Data Frame

Data Frame Bicimlendirme

```
df <- data.frame(

  magaza_no = c(1:5),
  semt = c("Mecidiyekoy", "Levent", "Sarikoy", "Gop", "Kagithane"),
  ortolama_kazanc = c(60,50,61,72,89),
  stringsAsFactors = FALSE  #  Karakter degiskeni factor deisken olmasini engeller
)


str(df)   # veri seti hakkinda bilgi veren bir fonksiyon genel bir yapi
```

```
## 'data.frame':    5 obs. of  3 variables:
##  $ magaza_no      : int  1 2 3 4 5
##  $ semt           : chr  "Mecidiyekoy" "Levent" "Sarikoy" "Gop" ...
##  $ ortolama_kazanc: num  60 50 61 72 89
```

```
summary(df)   # veri seti hakkinda özet bilgi veren bir fonksiyon genel bir yapi
```

```
##    magaza_no     semt           ortolama_kazanc
##  Min.   :1   Length:5           Min.   :50.0
##  1st Qu.:2   Class :character   1st Qu.:60.0
##  Median :3   Mode  :character   Median :61.0
##  Mean   :3                      Mean   :66.4
##  3rd Qu.:4                      3rd Qu.:72.0
##  Max.   :5                      Max.   :89.0
```

```
dim(df)   # boyutunu verir
```

```
## [1] 5 3
```

```
df2 <- data.frame(

  magaza_no = c(1:5),
  gecmis = c(2,4,5,2,3),
  personel_sayisi = c(60,50,61,72,89)
)


merge(df, df2)
```

```
##   magaza_no        semt ortolama_kazanc gecmis personel_sayisi
## 1         1 Mecidiyekoy              60      2              60
## 2         2      Levent              50      4              50
## 3         3     Sarikoy              61      5              61
## 4         4         Gop              72      2              72
## 5         5   Kagithane              89      3              89
```

```
merge(df, df2, by = "magaza_no")
```

```
##   magaza_no        semt ortolama_kazanc gecmis personel_sayisi
## 1         1 Mecidiyekoy              60      2              60
## 2         2      Levent              50      4              50
## 3         3     Sarikoy              61      5              61
## 4         4         Gop              72      2              72
## 5         5   Kagithane              89      3              89
```

```
cbind(df, df2)
```

```
##   magaza_no        semt ortolama_kazanc magaza_no gecmis personel_sayisi
## 1         1 Mecidiyekoy              60         1      2              60
## 2         2      Levent              50         2      4              50
## 3         3     Sarikoy              61         3      5              61
## 4         4         Gop              72         4      2              72
## 5         5   Kagithane              89         5      3              89
```

```
rbind(df, df)  # 2 farklı dataframe birlestirmek icin row isimlerinin ayni olmasi lazim
```

```
##    magaza_no        semt ortolama_kazanc
## 1          1 Mecidiyekoy              60
## 2          2      Levent              50
## 3          3     Sarikoy              61
## 4          4         Gop              72
## 5          5   Kagithane              89
## 6          1 Mecidiyekoy              60
## 7          2      Levent              50
## 8          3     Sarikoy              61
## 9          4         Gop              72
## 10         5   Kagithane              89
```

Data Frame Gozlem ve Degisken ekle cikar

```
df_all <- merge(df, df2, by = "magaza_no")

df_all
```

```
##   magaza_no        semt ortolama_kazanc gecmis personel_sayisi
## 1         1 Mecidiyekoy              60      2              60
## 2         2      Levent              50      4              50
## 3         3     Sarikoy              61      5              61
## 4         4         Gop              72      2              72
## 5         5   Kagithane              89      3              89
```

```
df_all$ort_mus <- c(1,3,5,7,9)  # degisken eklenmis olur

df_all$bos <- c(1,3,5,7,9)

df_all$bos <- NULL  # degsikeni siler


df_all$per_bas_kaz <- df_all$ortolama_kazanc / df_all$personel_sayisi


rbind(df_all, c(6, "Beyoglu", 99, 6, 12, 34, 1))   # satir eklenir
```

```
##   magaza_no        semt ortolama_kazanc gecmis personel_sayisi ort_mus
## 1         1 Mecidiyekoy              60      2              60       1
## 2         2      Levent              50      4              50       3
## 3         3     Sarikoy              61      5              61       5
## 4         4         Gop              72      2              72       7
## 5         5   Kagithane              89      3              89       9
## 6         6     Beyoglu              99      6              12      34
##   per_bas_kaz
## 1           1
## 2           1
## 3           1
## 4           1
## 5           1
## 6           1
```

```
df_all[-6]  # 6. satırı siler
```

```
##   magaza_no        semt ortolama_kazanc gecmis personel_sayisi per_bas_kaz
## 1         1 Mecidiyekoy              60      2              60           1
## 2         2      Levent              50      4              50           1
## 3         3     Sarikoy              61      5              61           1
## 4         4         Gop              72      2              72           1
## 5         5   Kagithane              89      3              89           1
```

Data Frame isimlendirme

```
##   n           r  s
## 1 1 mecidiyekoy 60
## 2 2      levent 50
## 3 3     sarikoy 61
## 4 4         gop 72
## 5 5   kagithane 89
```

```
##   magaza_no        semt ortolama_kazanc gecmis personel_sayisi ort_mus
## 1         1 Mecidiyekoy              60      2              60       1
## 2         2      Levent              50      4              50       3
## 3         3     Sarikoy              61      5              61       5
## 4         4         Gop              72      2              72       7
## 5         5   Kagithane              89      3              89       9
##   per_bas_kaz
## 1           1
## 2           1
## 3           1
## 4           1
## 5           1
```

```
##
## Attaching package: 'dplyr'
```

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

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
##             magaza_no ortolama_kazanc gecmis personel_sayisi ort_mus
## Mecidiyekoy         1              60      2              60       1
## Levent              2              50      4              50       3
## Sarikoy             3              61      5              61       5
## Gop                 4              72      2              72       7
## Kagithane           5              89      3              89       9
##             per_bas_kaz
## Mecidiyekoy           1
## Levent                1
## Sarikoy               1
## Gop                   1
## Kagithane             1
```

Liste veya Matrixleri Data Frame Donusturme

Data Frame Eleman islemleri

```
library(ggplot2)

mpg
```

```
## # A tibble: 234 x 11
##    manufacturer model    displ  year   cyl trans   drv     cty   hwy fl    class
##    <chr>        <chr>    <dbl> <int> <int> <chr>   <chr> <int> <int> <chr> <chr>
##  1 audi         a4         1.8  1999     4 auto(l~ f        18    29 p     comp~
##  2 audi         a4         1.8  1999     4 manual~ f        21    29 p     comp~
##  3 audi         a4         2    2008     4 manual~ f        20    31 p     comp~
##  4 audi         a4         2    2008     4 auto(a~ f        21    30 p     comp~
##  5 audi         a4         2.8  1999     6 auto(l~ f        16    26 p     comp~
##  6 audi         a4         2.8  1999     6 manual~ f        18    26 p     comp~
##  7 audi         a4         3.1  2008     6 auto(a~ f        18    27 p     comp~
##  8 audi         a4 quat~   1.8  1999     4 manual~ 4        18    26 p     comp~
##  9 audi         a4 quat~   1.8  1999     4 auto(l~ 4        16    25 p     comp~
## 10 audi         a4 quat~   2    2008     4 manual~ 4        20    28 p     comp~
## # ... with 224 more rows
```

```
summary(mpg)
```

```
##  manufacturer          model               displ            year
##  Length:234         Length:234         Min.   :1.600   Min.   :1999
##  Class :character   Class :character   1st Qu.:2.400   1st Qu.:1999
##  Mode  :character   Mode  :character   Median :3.300   Median :2004
##                                        Mean   :3.472   Mean   :2004
##                                        3rd Qu.:4.600   3rd Qu.:2008
##                                        Max.   :7.000   Max.   :2008
##       cyl           trans               drv                 cty
##  Min.   :4.000   Length:234         Length:234         Min.   : 9.00
##  1st Qu.:4.000   Class :character   Class :character   1st Qu.:14.00
##  Median :6.000   Mode  :character   Mode  :character   Median :17.00
##  Mean   :5.889                                         Mean   :16.86
##  3rd Qu.:8.000                                         3rd Qu.:19.00
##  Max.   :8.000                                         Max.   :35.00
##       hwy             fl                class
##  Min.   :12.00   Length:234         Length:234
##  1st Qu.:18.00   Class :character   Class :character
##  Median :24.00   Mode  :character   Mode  :character
##  Mean   :23.44
##  3rd Qu.:27.00
##  Max.   :44.00
```

```
str(mpg)
```

```
## Classes 'tbl_df', 'tbl' and 'data.frame':    234 obs. of  11 variables:
##  $ manufacturer: chr  "audi" "audi" "audi" "audi" ...
##  $ model       : chr  "a4" "a4" "a4" "a4" ...
##  $ displ       : num  1.8 1.8 2 2 2.8 2.8 3.1 1.8 1.8 2 ...
##  $ year        : int  1999 1999 2008 2008 1999 1999 2008 1999 1999 2008 ...
##  $ cyl         : int  4 4 4 4 6 6 6 4 4 4 ...
##  $ trans       : chr  "auto(l5)" "manual(m5)" "manual(m6)" "auto(av)" ...
##  $ drv         : chr  "f" "f" "f" "f" ...
##  $ cty         : int  18 21 20 21 16 18 18 18 16 20 ...
##  $ hwy         : int  29 29 31 30 26 26 27 26 25 28 ...
##  $ fl          : chr  "p" "p" "p" "p" ...
##  $ class       : chr  "compact" "compact" "compact" "compact" ...
```

```
mpg$manufacturer
```

```
##   [1] "audi"       "audi"       "audi"       "audi"       "audi"
##   [6] "audi"       "audi"       "audi"       "audi"       "audi"
##  [11] "audi"       "audi"       "audi"       "audi"       "audi"
##  [16] "audi"       "audi"       "audi"       "chevrolet"  "chevrolet"
##  [21] "chevrolet"  "chevrolet"  "chevrolet"  "chevrolet"  "chevrolet"
##  [26] "chevrolet"  "chevrolet"  "chevrolet"  "chevrolet"  "chevrolet"
##  [31] "chevrolet"  "chevrolet"  "chevrolet"  "chevrolet"  "chevrolet"
##  [36] "chevrolet"  "chevrolet"  "dodge"      "dodge"      "dodge"
##  [41] "dodge"      "dodge"      "dodge"      "dodge"      "dodge"
##  [46] "dodge"      "dodge"      "dodge"      "dodge"      "dodge"
##  [51] "dodge"      "dodge"      "dodge"      "dodge"      "dodge"
##  [56] "dodge"      "dodge"      "dodge"      "dodge"      "dodge"
##  [61] "dodge"      "dodge"      "dodge"      "dodge"      "dodge"
##  [66] "dodge"      "dodge"      "dodge"      "dodge"      "dodge"
##  [71] "dodge"      "dodge"      "dodge"      "dodge"      "ford"
##  [76] "ford"       "ford"       "ford"       "ford"       "ford"
##  [81] "ford"       "ford"       "ford"       "ford"       "ford"
##  [86] "ford"       "ford"       "ford"       "ford"       "ford"
##  [91] "ford"       "ford"       "ford"       "ford"       "ford"
##  [96] "ford"       "ford"       "ford"       "ford"       "honda"
## [101] "honda"      "honda"      "honda"      "honda"      "honda"
## [106] "honda"      "honda"      "honda"      "hyundai"    "hyundai"
## [111] "hyundai"    "hyundai"    "hyundai"    "hyundai"    "hyundai"
## [116] "hyundai"    "hyundai"    "hyundai"    "hyundai"    "hyundai"
## [121] "hyundai"    "hyundai"    "jeep"       "jeep"       "jeep"
## [126] "jeep"       "jeep"       "jeep"       "jeep"       "jeep"
## [131] "land rover" "land rover" "land rover" "land rover" "lincoln"
## [136] "lincoln"    "lincoln"    "mercury"    "mercury"    "mercury"
## [141] "mercury"    "nissan"     "nissan"     "nissan"     "nissan"
## [146] "nissan"     "nissan"     "nissan"     "nissan"     "nissan"
## [151] "nissan"     "nissan"     "nissan"     "nissan"     "pontiac"
## [156] "pontiac"    "pontiac"    "pontiac"    "pontiac"    "subaru"
## [161] "subaru"     "subaru"     "subaru"     "subaru"     "subaru"
## [166] "subaru"     "subaru"     "subaru"     "subaru"     "subaru"
## [171] "subaru"     "subaru"     "subaru"     "toyota"     "toyota"
## [176] "toyota"     "toyota"     "toyota"     "toyota"     "toyota"
## [181] "toyota"     "toyota"     "toyota"     "toyota"     "toyota"
## [186] "toyota"     "toyota"     "toyota"     "toyota"     "toyota"
## [191] "toyota"     "toyota"     "toyota"     "toyota"     "toyota"
## [196] "toyota"     "toyota"     "toyota"     "toyota"     "toyota"
## [201] "toyota"     "toyota"     "toyota"     "toyota"     "toyota"
## [206] "toyota"     "toyota"     "volkswagen" "volkswagen" "volkswagen"
## [211] "volkswagen" "volkswagen" "volkswagen" "volkswagen" "volkswagen"
## [216] "volkswagen" "volkswagen" "volkswagen" "volkswagen" "volkswagen"
## [221] "volkswagen" "volkswagen" "volkswagen" "volkswagen" "volkswagen"
## [226] "volkswagen" "volkswagen" "volkswagen" "volkswagen" "volkswagen"
## [231] "volkswagen" "volkswagen" "volkswagen" "volkswagen"
```

```
mpg$model
```

```
##   [1] "a4"                     "a4"                     "a4"
##   [4] "a4"                     "a4"                     "a4"
##   [7] "a4"                     "a4 quattro"             "a4 quattro"
##  [10] "a4 quattro"             "a4 quattro"             "a4 quattro"
##  [13] "a4 quattro"             "a4 quattro"             "a4 quattro"
##  [16] "a6 quattro"             "a6 quattro"             "a6 quattro"
##  [19] "c1500 suburban 2wd"     "c1500 suburban 2wd"     "c1500 suburban 2wd"
##  [22] "c1500 suburban 2wd"     "c1500 suburban 2wd"     "corvette"
##  [25] "corvette"               "corvette"               "corvette"
##  [28] "corvette"               "k1500 tahoe 4wd"        "k1500 tahoe 4wd"
##  [31] "k1500 tahoe 4wd"        "k1500 tahoe 4wd"        "malibu"
##  [34] "malibu"                 "malibu"                 "malibu"
##  [37] "malibu"                 "caravan 2wd"            "caravan 2wd"
##  [40] "caravan 2wd"            "caravan 2wd"            "caravan 2wd"
##  [43] "caravan 2wd"            "caravan 2wd"            "caravan 2wd"
##  [46] "caravan 2wd"            "caravan 2wd"            "caravan 2wd"
##  [49] "dakota pickup 4wd"      "dakota pickup 4wd"      "dakota pickup 4wd"
##  [52] "dakota pickup 4wd"      "dakota pickup 4wd"      "dakota pickup 4wd"
##  [55] "dakota pickup 4wd"      "dakota pickup 4wd"      "dakota pickup 4wd"
##  [58] "durango 4wd"            "durango 4wd"            "durango 4wd"
##  [61] "durango 4wd"            "durango 4wd"            "durango 4wd"
##  [64] "durango 4wd"            "ram 1500 pickup 4wd"    "ram 1500 pickup 4wd"
##  [67] "ram 1500 pickup 4wd"    "ram 1500 pickup 4wd"    "ram 1500 pickup 4wd"
##  [70] "ram 1500 pickup 4wd"    "ram 1500 pickup 4wd"    "ram 1500 pickup 4wd"
##  [73] "ram 1500 pickup 4wd"    "ram 1500 pickup 4wd"    "expedition 2wd"
##  [76] "expedition 2wd"         "expedition 2wd"         "explorer 4wd"
##  [79] "explorer 4wd"           "explorer 4wd"           "explorer 4wd"
##  [82] "explorer 4wd"           "explorer 4wd"           "f150 pickup 4wd"
##  [85] "f150 pickup 4wd"        "f150 pickup 4wd"        "f150 pickup 4wd"
##  [88] "f150 pickup 4wd"        "f150 pickup 4wd"        "f150 pickup 4wd"
##  [91] "mustang"                "mustang"                "mustang"
##  [94] "mustang"                "mustang"                "mustang"
##  [97] "mustang"                "mustang"                "mustang"
## [100] "civic"                  "civic"                  "civic"
## [103] "civic"                  "civic"                  "civic"
## [106] "civic"                  "civic"                  "civic"
## [109] "sonata"                 "sonata"                 "sonata"
## [112] "sonata"                 "sonata"                 "sonata"
## [115] "sonata"                 "tiburon"                "tiburon"
## [118] "tiburon"                "tiburon"                "tiburon"
## [121] "tiburon"                "tiburon"                "grand cherokee 4wd"
## [124] "grand cherokee 4wd"     "grand cherokee 4wd"     "grand cherokee 4wd"
## [127] "grand cherokee 4wd"     "grand cherokee 4wd"     "grand cherokee 4wd"
## [130] "grand cherokee 4wd"     "range rover"            "range rover"
## [133] "range rover"            "range rover"            "navigator 2wd"
## [136] "navigator 2wd"          "navigator 2wd"          "mountaineer 4wd"
## [139] "mountaineer 4wd"        "mountaineer 4wd"        "mountaineer 4wd"
## [142] "altima"                 "altima"                 "altima"
## [145] "altima"                 "altima"                 "altima"
## [148] "maxima"                 "maxima"                 "maxima"
## [151] "pathfinder 4wd"         "pathfinder 4wd"         "pathfinder 4wd"
## [154] "pathfinder 4wd"         "grand prix"             "grand prix"
## [157] "grand prix"             "grand prix"             "grand prix"
## [160] "forester awd"           "forester awd"           "forester awd"
## [163] "forester awd"           "forester awd"           "forester awd"
## [166] "impreza awd"            "impreza awd"            "impreza awd"
## [169] "impreza awd"            "impreza awd"            "impreza awd"
## [172] "impreza awd"            "impreza awd"            "4runner 4wd"
## [175] "4runner 4wd"            "4runner 4wd"            "4runner 4wd"
## [178] "4runner 4wd"            "4runner 4wd"            "camry"
## [181] "camry"                  "camry"                  "camry"
## [184] "camry"                  "camry"                  "camry"
## [187] "camry solara"           "camry solara"           "camry solara"
## [190] "camry solara"           "camry solara"           "camry solara"
## [193] "camry solara"           "corolla"                "corolla"
## [196] "corolla"                "corolla"                "corolla"
## [199] "land cruiser wagon 4wd" "land cruiser wagon 4wd" "toyota tacoma 4wd"
## [202] "toyota tacoma 4wd"      "toyota tacoma 4wd"      "toyota tacoma 4wd"
## [205] "toyota tacoma 4wd"      "toyota tacoma 4wd"      "toyota tacoma 4wd"
## [208] "gti"                    "gti"                    "gti"
## [211] "gti"                    "gti"                    "jetta"
## [214] "jetta"                  "jetta"                  "jetta"
## [217] "jetta"                  "jetta"                  "jetta"
## [220] "jetta"                  "jetta"                  "new beetle"
## [223] "new beetle"             "new beetle"             "new beetle"
## [226] "new beetle"             "new beetle"             "passat"
## [229] "passat"                 "passat"                 "passat"
## [232] "passat"                 "passat"                 "passat"
```

```
#mpg nin degikenleriyle yeni bir vei seti olusturulabilir

#head fonksiyonu ilk kaç staırı göstericegini belirtir

head(data.frame(mpg$manufacturer, mpg$model), 10)
```

```
##    mpg.manufacturer  mpg.model
## 1              audi         a4
## 2              audi         a4
## 3              audi         a4
## 4              audi         a4
## 5              audi         a4
## 6              audi         a4
## 7              audi         a4
## 8              audi a4 quattro
## 9              audi a4 quattro
## 10             audi a4 quattro
```

```
degiskenler <- c("model", "year", "cyl")

data <- mpg[degiskenler]

# belirli durumlardaki degsikenleri alma islemi

mpg[mpg$manufacturer == "Audi" & mpg$cyl == "6" & mpg$year > 1999, ]
```

```
## # A tibble: 0 x 11
## # ... with 11 variables: manufacturer <chr>, model <chr>, displ <dbl>,
## #   year <int>, cyl <int>, trans <chr>, drv <chr>, cty <int>, hwy <int>,
## #   fl <chr>, class <chr>
```

```
mpg
```

```
## # A tibble: 234 x 11
##    manufacturer model    displ  year   cyl trans   drv     cty   hwy fl    class
##    <chr>        <chr>    <dbl> <int> <int> <chr>   <chr> <int> <int> <chr> <chr>
##  1 audi         a4         1.8  1999     4 auto(l~ f        18    29 p     comp~
##  2 audi         a4         1.8  1999     4 manual~ f        21    29 p     comp~
##  3 audi         a4         2    2008     4 manual~ f        20    31 p     comp~
##  4 audi         a4         2    2008     4 auto(a~ f        21    30 p     comp~
##  5 audi         a4         2.8  1999     6 auto(l~ f        16    26 p     comp~
##  6 audi         a4         2.8  1999     6 manual~ f        18    26 p     comp~
##  7 audi         a4         3.1  2008     6 auto(a~ f        18    27 p     comp~
##  8 audi         a4 quat~   1.8  1999     4 manual~ 4        18    26 p     comp~
##  9 audi         a4 quat~   1.8  1999     4 auto(l~ 4        16    25 p     comp~
## 10 audi         a4 quat~   2    2008     4 manual~ 4        20    28 p     comp~
## # ... with 224 more rows
```

Data Frame Siralama

```
df_all
```

```
##   magaza_no        semt ortolama_kazanc gecmis personel_sayisi ort_mus
## 1         1 Mecidiyekoy              60      2              60       1
## 2         2      Levent              50      4              50       3
## 3         3     Sarikoy              61      5              61       5
## 4         4         Gop              72      2              72       7
## 5         5   Kagithane              89      3              89       9
##   per_bas_kaz
## 1           1
## 2           1
## 3           1
## 4           1
## 5           1
```

```
#semt isimlerine gore siralama

df_all[order(df_all$semt, decreasing = TRUE),]
```

```
##   magaza_no        semt ortolama_kazanc gecmis personel_sayisi ort_mus
## 3         3     Sarikoy              61      5              61       5
## 1         1 Mecidiyekoy              60      2              60       1
## 2         2      Levent              50      4              50       3
## 5         5   Kagithane              89      3              89       9
## 4         4         Gop              72      2              72       7
##   per_bas_kaz
## 3           1
## 1           1
## 2           1
## 5           1
## 4           1
```

Aplly Fonsksiyonlari

```
##########    microbenchmark fonksiyonu iki fonksiyonu arasında performans karsilastirmasi yapar
##########    source fonksiyonu başka dosyalardaki kodlara ulasmayi saglar


# lapply  listelerin islemlerinin sonucunu liste olarak donurur


l <- list( a = rnorm(90),
      b = rbeta(10,1,2),
      c = 1:5000
      )

lapply(l, mean)
```

```
## $a
## [1] 0.004434227
##
## $b
## [1] 0.3726232
##
## $c
## [1] 2500.5
```

```
# sapply  listelerin degerlerini vectore donusturur


l <- list( a = rnorm(90),
      b = rbeta(10,1,2),
      c = 1:5000
      )

sapply(l, mean)
```

```
##             a             b             c
##   -0.02692903    0.40363819 2500.50000000
```

```
# vapply ciktinin tipini garanti altina alir

vapply(1:10, sqrt, double(1))
```

```
##  [1] 1.000000 1.414214 1.732051 2.000000 2.236068 2.449490 2.645751 2.828427
##  [9] 3.000000 3.162278
```

```
# tapply dataframe icerisndeki kategorik degiskenlerin kiriliiminda fonksiyonlari calismasini saglar

str(mpg)
```

```
## Classes 'tbl_df', 'tbl' and 'data.frame':    234 obs. of  11 variables:
##  $ manufacturer: chr  "audi" "audi" "audi" "audi" ...
##  $ model       : chr  "a4" "a4" "a4" "a4" ...
##  $ displ       : num  1.8 1.8 2 2 2.8 2.8 3.1 1.8 1.8 2 ...
##  $ year        : int  1999 1999 2008 2008 1999 1999 2008 1999 1999 2008 ...
##  $ cyl         : int  4 4 4 4 6 6 6 4 4 4 ...
##  $ trans       : chr  "auto(l5)" "manual(m5)" "manual(m6)" "auto(av)" ...
##  $ drv         : chr  "f" "f" "f" "f" ...
##  $ cty         : int  18 21 20 21 16 18 18 18 16 20 ...
##  $ hwy         : int  29 29 31 30 26 26 27 26 25 28 ...
##  $ fl          : chr  "p" "p" "p" "p" ...
##  $ class       : chr  "compact" "compact" "compact" "compact" ...
```

```
tapply(mpg$cyl, mpg$class, mean)
```

```
##    2seater    compact    midsize    minivan     pickup subcompact        suv
##   8.000000   4.595745   5.317073   5.818182   7.030303   5.028571   6.967742
```

```
by(mpg[, c("displ", "cty", "hwy")], mpg$cyl,  colMeans)
```

```
## mpg$cyl: 4
##     displ       cty       hwy
##  2.145679 21.012346 28.802469
## ------------------------------------------------------------
## mpg$cyl: 5
## displ   cty   hwy
##  2.50 20.50 28.75
## ------------------------------------------------------------
## mpg$cyl: 6
##     displ       cty       hwy
##  3.408861 16.215190 22.822785
## ------------------------------------------------------------
## mpg$cyl: 8
##     displ       cty       hwy
##  5.132857 12.571429 17.628571
```

Map Fonsksiyonlari

```
library(purrr)

mapp <- mpg[, c("displ", "cty", "hwy")]

map_dbl(mapp, mean)
```

```
##     displ       cty       hwy
##  3.471795 16.858974 23.440171
```

```
mtcars %>% split(.$cyl) %>% map(~ lm(mpg ~ wt, data = .)) %>% map(summary) %>% map_dbl("r.squared")
```

```
##         4         6         8
## 0.5086326 0.4645102 0.4229655
```

Tibble

```
# data frame in modern anlamda yeniden tasarlanmis hali

# yazdırmada oluşturulan tibble in az elemanini gosterir  dataframe hepsini gosterir


tibble(
  a = 1:10000,
  b = 1:10000
)
```

```
## # A tibble: 10,000 x 2
##        a     b
##    <int> <int>
##  1     1     1
##  2     2     2
##  3     3     3
##  4     4     4
##  5     5     5
##  6     6     6
##  7     7     7
##  8     8     8
##  9     9     9
## 10    10    10
## # ... with 9,990 more rows
```

```
#bir veri setini tibble a donusturur

as_tibble(iris)
```

```
## # A tibble: 150 x 5
##    Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##           <dbl>       <dbl>        <dbl>       <dbl> <fct>
##  1          5.1         3.5          1.4         0.2 setosa
##  2          4.9         3            1.4         0.2 setosa
##  3          4.7         3.2          1.3         0.2 setosa
##  4          4.6         3.1          1.5         0.2 setosa
##  5          5           3.6          1.4         0.2 setosa
##  6          5.4         3.9          1.7         0.4 setosa
##  7          4.6         3.4          1.4         0.3 setosa
##  8          5           3.4          1.5         0.2 setosa
##  9          4.4         2.9          1.4         0.2 setosa
## 10          4.9         3.1          1.5         0.1 setosa
## # ... with 140 more rows
```