.2068679 -2.994226e-17    0.2907682  0.3511117
##          p.value
## Dim.3 2.384896e-08
## Dim.4 9.709145e-04
## Dim.5 1.140505e-07
##
## $`3`
##          v.test Mean in category Overall mean sd in category Overall sd
## Dim.1   13.91871      3.1425144 -5.072571e-17    0.7953018  2.2469849
## Dim.4    3.39719      0.1501056 -7.711876e-17    0.2279538  0.4397433
##          p.value
## Dim.1 4.875919e-44
## Dim.4 6.808178e-04
```

Table 13 : Centres des classes à partir de la HCPC

```
cars.hcpc$desc.ind
```

```
## $para
## Cluster: 1
##          158          249          5          155          35
## 0.4310569 0.4725770 0.4797413 0.5249647 0.5463474
## -----
## Cluster: 2
##          215          187          118          261          71
## 0.5457389 0.5921705 0.6448439 0.6489435 0.6520284
## -----
## Cluster: 3
##          93          7          194          254          189
## 0.4827492 0.4844572 0.4976658 0.5620200 0.5678561
##
## $dist
```

```

## Cluster: 1
##      236      107      248      198      64
## 5.156430 4.748235 4.561094 4.392584 4.284830
## -----
## Cluster: 2
##      203      96      29      41      63
## 3.609662 3.412059 3.078497 3.063380 2.996113
## -----
## Cluster: 3
##      245      153      8      133      45
## 5.111379 5.050821 4.974452 4.967498 4.847007

```