Final Project - Predicting March Madness

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```
library(tidyverse)
library(tidymodels)
library(Stat2Data)
library(caret)
library(leaps)
library(MASS)

cbb <- read_csv("data/cbb.csv")

#Remove non-postseason teams and R68 losers
cbb <- cbb[!is.na(cbb$POSTSEASON),]
cbb <- filter(cbb, !grepl("R68", POSTSEASON))

#Cleaning up variable names, variables, etc
cbb$POSTSEASON <- str_trim(cbb$POSTSEASON, side = c("both"))
cbb <- rename(cbb, march_madness = POSTSEASON)

cbb <- cbb |>
  mutate(march_madness = case_when(
    march_madness == "Sweet Sixteen" ~ "S16",
    march_madness == "Elite Eight" ~ "E8",
    march_madness == "Final Four" ~ "F4",
    march_madness == "Finals" ~ "2ND",
    march_madness == "CHAMPS" ~ "Champions",
    TRUE ~ march_madness
  ))

cbb
```

```
# A tibble: 896 x 19
   TEAM       march~1 Confe~2 ADJOE ADJDE `EFG%` `EFGD%`   TOR  TORD   ORB   DRB
```

```
   <chr>      <chr>   <chr>   <dbl> <dbl>  <dbl>   <dbl> <dbl> <dbl> <dbl> <dbl>
 1 Gonzaga    S16     WCC      120.  89.9   58.7    43.1  15.7  16.3  29.1  23.4
 2 Gonzaga    2ND     WCC      126.  90.9   61      47.7  16.1  19.3  30.1  23.8
 3 Gonzaga    E8      WCC      124.  91     59      44.2  14.9  19    31.5  26.8
 4 Villanova  Champi~ BE       129.  94.4   59.5    48.5  15    18.2  29.6  27.1
 5 Gonzaga    2ND     WCC      118.  87.2   56.6    41.1  16.2  17.1  30    26.2
 6 Villanova  Champi~ BE       124   92     56.1    46.7  16.3  20.6  28.2  29.4
 7 Kentucky   F4      SEC      122.  86.1   51.5    39.6  16.3  21.3  39.5  31.8
 8 Louisville S16     Amer     119.  88.2   53.5    43.9  15.3  25    37.1  32.7
 9 Louisville Champi~ BE       117   86     50.6    44.8  18.3  27    38.2  33.3
10 Kentucky   Champi~ SEC      124.  90.4   53.8    42    17.1  17.6  37.8  31.2
# ... with 886 more rows, 8 more variables: FTR <dbl>, FTRD <dbl>, `2P%` <dbl>,
#   `2P%D` <dbl>, `3P%` <dbl>, `3P%D` <dbl>, `ADJ T.` <dbl>, ...19 <dbl>, and
#   abbreviated variable names 1: march_madness, 2: Conference
```

```r
#separated each row by round for determining differences
cbb <- mutate(cbb, round_64 = if_else(march_madness == "R64", FALSE, TRUE))
round_64 <- cbb

cbb <- mutate(cbb, round_32 =
         case_when(march_madness == "R32" ~ FALSE,
         march_madness %in% c("S16", "E8", "F4", "2ND", "Champions") ~ TRUE,
         TRUE ~ NA))
round_32 <- cbb[!is.na(cbb$round_32),]

cbb <- mutate(cbb, sweet_sixteen =
         case_when(march_madness == "S16" ~ FALSE,
         march_madness %in% c("E8", "F4", "2ND", "Champions") ~ TRUE,
         TRUE ~ NA))
sweet_sixteen <- cbb[!is.na(cbb$sweet_sixteen),]

cbb <- mutate(cbb, elite_eight =
         case_when(march_madness == "E8" ~ FALSE,
         march_madness %in% c("F4", "2ND", "Champions") ~ TRUE,
         TRUE ~ NA))
elite_eight <- cbb[!is.na(cbb$elite_eight),]

cbb <- mutate(cbb, final_four =
         case_when(march_madness == "F4" ~ FALSE,
         march_madness %in% c("2ND", "Champions") ~ TRUE,
         TRUE ~ NA))
final_four <- cbb[!is.na(cbb$final_four),]
```

```r
cbb <- mutate(cbb, champ_game =
         case_when(march_madness == "2ND" ~ FALSE,
         march_madness %in% c("Champions") ~ TRUE,
         TRUE ~ NA))
champ_game <- cbb[!is.na(cbb$champ_game),]
```

```r
round_64_model <- glm(round_64 ~ ADJOE + ADJDE + `EFG%` +
                        `EFGD%` + TOR + TORD + ORB +
                        DRB + FTR + FTRD + `2P%` +
                        `2P%D` + `3P%` + `ADJ T.` +
                        ADJOE*ADJDE + `EFG%`*`EFGD%` +
                        TOR*TORD + `2P%`*`2P%D`,
                      data = round_64,
                      family = "binomial")

round_64_min <- glm(round_64 ~ 1,
                    data = round_64,
                    family = "binomial")

stepAIC(round_64_min,
        scope = list(lower = round_64_min, upper = round_64_model),
        data = round_64, direction = "both")
```

```
Start:  AIC=1244.12
round_64 ~ 1

           Df Deviance    AIC
+ ADJOE     1   1031.8 1035.8
+ ADJDE     1   1040.5 1044.5
+ `EFGD%`   1   1197.5 1201.5
+ TOR       1   1207.0 1211.0
+ ORB       1   1210.9 1214.9
+ `2P%D`    1   1211.7 1215.7
+ FTRD      1   1224.4 1228.4
+ `EFG%`    1   1227.7 1231.7
+ `2P%`     1   1228.1 1232.1
+ `3P%`     1   1237.0 1241.0
+ FTR       1   1237.7 1241.7
+ TORD      1   1239.3 1243.3
<none>          1242.1 1244.1
+ `ADJ T.`  1   1241.7 1245.7
```

```
+ DRB       1   1242.0 1246.0

Step:  AIC=1035.84
round_64 ~ ADJOE

           Df Deviance     AIC
+ ADJDE     1   871.82  877.82
+ `EFGD%`   1   972.14  978.14
+ `2P%D`    1   999.46 1005.46
+ TORD      1  1002.69 1008.69
+ `EFG%`    1  1003.77 1009.77
+ `3P%`     1  1007.29 1013.29
+ `2P%`     1  1021.48 1027.48
+ ORB       1  1023.33 1029.33
+ `ADJ T.`  1  1028.65 1034.65
<none>         1031.84 1035.84
+ FTRD      1  1030.72 1036.72
+ TOR       1  1030.98 1036.98
+ FTR       1  1031.05 1037.05
+ DRB       1  1031.42 1037.42
- ADJOE     1  1242.12 1244.12

Step:  AIC=877.82
round_64 ~ ADJOE + ADJDE

              Df Deviance     AIC
+ ADJOE:ADJDE  1   863.63  871.63
+ `2P%D`       1   867.06  875.06
+ TOR          1   868.60  876.60
+ DRB          1   869.41  877.41
+ `EFG%`       1   869.60  877.60
<none>             871.82  877.82
+ TORD         1   869.99  877.99
+ `EFGD%`      1   870.22  878.22
+ `2P%`        1   870.32  878.32
+ `3P%`        1   870.87  878.87
+ FTRD         1   871.67  879.67
+ `ADJ T.`     1   871.71  879.71
+ FTR          1   871.81  879.81
+ ORB          1   871.82  879.82
- ADJDE        1  1031.84 1035.84
- ADJOE        1  1040.51 1044.51
```

```
Step:  AIC=871.63
round_64 ~ ADJOE + ADJDE + ADJOE:ADJDE

              Df Deviance    AIC
+ `2P%D`       1   857.43 867.43
+ TOR          1   860.62 870.62
+ DRB          1   861.05 871.05
+ `EFGD%`      1   861.37 871.37
+ `EFG%`       1   861.44 871.44
<none>             863.63 871.63
+ TORD         1   861.93 871.93
+ `2P%`        1   862.12 872.12
+ `3P%`        1   862.65 872.65
+ FTRD         1   863.49 873.49
+ FTR          1   863.50 873.50
+ `ADJ T.`     1   863.51 873.51
+ ORB          1   863.59 873.59
- ADJOE:ADJDE  1   871.82 877.82

Step:  AIC=867.43
round_64 ~ ADJOE + ADJDE + `2P%D` + ADJOE:ADJDE

              Df Deviance    AIC
+ DRB          1   853.77 865.77
+ `EFG%`       1   855.18 867.18
<none>             857.43 867.43
+ `2P%`        1   855.57 867.57
+ TOR          1   855.88 867.88
+ `EFGD%`      1   856.73 868.73
+ `3P%`        1   856.82 868.82
+ TORD         1   857.01 869.01
+ ORB          1   857.27 869.27
+ FTR          1   857.32 869.32
+ FTRD         1   857.40 869.40
+ `ADJ T.`     1   857.40 869.40
- `2P%D`       1   863.63 871.63
- ADJOE:ADJDE  1   867.06 875.06

Step:  AIC=865.77
round_64 ~ ADJOE + ADJDE + `2P%D` + DRB + ADJOE:ADJDE

              Df Deviance    AIC
+ TOR          1   850.64 864.64
```

```
<none>              853.77 865.77
+ `EFG%`       1   852.87 866.87
+ `2P%`        1   853.10 867.10
+ FTRD         1   853.25 867.25
+ `EFGD%`      1   853.25 867.25
- DRB          1   857.43 867.43
+ TORD         1   853.44 867.44
+ `3P%`        1   853.46 867.46
+ `ADJ T.`     1   853.68 867.68
+ ORB          1   853.75 867.75
+ FTR          1   853.77 867.77
- `2P%D`       1   861.05 871.05
- ADJOE:ADJDE  1   863.82 873.82

Step:  AIC=864.64
round_64 ~ ADJOE + ADJDE + `2P%D` + DRB + TOR + ADJOE:ADJDE

              Df Deviance    AIC
<none>              850.64 864.64
- TOR          1   853.77 865.77
+ ORB          1   850.09 866.09
+ `EFGD%`      1   850.26 866.26
+ TORD         1   850.27 866.27
+ `EFG%`       1   850.33 866.33
+ FTRD         1   850.35 866.35
+ FTR          1   850.44 866.44
+ `2P%`        1   850.46 866.46
+ `3P%`        1   850.48 866.48
+ `ADJ T.`     1   850.61 866.61
- DRB          1   855.88 867.88
- `2P%D`       1   856.01 868.01
- ADJOE:ADJDE  1   860.21 872.21


Call:  glm(formula = round_64 ~ ADJOE + ADJDE + `2P%D` + DRB + TOR +
    ADJOE:ADJDE, family = "binomial", data = round_64)

Coefficients:
(Intercept)        ADJOE        ADJDE       `2P%D`          DRB          TOR
 -135.80213      1.42933      1.14692      0.08999      0.06315     -0.09017
ADJOE:ADJDE
   -0.01290
```

```
Degrees of Freedom: 895 Total (i.e. Null);  889 Residual
Null Deviance:      1242
Residual Deviance: 850.6    AIC: 864.6
```

```r
round_32_model <- glm(round_32 ~ ADJOE + ADJDE + `EFG%` +
                        `EFGD%` + TOR + TORD + ORB +
                        DRB + FTR + FTRD + `2P%` +
                        `2P%D` + `3P%` + `ADJ T.`,
                      data = round_32,
                      family = "binomial")

round_32_min <- glm(round_32 ~ 1,
                    data = round_32,
                    family = "binomial")

stepAIC(round_32_min,
        scope = list(lower = round_32_min,
                     upper = round_32_model),
        data = round_32, direction = "both")
```

```
Start:  AIC=623.06
round_32 ~ 1

           Df Deviance    AIC
+ ADJOE     1   563.40 567.40
+ ADJDE     1   590.88 594.88
+ `EFG%`    1   605.82 609.82
+ `2P%`     1   607.28 611.28
+ FTRD      1   612.35 616.35
+ `EFGD%`   1   613.05 617.05
+ `2P%D`    1   614.75 618.75
+ `3P%`     1   615.23 619.23
+ TOR       1   616.56 620.56
+ ORB       1   616.60 620.60
<none>          621.06 623.06
+ `ADJ T.`  1   620.38 624.38
+ DRB       1   620.57 624.57
+ FTR       1   620.73 624.73
+ TORD      1   620.83 624.83
```

```
Step:  AIC=567.4
round_32 ~ ADJOE

           Df Deviance    AIC
+ ADJDE     1   519.16 525.16
+ `EFGD%`   1   550.12 556.12
+ `2P%D`    1   555.62 561.62
+ `3P%`     1   559.58 565.58
+ TORD      1   559.67 565.67
+ TOR       1   561.19 567.19
<none>          563.40 567.40
+ FTRD      1   561.82 567.82
+ ORB       1   562.15 568.15
+ `EFG%`    1   562.35 568.35
+ FTR       1   563.12 569.12
+ `ADJ T.`  1   563.37 569.37
+ DRB       1   563.38 569.38
+ `2P%`     1   563.38 569.38
- ADJOE     1   621.06 623.06

Step:  AIC=525.16
round_32 ~ ADJOE + ADJDE

           Df Deviance    AIC
<none>          519.16 525.16
+ `2P%D`    1   517.35 525.35
+ `EFGD%`   1   518.11 526.11
+ FTRD      1   518.20 526.20
+ DRB       1   518.31 526.31
+ FTR       1   518.42 526.42
+ ORB       1   518.74 526.74
+ `ADJ T.`  1   518.74 526.74
+ `3P%`     1   518.76 526.76
+ `2P%`     1   519.03 527.03
+ TOR       1   519.09 527.09
+ TORD      1   519.11 527.11
+ `EFG%`    1   519.15 527.15
- ADJDE     1   563.40 567.40
- ADJOE     1   590.88 594.88


Call:  glm(formula = round_32 ~ ADJOE + ADJDE, family = "binomial",
```

```
    data = round_32)

Coefficients:
(Intercept)        ADJOE        ADJDE
    -2.7505       0.1842      -0.1949

Degrees of Freedom: 447 Total (i.e. Null);  445 Residual
Null Deviance:      621.1
Residual Deviance: 519.2    AIC: 525.2
```

```
sweet_sixteen_model <- glm(sweet_sixteen ~ ADJOE + ADJDE +
                           `EFG%` + `EFGD%` + TOR + TORD +
                             ORB + DRB + FTR + FTRD + `2P%` +
                             `2P%D` + `3P%` + `ADJ T.`,
                         data = sweet_sixteen,
                         family = "binomial")

sweet_sixteen_min <- glm(sweet_sixteen ~ 1,
                     data = sweet_sixteen,
                     family = "binomial")

stepAIC(sweet_sixteen_min,
        scope = list(lower = sweet_sixteen_min,
                     upper = sweet_sixteen_model),
        data = sweet_sixteen, direction = "both")
```

```
Start:  AIC=312.53
sweet_sixteen ~ 1

           Df Deviance    AIC
+ ADJOE     1   296.66 300.66
+ ADJDE     1   302.34 306.34
+ ORB       1   305.41 309.41
+ `EFGD%`   1   306.80 310.80
+ `2P%`     1   307.64 311.64
+ `2P%D`    1   308.51 312.51
<none>          310.53 312.53
+ `EFG%`    1   309.10 313.10
+ TOR       1   309.43 313.43
+ FTR       1   309.68 313.68
+ FTRD      1   310.33 314.33
```

```
+ `3P%`      1   310.44 314.44
+ TORD       1   310.50 314.50
+ DRB        1   310.52 314.52
+ `ADJ T.`   1   310.52 314.52

Step:  AIC=300.66
sweet_sixteen ~ ADJOE

            Df Deviance    AIC
+ ADJDE      1   280.66 286.66
+ `3P%`      1   288.30 294.30
+ `EFGD%`    1   290.17 296.17
+ ORB        1   292.83 298.83
+ `EFG%`     1   293.43 299.43
+ `2P%D`     1   293.78 299.78
+ TORD       1   294.61 300.61
<none>           296.66 300.66
+ FTR        1   295.15 301.15
+ FTRD       1   295.76 301.76
+ TOR        1   295.93 301.93
+ DRB        1   296.42 302.42
+ `2P%`      1   296.53 302.53
+ `ADJ T.`   1   296.55 302.55
- ADJOE      1   310.53 312.53

Step:  AIC=286.66
sweet_sixteen ~ ADJOE + ADJDE

            Df Deviance    AIC
+ `3P%`      1   276.63 284.63
+ `EFG%`     1   278.34 286.34
<none>           280.66 286.66
+ DRB        1   279.25 287.25
+ FTRD       1   279.33 287.33
+ `2P%D`     1   279.58 287.58
+ ORB        1   279.89 287.89
+ FTR        1   280.08 288.08
+ `2P%`      1   280.10 288.10
+ `ADJ T.`   1   280.47 288.47
+ `EFGD%`    1   280.53 288.53
+ TOR        1   280.62 288.62
+ TORD       1   280.65 288.65
- ADJDE      1   296.66 300.66
```

```
- ADJOE     1   302.34 306.34

Step:  AIC=284.63
sweet_sixteen ~ ADJOE + ADJDE + `3P%`

           Df Deviance    AIC
<none>          276.63 284.63
+ DRB       1   275.41 285.41
+ FTRD      1   275.48 285.48
+ `2P%D`    1   275.99 285.99
+ `2P%`     1   276.11 286.11
+ `ADJ T.`  1   276.17 286.17
+ FTR       1   276.24 286.24
+ `EFG%`    1   276.36 286.36
+ TOR       1   276.40 286.40
+ ORB       1   276.53 286.53
+ TORD      1   276.61 286.61
+ `EFGD%`   1   276.62 286.62
- `3P%`     1   280.66 286.66
- ADJDE     1   288.30 294.30
- ADJOE     1   301.82 307.82


Call:  glm(formula = sweet_sixteen ~ ADJOE + ADJDE + `3P%`, family = "binomial",
    data = sweet_sixteen)

Coefficients:
(Intercept)        ADJOE        ADJDE        `3P%`
    -2.9987       0.1815      -0.1382      -0.1447

Degrees of Freedom: 223 Total (i.e. Null);  220 Residual
Null Deviance:      310.5
Residual Deviance: 276.6    AIC: 284.6
```

```r
elite_eight_model <- glm(elite_eight ~ ADJOE + ADJDE +
                           `EFG%` + `EFGD%` + TOR + TORD +
                             ORB + DRB + FTR + FTRD + `2P%` +
                             `2P%D` + `3P%` + `ADJ T.`,
                         data = elite_eight,
                         family = "binomial")

elite_eight_min <- glm(elite_eight ~ 1,
```

```
                    data = elite_eight,
                    family = "binomial")

stepAIC(elite_eight_min,
        scope = list(lower = elite_eight_min,
                     upper = elite_eight_model),
        data = elite_eight, direction = "both")
```

```
Start:  AIC=157.26
elite_eight ~ 1

           Df Deviance    AIC
+ ADJDE     1   151.74 155.74
+ ADJOE     1   152.77 156.77
+ FTRD      1   153.07 157.07
<none>          155.26 157.26
+ `2P%`     1   153.99 157.99
+ TOR       1   154.41 158.41
+ `EFGD%`   1   154.44 158.44
+ DRB       1   154.59 158.59
+ `ADJ T.`  1   154.69 158.69
+ `3P%`     1   154.73 158.73
+ ORB       1   154.80 158.80
+ FTR       1   154.93 158.93
+ `2P%D`    1   155.03 159.03
+ `EFG%`    1   155.11 159.11
+ TORD      1   155.26 159.26

Step:  AIC=155.73
elite_eight ~ ADJDE

           Df Deviance    AIC
+ ADJOE     1   147.48 153.48
+ FTRD      1   149.09 155.09
+ TOR       1   149.47 155.47
<none>          151.74 155.74
+ `3P%`     1   149.91 155.91
+ `ADJ T.`  1   150.53 156.53
+ `2P%`     1   150.57 156.57
+ TORD      1   150.78 156.78
+ FTR       1   150.87 156.87
+ `2P%D`    1   150.94 156.94
```

```
- ADJDE     1   155.26 157.26
+ DRB       1   151.32 157.32
+ `EFGD%`   1   151.36 157.36
+ ORB       1   151.71 157.71
+ `EFG%`    1   151.73 157.73

Step:  AIC=153.48
elite_eight ~ ADJDE + ADJOE

           Df Deviance    AIC
+ `2P%`     1   139.57 147.57
+ `EFG%`    1   143.28 151.28
<none>          147.48 153.48
+ `ADJ T.`  1   145.90 153.90
+ `2P%D`    1   146.00 154.00
+ FTRD      1   146.75 154.75
+ `EFGD%`   1   146.85 154.85
+ FTR       1   147.01 155.01
+ TOR       1   147.18 155.18
+ TORD      1   147.26 155.26
+ `3P%`     1   147.36 155.36
+ DRB       1   147.36 155.36
+ ORB       1   147.46 155.46
- ADJOE     1   151.74 155.74
- ADJDE     1   152.77 156.77

Step:  AIC=147.57
elite_eight ~ ADJDE + ADJOE + `2P%`

           Df Deviance    AIC
+ FTRD      1   136.54 146.54
+ ORB       1   137.46 147.46
+ `2P%D`    1   137.53 147.53
<none>          139.57 147.57
+ DRB       1   138.26 148.26
+ FTR       1   138.31 148.31
+ `EFGD%`   1   138.40 148.40
+ TORD      1   139.09 149.09
+ `ADJ T.`  1   139.29 149.29
+ TOR       1   139.39 149.39
+ `EFG%`    1   139.40 149.40
+ `3P%`     1   139.56 149.56
- ADJDE     1   146.76 152.76
```

```
- `2P%`      1   147.48 153.48
- ADJOE      1   150.57 156.57

Step:  AIC=146.54
elite_eight ~ ADJDE + ADJOE + `2P%` + FTRD

           Df Deviance    AIC
+ `2P%D`    1   134.45 146.45
<none>          136.54 146.54
+ ORB       1   134.74 146.74
+ `EFGD%`   1   135.40 147.40
+ DRB       1   135.54 147.54
- FTRD      1   139.57 147.57
+ FTR       1   136.02 148.02
+ `ADJ T.`  1   136.13 148.13
+ `EFG%`    1   136.23 148.23
+ `3P%`     1   136.47 148.47
+ TORD      1   136.49 148.49
+ TOR       1   136.54 148.54
- ADJDE     1   143.77 151.77
- ADJOE     1   144.81 152.81
- `2P%`     1   146.75 154.75

Step:  AIC=146.45
elite_eight ~ ADJDE + ADJOE + `2P%` + FTRD + `2P%D`

           Df Deviance    AIC
<none>          134.45 146.45
- `2P%D`    1   136.54 146.54
+ `ADJ T.`  1   133.41 147.41
+ ORB       1   133.41 147.41
- FTRD      1   137.53 147.53
+ DRB       1   133.94 147.94
+ `EFG%`    1   134.15 148.15
+ FTR       1   134.29 148.29
+ TORD      1   134.30 148.30
+ `3P%`     1   134.37 148.37
+ `EFGD%`   1   134.39 148.39
+ TOR       1   134.41 148.41
- ADJDE     1   143.38 153.38
- ADJOE     1   143.83 153.83
- `2P%`     1   145.29 155.29
```

```
Call:  glm(formula = elite_eight ~ ADJDE + ADJOE + `2P%` + FTRD + `2P%D`,
    family = "binomial", data = elite_eight)

Coefficients:
(Intercept)        ADJDE        ADJOE        `2P%`         FTRD       `2P%D`
   12.22212     -0.23456      0.16972     -0.28213     -0.07466      0.14523

Degrees of Freedom: 111 Total (i.e. Null);  106 Residual
Null Deviance:      155.3
Residual Deviance: 134.5    AIC: 146.5
```

```
final_four_model <- glm(final_four ~ ADJOE + ADJDE + `EFG%` +
                          `EFGD%` + TOR + TORD + ORB + DRB +
                          FTR + FTRD + `2P%` + `2P%D` +
                          `3P%` + `ADJ T.`,
                        data = final_four,
                        family = "binomial")

final_four_min <- glm(final_four ~ 1,
                      data = final_four,
                      family = "binomial")

stepAIC(final_four_min,
        scope = list(lower = final_four_min,
                     upper = final_four_model),
        data = final_four, direction = "both")
```

```
Start:  AIC=79.63
final_four ~ 1

           Df Deviance    AIC
+ ADJOE     1   72.316 76.316
+ `2P%`     1   72.766 76.766
+ TOR       1   73.669 77.669
+ `EFG%`    1   74.721 78.721
<none>          77.632 79.632
+ DRB       1   75.667 79.667
+ ADJDE     1   76.231 80.231
+ `ADJ T.`  1   76.675 80.675
+ `2P%D`    1   76.940 80.940
```

```
+ FTRD       1   77.267 81.267
+ `3P%`      1   77.385 81.385
+ TORD       1   77.426 81.426
+ `EFGD%`    1   77.476 81.476
+ FTR        1   77.605 81.605
+ ORB        1   77.624 81.624

Step:  AIC=76.32
final_four ~ ADJOE

            Df Deviance    AIC
+ ADJDE      1   69.269 75.269
<none>           72.316 76.316
+ `2P%D`     1   71.084 77.084
+ `2P%`      1   71.131 77.131
+ DRB        1   71.182 77.182
+ FTR        1   71.655 77.655
+ `EFGD%`    1   71.718 77.718
+ `3P%`      1   71.775 77.775
+ TOR        1   71.794 77.794
+ `ADJ T.`   1   71.981 77.981
+ FTRD       1   72.026 78.026
+ `EFG%`     1   72.240 78.240
+ ORB        1   72.277 78.277
+ TORD       1   72.293 78.293
- ADJOE      1   77.632 79.632

Step:  AIC=75.27
final_four ~ ADJOE + ADJDE

            Df Deviance    AIC
<none>           69.269 75.269
+ TOR        1   67.499 75.499
+ DRB        1   68.132 76.132
- ADJDE      1   72.316 76.316
+ `2P%`      1   68.541 76.541
+ TORD       1   68.724 76.724
+ ORB        1   68.730 76.730
+ `EFGD%`    1   68.944 76.944
+ FTRD       1   69.061 77.061
+ `EFG%`     1   69.149 77.149
+ `3P%`      1   69.158 77.158
+ `ADJ T.`   1   69.163 77.163
```

```
+ FTR       1   69.182 77.182
+ `2P%D`    1   69.268 77.268
- ADJOE     1   76.231 80.231


Call:  glm(formula = final_four ~ ADJOE + ADJDE, family = "binomial",
    data = final_four)

Coefficients:
(Intercept)        ADJOE        ADJDE
    -4.2298       0.1535      -0.1517

Degrees of Freedom: 55 Total (i.e. Null);  53 Residual
Null Deviance:      77.63
Residual Deviance: 69.27    AIC: 75.27
```

```
champ_game_model <- glm(champ_game ~ ADJOE + ADJDE +
                          `EFG%` + `EFGD%` + TOR + TORD +
                          ORB + DRB + FTR + FTRD + `2P%` +
                          `2P%D` + `3P%` + `ADJ T.`,
                        data = champ_game,
                        family = "binomial")
```

```
Warning: glm.fit: algorithm did not converge

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
```

```
champ_game_min <- glm(champ_game ~ 1,
                      data = champ_game,
                      family = "binomial")

stepAIC(champ_game_min,
        scope = list(lower = champ_game_min,
                     upper = champ_game_model),
        data = champ_game, direction = "both")
```

```
Start:  AIC=40.82
champ_game ~ 1
```

```
           Df Deviance    AIC
+ DRB       1   31.186 35.186
+ `3P%`     1   32.187 36.187
+ ADJOE     1   34.854 38.854
<none>          38.816 40.816
+ TORD      1   37.295 41.295
+ ORB       1   37.445 41.445
+ FTR       1   37.755 41.755
+ FTRD      1   38.393 42.393
+ `EFGD%`   1   38.443 42.443
+ `EFG%`    1   38.460 42.460
+ ADJDE     1   38.641 42.641
+ `2P%`     1   38.670 42.670
+ `2P%D`    1   38.718 42.718
+ TOR       1   38.801 42.801
+ `ADJ T.`  1   38.813 42.813

Step:  AIC=35.19
champ_game ~ DRB

           Df Deviance    AIC
+ `3P%`     1   21.981 27.981
+ ADJOE     1   24.532 30.532
+ `EFG%`    1   27.351 33.351
+ FTR       1   27.531 33.531
+ FTRD      1   28.161 34.161
<none>          31.186 35.186
+ TOR       1   30.319 36.319
+ `2P%`     1   30.333 36.333
+ `2P%D`    1   30.530 36.530
+ `EFGD%`   1   31.028 37.028
+ `ADJ T.`  1   31.124 37.124
+ ADJDE     1   31.152 37.152
+ ORB       1   31.178 37.178
+ TORD      1   31.186 37.186
- DRB       1   38.816 40.816

Step:  AIC=27.98
champ_game ~ DRB + `3P%`

           Df Deviance    AIC
+ ADJOE     1   19.881 27.881
<none>          21.981 27.981
```

```
+ ORB        1   20.541 28.541
+ `EFGD%`    1   21.270 29.270
+ FTR        1   21.305 29.305
+ `2P%D`     1   21.469 29.469
+ FTRD       1   21.788 29.788
+ `ADJ T.`   1   21.816 29.816
+ `EFG%`     1   21.905 29.905
+ `2P%`      1   21.921 29.921
+ ADJDE      1   21.928 29.928
+ TORD       1   21.962 29.962
+ TOR        1   21.964 29.964
- `3P%`      1   31.186 35.186
- DRB        1   32.187 36.187

Step:  AIC=27.88
champ_game ~ DRB + `3P%` + ADJOE

           Df Deviance    AIC
<none>          19.881 27.881
- ADJOE     1   21.981 27.981
+ `EFG%`    1   18.062 28.062
+ `2P%`     1   18.301 28.301
+ TOR       1   18.372 28.372
+ ORB       1   18.697 28.697
+ FTRD      1   19.537 29.537
+ ADJDE     1   19.556 29.556
+ `2P%D`    1   19.698 29.699
+ FTR       1   19.733 29.733
+ `ADJ T.`  1   19.756 29.756
+ TORD      1   19.834 29.834
+ `EFGD%`   1   19.850 29.850
- `3P%`     1   24.532 30.532
- DRB       1   31.482 37.482


Call:  glm(formula = champ_game ~ DRB + `3P%` + ADJOE, family = "binomial",
    data = champ_game)

Coefficients:
(Intercept)          DRB         `3P%`         ADJOE
   -63.5938       0.6698       0.5753       0.1957
```

```
Degrees of Freedom: 27 Total (i.e. Null);  24 Residual
Null Deviance:      38.82
Residual Deviance: 19.88    AIC: 27.88
```