Project 1

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In this project, you're given a text file with chess tournament results where the information has some structure. Your job is to create an R Markdown file that generates a .CSV file (that could for example be imported into a SQL database) with the following information for all of the players: Player's Name, Player's State, Total Number of Points, Player's Pre-Rating, and Average Pre Chess Rating of Opponents For the first player, the information would be: Gary Hua, ON, 6.0, 1794, 1605 1605 was calculated by using the pre-tournament opponents' ratings of 1436, 1563, 1600, 1610, 1649, 1663, 1716, and dividing by the total number of games played.
The chess rating system (invented by a Minnesota statistician named Arpad Elo) has been used in many other contexts, including assessing relative strength of employment candidates by human resource departments.

Loading the data from the tournament file

```
library(stringr)

chess_dataset <- readLines("https://raw.githubusercontent.com/theoracley/Data607/master/Project1/tournar

#chess_dataset <- readLines("./tournamentinfo.txt")
head(chess_dataset)
```

```
## [1] "-----------------------------------------------------------------------------------------"
## [2] " Pair | Player Name                     |Total|Round|Round|Round|Round|Round|Round|Round| "
## [3] " Num  | USCF ID / Rtg (Pre->Post)       | Pts |  1  |  2  |  3  |  4  |  5  |  6  |  7  | "
## [4] "-----------------------------------------------------------------------------------------"
## [5] "    1 | GARY HUA                        |6.0  |W  39|W  21|W  18|W  14|W   7|D  12|D   4|"
## [6] "   ON | 15445895 / R: 1794   ->1817     |N:2  |W    |B    |W    |B    |W    |B    |W    |"
```

```
tail(chess_dataset)
```

```
## [1] "   63 | THOMAS JOSEPH HOSMER            |1.0  |L   2|L  48|D  49|L  43|L  45|H    |U    |"
## [2] "   MI | 15057092 / R: 1175   ->1125     |     |W    |B    |W    |B    |B    |     |     |"
## [3] "-----------------------------------------------------------------------------------------"
## [4] "   64 | BEN LI                          |1.0  |L  22|D  30|L  31|D  49|L  46|L  42|L  54|"
## [5] "   MI | 15006561 / R: 1163   ->1112     |     |B    |W    |W    |B    |W    |B    |B    |"
## [6] "-----------------------------------------------------------------------------------------"
```

Lets start cleaning our data by removing headers

```
chess_dataset_cleaned <- chess_dataset[-c(0:4)]
head(chess_dataset_cleaned, 15)
```

```
##  [1] "    1 | GARY HUA                        |6.0  |W  39|W  21|W  18|W  14|W   7|D  12|D   4|"
##  [2] "   ON | 15445895 / R: 1794   ->1817     |N:2  |W    |B    |W    |B    |W    |B    |W    |"
```

```
##  [3] "-----------------------------------------------------------------------------------------"
##  [4] "    2 | DAKSHESH DARURI                 |6.0  |W  63|W  58|L   4|W  17|W  16|W  20|W   7|"
##  [5] "   MI | 14598900 / R: 1553   ->1663     |N:2  |B    |W    |B    |W    |B    |W    |B    |"
##  [6] "-----------------------------------------------------------------------------------------"
##  [7] "    3 | ADITYA BAJAJ                    |6.0  |L   8|W  61|W  25|W  21|W  11|W  13|W  12|"
##  [8] "   MI | 14959604 / R: 1384   ->1640     |N:2  |W    |B    |W    |B    |W    |B    |W    |"
##  [9] "-----------------------------------------------------------------------------------------"
## [10] "    4 | PATRICK H SCHILLING             |5.5  |W  23|D  28|W   2|W  26|D   5|W  19|D   1|"
## [11] "   MI | 12616049 / R: 1716   ->1744     |N:2  |W    |B    |W    |B    |W    |B    |B    |"
## [12] "-----------------------------------------------------------------------------------------"
## [13] "    5 | HANSHI ZUO                      |5.5  |W  45|W  37|D  12|D  13|D   4|W  14|W  17|"
## [14] "   MI | 14601533 / R: 1655   ->1690     |N:2  |B    |W    |B    |W    |B    |W    |B    |"
## [15] "-----------------------------------------------------------------------------------------"
```

then trim the characters

```
chess_dataset_cleaned <- chess_dataset_cleaned[sapply(chess_dataset_cleaned, nchar) > 0]
head(chess_dataset_cleaned)
```

```
## [1] "    1 | GARY HUA                       |6.0  |W  39|W  21|W  18|W  14|W   7|D  12|D   4|"
## [2] "   ON | 15445895 / R: 1794   ->1817     |N:2  |W    |B    |W    |B    |W    |B    |W    |"
## [3] "-----------------------------------------------------------------------------------------"
## [4] "    2 | DAKSHESH DARURI                 |6.0  |W  63|W  58|L   4|W  17|W  16|W  20|W   7|"
## [5] "   MI | 14598900 / R: 1553   ->1663     |N:2  |B    |W    |B    |W    |B    |W    |B    |"
## [6] "-----------------------------------------------------------------------------------------"
```

then extract the rows (starting from 1) that have names in them into a vector. We use seq() which return those rows numbers. We skip by 3 each time.

```
ourSeq_rows <- c(seq(1, length(chess_dataset_cleaned), 3))
ourSeq_rows
```

```
##  [1]   1   4   7  10  13  16  19  22  25  28  31  34  37  40  43  46  49
## [18]  52  55  58  61  64  67  70  73  76  79  82  85  88  91  94  97 100
## [35] 103 106 109 112 115 118 121 124 127 130 133 136 139 142 145 148 151
## [52] 154 157 160 163 166 169 172 175 178 181 184 187 190
```

get the data corresponding to those rows

```
ourSeq_data <- chess_dataset_cleaned[ourSeq_rows]
head(ourSeq_data)
```

```
## [1] "    1 | GARY HUA                       |6.0  |W  39|W  21|W  18|W  14|W   7|D  12|D   4|"
## [2] "    2 | DAKSHESH DARURI                 |6.0  |W  63|W  58|L   4|W  17|W  16|W  20|W   7|"
## [3] "    3 | ADITYA BAJAJ                    |6.0  |L   8|W  61|W  25|W  21|W  11|W  13|W  12|"
## [4] "    4 | PATRICK H SCHILLING             |5.5  |W  23|D  28|W   2|W  26|D   5|W  19|D   1|"
## [5] "    5 | HANSHI ZUO                      |5.5  |W  45|W  37|D  12|D  13|D   4|W  14|W  17|"
## [6] "    6 | HANSEN SONG                     |5.0  |W  34|D  29|L  11|W  35|D  10|W  27|W  21|"
```

Let's extract the names using regular expression

```
names <- str_extract(ourSeq_data, "[[:alpha:]]{2,}([[:blank:]][[:alpha:]]{1,}){1,}")
head(names)
```

```
## [1] "GARY HUA"            "DAKSHESH DARURI"     "ADITYA BAJAJ"
## [4] "PATRICK H SCHILLING" "HANSHI ZUO"          "HANSEN SONG"
```

Let's extract the rows numbers into a vector starting from row 2 and skipping 3

```
ourseq2 <- c(seq(2, length(chess_dataset_cleaned), 3))
ourseq2
```

```
##  [1]   2   5   8  11  14  17  20  23  26  29  32  35  38  41  44  47  50
## [18]  53  56  59  62  65  68  71  74  77  80  83  86  89  92  95  98 101
## [35] 104 107 110 113 116 119 122 125 128 131 134 137 140 143 146 149 152
## [52] 155 158 161 164 167 170 173 176 179 182 185 188 191
```

get the data corresponding to those rows

```
ourSeq2_data <- chess_dataset_cleaned[ourseq2]
head(ourSeq2_data)
```

```
## [1] "   ON | 15445895 / R: 1794   ->1817     |N:2  |W    |B    |W    |B    |W    |B    |W    |"
## [2] "   MI | 14598900 / R: 1553   ->1663     |N:2  |B    |W    |B    |W    |B    |W    |B    |"
## [3] "   MI | 14959604 / R: 1384   ->1640     |N:2  |W    |B    |W    |B    |W    |B    |W    |"
## [4] "   MI | 12616049 / R: 1716   ->1744     |N:2  |W    |B    |W    |B    |W    |B    |B    |"
## [5] "   MI | 14601533 / R: 1655   ->1690     |N:2  |B    |W    |B    |W    |B    |W    |B    |"
## [6] "   OH | 15055204 / R: 1686   ->1687     |N:3  |W    |B    |W    |B    |B    |W    |B    |"
```

Let's extract the states

```
states <- str_extract(ourSeq2_data, "[[:alpha:]]{2}")
states
```

```
##  [1] "ON" "MI" "MI" "MI" "MI" "OH" "MI" "MI" "ON" "MI" "MI" "MI" "MI" "MI"
## [15] "MI" "MI" "MI" "MI" "MI" "MI" "ON" "MI" "ON" "MI" "MI" "ON" "MI" "MI"
## [29] "MI" "ON" "MI" "ON" "MI" "MI" "MI" "MI" "MI" "MI" "MI" "MI" "MI" "MI"
## [43] "MI" "MI" "MI" "MI" "MI" "MI" "MI" "MI" "MI" "MI" "MI" "MI" "MI" "MI"
## [57] "MI" "MI" "MI" "MI" "ON" "MI" "MI" "MI"
```

Let's extract the points from ourSeq_data

```
thepoints <- str_extract(ourSeq_data, "[[:digit:]]+\\.[[:digit:]]")
thepoints <- as.numeric(as.character(thepoints))
thepoints
```

```
##  [1] 6.0 6.0 6.0 5.5 5.5 5.0 5.0 5.0 5.0 5.0 4.5 4.5 4.5 4.5 4.5 4.0 4.0
## [18] 4.0 4.0 4.0 4.0 4.0 4.0 4.0 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5
## [35] 3.5 3.5 3.5 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 2.5 2.5 2.5 2.5 2.5
## [52] 2.5 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 1.5 1.5 1.0 1.0 1.0
```

Let's extract the pre-rating from ourSeq2_data

```
pre_ratings <- str_extract(ourSeq2_data, ".\\: \\s?[[:digit:]]{3,4}")
pre_ratings
```

```
##  [1] "R: 1794" "R: 1553" "R: 1384" "R: 1716" "R: 1655" "R: 1686" "R: 1649"
##  [8] "R: 1641" "R: 1411" "R: 1365" "R: 1712" "R: 1663" "R: 1666" "R: 1610"
## [15] "R: 1220" "R: 1604" "R: 1629" "R: 1600" "R: 1564" "R: 1595" "R: 1563"
## [22] "R: 1555" "R: 1363" "R: 1229" "R: 1745" "R: 1579" "R: 1552" "R: 1507"
## [29] "R: 1602" "R: 1522" "R: 1494" "R: 1441" "R: 1449" "R: 1399" "R: 1438"
## [36] "R: 1355" "R:  980" "R: 1423" "R: 1436" "R: 1348" "R: 1403" "R: 1332"
## [43] "R: 1283" "R: 1199" "R: 1242" "R:  377" "R: 1362" "R: 1382" "R: 1291"
## [50] "R: 1056" "R: 1011" "R:  935" "R: 1393" "R: 1270" "R: 1186" "R: 1153"
## [57] "R: 1092" "R:  917" "R:  853" "R:  967" "R:  955" "R: 1530" "R: 1175"
## [64] "R: 1163"
```

Let's extract the digits and convert them to numeric

```
pre_ratings <- as.numeric(str_extract(pre_ratings, "\\(?[0-9,.]+\\)?"))
pre_ratings
```

```
##  [1] 1794 1553 1384 1716 1655 1686 1649 1641 1411 1365 1712 1663 1666 1610
## [15] 1220 1604 1629 1600 1564 1595 1563 1555 1363 1229 1745 1579 1552 1507
## [29] 1602 1522 1494 1441 1449 1399 1438 1355  980 1423 1436 1348 1403 1332
## [43] 1283 1199 1242  377 1362 1382 1291 1056 1011  935 1393 1270 1186 1153
## [57] 1092  917  853  967  955 1530 1175 1163
```

Let's do the same for the opponent

```
opponent_numbers <- str_extract_all(ourSeq_data, "[[:digit:]]{1,2}\\|")
opponent_numbers <- str_extract_all(opponent_numbers, "[[:digit:]]{1,2}")
opponent_numbers <- lapply(opponent_numbers, as.numeric)
head(opponent_numbers)
```

```
## [[1]]
## [1] 39 21 18 14  7 12  4
##
## [[2]]
## [1] 63 58  4 17 16 20  7
##
## [[3]]
## [1]  8 61 25 21 11 13 12
##
## [[4]]
## [1] 23 28  2 26  5 19  1
##
## [[5]]
## [1] 45 37 12 13  4 14 17
##
## [[6]]
## [1] 34 29 11 35 10 27 21
```

What's the prerating average for our opponent?

```r
opponent_prerating_average <- list()

for (i in 1:length(opponent_numbers)){
  opponent_prerating_average[i] <- round(mean(pre_ratings[unlist(opponent_numbers[i])]),2)
}
opponent_prerating_average <- lapply(opponent_prerating_average, as.numeric)
opponent_prerating_average <- data.frame(unlist(opponent_prerating_average))

ourFinalTable <- cbind.data.frame(names, states, thepoints, pre_ratings, opponent_prerating_average)
colnames(ourFinalTable) <- c("Player_Name", "Player_State", "Player_Points", "Player_Pre_Rating", "Oppo
ourFinalTable
```

```
##                 Player_Name Player_State Player_Points Player_Pre_Rating
## 1                   GARY HUA           ON           6.0               1794
## 2            DAKSHESH DARURI           MI           6.0               1553
## 3               ADITYA BAJAJ           MI           6.0               1384
## 4         PATRICK H SCHILLING           MI           5.5               1716
## 5                 HANSHI ZUO           MI           5.5               1655
## 6                HANSEN SONG           OH           5.0               1686
## 7          GARY DEE SWATHELL           MI           5.0               1649
## 8           EZEKIEL HOUGHTON           MI           5.0               1641
## 9                 STEFANO LEE           ON           5.0               1411
## 10                  ANVIT RAO           MI           5.0               1365
## 11 CAMERON WILLIAM MC LEMAN           MI           4.5               1712
## 12            KENNETH J TACK           MI           4.5               1663
## 13         TORRANCE HENRY JR           MI           4.5               1666
## 14              BRADLEY SHAW           MI           4.5               1610
## 15   ZACHARY JAMES HOUGHTON           MI           4.5               1220
## 16              MIKE NIKITIN           MI           4.0               1604
## 17        RONALD GRZEGORCZYK           MI           4.0               1629
## 18             DAVID SUNDEEN           MI           4.0               1600
## 19              DIPANKAR ROY           MI           4.0               1564
## 20               JASON ZHENG           MI           4.0               1595
## 21             DINH DANG BUI           ON           4.0               1563
## 22          EUGENE L MCCLURE           MI           4.0               1555
## 23                 ALAN BUI           ON           4.0               1363
## 24         MICHAEL R ALDRICH           MI           4.0               1229
## 25          LOREN SCHWIEBERT           MI           3.5               1745
## 26                   MAX ZHU           ON           3.5               1579
## 27            GAURAV GIDWANI           MI           3.5               1552
## 28     SOFIA ADINA STANESCU           MI           3.5               1507
## 29          CHIEDOZIE OKORIE           MI           3.5               1602
## 30        GEORGE AVERY JONES           ON           3.5               1522
## 31              RISHI SHETTY           MI           3.5               1494
## 32    JOSHUA PHILIP MATHEWS           ON           3.5               1441
## 33                  JADE GE           MI           3.5               1449
## 34   MICHAEL JEFFERY THOMAS           MI           3.5               1399
## 35         JOSHUA DAVID LEE           MI           3.5               1438
## 36            SIDDHARTH JHA           MI           3.5               1355
## 37     AMIYATOSH PWNANANDAM           MI           3.5                980
## 38                BRIAN LIU           MI           3.0               1423
## 39            JOEL R HENDON           MI           3.0               1436
## 40             FOREST ZHANG           MI           3.0               1348
```

```
## 41      KYLE WILLIAM MURPHY          MI          3.0              1403
## 42                   JARED GE          MI          3.0              1332
## 43         ROBERT GLEN VASEY          MI          3.0              1283
## 44        JUSTIN D SCHILLING          MI          3.0              1199
## 45                 DEREK YAN          MI          3.0              1242
## 46 JACOB ALEXANDER LAVALLEY           MI          3.0               377
## 47               ERIC WRIGHT          MI          2.5              1362
## 48              DANIEL KHAIN          MI          2.5              1382
## 49          MICHAEL J MARTIN          MI          2.5              1291
## 50                SHIVAM JHA          MI          2.5              1056
## 51           TEJAS AYYAGARI           MI          2.5              1011
## 52                ETHAN GUO          MI          2.5               935
## 53            JOSE C YBARRA          MI          2.0              1393
## 54              LARRY HODGE          MI          2.0              1270
## 55                ALEX KONG          MI          2.0              1186
## 56             MARISA RICCI          MI          2.0              1153
## 57               MICHAEL LU          MI          2.0              1092
## 58             VIRAJ MOHILE          MI          2.0               917
## 59         SEAN M MC CORMICK         MI          2.0               853
## 60                JULIA SHEN          MI          1.5               967
## 61            JEZZEL FARKAS          ON          1.5               955
## 62            ASHWIN BALAJI          MI          1.0              1530
## 63     THOMAS JOSEPH HOSMER          MI          1.0              1175
## 64                    BEN LI          MI          1.0              1163
##    Opponent_Pre_Rating_AVG
## 1                  1605.29
## 2                  1469.29
## 3                  1563.57
## 4                  1573.57
## 5                  1500.86
## 6                  1518.71
## 7                  1372.14
## 8                  1468.43
## 9                  1523.14
## 10                 1554.14
## 11                 1467.57
## 12                 1506.17
## 13                 1497.86
## 14                 1515.00
## 15                 1483.86
## 16                 1385.80
## 17                 1498.57
## 18                 1480.00
## 19                 1426.29
## 20                 1410.86
## 21                 1470.43
## 22                 1300.33
## 23                 1213.86
## 24                 1357.00
## 25                 1363.29
## 26                 1506.86
## 27                 1221.67
## 28                 1522.14
## 29                 1313.50
```

```
## 30                1144.14
## 31                1259.86
## 32                1378.71
## 33                1276.86
## 34                1375.29
## 35                1149.71
## 36                1388.17
## 37                1384.80
## 38                1539.17
## 39                1429.57
## 40                1390.57
## 41                1248.50
## 42                1149.86
## 43                1106.57
## 44                1327.00
## 45                1152.00
## 46                1357.71
## 47                1392.00
## 48                1355.80
## 49                1285.80
## 50                1296.00
## 51                1356.14
## 52                1494.57
## 53                1345.33
## 54                1206.17
## 55                1406.00
## 56                1414.40
## 57                1363.00
## 58                1391.00
## 59                1319.00
## 60                1330.20
## 61                1327.29
## 62                1186.00
## 63                1350.20
## 64                1263.00
```

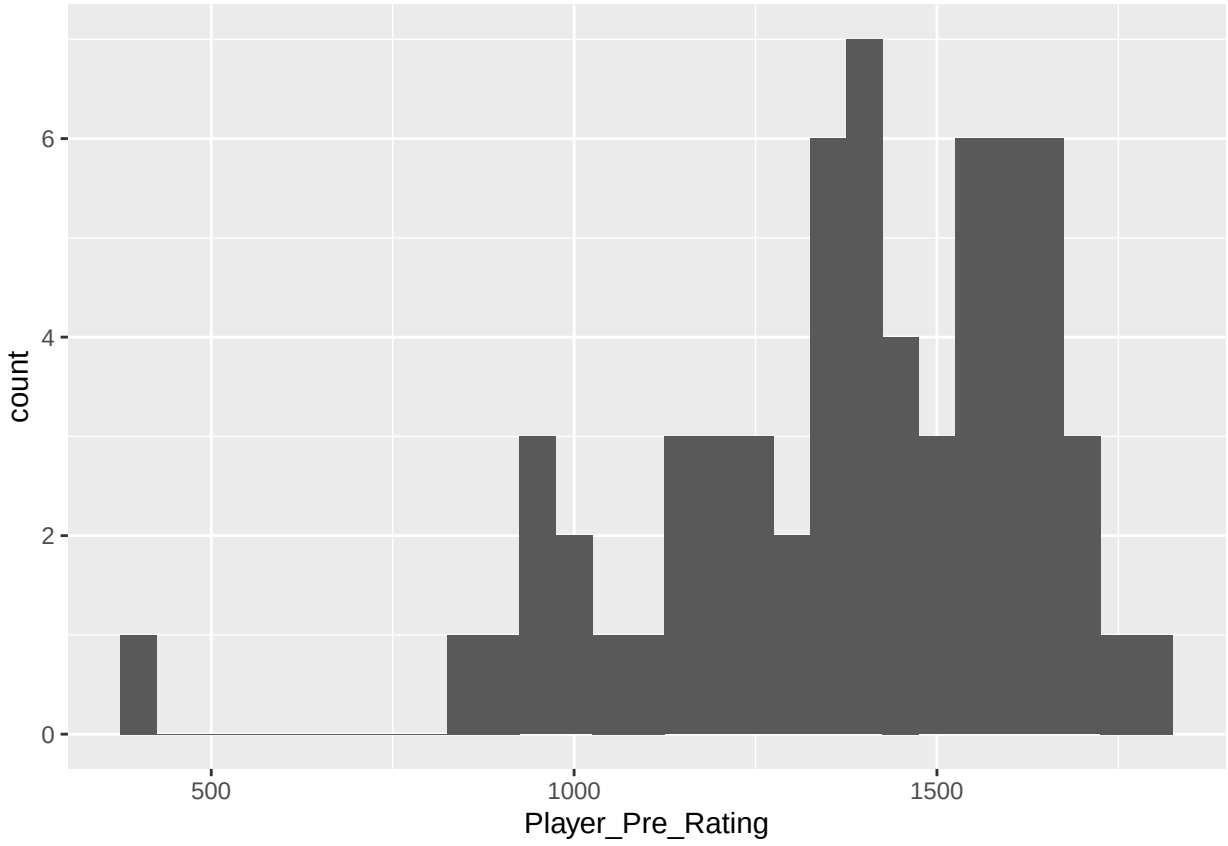
Write this result table to an output file

```
write.csv(ourFinalTable, "./Results.csv")
```

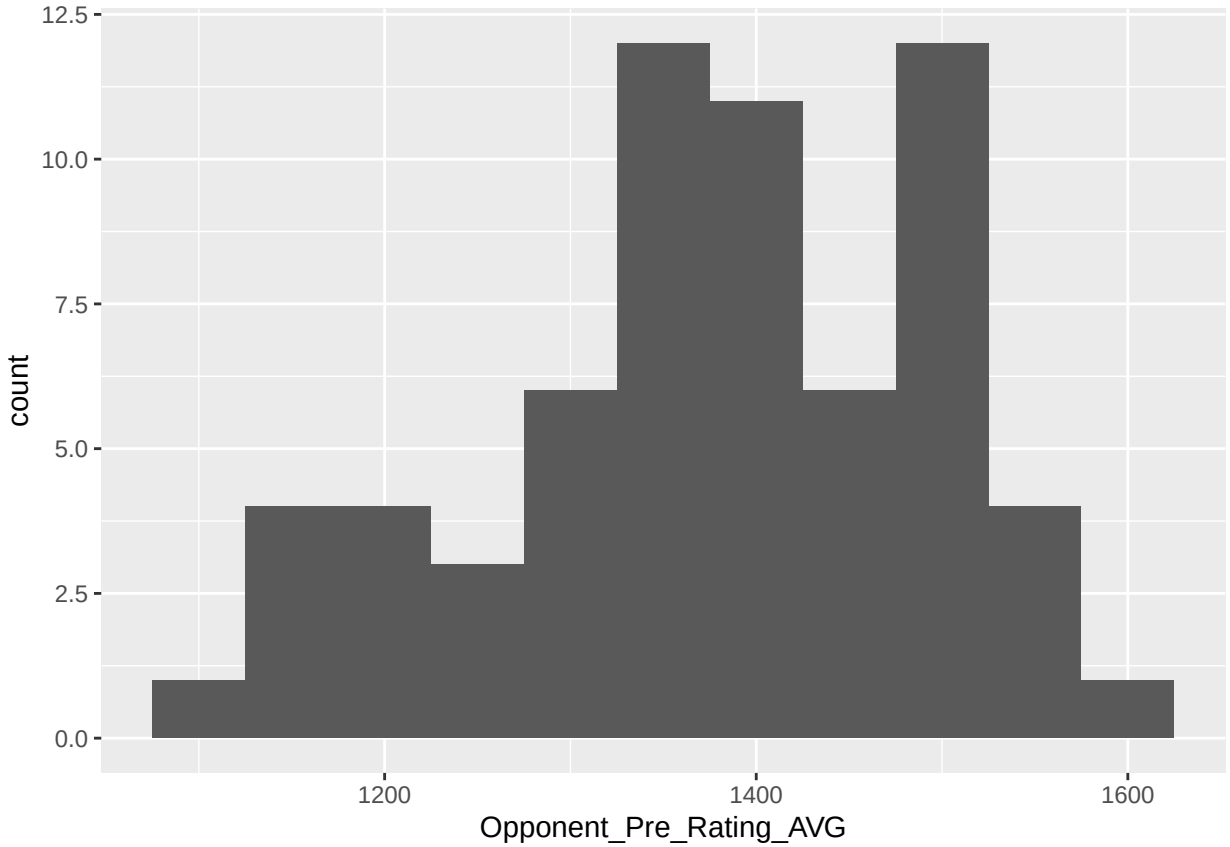
Let's Plot

```
library(ggplot2)

ggplot(ourFinalTable, aes(x=Player_Pre_Rating)) + geom_histogram(binwidth = 50)
```




```
ggplot(ourFinalTable, aes(x=Opponent_Pre_Rating_AVG)) + geom_histogram(binwidth = 50)
```


12.5
10.0
7.5
5.0
2.5
0.0
count
1200
1400
1600
Opponent_Pre_Rating_AVG