## 1. Apply Family

matrix <- matrix(data = 1:15, nrow = 5, ncol = 3)  
matrix

## [,1] [,2] [,3]  
## [1,] 1 6 11  
## [2,] 2 7 12  
## [3,] 3 8 13  
## [4,] 4 9 14  
## [5,] 5 10 15

apply(X = matrix, MARGIN = 1, FUN = mean)

## [1] 6 7 8 9 10

apply(X = matrix, MARGIN = 2, FUN = mean)

## [1] 3 8 13

apply(X = matrix, MARGIN = 1, FUN = sum)

## [1] 18 21 24 27 30

apply(X = matrix, MARGIN = 2, FUN = sum)

## [1] 15 40 65

LIST <- list(1:10, 11:20)

lapply(X = LIST, FUN = mean)

## [[1]]  
## [1] 5.5  
##   
## [[2]]  
## [1] 15.5

lapply(X = LIST, FUN = sum)

## [[1]]  
## [1] 55  
##   
## [[2]]  
## [1] 155

sapply(LIST, mean)

## [1] 5.5 15.5

sapply(LIST, sum)

## [1] 55 155

## 2. Aggregate

head(chickwts)

## weight feed  
## 1 179 horsebean  
## 2 160 horsebean  
## 3 136 horsebean  
## 4 227 horsebean  
## 5 217 horsebean  
## 6 168 horsebean

aggregate(x = chickwts$weight, by = list(chickwts$feed), FUN = mean)

## Group.1 x  
## 1 casein 323.5833  
## 2 horsebean 160.2000  
## 3 linseed 218.7500  
## 4 meatmeal 276.9091  
## 5 soybean 246.4286  
## 6 sunflower 328.9167

head(warpbreaks)

## breaks wool tension  
## 1 26 A L  
## 2 30 A L  
## 3 54 A L  
## 4 25 A L  
## 5 70 A L  
## 6 52 A L

aggregate(x = warpbreaks$breaks, by = list(warpbreaks$tension), FUN = mean)

## Group.1 x  
## 1 L 36.38889  
## 2 M 26.38889  
## 3 H 21.66667

aggregate(x = warpbreaks$breaks, by = list(warpbreaks$wool), FUN = mean)

## Group.1 x  
## 1 A 31.03704  
## 2 B 25.25926

aggregate(x = warpbreaks$breaks, by = list(warpbreaks$wool, warpbreaks$tension), FUN = mean)

## Group.1 Group.2 x  
## 1 A L 44.55556  
## 2 B L 28.22222  
## 3 A M 24.00000  
## 4 B M 28.77778  
## 5 A H 24.55556  
## 6 B H 18.77778

## 3. plyr

head(baseball)

## id year stint team lg g ab r h X2b X3b hr rbi sb cs bb so ibb  
## 4 ansonca01 1871 1 RC1 25 120 29 39 11 3 0 16 6 2 2 1 NA  
## 44 forceda01 1871 1 WS3 32 162 45 45 9 4 0 29 8 0 4 0 NA  
## 68 mathebo01 1871 1 FW1 19 89 15 24 3 1 0 10 2 1 2 0 NA  
## 99 startjo01 1871 1 NY2 33 161 35 58 5 1 1 34 4 2 3 0 NA  
## 102 suttoez01 1871 1 CL1 29 128 35 45 3 7 3 23 3 1 1 0 NA  
## 106 whitede01 1871 1 CL1 29 146 40 47 6 5 1 21 2 2 4 1 NA  
## hbp sh sf gidp  
## 4 NA NA NA NA  
## 44 NA NA NA NA  
## 68 NA NA NA NA  
## 99 NA NA NA NA  
## 102 NA NA NA NA  
## 106 NA NA NA NA

head(ddply(baseball, .(id), summarise, OBP = h / ab, .drop = TRUE))

## id OBP  
## 1 aaronha01 0.2799145  
## 2 aaronha01 0.3139535  
## 3 aaronha01 0.3284072  
## 4 aaronha01 0.3219512  
## 5 aaronha01 0.3261231  
## 6 aaronha01 0.3545310

## 4. data.table

carsDT <- data.table(mtcars, keep.rownames = TRUE)  
head(carsDT)

## rn mpg cyl disp hp drat wt qsec vs am gear carb  
## 1: Mazda RX4 21.0 6 160 110 3.90 2.620 16.46 0 1 4 4  
## 2: Mazda RX4 Wag 21.0 6 160 110 3.90 2.875 17.02 0 1 4 4  
## 3: Datsun 710 22.8 4 108 93 3.85 2.320 18.61 1 1 4 1  
## 4: Hornet 4 Drive 21.4 6 258 110 3.08 3.215 19.44 1 0 3 1  
## 5: Hornet Sportabout 18.7 8 360 175 3.15 3.440 17.02 0 0 3 2  
## 6: Valiant 18.1 6 225 105 2.76 3.460 20.22 1 0 3 1

mean\_mpg <-mean(carsDT$mpg)  
mean\_mpg

## [1] 20.09062

aggregate(  
 x = carsDT$mpg,  
 by = list(am = carsDT$am),  
 FUN = mean  
)

## am x  
## 1 0 17.14737  
## 2 1 24.39231

aggregate(  
 x = carsDT$mpg,  
 by = list(am = carsDT$am, cyl = carsDT$cyl),  
 FUN = mean  
)

## am cyl x  
## 1 0 4 22.90000  
## 2 1 4 28.07500  
## 3 0 6 19.12500  
## 4 1 6 20.56667  
## 5 0 8 15.05000  
## 6 1 8 15.40000