Project 1

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Chess Data.

```
project1_data <- read.table("https://raw.githubusercontent.com/mikegankhuyag/607-Projects/master/tournar
head(project1_data)
```

```
##                                                                                                  V1
## 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    |
```

```
library(stringr)
project1_data[1:10,]
```

```
##  [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    |"
##  [7] "----------------------------------------------------------------------------------------------"
##  [8] "    2 | DAKSHESH DARURI                 |6.0  |W  63|W  58|L   4|W  17|W  16|W  20|W   7|"
##  [9] "   MI | 14598900 / R: 1553   ->1663     |N:2  |B    |W    |B    |W    |B    |W    |B    |"
## [10] "----------------------------------------------------------------------------------------------"
```

The data for each player is in 2 lines, so I combined the first and second row of the player by finding the sequence for the lines.

```
Chess_Data <- paste (project1_data[seq(5,196,3),],project1_data[seq(6,196,3),1],sep = "")
seq
```

```
## function (...)
## UseMethod("seq")
## <bytecode: 0x0000000018e42eb8>
## <environment: namespace:base>
```

```
head(Chess_Data)
```

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

Where needed, I created seprators using the same '|' mark that the data uses. Also, I decided to input an "end" to mark where data becomes is irrelivant.

```
Chess_data1 <- str_replace_all(Chess_Data, pattern = "\\:\\S?","|")
str_sub(Chess_data1,130, 134) <- "|end"
str_sub(Chess_data1,119, 120) <- " |"
head(Chess_data1)
```

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

Using the | as a seperator, I created a table.

```
Chess_data2 <-read.table(text = Chess_data1, sep = "|")
head(Chess_data2)
```

```
##   V1                                V2  V3    V4    V5    V6    V7    V8
## 1  1  GARY HUA                       6.0 W  39 W  21 W  18 W  14 W   7
## 2  2  DAKSHESH DARURI                6.0 W  63 W  58 L   4 W  17 W  16
## 3  3  ADITYA BAJAJ                   6.0 L   8 W  61 W  25 W  21 W  11
## 4  4  PATRICK H SCHILLING            5.5 W  23 D  28 W   2 W  26 D   5
## 5  5  HANSHI ZUO                     5.5 W  45 W  37 D  12 D  13 D   4
## 6  6  HANSEN SONG                    5.0 W  34 D  29 L  11 W  35 D  10
##      V9   V10    V11           V12       V13       V14 V15   V16   V17
## 1 D  12 D   4    ON   15445895 / R  1794     1817      end W     B
## 2 W  20 W   7    MI   14598900 / R  1553     1663      end B     W
## 3 W  13 W  12    MI   14959604 / R  1384     1640      end W     B
## 4 W  19 D   1    MI   12616049 / R  1716     1744      end W     B
## 5 W  14 W  17    MI   14601533 / R  1655     1690      end B     W
## 6 W  27 W  21    OH   15055204 / R  1686     1687      end W     B
##     V18   V19   V20   V21   V22 V23
## 1 W     B     W     B     W      NA
## 2 B     W     B     W     B      NA
## 3 W     B     W     B     W      NA
## 4 W     B     W     B     B      NA
## 5 B     W     B     W     B      NA
## 6 W     B     B     W     B      NA
```

Create a data frame out of the new table and name the columns.

```
chess_data3 <- data.frame(Chess_data2[,1:14])
colnames(chess_data3) <-c("ID","Player","Score","Game1","Game2","Game3","Game4","Game5","Game6","Game7"
```

```
chess_data3[1:10,]
```

```
##    ID                          Player Score Game1 Game2 Game3 Game4
## 1   1  GARY HUA                          6.0 W  39 W  21 W  18 W  14
## 2   2  DAKSHESH DARURI                   6.0 W  63 W  58 L   4 W  17
## 3   3  ADITYA BAJAJ                      6.0 L   8 W  61 W  25 W  21
## 4   4  PATRICK H SCHILLING               5.5 W  23 D  28 W   2 W  26
## 5   5  HANSHI ZUO                        5.5 W  45 W  37 D  12 D  13
## 6   6  HANSEN SONG                       5.0 W  34 D  29 L  11 W  35
## 7   7  GARY DEE SWATHELL                 5.0 W  57 W  46 W  13 W  11
## 8   8  EZEKIEL HOUGHTON                  5.0 W   3 W  32 L  14 L   9
## 9   9  STEFANO LEE                       5.0 W  25 L  18 W  59 W   8
## 10 10  ANVIT RAO                         5.0 D  16 L  19 W  55 W  31
##    Game5 Game6 Game7  State       USCF_ID Pre_Rating Post_Rating
## 1  W   7 D  12 D   4    ON   15445895 / R   1794       1817
## 2  W  16 W  20 W   7    MI   14598900 / R   1553       1663
## 3  W  11 W  13 W  12    MI   14959604 / R   1384       1640
## 4  D   5 W  19 D   1    MI   12616049 / R   1716       1744
## 5  D   4 W  14 W  17    MI   14601533 / R   1655       1690
## 6  D  10 W  27 W  21    OH   15055204 / R   1686       1687
## 7  L   1 W   9 L   2    MI   11146376 / R   1649       1673
## 8  W  47 W  28 W  19    MI   15142253 / R   1641P17    1657P24
## 9  W  26 L   7 W  20    ON   14954524 / R   1411       1564
## 10 D   6 W  25 W  18    MI   14150362 / R   1365       1544
```

Clean out the data frame.

```
chess_data3$USCF_ID <- unlist(str_extract_all(chess_data3$USCF_ID,"\\(?\\d{8}?"))
chess_data3$Pre_Rating <- substr(chess_data3$Pre_Rating, 1, 5)
chess_data3$Post_Rating <- substr(chess_data3$Post_Rating, 1, 4)

chess_data3[1:10,]
```

```
##    ID                          Player Score Game1 Game2 Game3 Game4
## 1   1  GARY HUA                          6.0 W  39 W  21 W  18 W  14
## 2   2  DAKSHESH DARURI                   6.0 W  63 W  58 L   4 W  17
## 3   3  ADITYA BAJAJ                      6.0 L   8 W  61 W  25 W  21
## 4   4  PATRICK H SCHILLING               5.5 W  23 D  28 W   2 W  26
## 5   5  HANSHI ZUO                        5.5 W  45 W  37 D  12 D  13
## 6   6  HANSEN SONG                       5.0 W  34 D  29 L  11 W  35
## 7   7  GARY DEE SWATHELL                 5.0 W  57 W  46 W  13 W  11
## 8   8  EZEKIEL HOUGHTON                  5.0 W   3 W  32 L  14 L   9
## 9   9  STEFANO LEE                       5.0 W  25 L  18 W  59 W   8
## 10 10  ANVIT RAO                         5.0 D  16 L  19 W  55 W  31
##    Game5 Game6 Game7  State  USCF_ID Pre_Rating Post_Rating
## 1  W   7 D  12 D   4    ON  15445895       1794        1817
## 2  W  16 W  20 W   7    MI  14598900       1553        1663
## 3  W  11 W  13 W  12    MI  14959604       1384        1640
## 4  D   5 W  19 D   1    MI  12616049       1716        1744
## 5  D   4 W  14 W  17    MI  14601533       1655        1690
## 6  D  10 W  27 W  21    OH  15055204       1686        1687
## 7  L   1 W   9 L   2    MI  11146376       1649        1673
```

```
## 8  W  47 W  28 W  19    MI  15142253       1641        1657
## 9  W  26 L   7 W  20    ON  14954524       1411        1564
## 10 D   6 W  25 W  18    MI  14150362       1365        1544
```

Create a new data frame with just the opponent number and not the outcome of the match

```
Chess_data_4 <- chess_data3

Chess_data_4$Game1 <- unlist((str_extract(Chess_data_4$Game1, "\\d+")))
Chess_data_4$Game2 <- unlist((str_extract(Chess_data_4$Game2, "\\d+")))
Chess_data_4$Game3 <- unlist((str_extract(Chess_data_4$Game3, "\\d+")))
Chess_data_4$Game4 <- unlist((str_extract(Chess_data_4$Game4, "\\d+")))
Chess_data_4$Game5 <- unlist((str_extract(Chess_data_4$Game5, "\\d+")))
Chess_data_4$Game6 <- unlist((str_extract(Chess_data_4$Game6, "\\d+")))
Chess_data_4$Game7 <- unlist((str_extract(Chess_data_4$Game7, "\\d+")))
head(Chess_data_4)
```

```
##   ID                          Player Score Game1 Game2 Game3 Game4 Game5
## 1  1  GARY HUA                          6.0    39    21    18    14     7
## 2  2  DAKSHESH DARURI                   6.0    63    58     4    17    16
## 3  3  ADITYA BAJAJ                      6.0     8    61    25    21    11
## 4  4  PATRICK H SCHILLING               5.5    23    28     2    26     5
## 5  5  HANSHI ZUO                        5.5    45    37    12    13     4
## 6  6  HANSEN SONG                       5.0    34    29    11    35    10
##   Game6 Game7  State  USCF_ID Pre_Rating Post_Rating
## 1    12     4    ON  15445895       1794        1817
## 2    20     7    MI  14598900       1553        1663
## 3    13    12    MI  14959604       1384        1640
## 4    19     1    MI  12616049       1716        1744
## 5    14    17    MI  14601533       1655        1690
## 6    27    21    OH  15055204       1686        1687
```

Create a matrix from the data frame of just the ID and the pre rank of the opponent.

```
Chess_data_Ranks <- matrix(c(Chess_data_4$ID, Chess_data_4$Pre_Rating), ncol = 2,nrow = 64)
colnames(Chess_data_Ranks) <- c("ID", "Pre_Rank")
Chess_data_Ranks <- data.frame(Chess_data_Ranks)

head(Chess_data_Ranks)
```

```
##   ID Pre_Rank
## 1  1     1794
## 2  2     1553
## 3  3     1384
## 4  4     1716
## 5  5     1655
## 6  6     1686
```

Match opponent ID with their Pre rank scores and create a new tablae with just opponents pre rank averages.

```
Chess_data_Ranks2 <- Chess_data_4

Chess_data_Ranks2$Game1 <- Chess_data_Ranks$Pre_Rank[ match(Chess_data_Ranks2$Game1, Chess_data_Ranks$I
Chess_data_Ranks2$Game2 <- Chess_data_Ranks$Pre_Rank[ match(Chess_data_Ranks2$Game2, Chess_data_Ranks$I
Chess_data_Ranks2$Game3 <- Chess_data_Ranks$Pre_Rank[ match(Chess_data_Ranks2$Game3, Chess_data_Ranks$I
Chess_data_Ranks2$Game4 <- Chess_data_Ranks$Pre_Rank[ match(Chess_data_Ranks2$Game4, Chess_data_Ranks$I
Chess_data_Ranks2$Game5 <- Chess_data_Ranks$Pre_Rank[ match(Chess_data_Ranks2$Game5, Chess_data_Ranks$I
Chess_data_Ranks2$Game6 <- Chess_data_Ranks$Pre_Rank[ match(Chess_data_Ranks2$Game6, Chess_data_Ranks$I
Chess_data_Ranks2$Game7 <- Chess_data_Ranks$Pre_Rank[ match(Chess_data_Ranks2$Game7, Chess_data_Ranks$I

head(Chess_data_Ranks2)
```

```
##   ID                          Player Score Game1 Game2 Game3 Game4 Game5
## 1  1  GARY HUA                         6.0  1436  1563  1600  1610  1649
## 2  2  DAKSHESH DARURI                  6.0  1175   917  1716  1629  1604
## 3  3  ADITYA BAJAJ                     6.0  1641   955  1745  1563  1712
## 4  4  PATRICK H SCHILLING              5.5  1363  1507  1553  1579  1655
## 5  5  HANSHI ZUO                       5.5  1242   980  1663  1666  1716
## 6  6  HANSEN SONG                      5.0  1399  1602  1712  1438  1365
##   Game6 Game7  State  USCF_ID Pre_Rating Post_Rating
## 1  1663  1716    ON  15445895       1794        1817
## 2  1595  1649    MI  14598900       1553        1663
## 3  1666  1663    MI  14959604       1384        1640
## 4  1564  1794    MI  12616049       1716        1744
## 5  1610  1629    MI  14601533       1655        1690
## 6  1552  1563    OH  15055204       1686        1687
```

Turn all values in the game to a numeric value to cacluclate new rank

```
Chess_data_Ranks2$Game1 <- as.numeric(as.character(Chess_data_Ranks2$Game1))
Chess_data_Ranks2$Game2 <- as.numeric(as.character(Chess_data_Ranks2$Game2))
Chess_data_Ranks2$Game3 <- as.numeric(as.character(Chess_data_Ranks2$Game3))
Chess_data_Ranks2$Game4 <- as.numeric(as.character(Chess_data_Ranks2$Game4))
Chess_data_Ranks2$Game5 <- as.numeric(as.character(Chess_data_Ranks2$Game5))
Chess_data_Ranks2$Game6 <- as.numeric(as.character(Chess_data_Ranks2$Game6))
Chess_data_Ranks2$Game7 <- as.numeric(as.character(Chess_data_Ranks2$Game7))
```

Create a new column calculating the

```
New_Rating <- round(rowMeans(Chess_data_Ranks2[,4:10],na.rm = TRUE),digits = 0)

Chess_data_Ranks2$New_Rating <- New_Rating

Chess_data_Ranks2[,c(1,2,13,15)]
```

```
##    ID                          Player Pre_Rating New_Rating
## 1   1  GARY HUA                            1794       1605
## 2   2  DAKSHESH DARURI                      1553       1469
## 3   3  ADITYA BAJAJ                         1384       1564
## 4   4  PATRICK H SCHILLING                  1716       1574
## 5   5  HANSHI ZUO                           1655       1501
## 6   6  HANSEN SONG                          1686       1519
## 7   7  GARY DEE SWATHELL                    1649       1372
## 8   8  EZEKIEL HOUGHTON                     1641       1468
## 9   9  STEFANO LEE                         1411       1523
## 10 10  ANVIT RAO                           1365       1554
## 11 11  CAMERON WILLIAM MC LEMAN            1712       1468
## 12 12  KENNETH J TACK                      1663       1506
## 13 13  TORRANCE HENRY JR                   1666       1498
## 14 14  BRADLEY SHAW                        1610       1515
## 15 15  ZACHARY JAMES HOUGHTON              1220       1484
## 16 16  MIKE NIKITIN                        1604       1386
## 17 17  RONALD GRZEGORCZYK                  1629       1499
## 18 18  DAVID SUNDEEN                       1600       1480
## 19 19  DIPANKAR ROY                        1564       1426
## 20 20  JASON ZHENG                         1595       1411
## 21 21  DINH DANG BUI                       1563       1470
## 22 22  EUGENE L MCCLURE                    1555       1300
## 23 23  ALAN BUI                            1363       1214
## 24 24  MICHAEL R ALDRICH                   1229       1357
## 25 25  LOREN SCHWIEBERT                    1745       1363
## 26 26  MAX ZHU                             1579       1507
## 27 27  GAURAV GIDWANI                      1552       1222
## 28 28  SOFIA ADINA STANESCU-BELLU          1507       1522
## 29 29  CHIEDOZIE OKORIE                    1602       1314
## 30 30  GEORGE AVERY JONES                  1522       1144
## 31 31  RISHI SHETTY                        1494       1260
## 32 32  JOSHUA PHILIP MATHEWS               1441       1379
## 33 33  JADE GE                             1449       1277
## 34 34  MICHAEL JEFFERY THOMAS              1399       1375
## 35 35  JOSHUA DAVID LEE                    1438       1150
## 36 36  SIDDHARTH JHA                       1355       1388
## 37 37  AMIYATOSH PWNANANDAM                 980       1385
## 38 38  BRIAN LIU                           1423       1539
## 39 39  JOEL R HENDON                       1436       1430
## 40 40  FOREST ZHANG                        1348       1391
## 41 41  KYLE WILLIAM MURPHY                 1403       1248
## 42 42  JARED GE                            1332       1150
## 43 43  ROBERT GLEN VASEY                   1283       1107
## 44 44  JUSTIN D SCHILLING                  1199       1327
## 45 45  DEREK YAN                           1242       1152
## 46 46  JACOB ALEXANDER LAVALLEY             377       1358
## 47 47  ERIC WRIGHT                         1362       1392
## 48 48  DANIEL KHAIN                        1382       1356
## 49 49  MICHAEL J MARTIN                    1291       1286
## 50 50  SHIVAM JHA                          1056       1296
## 51 51  TEJAS AYYAGARI                      1011       1356
## 52 52  ETHAN GUO                           935       1495
## 53 53  JOSE C YBARRA                       1393       1345
```

```
## 54 54  LARRY HODGE                          1270       1206
## 55 55  ALEX KONG                            1186       1406
## 56 56  MARISA RICCI                         1153       1414
## 57 57  MICHAEL LU                           1092       1363
## 58 58  VIRAJ MOHILE                          917       1391
## 59 59  SEAN M MC CORMICK                     853       1319
## 60 60  JULIA SHEN                            967       1330
## 61 61  JEZZEL FARKAS                         955       1327
## 62 62  ASHWIN BALAJI                        1530       1186
## 63 63  THOMAS JOSEPH HOSMER                 1175       1350
## 64 64  BEN LI                               1163       1263
```

```
Chess_data_Ranks2$Pre_Rating <- as.numeric(as.character(Chess_data_Ranks2$Pre_Rating))
Ranking_differences <- Chess_data_Ranks2$New_Rating -  Chess_data_Ranks2$Pre_Rating

Chess_data_Ranks2$Ranking_differences <- Ranking_differences

head(Chess_data_Ranks2)
```

```
##   ID                          Player Score Game1 Game2 Game3 Game4 Game5
## 1  1  GARY HUA                          6.0  1436  1563  1600  1610  1649
## 2  2  DAKSHESH DARURI                   6.0  1175   917  1716  1629  1604
## 3  3  ADITYA BAJAJ                      6.0  1641   955  1745  1563  1712
## 4  4  PATRICK H SCHILLING               5.5  1363  1507  1553  1579  1655
## 5  5  HANSHI ZUO                        5.5  1242   980  1663  1666  1716
## 6  6  HANSEN SONG                       5.0  1399  1602  1712  1438  1365
##   Game6 Game7  State  USCF_ID Pre_Rating Post_Rating New_Rating
## 1  1663  1716    ON  15445895       1794        1817       1605
## 2  1595  1649    MI  14598900       1553        1663       1469
## 3  1666  1663    MI  14959604       1384        1640       1564
## 4  1564  1794    MI  12616049       1716        1744       1574
## 5  1610  1629    MI  14601533       1655        1690       1501
## 6  1552  1563    OH  15055204       1686        1687       1519
##   Ranking_differences
## 1                -189
## 2                 -84
## 3                 180
## 4                -142
## 5                -154
## 6                -167
```

```
summary(Chess_data_Ranks2$Ranking_differences)
```

```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
## -382.000 -172.250  -68.000    0.125  139.750  981.000
```

```
Chess_data_Ranks2
```

```
##    ID                           Player Score Game1 Game2 Game3 Game4
## 1   1  GARY HUA                          6.0  1436  1563  1600  1610
## 2   2  DAKSHESH DARURI                   6.0  1175   917  1716  1629
## 3   3  ADITYA BAJAJ                      6.0  1641   955  1745  1563
## 4   4  PATRICK H SCHILLING               5.5  1363  1507  1553  1579
## 5   5  HANSHI ZUO                        5.5  1242   980  1663  1666
## 6   6  HANSEN SONG                       5.0  1399  1602  1712  1438
## 7   7  GARY DEE SWATHELL                 5.0  1092   377  1666  1712
```

```
## 8   8  EZEKIEL HOUGHTON                5.0  1384  1441  1610  1411
## 9   9  STEFANO LEE                      5.0  1745  1600   853  1641
## 10 10  ANVIT RAO                        5.0  1604  1564  1186  1494
## 11 11  CAMERON WILLIAM MC LEMAN         4.5  1423  1153  1686  1649
## 12 12  KENNETH J TACK                   4.5  1332  1449  1655  1423
## 13 13  TORRANCE HENRY JR                4.5  1355  1552  1649  1655
## 14 14  BRADLEY SHAW                     4.5  1270  1199  1641  1794
## 15 15  ZACHARY JAMES HOUGHTON           4.5  1564  1604  1522  1555
## 16 16  MIKE NIKITIN                     4.0  1365  1220    NA  1436
## 17 17  RONALD GRZEGORCZYK               4.0  1382  1403  1579  1553
## 18 18  DAVID SUNDEEN                    4.0  1362  1411  1794  1441
## 19 19  DIPANKAR ROY                     4.0  1220  1365   935  1507
## 20 20  JASON ZHENG                      4.0  1348  1291  1363  1403
## 21 21  DINH DANG BUI                    4.0  1283  1794  1362  1384
## 22 22  EUGENE L MCCLURE                 4.0  1163   935  1507  1220
## 23 23  ALAN BUI                         4.0  1716  1283  1595   917
## 24 24  MICHAEL R ALDRICH                4.0  1507  1362  1283  1745
## 25 25  LOREN SCHWIEBERT                 3.5  1411  1393  1384  1229
## 26 26  MAX ZHU                          3.5  1291  1348  1629  1716
## 27 27  GAURAV GIDWANI                   3.5  1011  1666   377   980
## 28 28  SOFIA ADINA STANESCU-BELLU       3.5  1229  1716  1555  1564
## 29 29  CHIEDOZIE OKORIE                 3.5  1056  1686  1423  1399
## 30 30  GEORGE AVERY JONES               3.5   935  1163  1220  1186
## 31 31  RISHI SHETTY                     3.5   917  1186  1163  1365
## 32 32  JOSHUA PHILIP MATHEWS            3.5   955  1641  1199  1600
## 33 33  JADE GE                          3.5   967  1663  1056  1355
## 34 34  MICHAEL JEFFERY THOMAS           3.5  1686   967   980  1602
## 35 35  JOSHUA DAVID LEE                 3.5   377  1423  1153  1686
## 36 36  SIDDHARTH JHA                    3.5  1666  1092  1011  1449
## 37 37  AMIYATOSH PWNANANDAM             3.5    NA  1655  1399  1552
## 38 38  BRIAN LIU                        3.0  1712  1438  1602  1663
## 39 39  JOEL R HENDON                    3.0  1794  1270  1348  1604
## 40 40  FOREST ZHANG                     3.0  1595  1579  1436   853
## 41 41  KYLE WILLIAM MURPHY              3.0   853  1629   917  1595
## 42 42  JARED GE                         3.0  1663  1056  1092   967
## 43 43  ROBERT GLEN VASEY                3.0  1563  1363  1229  1175
## 44 44  JUSTIN D SCHILLING               3.0    NA  1610  1441  1393
## 45 45  DEREK YAN                        3.0  1655  1011   967  1153
## 46 46  JACOB ALEXANDER LAVALLEY         3.0  1438  1649  1552  1056
## 47 47  ERIC WRIGHT                      2.5  1600  1229  1563   955
## 48 48  DANIEL KHAIN                     2.5  1629  1175    NA   935
## 49 49  MICHAEL J MARTIN                 2.5  1579  1595  1175  1163
## 50 50  SHIVAM JHA                       2.5  1602  1332  1449   377
## 51 51  TEJAS AYYAGARI                   2.5  1552  1242  1355  1092
## 52 52  ETHAN GUO                        2.5  1522  1555  1564  1382
## 53 53  JOSE C YBARRA                    2.0    NA  1745    NA  1199
## 54 54  LARRY HODGE                      2.0  1610  1436   955    NA
## 55 55  ALEX KONG                        2.0  1530  1494  1365  1522
## 56 56  MARISA RICCI                     2.0    NA  1712  1438  1242
## 57 57  MICHAEL LU                       2.0  1649  1355  1332  1011
## 58 58  VIRAJ MOHILE                     2.0  1494  1553  1403  1363
## 59 59  SEAN M MC CORMICK                2.0  1403    NA  1411  1348
## 60 60  JULIA SHEN                       1.5  1449  1399  1242  1332
## 61 61  JEZZEL FARKAS                    1.5  1441  1384  1270  1362
```

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## 62 62  ASHWIN BALAJI                     1.0  1186    NA    NA    NA
## 63 63  THOMAS JOSEPH HOSMER              1.0  1553  1382  1291  1283
## 64 64  BEN LI                            1.0  1555  1522  1494  1291
##    Game5 Game6 Game7  State  USCF_ID Pre_Rating Post_Rating New_Rating
## 1   1649  1663  1716     ON 15445895       1794        1817       1605
## 2   1604  1595  1649     MI 14598900       1553        1663       1469
## 3   1712  1666  1663     MI 14959604       1384        1640       1564
## 4   1655  1564  1794     MI 12616049       1716        1744       1574
## 5   1716  1610  1629     MI 14601533       1655        1690       1501
## 6   1365  1552  1563     OH 15055204       1686        1687       1519
## 7   1794  1411  1553     MI 11146376       1649        1673       1372
## 8   1362  1507  1564     MI 15142253       1641        1657       1468
## 9   1579  1649  1595     ON 14954524       1411        1564       1523
## 10  1686  1745  1600     MI 14150362       1365        1544       1554
## 11  1384  1399  1579     MI 12581589       1712        1696       1468
## 12    NA  1794  1384     MI 12681257       1663        1670       1506
## 13  1449  1384  1441     MI 15082995       1666        1662       1498
## 14  1552  1655  1494     MI 10131499       1610        1618       1515
## 15  1270  1449  1423     MI 15619130       1220        1416       1484
## 16  1553  1355    NA     MI 10295068       1604        1613       1386
## 17  1363  1555  1655     MI 10297702       1629        1610       1499
## 18  1564  1423  1365     MI 11342094       1600        1600       1480
## 19  1600  1716  1641     MI 14862333       1564        1570       1426
## 20  1507  1553  1411     MI 14529060       1595        1569       1411
## 21  1348  1436  1686     ON 15495066       1563        1562       1470
## 22    NA  1629  1348     MI 12405534       1555        1529       1300
## 23  1629   980   377     ON 15030142       1363        1371       1214
## 24   967  1199  1436     MI 13469010       1229        1300       1357
## 25  1399  1365  1362     MI 12486656       1745        1681       1363
## 26  1411  1441  1712     ON 15131520       1579        1564       1507
## 27  1610  1686    NA     MI 14476567       1552        1539       1222
## 28  1595  1641  1355     MI 14882954       1507        1513       1522
## 29   935  1382    NA     MI 15323285       1602        1508       1314
## 30  1494   955  1056     ON 12577178       1522        1444       1144
## 31  1522  1056  1610     MI 15131618       1494        1444       1260
## 32  1011  1579  1666     ON 14073750       1441        1433       1379
## 33  1666  1220  1011     MI 14691842       1449        1421       1277
## 34  1745  1712   935     MI 15051807       1399        1400       1375
## 35  1092   935  1382     MI 14601397       1438        1392       1150
## 36    NA  1604  1507     MI 14773163       1355        1367       1388
## 37    NA  1363   955     MI 15489571        980        1077       1385
## 38    NA  1600  1220     MI 15108523       1423        1439       1539
## 39  1199  1563  1229     MI 12923035       1436        1413       1430
## 40  1563  1153  1555     MI 14892710       1348        1346       1391
## 41    NA    NA    NA     MI 15761443       1403        1341       1248
## 42   955  1163  1153     MI 14462326       1332        1256       1150
## 43   853   377  1186     MI 14101068       1283        1244       1107
## 44  1436  1229   853     MI 15323504       1199        1199       1327
## 45  1175  1186   917     MI 15372807       1242        1191       1152
## 46  1163  1283  1363     MI 15490981        377        1076       1358
## 47  1641  1011  1745     MI 12533115       1362        1341       1392
## 48    NA  1602  1438     MI 14369165       1382        1335       1356
## 49   917    NA    NA     MI 12531685       1291        1259       1286
## 50    NA  1494  1522     MI 14773178       1056        1111       1296
```

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## 51  1441  1362  1449    MI  15205474       1011        1097        1356
## 52  1602  1438  1399    MI  14918803        935        1092        1495
## 53    NA  1092    NA    MI  12578849       1393        1359        1345
## 54  1220   853  1163    MI  12836773       1270        1200        1206
## 55    NA  1242  1283    MI  15412571       1186        1163        1406
## 56    NA  1348  1332    MI  14679887       1153        1140        1414
## 57  1438  1393    NA    MI  15113330       1092        1079        1363
## 58  1291    NA  1242    MI  14700365        917         941        1391
## 59  1283  1270  1199    MI  12841036        853         878        1319
## 60  1229    NA    NA    MI  14579262        967         984        1330
## 61  1332  1522   980    ON  15771592        955         979        1327
## 62    NA    NA    NA    MI  15219542       1530        1535        1186
## 63  1242    NA    NA    MI  15057092       1175        1125        1350
## 64   377  1332  1270    MI  15006561       1163        1112        1263
##    Ranking_differences
## 1                 -189
## 2                  -84
## 3                  180
## 4                 -142
## 5                 -154
## 6                 -167
## 7                 -277
## 8                 -173
## 9                  112
## 10                 189
## 11                -244
## 12                -157
## 13                -168
## 14                 -95
## 15                 264
## 16                -218
## 17                -130
## 18                -120
## 19                -138
## 20                -184
## 21                 -93
## 22                -255
## 23                -149
## 24                 128
## 25                -382
## 26                 -72
## 27                -330
## 28                  15
## 29                -288
## 30                -378
## 31                -234
## 32                 -62
## 33                -172
## 34                 -24
## 35                -288
## 36                  33
## 37                 405
## 38                 116
## 39                  -6
```

```
## 40                43
## 41              -155
## 42              -182
## 43              -176
## 44               128
## 45               -90
## 46               981
## 47                30
## 48               -26
## 49                -5
## 50               240
## 51               345
## 52               560
## 53               -48
## 54               -64
## 55               220
## 56               261
## 57               271
## 58               474
## 59               466
## 60               363
## 61               372
## 62              -344
## 63               175
## 64               100
```