stats 20 hw 4

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Q1.

```
mat_1 <- matrix(1:6, nrow = 2)
mat_2 <- matrix(1:6, nrow = 1)
vec_1 <- 1:6

my_t <- function(x) {
  if (is.null(dim(x))) {
    t_matrix <- matrix(x, nrow = 1)
  } else {
    t_col <- dim(x)[1]
    t_row <- dim(x)[2]
    t_matrix <- matrix(x,nrow = t_row,ncol = t_col)
  }
  t_matrix
}

mat_2
```

```
##      [,1] [,2] [,3] [,4] [,5] [,6]
## [1,]    1    2    3    4    5    6
```

```
t(mat_2)
```

```
##      [,1]
## [1,]    1
## [2,]    2
## [3,]    3
## [4,]    4
## [5,]    5
## [6,]    6
```

```
my_t(mat_2)
```

```
##      [,1]
## [1,]    1
## [2,]    2
## [3,]    3
## [4,]    4
## [5,]    5
## [6,]    6
```

```
mat_1
```

```
##      [,1] [,2] [,3]
## [1,]    1    3    5
## [2,]    2    4    6
```

```
t(mat_1)
```

```
##      [,1] [,2]
## [1,]    1    2
## [2,]    3    4
## [3,]    5    6
```

```
my_t(mat_1)
```

```
##      [,1] [,2]
## [1,]    1    4
## [2,]    2    5
## [3,]    3    6
```

```
vec_1
```

```
## [1] 1 2 3 4 5 6
```

```
t(vec_1)
```

```
##      [,1] [,2] [,3] [,4] [,5] [,6]
## [1,]    1    2    3    4    5    6
```

```
my_t(vec_1)
```

```
##      [,1] [,2] [,3] [,4] [,5] [,6]
## [1,]    1    2    3    4    5    6
```

Q2. a.

```
my_cor <- function(x, y, use = "everything") {
  # 1. check whether length x and y the same, if not then ERROR
  if(length(x) != length(y)) {
    stop("Error: incompatible dimensions")
  }
  if (use != "pairwise.complete.obs" && use != "everything") {
    stop("Error: Invalid 'use' argument")
  }
   # 3. check if x and y are vectors (not matrix), if not then ERROR
  if (!is.vector(x) || !is.vector(y)) {
    stop("Both arguments must be vectors.")
  }
  # then check if pairwise...
  if(use == "pairwise.complete.obs") {
    complete_obs <- !is.na(x) & !is.na(y)
    x <- x[complete_obs]
    y <- y[complete_obs]
  }
  x1 <- x - mean(x)
  y1 <- y - mean(y)
  num <- sum(x1*y1)
  denom <- sqrt(sum(x1^2))*sqrt(sum(y1^2))
  r <- num/denom
  r
}
```

```
cor(c(1,2,3,NA), 1:4, use = "everything") # x and y are not of the same length
```

```
## [1] NA
```

```
my_cor(c(1,2,3,NA), 1:4, use = "everything")
```

```
## [1] NA
```

```
v1 <- c(1, 2, 3)
v2 <- c(NA, 2, 3)
length(v1)
```

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

```
length(v2)
```

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

b.

```
linreg <- function(x, y, use = "everything") {
  if (use != "pairwise.complete.obs" && use != "everything") {
    stop("Error: nvalid 'use' argument")
  }
  if (use == "pairwise.complete.obs") {
    complete_obs <- !is.na(x) & !is.na(y)
    x <- x[complete_obs]
    y <- y[complete_obs]
  }
  b <- cor(x,y)*(sd(y)/sd(x))
  a <- mean(y) - b*mean(x)
  c(a,b)
}
  # check if `use` is one of the two options, if not then ERROR

linreg(c(1,2,4,6,8), c(1,2,3,4,5), use = "pairwise.complete.obs")
```

```
## [1] 0.6951220 0.5487805
```

c.

```
linreg(c(61,62,63,64,66,68), c(104,110,125,141,160,170))
```

```
## [1] -510.64706   10.08824
```

```
# equation is -510.64706 + 10.08824x because my equation returned -510.64706 which is th
e y intercept and 10.08824 is the slope.
```

d.

```
linreg_mat <- function(x, y) {
  X <- cbind(1, x)
  Xt <- t(X)
  XtX <- crossprod(X)
  XtX_inv <- solve(XtX)
  Xt_y <- t(X) %*% y
  answer <- XtX_inv %*% Xt_y

  answer
}
```

e.

```
y <- matrix(c(104,110,125,141,160,170))
x <- matrix(c(61,62,63,64,66,68))
#linreg_mat(x, y)
coefficients <- linreg_mat(x, y)
coefficients
```

```
##            [,1]
## [1,] -510.64706
## [2,]   10.08824
```

Q3. a.

```
`%m%` <- function(A, B) {
  if(ncol(A) != nrow(B)) {
    stop("error: multiplication not possible")
  } else {
  mat <- matrix(,nrow = nrow(A), ncol = ncol(B))
    for (i in 1:nrow(A)) {
        for (j in 1:ncol(B)) {
          mat[i,j] <- 0
          for (k in 1:nrow(B)) {
          mat[i,j] <- mat[i,j] + A[i,k]*B[k,j]
        }
      }
    }
  }
  mat
}
# A %m% B
```

b.

```
X <- matrix(6:1, nrow = 2, byrow = TRUE)
Y <- matrix(1:9, nrow = 3)
X
```

```
##      [,1] [,2] [,3]
## [1,]    6    5    4
## [2,]    3    2    1
```

```
Y
```

```
##      [,1] [,2] [,3]
## [1,]    1    4    7
## [2,]    2    5    8
## [3,]    3    6    9
```

```
X %*% Y
```

```
##      [,1] [,2] [,3]
## [1,]   28   73  118
## [2,]   10   28   46
```

```
`%m%`(X,Y)
```

```
##      [,1] [,2] [,3]
## [1,]   28   73  118
## [2,]   10   28   46
```

Q4.

```
`%^%` <- function(x, k) {
  result <- x
  if(k == 0) {
    result <- diag(nrow(x))
  } else {
    for (elmt in 2:k) {
      result <- result %m% x
    }
  }
  result
}

Z <- matrix(c(.2,.7,.1,.6,.2,.2,.4,.1,.5), nrow = 3, ncol = 3, byrow = TRUE)
Z
```

```
##      [,1] [,2] [,3]
## [1,]  0.2  0.7  0.1
## [2,]  0.6  0.2  0.2
## [3,]  0.4  0.1  0.5
```

```
`%^%`(Z,0)
```

```
##      [,1] [,2] [,3]
## [1,]    1    0    0
## [2,]    0    1    0
## [3,]    0    0    1
```

```
`%^%`(Z,5)
```

```
##         [,1]    [,2]    [,3]
## [1,] 0.38870 0.38429 0.22701
## [2,] 0.40232 0.36828 0.22940
## [3,] 0.39754 0.36995 0.23251
```

```
`%^%`(Z,50)
```

```
##           [,1]  [,2]      [,3]
## [1,] 0.3958333 0.375 0.2291667
## [2,] 0.3958333 0.375 0.2291667
## [3,] 0.3958333 0.375 0.2291667
```

```
`%^%`(Z,500)
```

```
##           [,1]  [,2]      [,3]
## [1,] 0.3958333 0.375 0.2291667
## [2,] 0.3958333 0.375 0.2291667
## [3,] 0.3958333 0.375 0.2291667
```

Q5.

```
which(c(TRUE, FALSE, TRUE))
```

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

```
# which(c(1, 0, 1)) # input has to be logical

which(c(TRUE, FALSE, TRUE, NA, NULL))
```

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

```
#which(c(TRUE, FALSE, TRUE, NA, NaN, NULL))

my_which <- function(x, arr.ind = FALSE) {
  logic <- c(seq_along(x)[x])
  if(!(is.logical(x))) {
    stop("Error in which: argument to 'which' is not logical")
  }
  if(arr.ind && is.matrix(x)) {
    logic <- matrix(c(1+(logic -1) %% ncol(x), 1 + (indices -1) %% ncol(x)), ncol = 2, b
yrow = true)
  }
  logic
}
my_which(c(TRUE, FALSE, TRUE), TRUE)
```

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

```
z <- matrix(c(TRUE, FALSE, TRUE, TRUE, TRUE, FALSE), nrow = 2)
my_which(z)
```

```
## [1] 1 3 4 5
```

```
which(z)
```

```
## [1] 1 3 4 5
```

Q6 a.

```
# save the data to your working directory
# Load the data
load("mlb.RData")

# Find the maximum number of hits from each team
max_hits <- tapply(hit, team, max)
max_hits
```

```
## ARI ATL BAL BOS CHA CHN CIN CLE COL DET HOU KCA LAA LAN MIA MIL MIN NYA NYN OAK
## 172 191 163 188 145 176 182 183 182 185 170 192 162 145 165 187 161 170 142 161
## PHI PIT SDN SEA SFN SLN TBA TEX TOR WAS
## 153 155 155 178 135 163 148 148 129 180
```

```
# players in a team
players_per_team <- table(factor(team, levels = levels(team)))
players_per_team
```

```
##
## ARI ATL BAL BOS CHA CHN CIN CLE COL DET HOU KCA LAA LAN MIA MIL MIN NYA NYN OAK
##  49  59  56  44  51  50  53  49  41  49  41  49  60  52  51  53  54  50  56  53
## PHI PIT SDN SEA SFN SLN TBA TEX TOR WAS
##  48  48  49  53  48  49  54  50  63  53
```

```
# number of players >1 hr
players_with_hr <- table(team[hr > 0])
players_with_hr
```

```
##
## ARI ATL BAL BOS CHA CHN CIN CLE COL DET HOU KCA LAA LAN MIA MIL MIN NYA NYN OAK
##  18  17  22  18  18  16  23  21  19  18  17  19  23  17  16  23  18  19  19  16
## PHI PIT SDN SEA SFN SLN TBA TEX TOR WAS
##  23  18  19  17  19  21  24  17  21  19
```

```
highest_batting_average <- tapply(hit[ab >= 100] / ab[ab >= 100], team[ab >= 100], max,
na.rm = TRUE)
highest_batting_average
```

```
##       ARI       ATL       BAL       BOS       CHA       CHN       CIN       CLE
## 0.2928571 0.3090615 0.3150685 0.3461538 0.2923977 0.3054945 0.3099315 0.3119266
##       COL       DET       HOU       KCA       LAA       LAN       MIA       MIL
## 0.2966102 0.2985075 0.3164794 0.3067227 0.3121019 0.3123288 0.2782462 0.3257840
##       MIN       NYA       NYN       OAK       PHI       PIT       SDN       SEA
## 0.2880795 0.3333333 0.3288889 0.2960526 0.2702079 0.2996032 0.2796935 0.3037543
##       SFN       SLN       TBA       TEX       TOR       WAS
## 0.2839196 0.3052434 0.3426573 0.2725173 0.2811245 0.3081285
```

```
batting_average <- tapply(hit / ab, team, mean, na.rm = TRUE)
batting_average
```

```
##       ARI       ATL       BAL       BOS       CHA       CHN       CIN       CLE
## 0.1433350 0.1828012 0.1870557 0.2015189 0.1915337 0.1824375 0.1419764 0.2027652
##       COL       DET       HOU       KCA       LAA       LAN       MIA       MIL
## 0.2050217 0.1650542 0.1891562 0.2013004 0.2032076 0.1769574 0.1722957 0.2161377
##       MIN       NYA       NYN       OAK       PHI       PIT       SDN       SEA
## 0.2057214 0.1706966 0.1582458 0.2063389 0.1501368 0.1946479 0.1349041 0.2323296
##       SFN       SLN       TBA       TEX       TOR       WAS
## 0.1941467 0.1698089 0.2056881 0.1700884 0.2247015 0.1750777
```

```
load("mlb.RData")


average <- tapply(hr, list(pos, league), mean, na.rm = TRUE)
average
```

```
##                      AL         NL
## catcher      4.46153846  4.7586207
## centerfield  6.76315789  7.3939394
## firstbase   11.15217391 12.9142857
## leftfield    8.80434783  9.6808511
## pitcher      0.05152225  0.0547619
## rightfield  11.73170732  7.5348837
## secondbase   6.25000000  6.2800000
## shortstop   10.12903226  8.5517241
## thirdbase    9.02631579  7.9318182
```

```
difference <- abs(average[, "AL"] - average[, "NL"])
difference
```

```
##     catcher centerfield   firstbase   leftfield     pitcher  rightfield
## 0.297082228 0.630781499 1.762111801 0.876503238 0.003239657 4.196823596
##  secondbase   shortstop   thirdbase
## 0.030000000 1.577308120 1.094497608
```

```
largest_difference <- names(which.max(difference))
largest_difference
```

```
## [1] "rightfield"
```

```
load("mlb.RData")

median_players <- tapply(team, pos, function(x) median(table(x)))
median_players
```

```
##     catcher centerfield   firstbase   leftfield     pitcher  rightfield
##           4           2           3           3          28           3
##  secondbase   shortstop   thirdbase
##           3           2           3
```

```
team
```

```
##    [1] CHA ATL TBA KCA WAS NYA ATL WAS SLN DET MIN MIL ARI TEX MIL ATL MIA DET
##   [19] LAN PHI TOR ATL CLE CLE KCA LAA COL CHN CLE SEA PHI HOU LAA TBA BAL OAK
##   [37] MIA MIL PHI LAA PIT CHA COL SEA BAL TBA ARI TEX NYA CIN PHI BAL TBA PIT
##   [55] LAA MIL COL SEA PHI TBA MIL MIN SDN NYA MIN SFN ARI CHA PHI TOR LAN SLN
##   [73] CHN LAN DET CIN TBA MIL DET LAA KCA LAN CLE TOR MIL BOS TEX CIN SLN MIA
##   [91] OAK ARI LAA NYN CHN OAK TBA CLE SDN NYN NYN ATL NYN PHI WAS CHA NYN SEA
##  [109] BAL LAA SFN BOS TBA CLE MIN CLE DET LAN PIT SFN TEX BOS SEA MIN TOR NYA
##  [127] COL BOS TOR TEX ATL CLE NYA SFN COL OAK SFN SFN CIN LAA OAK BAL NYN BOS
##  [145] KCA TOR PIT MIA CHN ATL MIA PHI SLN ARI DET KCA BAL ATL ARI SEA ARI BOS
##  [163] CLE BOS PIT MIL SLN HOU SDN CIN LAA LAA MIA MIA ARI BAL NYA OAK ATL MIL
##  [181] NYN CHN ARI OAK LAN SFN CHA BAL PIT MIL CHA MIN TEX KCA COL BOS CHN TEX
##  [199] LAA MIN NYN PHI CLE DET OAK MIL LAA TEX ATL DET OAK SEA CHN ATL SLN DET
##  [217] CLE BAL CIN BAL DET TBA SDN CIN CHA COL DET MIN BAL MIA MIN SLN CHA MIL
##  [235] TEX PIT NYN NYA MIL ARI NYA OAK LAN CHN TEX CHN MIA TEX TBA CLE MIL TBA
##  [253] TEX SDN CLE LAN CHN TBA TEX CLE TOR MIA BAL WAS NYA HOU DET LAA WAS TBA
##  [271] SEA TEX NYN MIA NYN CHN SEA MIA NYN ARI LAN SDN WAS CHA HOU BAL OAK CHA
##  [289] LAA LAA PHI SFN PHI PIT CIN TBA SEA TOR CIN SFN COL BOS ATL TOR MIN PHI
##  [307] TEX KCA COL CHA SFN NYN CHN CHA MIL PHI BAL HOU TOR OAK CLE CHN COL MIA
##  [325] HOU NYN MIN SLN ARI CHN ARI CHA PHI NYN ARI CIN TEX COL MIA LAA SEA HOU
##  [343] BOS TOR SEA PIT SDN CLE PIT TEX ARI MIA WAS CIN PHI TOR CLE WAS MIN LAN
##  [361] KCA MIL CLE LAA TOR MIN NYA TOR KCA ATL CHN MIN KCA TBA SFN MIN SEA OAK
##  [379] COL CIN ATL ARI SFN WAS CHN CLE PHI PHI SEA SDN CLE CHA TBA BOS SDN CIN
##  [397] KCA MIN ARI TOR NYN NYN OAK TBA DET LAN CHA CHN WAS HOU CIN PIT LAN LAA
##  [415] TOR SEA LAN TBA MIN DET OAK KCA CIN HOU TEX SLN ATL LAA NYN NYN PHI CIN
##  [433] LAN ATL KCA ATL LAA LAN OAK TBA LAN MIN SLN OAK PHI MIL CHA PIT NYA NYN
##  [451] COL ATL CHN ATL PIT LAN SEA ATL CHA BAL CHA DET NYN LAN KCA CIN TEX NYA
##  [469] SLN MIA TEX SDN SEA SLN SLN SFN CHA SLN OAK TOR CHN MIA CHA PHI LAN TEX
##  [487] NYA CHA CIN MIN HOU BAL ATL TOR SFN TEX OAK CIN BAL DET NYA MIN HOU TOR
##  [505] BAL CHN MIN CHA BAL PIT TBA WAS ARI SEA LAN ATL KCA ARI SLN CLE TBA CHA
##  [523] SFN SFN MIN NYN CHA COL CLE WAS MIL HOU SEA MIA CHA DET WAS KCA CLE KCA
##  [541] SEA CHN OAK CIN WAS HOU WAS TOR MIL LAN LAA MIN MIA OAK COL NYA NYA DET
##  [559] SLN NYA DET ARI TOR KCA SEA MIN NYN HOU CIN MIA SDN MIL MIA TOR NYN SLN
##  [577] TOR TOR CLE TEX SLN CLE MIL NYA MIN NYA BOS DET TEX CHN CIN CHA KCA COL
##  [595] CHN SDN CLE NYN SEA SFN CHN TOR NYA DET WAS PIT HOU BAL NYN CIN OAK TOR
##  [613] SDN SEA LAA TBA PIT NYA SDN WAS BOS CHN OAK SEA LAA PHI CIN MIA LAN SEA
##  [631] SFN TOR CIN KCA WAS PHI CIN KCA SEA BAL CHN NYA DET SLN NYA MIN LAN KCA
##  [649] ARI COL MIA NYA SFN SLN WAS COL PIT BOS MIL PHI SDN MIL COL HOU TBA LAN
##  [667] SLN LAA CIN MIN SDN SFN PHI PHI TEX COL DET CIN ATL CHA SFN NYN OAK ATL
##  [685] HOU SDN TOR LAN KCA ARI MIL MIL TEX LAA LAA DET BOS COL LAA SFN LAA BAL
##  [703] DET CHA SFN BAL BAL OAK NYA KCA TEX NYN NYA PIT TEX PIT KCA WAS OAK SFN
##  [721] SLN BOS NYN LAN HOU WAS SDN KCA MIN LAN HOU WAS OAK TBA BOS TEX PHI PIT
##  [739] MIN MIA LAA BOS WAS CHN CLE TBA ARI CLE PHI MIL ARI TBA PIT CLE NYA CHA
##  [757] DET PIT MIL ARI LAA PIT NYN MIN CHA ARI LAA CHN SDN OAK PIT SFN SEA SEA
##  [775] SEA TEX MIA PHI TOR COL SLN BOS CHN DET LAN CLE BOS DET MIN PHI KCA NYA
##  [793] NYN LAN SDN MIL SFN MIL KCA MIA SDN CHA ARI CIN TOR PHI TBA OAK OAK SDN
##  [811] OAK DET NYN PIT SDN MIL MIN NYA SLN DET BAL LAN WAS LAN LAN MIN CIN DET
##  [829] TOR SDN LAA HOU OAK BAL TEX CHN SDN BAL HOU SEA ATL COL ARI CLE LAA ARI
##  [847] PIT SLN TEX BOS SLN DET CLE OAK TOR DET ARI SDN NYN MIN KCA OAK MIA SEA
##  [865] SLN MIN TOR TEX CHN CLE DET HOU DET ATL KCA ATL HOU SFN NYA ARI COL WAS
##  [883] SDN TOR LAA TOR HOU NYA TOR COL NYN PIT PIT TBA BAL ARI BAL MIN CLE SDN
##  [901] SFN CIN TEX OAK PIT KCA CIN NYN MIA LAA SLN MIL CLE TBA MIL WAS ARI CHN
##  [919] PHI TBA WAS CHA TEX ATL SEA SDN SLN CHA KCA OAK WAS NYA CHN TBA TEX TOR
```

```
##  [937] LAA PIT BOS PHI SEA PIT SFN LAA MIN CHN HOU SEA MIN KCA MIL MIN ATL BAL
##  [955] LAN SLN WAS CHN ARI COL COL PIT SDN CLE CHA CHN LAN ARI SEA PHI PHI PIT
##  [973] KCA ATL PIT TOR SEA NYN NYN SDN PHI SLN DET CHN MIL PIT BOS TEX BAL TBA
##  [991] KCA COL MIA BAL MIN TEX CLE MIA KCA TOR COL LAA SFN OAK CLE SLN MIL KCA
## [1009] MIA BAL SFN PIT TOR HOU NYN CLE COL ARI SLN OAK CHA SFN TOR LAA LAN LAA
## [1027] COL ATL TOR SEA SEA HOU TOR BOS LAN BOS TEX LAA SLN SFN CIN ARI MIL CIN
## [1045] KCA CIN SDN ATL TEX HOU MIL TEX TBA CLE CLE KCA MIA ATL NYA BAL NYN MIN
## [1063] OAK TOR SLN TBA OAK BOS MIL KCA ATL BAL TOR MIL OAK SDN OAK PHI NYN PHI
## [1081] CLE PIT MIN ARI BOS TOR SLN BOS SFN COL OAK BOS MIA MIN HOU BOS TEX TBA
## [1099] LAN LAA CIN PHI CHN CIN TOR OAK SEA BOS LAA CLE ATL CLE LAA BAL NYN PHI
## [1117] TBA PHI BAL ATL ARI MIA HOU MIN HOU CIN ATL TBA TOR NYN DET BOS WAS SDN
## [1135] SLN SDN CIN NYN PIT DET WAS WAS NYN SDN LAA MIA BAL MIA PHI PIT LAA ATL
## [1153] MIA CHN WAS NYA TBA TEX NYA NYN LAA WAS MIN OAK CHA SFN BOS WAS TEX PIT
## [1171] DET PIT TBA BAL MIN MIA CIN WAS PIT KCA MIN SEA NYA TBA CHA HOU CHA CLE
## [1189] NYN MIN CHN LAN WAS SDN SLN TOR TEX MIA CHA ATL SEA COL CHN LAN SEA CLE
## [1207] NYA PIT TEX CHA MIL ARI BOS DET SFN TEX TOR WAS ATL CHA NYA SFN MIN BAL
## [1225] PHI ATL LAN MIL PIT MIN CHA TOR BAL DET CHA CIN WAS LAA BAL MIL TBA CHN
## [1243] BOS BAL ARI LAN SEA SEA OAK COL NYA WAS NYN CIN TOR COL SFN MIL NYA ARI
## [1261] SLN CHA ARI LAA NYA SLN MIA MIA WAS LAA ATL CIN HOU BAL LAA KCA CHA SFN
## [1279] MIN KCA BOS MIA NYN NYN TOR HOU CHA TBA TOR SFN TOR PIT DET OAK TBA SFN
## [1297] TBA ATL ATL MIL TOR KCA WAS CHA MIL ATL SLN WAS ARI TBA SEA SDN KCA HOU
## [1315] TEX PIT SDN TBA NYA HOU MIA CIN CIN WAS LAN ATL ARI DET BAL MIN SDN COL
## [1333] KCA SDN MIA WAS SFN HOU SFN LAN TOR CHN DET SFN CIN PHI TBA WAS BAL MIL
## [1351] SEA ATL ATL NYN TOR BOS NYN SDN PIT NYA COL NYA COL CLE OAK LAN WAS MIA
## [1369] LAA ATL MIA TOR TOR MIL PHI OAK CHA BOS BAL CHA TEX LAN CLE SFN WAS NYA
## [1387] KCA NYA ATL CIN TOR BOS OAK TEX OAK OAK LAA LAA BAL CHN HOU ATL CIN ATL
## [1405] SLN SEA DET MIA DET LAN WAS CHN LAA MIA TOR LAN SDN TOR LAN COL LAA HOU
## [1423] SFN BAL PHI LAN BAL ARI NYN MIN COL KCA BOS PHI TBA BOS LAN TBA ATL LAN
## [1441] DET HOU CHA BAL SDN MIL BAL KCA SEA SEA ATL SEA SLN NYA CHA WAS CIN SLN
## [1459] NYA NYN SLN BOS PHI ARI NYA ARI MIA LAA NYA SEA SFN SLN SDN SLN TBA CHN
## [1477] CIN OAK TBA SEA NYN HOU ATL SDN SDN WAS MIL BAL WAS TBA CIN SFN PHI MIL
## [1495] PIT DET MIN ATL CHN SDN CIN ATL SLN ATL CIN MIA COL SLN LAN LAA TBA MIL
## [1513] BOS NYN ATL BAL BOS BAL BAL TBA SDN MIL LAA LAA CHN MIL NYN CHN MIA ARI
## [1531] CLE DET WAS CHN SEA
## 30 Levels: ARI ATL BAL BOS CHA CHN CIN CLE COL DET HOU KCA LAA LAN MIA ... WAS
```

Q7

```
my_row <- function(x) {
  matrix <- matrix(x, nrow = nrow(x), ncol = ncol(x))
  for (elmt in seq_along(x)) {
#    if()
  }
}
```

Q8