

ECON 673 Assignment 1

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1 Question 1 Matrix Manipulation

1.1 Question (A)

```
makeTeam <- function(data, team)
{
  team <- match.arg(team, unique(data[, "Home"]))
  which <- data[, "Home"] == team | data[, "Away"] == team
  obj <- data[which,]
  chk <- obj[, "Period"] %in% c(1:4, "OT", "SO")
  obj <- obj[chk,]
  obj[obj[, "Period"] == "4", "Period"] <- "OT"
  class(obj) <- "team"
  attr(obj, "team") <- team
  obj
}

Boston <- makeTeam(res, "BOSTON BRUINS")

print.team <- function(teamname, print=TRUE){
  games.played <- length(unique(teamname[, 1]))
  years.played <- length(as.numeric(unique(strtrim(teamname[, 1], 4))))
  game.year <- as.numeric(unique(strtrim(teamname[, 1], 4))-1)
  team_name <- attr(teamname, "team")
  if (print)
    cat("    Goal Data for: ", team_name, "\n",
        "*****", "\n",
        "\n",
        " Games Played: ", games.played, "\n",
        " Seasons: ", game.year[1], "-", game.year[2], "to",
        game.year[years.played], "-", game.year[years.played]+1
        )
}

Boston.print <- print.team(Boston, print=TRUE)
```

1.2 Question (B)

```
bostonplot <- c()
plot <- function(teamname){
  team_name <- attr(teamname,"team")
  for (i in 1:length(teamname[,6])) {
    if(team[,6][i]=="1" & teamname[,7][i]==team_name){
      bostonplot <- c("1",bostonplot)
    }
  }
  for (i in 1:length(teamname[,6])) {
    if(team[,6][i]=="2" & teamname[,7][i]==team_name){
      bostonplot <- c("2",bostonplot)
    }
  }
  for (i in 1:length(teamname[,6])) {
    if(team[,6][i]=="3" & teamname[,7][i]==team_name){
      bostonplot <- c("3",bostonplot)
    }
  }
  for (i in 1:length(teamname[,6])) {
    if(team[,6][i]=="OT" & teamname[,7][i]==team_name){
      bostonplot <- c("OT",bostonplot)
    }
  }
  for (i in 1:length(teamname[,6])) {
    if(team[,6][i]=="SO" & teamname[,7][i]==team_name){
      bostonplot <- c("SO",bostonplot)
    }
  }
}

barplot(bostonplot, main="Goals per periods: BOSTON BRUINS", team_name)
}
```

1.3 Question (C)

```
Montreal <- makeTeam(res, "MONTREAL")
n <- c()
m <- c()
compare <- function(team1, team2){
  team.1 <- attr(team1, "team")
  team.2 <- attr(team2, "team")
  for (i in 1:length(team1[,7])) {
    if(team1[,7][i] == team.1){
      n <- c(n, as.numeric(strtrim(team1[,1][i],4)))
    }
  }
  for (i in 1:length(team2[,7])) {
    if(team2[,7][i] == team.2){
      m <- c(m, as.numeric(strtrim(team2[,1][i],4)))
    }
  }
  plot(table(n), type = "b", col = "blue",
        main="Goals Per Season", xlab="Season", ylab="Goals",ylim=c(120,280))
  lines(table(m), type = "b", col = "red")
  legend("topright", c(team.1, team.2),
        lty = c(1,1),
        col = c("blue", "red"))
}
compare(Boston, Montreal)
```

1.4 Question D

```
numWin <- function(team, season){
  back <- as.numeric(strtrim(season,4))+1
  gameid <- unique(subset(team[, "Game_id"], strtrim(team[, "Game_id"], 4)==back))
  isWin <- function(g, team){
    a <- sum(team[, "Goal_Team"]==attr(team, "team")&team[, "Game_id"]==g)
    b <- sum(!team[, "Goal_Team"]==attr(team, "team")&team[, "Game_id"]==g)
    if (a>b){
      return(TRUE)
    }
    else if (a<=b){
      return(FALSE)}
  }
  wins <- rep(0,length(gameid))
  i <- 1
  for (g in gameid) {
    wins[i]=isWin(g,team)
    i <- 1+i
  }
  x <- c(sum(wins), length(gameid))
  names(x) <- c("wins", "gamesplayed")
  x
}
```

1.5 Question E

```
getAllWins <- function(team){
  year <- as.numeric(unique(strtrim(team[, "Game_id"], 4)))
  season <- paste(year-1, "-", year, sep = "")
  x <- rbind(rep(0, length(season)), rep(0, length(season)))
  i <- 1
  for (s in season) {
    x[,i] <- numWin(team,s)
    i <- i+1
  }
  rownames(x) <- paste(c("wins", "gameplayed"))
  colnames(x) <- paste(season)
  x
}

atable <- function(team1, team2, team3){
  library(xtable)
  matrix <- cbind(getAllWins(team1)[1,], getAllWins(team2)[1,],
                  getAllWins(team3)[1,])
  colnames(matrix) <- paste(c(attr(team1, "team"), attr(team2, "team"),
                              attr(team3, "team")))
  xtable(matrix, digits=0)
}

Pittsburgh <- makeTeam(res, "PITTSBURGH")
atable(Montreal, Boston, Pittsburgh)
```

1.6 Question F

```
summary <- function(team){  
  print.team(team)  
  ratio <- getAllWins(team)[1,]/getAllWins(team)[2,]  
  b <- as.matrix(ratio)  
  rownames(b) <- paste(colnames(getAllWins(team)))  
  season.min <- rownames(unique(subset(b,b[,1]==min(b[,1]))))  
  season.max <- rownames(unique(subset(b,b[,1]==max(b[,1]))))  
  min <- min(ratio)  
  max <- max(ratio)  
  options(digits=2)  
  cat("The Best Season is ", season.max, "with a ratio wins to games played of",  
      max,"\n")  
  cat("The Workst Season is ", season.min, "with a ratio wins to games played of",  
      min,"\n")  
}  
summary(Montreal)  
summary(Boston)
```