Homework 3 Solutions

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i.

```
nets1617 <- readLines("NetsSchedule.html")
```

The number of lines in the file corresponds to the length of the vector *nets1617*.

```
length(nets1617)
```

```
## [1] 811
```

I can find the number of characters in each line of the file by running *nchar(nets1617)* since *nchar()* vectorizes. This will return a vector of length 9306 with each element telling the number of characters in the corresponding line of the file. Then we can take a sum of these values to give the total number of characters.

```
sum(nchar(nets1617))
```

```
## [1] 127835
```

Finally, I can use the *max()* command, with *nchar(nets1617)* as its input, to find the maximum number of characters in any line of the code.

```
max(nchar(nets1617))
```

```
## [1] 7211
```

  ii. In the first game of the regular season, the Nets are playing the Boston Celtics in Boston on Wednesday, October 26 at 7:30PM. In the last game of the season, the Nets are playing the Chicago Bulls in Chicago on Wednesday, April 12 at 8:00PM.

  iii. The 315th line corresponds to the first game of the regular season and the 396th line corresponds to the last game of the regular season.

  iv. I use a regular expression to search for a capital letter, followed by two lowercase letters, a comma, a space, a capital letter, two lowercase letters, a space, and then one or more digits. This regular expression is found in *date_exp*. Then I use *grep()* to search *nets1617* for lines with dates in them. These lines are stored in *game.lines*. Looking at the first and last values of *game.lines* I see information on the first and last games.

```
date_exp <- "[A-Z][a-z]{2},\\s[A-Z][a-z]{2}\\s[0-9]+"
game.lines <- grep(date_exp, nets1617)
nets1617[game.lines[1]]
```

```
## [1] "\t\t\t\t<div class=\"mod-page-tabs mod-thirdnav-tabs\" style=\"padding-top: 3px;\"><u
l class=\"ui-tabs\"><li class=\"shiftleft\"><a href=\"//www.espn.com/nba/team/schedule/_/nam
e/bkn/\">Preseason</a></li><li class=\"active\"><a href=\"//www.espn.com/nba/team/schedule/_/n
ame/bkn/seasontype/2\">Regular</a></li></ul></div><div class=\"mod-container mod-table mod-no
-header-footer\"><div class=\"mod-content\"><table cellspacing=\"1\" cellpadding=\"3\" class=
\"tablehead\"><tr class=\"stathead\"><td colspan=\"9\">2017 Regular Season Schedule</td></tr>
<tr class=\"colhead\"><td>OCTOBER</td><td>OPPONENT</td><td>TIME (ET)</td><td style=\"text-ali
gn:center;\">TV</td><td colspan=\"4\">TICKETS</td></tr><tr class=\"oddrow team-46-2\"><td>We
d, Oct 26</td><td><ul class=\"game-schedule\"><li class=\"game-status\">@</li><li class=\"tea
m-logo-small logo-nba-small\"><a href=\"http://www.espn.com/nba/team/_/name/bos/boston-celtic
s\"><img src=\"http://a.espncdn.com/combiner/i?img=/i/teamlogos/nba/500/scoreboard/Bos.png&h=
80&w=80\"></a></li><li class=\"team-name\"><a href=\"http://www.espn.com/nba/team/_/name/bos/
boston-celtics\">Boston</a></li></ul></td><td>7:30 PM</td><td style=\"text-align:center;\">&n
bsp;</td>"
```

```
nets1617[game.lines[length(game.lines)]]
```

```
## [1] "<td colspan=\"4\"><a href=\"http://www.stubhub.com/boston-celtics-tickets-boston-celt
ics-boston-td-garden-4-10-2017/event/9640702/?gcid=C12289x471&keyword=NBA+Team+Schedule+Bosto
n+Celtics+20170410\">2,739 available from $31</a></td></tr><tr class=\"oddrow team-46-4\"><td
>Wed, Apr 12</td><td><ul class=\"game-schedule\"><li class=\"game-status\">@</li><li class=
\"team-logo-small logo-nba-small\"><a href=\"http://www.espn.com/nba/team/_/name/chi/chicago-
bulls\"><img src=\"http://a.espncdn.com/combiner/i?img=/i/teamlogos/nba/500/scoreboard/Chi.pn
g&h=80&w=80\"></a></li><li class=\"team-name\"><a href=\"http://www.espn.com/nba/team/_/name/
chi/chicago-bulls\">Chicago</a></li></ul></td><td>8:00 PM</td><td style=\"text-align:cente
r;\"> </td>"
```

v. *gregexpr()* returns the starting locations and the lengths of each of the game dates, then we can actually extract the information using *regmatches()*. Since the output of *regmatches()* is a list, we use the *unlist()* command to turn it into a vector.

```
date.locations <- gregexpr(date_exp, nets1617[game.lines])
date <- regmatches(nets1617[game.lines], date.locations)
date <- unlist(date)
```

vi. Extracting the game times is similar to extracting the dates, but now my regular expression searches for one or more digits followed by a colon, 2 digits, a space, and then either AM or PM.

```
time_exp <- "[0-9]+:[0-9]{2} (PM|AM)"
time.locations <- gregexpr(time_exp, nets1617[game.lines])
time <- regmatches(nets1617[game.lines], time.locations)
time <- unlist(time)
```

vii. In my solution, I use the fact that in each line, the string appears before the home or away information. So my regular expression searches for followed by '@' or followed by 'vs'. As in part (v) and (vi) I use *gregexpr()* and *regmatches()* to actually extract the strings which match the regular expression. Since these strings include before '@' or 'vs', I then use the *substr()* command just the '@' or the 'vs'. Finally, I create the *home* vector from this information.

```
away_exp <- "<li class=\"game-status\">@|<li class=\"game-status\">vs"
away.locations <- gregexpr(away_exp, nets1617[game.lines])
away <- regmatches(nets1617[game.lines], away.locations)
away <- substr(away, 25, nchar(away))
home <- rep(1, length(away))
home[away == "@"] <- 0
```

viii. In my solution, I use the fact that in each line, the string appears before the opponent and afterwards. So my regular expression searches for followed by anything inside '<' and '>', letters or space, and . *gregexpr()* and *regmatches()* are used to actually extract the strings which match the regular expression. Since these strings include extra information, I use another regular expression to search for the opponent's name recognizing that this will take the form of letters or spaces coming after '>' and before '<'. Finally, we extract just the opponent names using *substr()*.

```
opponent_exp <- "<li class=\"team-name\"><.+>([a-zA-Z]|\\s)+</a>"
opponent.locations <- gregexpr(opponent_exp, nets1617[game.lines])
opponent <- regmatches(nets1617[game.lines], opponent.locations)
opponent <- unlist(opponent)

name_exp <- ">([a-zA-Z]|\\s)+<"
name.locations <- gregexpr(name_exp, opponent)
name <- regmatches(opponent, name.locations)
opponent <- substr(name, 2, nchar(name)-1)
```

ix.

```
schedule <- data.frame(date, time, opponent, home)
schedule[1:10,]
```

```
##            date      time   opponent home
## 1   Wed, Oct 26  7:30 PM     Boston    0
## 2   Fri, Oct 28  7:30 PM    Indiana    1
## 3   Sat, Oct 29  8:00 PM  Milwaukee    0
## 4   Mon, Oct 31  7:30 PM    Chicago    1
## 5    Wed, Nov 2  7:30 PM    Detroit    1
## 6    Fri, Nov 4  7:30 PM  Charlotte    1
## 7    Tue, Nov 8  7:30 PM  Minnesota    1
## 8    Wed, Nov 9  7:00 PM   NY Knicks   0
## 9   Sat, Nov 12  9:00 PM    Phoenix    0
## 10 Mon, Nov 14 10:30 PM          LA    0
```