

DS5220: FIFA Player Assessment Model and Analytics

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Loading Data

```
fifa16 <- fread("~/Desktop/Northeastern-University/SML/FIFA-Player-Assessment-Model-and-Analytics/Datasets/fifa16.csv")
fifa16 <- as_tibble(fifa16)

fifa17 <- fread("~/Desktop/Northeastern-University/SML/FIFA-Player-Assessment-Model-and-Analytics/Datasets/fifa17.csv")
fifa17 <- as_tibble(fifa17)

fifa18 <- fread("~/Desktop/Northeastern-University/SML/FIFA-Player-Assessment-Model-and-Analytics/Datasets/fifa18.csv")
fifa18 <- as_tibble(fifa18)

fifa19 <- fread("~/Desktop/Northeastern-University/SML/FIFA-Player-Assessment-Model-and-Analytics/Datasets/fifa19.csv")
fifa19 <- as_tibble(fifa19)

fifa20 <- fread("~/Desktop/Northeastern-University/SML/FIFA-Player-Assessment-Model-and-Analytics/Datasets/fifa20.csv")
fifa20 <- as_tibble(fifa20)

fifa_datasets_list = list(fifa16, fifa17, fifa18, fifa19, fifa20)
years = list("2016", "2017", "2018", "2019", "2020")
```

Exploratory Data Analysis

Abstract Hypothesis EDA

1. There exists a positive correlation between player rating and value

```
# Correlation between player overall and value in euros
for (i in seq_along(fifa_datasets_list)) {
  ovr_val_wag <- fifa_datasets_list[[i]] %>% select(overall, value_eur, wage_eur)
  cor_ovr_val_wag <- cor(ovr_val_wag)
  print(paste("Year", years[[i]], ":"))
  print(round(cor_ovr_val_wag, 2))
}

## [1] "Year 2016 :"
##           overall value_eur wage_eur
## overall     1.00      0.60      0.73
## value_eur    0.60      1.00      0.91
```

```

## wage_eur      0.73      0.91      1.00
## [1] "Year 2017 :"
##          overall value_eur wage_eur
## overall      1.00      0.60      0.62
## value_eur     0.60      1.00      0.88
## wage_eur      0.62      0.88      1.00
## [1] "Year 2018 :"
##          overall value_eur wage_eur
## overall      1.00      0.63      0.60
## value_eur     0.63      1.00      0.85
## wage_eur      0.60      0.85      1.00
## [1] "Year 2019 :"
##          overall value_eur wage_eur
## overall      1.00      0.63      0.57
## value_eur     0.63      1.00      0.86
## wage_eur      0.57      0.86      1.00
## [1] "Year 2020 :"
##          overall value_eur wage_eur
## overall      1.00      0.64      0.57
## value_eur     0.64      1.00      0.86
## wage_eur      0.57      0.86      1.00

```

2. Player wage and age are positively correlated upto the age of 31

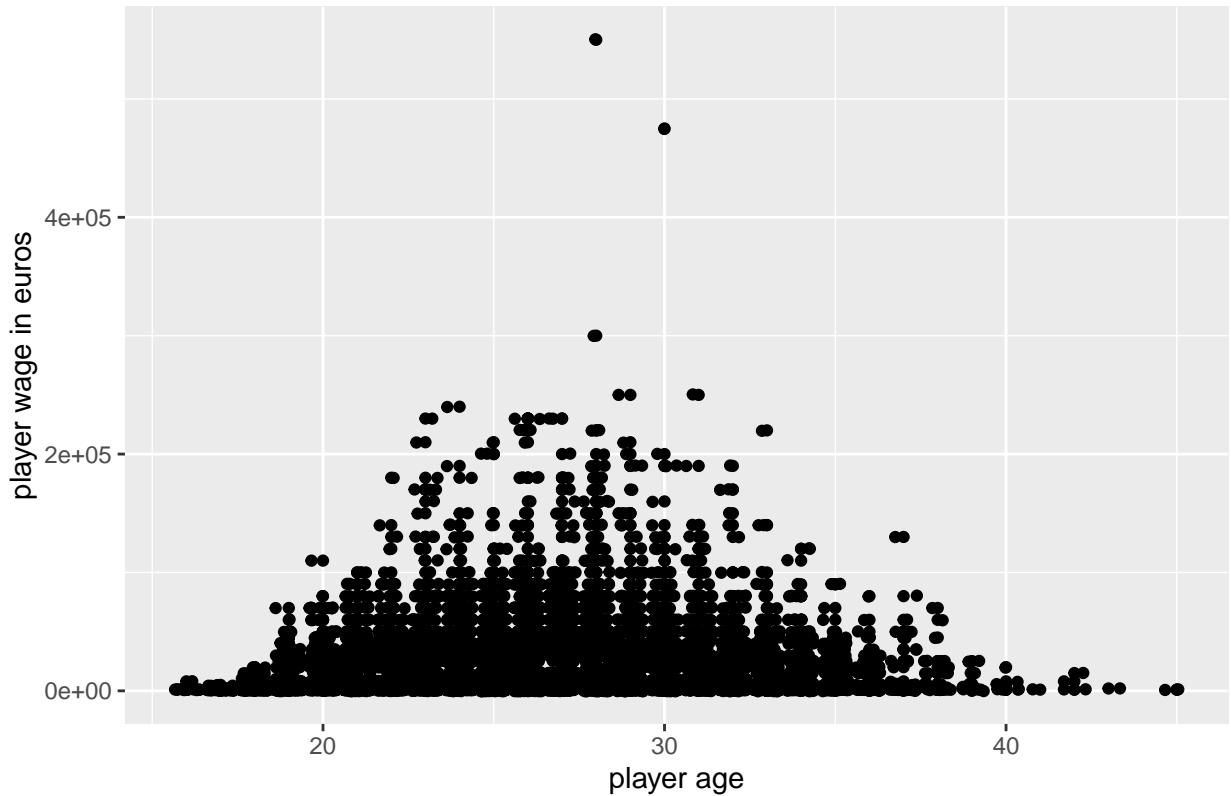
and negatively correlated after that

```

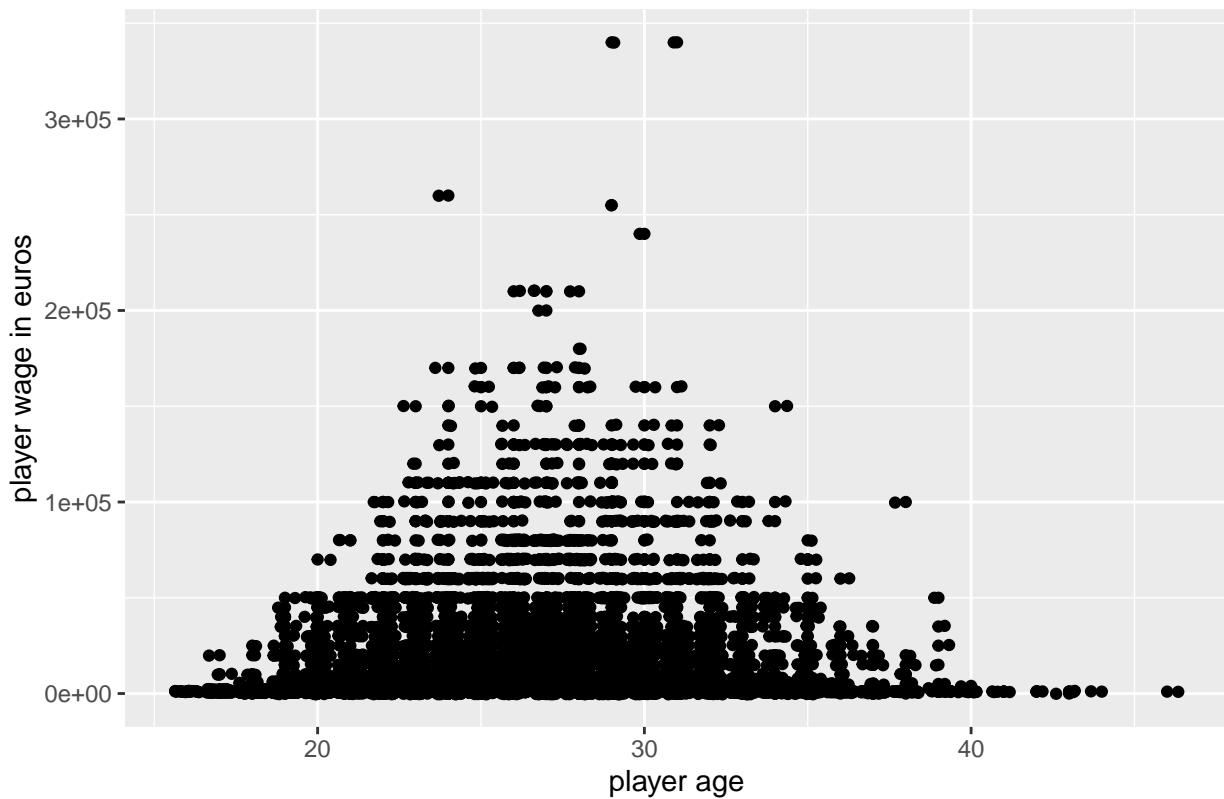
# WAGE AND AGE CORRELATION: scatter plot of wage and age
for (i in seq_along(fifa_datasets_list)) {
  wage_age_plt <- fifa_datasets_list[[i]] %>% ggplot(aes(age, wage_eur)) +
    geom_point() + geom_jitter() +
    labs(x="player age", y="player wage in euros",
         title=paste("Year", years[[i]], ":", "Wage vs Age Scatter Plot"))
  print(wage_age_plt)
}

```

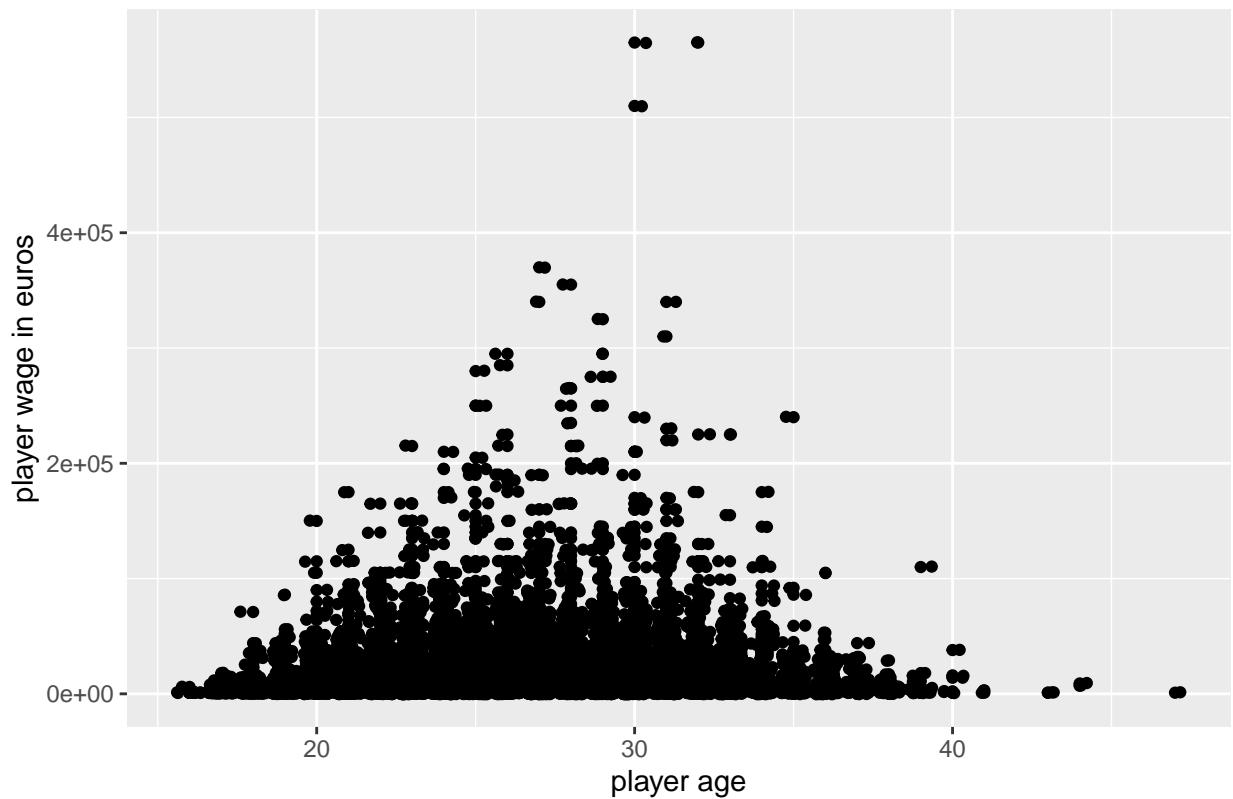
Year 2016 : Wage vs Age Scatter Plot



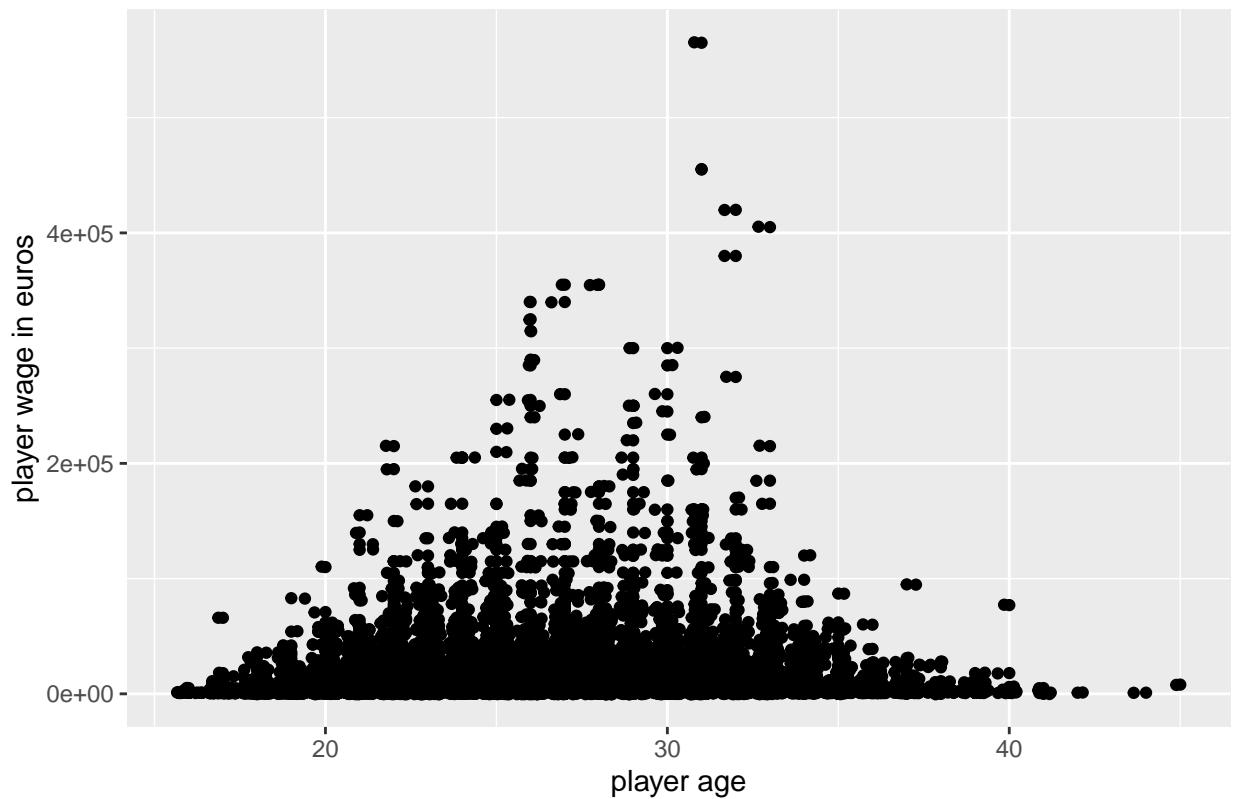
Year 2017 : Wage vs Age Scatter Plot



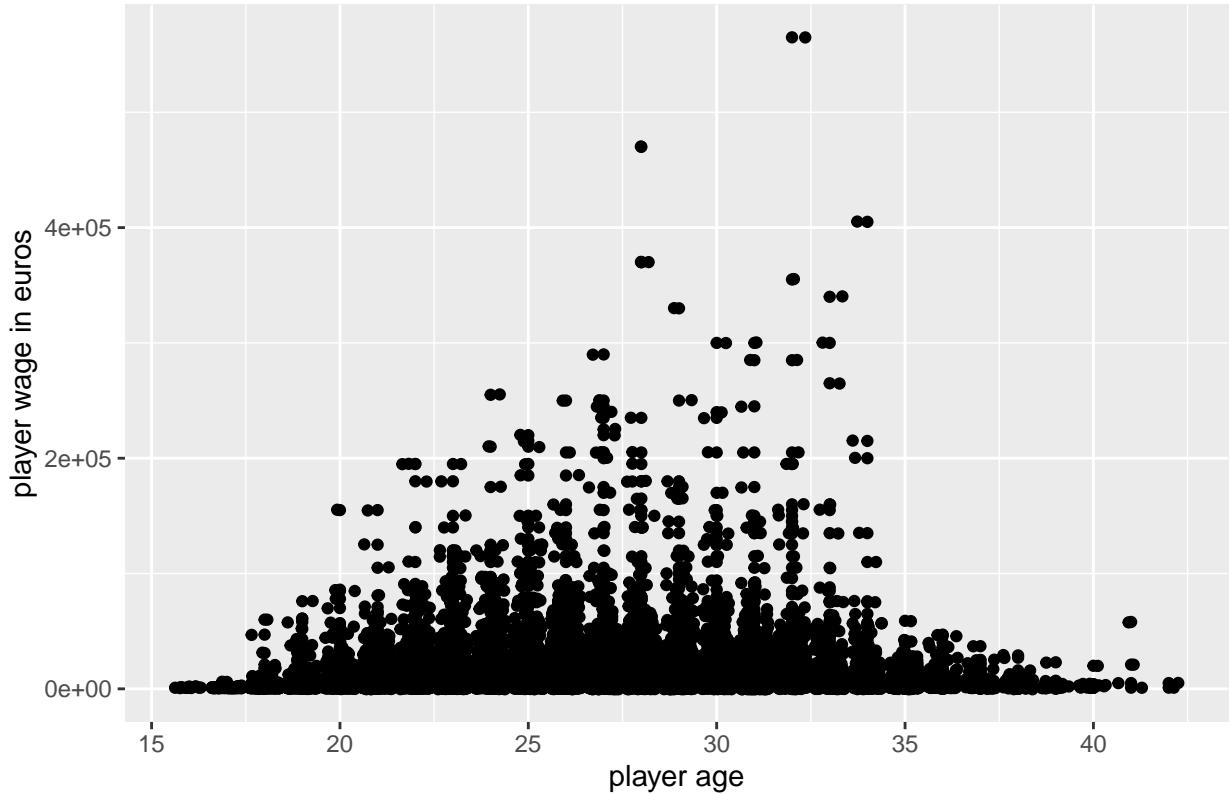
Year 2018 : Wage vs Age Scatter Plot



Year 2019 : Wage vs Age Scatter Plot



Year 2020 : Wage vs Age Scatter Plot



```

for (i in seq_along(fifa_datasets_list)) {

  players31_andless <- fifa_datasets_list[[i]] %>%
    filter(age <= 31) %>% select(age, wage_eur, value_eur)
  players_over31 <- fifa_datasets_list[[i]] %>%
    filter(age > 31) %>% select(age, wage_eur, value_eur)

  cor_31andless <- cor(players31_andless)
  print(paste("Year", years[[i]], ":", "Players <= 31"))
  print(round(cor_31andless, 2))
  #age and wage are +vely correlated but the correlation is not very high.

  players_over31 <- cor(players_over31)
  print(paste("Year", years[[i]], ":", "Players > 31"))
  print(round(players_over31, 2))
  #age and wage are -vely correlated but the correlation is not very high.
}

## [1] "Year 2016 : Players <= 31"
##       age wage_eur value_eur
## age      1.00     0.27     0.15
## wage_eur  0.27     1.00     0.91
## value_eur 0.15     0.91     1.00
## [1] "Year 2016 : Players > 31"
##       age wage_eur value_eur
## age      1.00    -0.08    -0.15

```

```

## wage_eur -0.08      1.00      0.87
## value_eur -0.15      0.87      1.00
## [1] "Year 2017 : Players <= 31"
##           age wage_eur value_eur
## age        1.00    0.23     0.15
## wage_eur   0.23    1.00     0.89
## value_eur  0.15    0.89     1.00
## [1] "Year 2017 : Players > 31"
##           age wage_eur value_eur
## age        1.00   -0.12    -0.17
## wage_eur  -0.12    1.00     0.81
## value_eur -0.17    0.81     1.00
## [1] "Year 2018 : Players <= 31"
##           age wage_eur value_eur
## age        1.00    0.20     0.16
## wage_eur   0.20    1.00     0.86
## value_eur  0.16    0.86     1.00
## [1] "Year 2018 : Players > 31"
##           age wage_eur value_eur
## age        1.00   -0.11    -0.17
## wage_eur  -0.11    1.00     0.86
## value_eur -0.17    0.86     1.00
## [1] "Year 2019 : Players <= 31"
##           age wage_eur value_eur
## age        1.00    0.19     0.16
## wage_eur   0.19    1.00     0.87
## value_eur  0.16    0.87     1.00
## [1] "Year 2019 : Players > 31"
##           age wage_eur value_eur
## age        1.00   -0.12    -0.18
## wage_eur  -0.12    1.00     0.88
## value_eur -0.18    0.88     1.00
## [1] "Year 2020 : Players <= 31"
##           age wage_eur value_eur
## age        1.00    0.19     0.15
## wage_eur   0.19    1.00     0.87
## value_eur  0.15    0.87     1.00
## [1] "Year 2020 : Players > 31"
##           age wage_eur value_eur
## age        1.00   -0.12    -0.18
## wage_eur  -0.12    1.00     0.92
## value_eur -0.18    0.92     1.00

```

3. Left footed players have a higher overall rating compared to right footed players

```

# Left footed players have a higher overall rating compared to right footed players
for (i in seq_along(fifa_datasets_list)) {
  left_foot <- fifa_datasets_list[[i]] %>% filter(preferred_foot=="Left") %>%
    summarise(avg_player_overall_left = mean(overall)) %>% mutate(year = years[[i]])

```

```

right_foot <- fifa_datasets_list[[i]] %>% filter(preferred_foot=="Right")%>%
  summarise(avg_player_overall_right = mean(overall)) %>% mutate(year = years[[i]])

foot_rating_year <- left_foot %>% left_join(right_foot)
print(foot_rating_year)
}

## Joining, by = "year"

## # A tibble: 1 x 3
##   avg_player_overall_left year avg_player_overall_right
##   <dbl> <chr>           <dbl>
## 1 66.2  2016             65.5

## Joining, by = "year"

##   avg_player_overall_left year avg_player_overall_right
##   <dbl> <chr>           <dbl>
## 1 66.73062 2017          66.06775

## Joining, by = "year"

## # A tibble: 1 x 3
##   avg_player_overall_left year avg_player_overall_right
##   <dbl> <chr>           <dbl>
## 1 66.7  2018             66.2

## Joining, by = "year"

## # A tibble: 1 x 3
##   avg_player_overall_left year avg_player_overall_right
##   <dbl> <chr>           <dbl>
## 1 66.8  2019             66.1

## Joining, by = "year"

## # A tibble: 1 x 3
##   avg_player_overall_left year avg_player_overall_right
##   <dbl> <chr>           <dbl>
## 1 66.7  2020             66.1

```

4. Tall, short and strong players are statistically good at

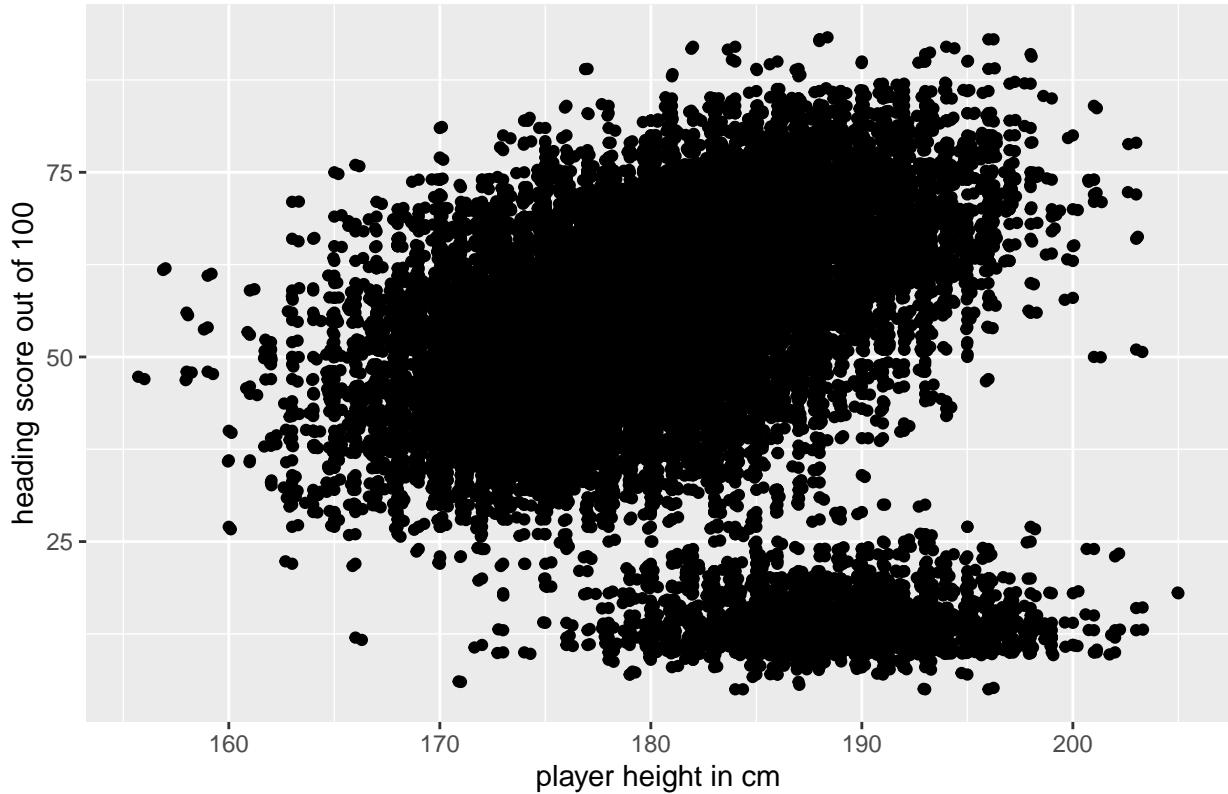
heading, dribbling and tackling respectively

```

# Tall players and heading: scatter plot of height vs heading
fifa20 %>% ggplot(aes(height_cm, attacking_heading_accuracy)) +
  geom_point() + geom_jitter() +
  labs(x="player height in cm", y="heading score out of 100",
       title = "Plot of height vs heading score")

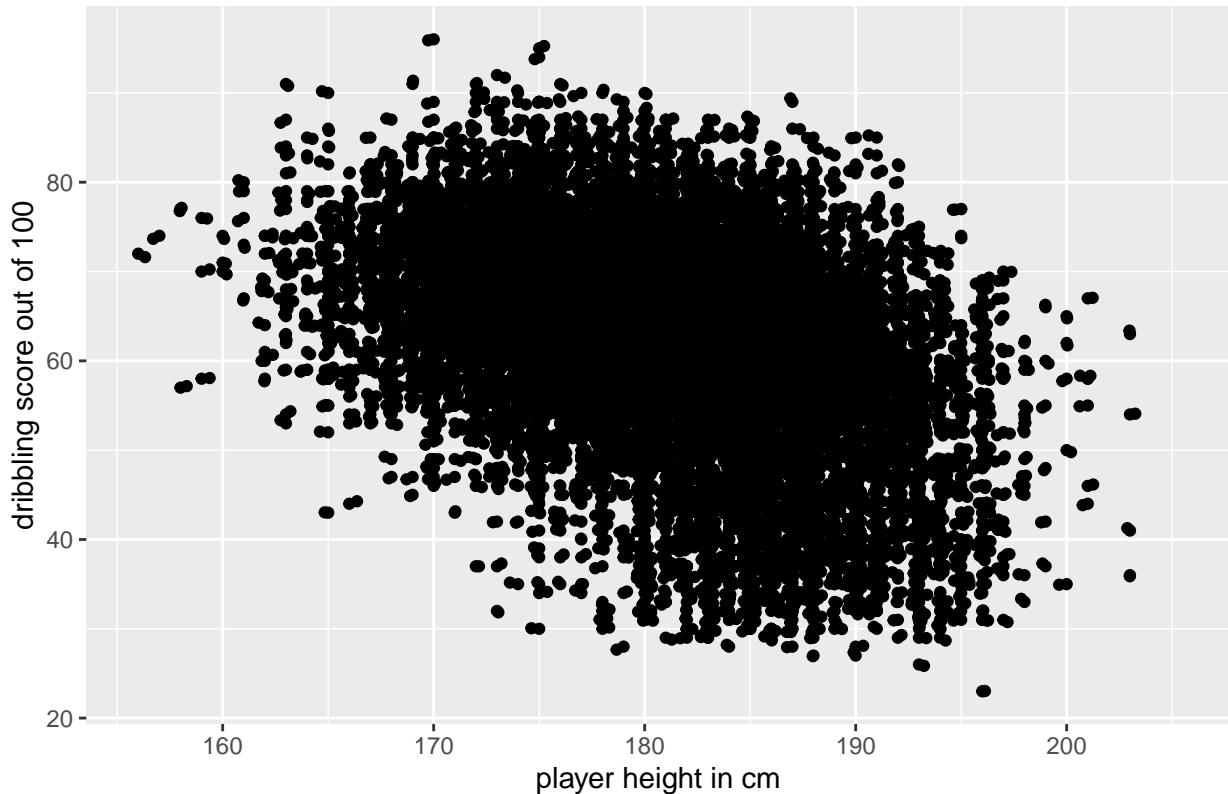
```

Plot of height vs heading score



```
# THIS IS A VERY INTERESTING FIND. WHY?  
cor(fifa20$height_cm, fifa20$attacking_heading_accuracy,  
    method = "spearman", use = "complete.obs")  
  
## [1] 0.2054838  
  
# There exists a weak positive correlation between height and heading.  
  
# Short players and dribbling: scatter plot of height vs dribbling  
fifa20 %>% ggplot(aes(height_cm, dribbling)) + geom_point() +  
  geom_jitter() + labs(x = "player height in cm", y = "dribbling score out of 100",  
    title = "Plot of height vs dribbling score")
```

Plot of height vs dribbling score

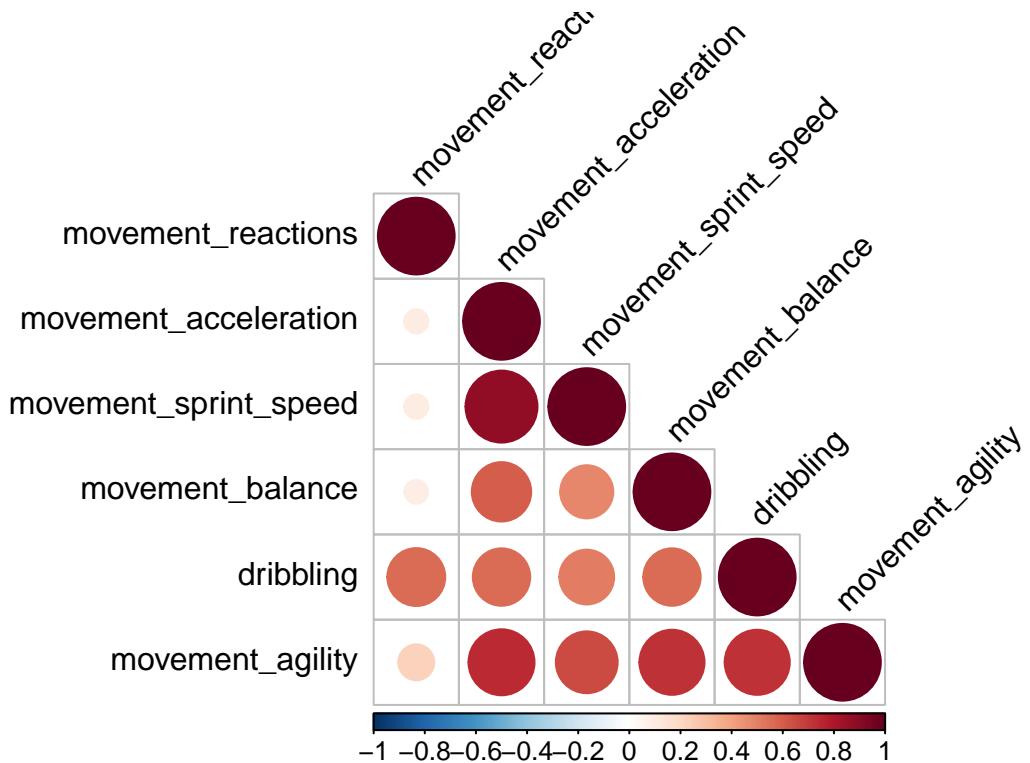


```
cor(fifa20$height_cm, fifa20$dribbling,
  method = "spearman", use = "complete.obs")  
  
## [1] -0.3946403  
  
# There is a weak negative correlation b/w height and dribbling ie short players are good at dribbling.  
  
#Dribbling and movement attributes:  
cor(fifa20$dribbling, fifa20$movement_agility,  
  method = "pearson", use = "complete.obs")  
  
## [1] 0.7241454  
  
#Dribbling and movement_agility are highly +vely correlated  
  
cor(fifa20$dribbling, fifa20$movement_balance,  
  method = "pearson", use = "complete.obs")  
  
## [1] 0.5581589  
  
#Dribbling and movement_balance are moderately +vely correlated  
  
# Correlation matrix for dribbling and movement attributes:
```

```

drib_move <- fifa20 %>% select(dribbling,movement_acceleration,
                                    movement_sprint_speed, movement_agility,
                                    movement_reactions, movement_balance)
source("http://www.sthda.com/upload/rquery_cormat.r")
require("corrplot")
rquery.cormat(drib_move)

```



```

## $r
##           movement_reactions movement_acceleration
## movement_reactions          1
## movement_acceleration      0.1          1
## movement_sprint_speed      0.1          0.88
## movement_balance           0.096         0.6
## dribbling                  0.57          0.56
## movement_agility           0.22          0.74
##           movement_sprint_speed movement_balance dribbling
## movement_reactions
## movement_acceleration
## movement_sprint_speed          1
## movement_balance              0.48          1
## dribbling                     0.51          0.56          1
## movement_agility              0.65          0.72          0.72
##           movement_agility
## movement_reactions
## movement_acceleration

```

```

## movement_sprint_speed
## movement_balance
## dribbling
## movement_agility           1
##
## $p
##               movement_reactions movement_acceleration
## movement_reactions          0
## movement_acceleration      2.8e-151
## movement_sprint_speed      1.7e-155
## movement_balance            3.1e-97
## dribbling                   0
## movement_agility            5.89999999999934e-312
##               movement_sprint_speed movement_balance dribbling
## movement_reactions
## movement_acceleration
## movement_sprint_speed      0
## movement_balance            0
## dribbling                   0
## movement_agility            0
##               movement_agility
## movement_reactions
## movement_acceleration
## movement_sprint_speed
## movement_balance
## dribbling
## movement_agility           0
##
## $sym
##               movement_reactions movement_acceleration
## movement_reactions          1
## movement_acceleration       1
## movement_sprint_speed       +
## movement_balance             .
## dribbling                   .
## movement_agility            ,
##               movement_sprint_speed movement_balance dribbling
## movement_reactions
## movement_acceleration
## movement_sprint_speed      1
## movement_balance            .
## dribbling                   .
## movement_agility            ,
##               movement_agility
## movement_reactions
## movement_acceleration
## movement_sprint_speed
## movement_balance
## dribbling
## movement_agility           1
## attr(,"legend")
## [1] 0  ' 0.3 . 0.6 , 0.8 +' 0.9 '*' 0.95 'B' 1

```

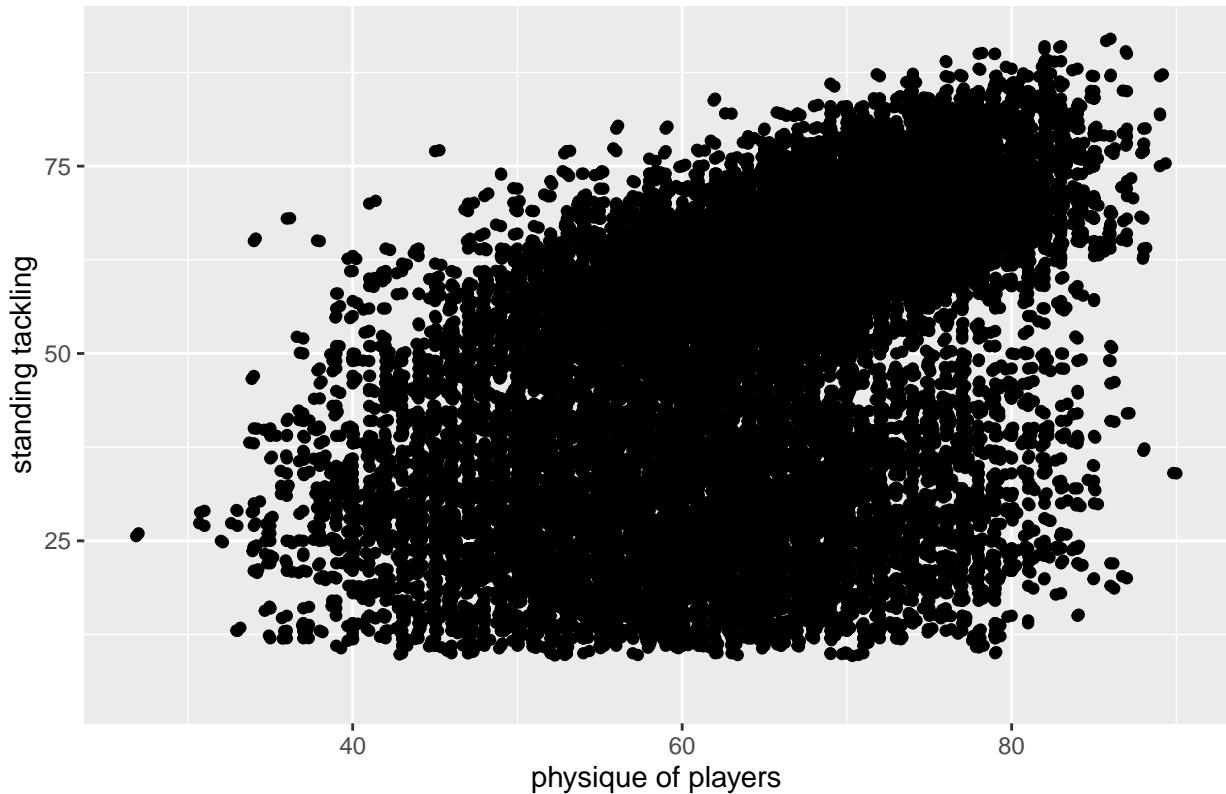
```

# We can see from the corrplot that dribbling is highly
# +vely correlated with the movement attributes.

# Strong players and tackling(both standing and sliding)
# scatter plot of physique vs standing tackling
fifa20 %>% ggplot(aes(physic, defending_standing_tackle)) +geom_point() +
  geom_jitter() +labs(x="physique of players", y="standing tackling",
  title = "physique vs standing tackling")

```

physique vs standing tackling



```

cor(fifa20$physic, fifa20$defending_standing_tackle,
  method = "pearson", use = "complete.obs")

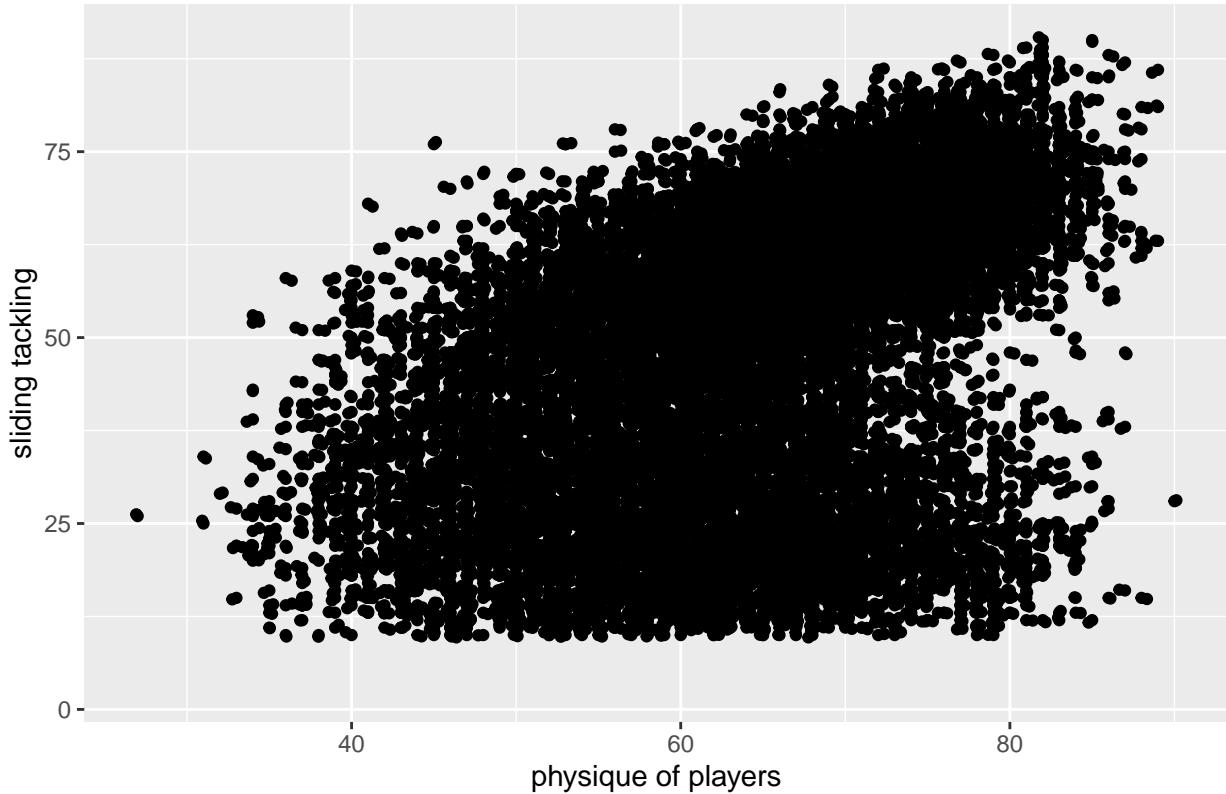
## [1] 0.4896467

# Moderate +ve correlation

# Scatter plot of physique vs sliding tackling
fifa20 %>% ggplot(aes(physic, defending_sliding_tackle)) +geom_point() +
  geom_jitter() +labs(x="physique of players", y="sliding tackling",
  title = "physique vs sliding tackling")

```

physique vs sliding tackling



```
cor(fifa20$physic, fifa20$defending_sliding_tackle,
  method = "pearson", use = "complete.obs")
```

```
## [1] 0.4515019
```

```
# Moderate +ve correlation
```

```
team_of_the_year <- function(year_data) {
```

```
  team_11 <- vector(mode = "list", length = 11)
```

```
  # STRIKER - positions to be considered: ST, CF, LS, RS, LF, RF
```

```
  striker <- year_data %>% filter(team_position %in% c("ST", "CF", "LS", "RS", "LF", "RF")) %>%
    arrange(desc(overall)) %>% select(short_name, team_position, overall) %>% top_n(1)
```

```
  team_11[[1]] = data.frame(striker)
```

```
  # Wingers: 2 wingers to be picked, one on the left and one on the right.
```

```
  # positions to be considered: RW, LW
```

```
  lw <- year_data %>% filter(team_position %in% c("LW")) %>%
    arrange(desc(overall)) %>% select(short_name, team_position, overall) %>% top_n(1)
```

```
  team_11[[2]] = data.frame(lw)
```

```
  rw <- year_data %>% filter(team_position %in% c("RW")) %>%
    arrange(desc(overall)) %>% select(short_name, team_position, overall) %>% top_n(1)
```

```
  team_11[[3]] = data.frame(rw)
```

```

# 1 AM, positions: CAM, LAM, RAM
am <- year_data %>% filter(team_position %in% c("CAM", "LAM", "RAM")) %>%
  arrange(desc(overall)) %>% select(short_name, team_position, overall) %>% top_n(1)
team_11[[4]] = data.frame(am)

# 2 midfielders, one on the right and one on the left:
# right midfielder: RCM, CDM, RDM, CM
rm <- year_data %>% filter(team_position %in% c("RCM", "CDM", "RDM", "CM")) %>%
  arrange(desc(overall)) %>% select(short_name, team_position, overall) %>% top_n(1)
team_11[[5]] = data.frame(rm)

# left midfielder: LCM, CDM, LDM, CM
lm <- year_data %>% filter(team_position %in% c("LCM", "CDM", "LDM", "CM")) %>%
  arrange(desc(overall)) %>% select(short_name, team_position, overall) %>% top_n(1)
team_11[[6]] = data.frame(lm)

# 2 wing backs, one on the right and one on the left:
# left back, positions to be considered: LB, LWB
lb <- year_data %>% filter(team_position %in% c("LWB", "LB")) %>%
  arrange(desc(overall)) %>% select(short_name, team_position, overall) %>% top_n(1)
team_11[[7]] = data.frame(lb)

# right back, positions to be considered: RB, RWB
rb <- year_data %>% filter(team_position %in% c("RWB", "RB")) %>%
  arrange(desc(overall)) %>% select(short_name, team_position, overall) %>% top_n(1)
team_11[[8]] = data.frame(rb)

# 2 centre backs:
# positions to be considered: LCB, RCB
lcb <- year_data %>% filter(team_position %in% c("LCB")) %>%
  arrange(desc(overall)) %>% select(short_name, team_position, overall) %>% top_n(1)
team_11[[9]] = data.frame(lcb)

rcb <- year_data %>% filter(team_position %in% c("RCB")) %>%
  arrange(desc(overall)) %>% select(short_name, team_position, overall) %>% top_n(1)
team_11[[10]] = data.frame(rcb)

gk <- year_data %>% filter(team_position %in% c("GK")) %>%
  arrange(desc(overall)) %>% select(short_name, team_position, overall) %>% top_n(1)
team_11[[11]] = data.frame(gk)

best11 <- do.call("rbind", team_11)
print(best11)
}

```

5. The starting eleven with the highest overall rating for a given year wins the champions league that year


```

## 13          L. Bonucci      RCB      88
## 14          M. Neuer        GK       92
## [1] "Year 2019 :"

## Selecting by overall

##             short_name team_position overall
## 1           L. Suárez        ST      91
## 2 Cristiano Ronaldo      LW      94
## 3           L. Messi        RW      94
## 4        Neymar Jr        CAM     92
## 5       K. De Bruyne      RCM     91
## 6        L. Modrić        RCM     91
## 7         T. Kroos        LCM     90
## 8         Marcelo         LB      88
## 9    Azpilicueta        RB      86
## 10       Sergio Ramos     LCB     91
## 11        Piqué          RCB     87
## 12       De Gea           GK      91
## [1] "Year 2020 :"

## Selecting by overall

##             short_name team_position overall
## 1           H. Kane        ST      89
## 2        S. Agüero        ST      89
## 3           L. Suárez      ST      89
## 4      R. Lewandowski     ST      89
## 5 Cristiano Ronaldo      LW      93
## 6           L. Messi        RW      94
## 7        Neymar Jr        CAM     92
## 8       K. De Bruyne      RCM     91
## 9      Sergio Busquets    CDM     89

```

```

## 10      Jordi Alba      LB      87
## 11      J. Kimmich     RB      86
## 12      V. van Dijk    LCB     90
## 13      Piqué          RCB     88
## 14      D. Godín        RCB     88
## 15      J. Oblak         GK     91

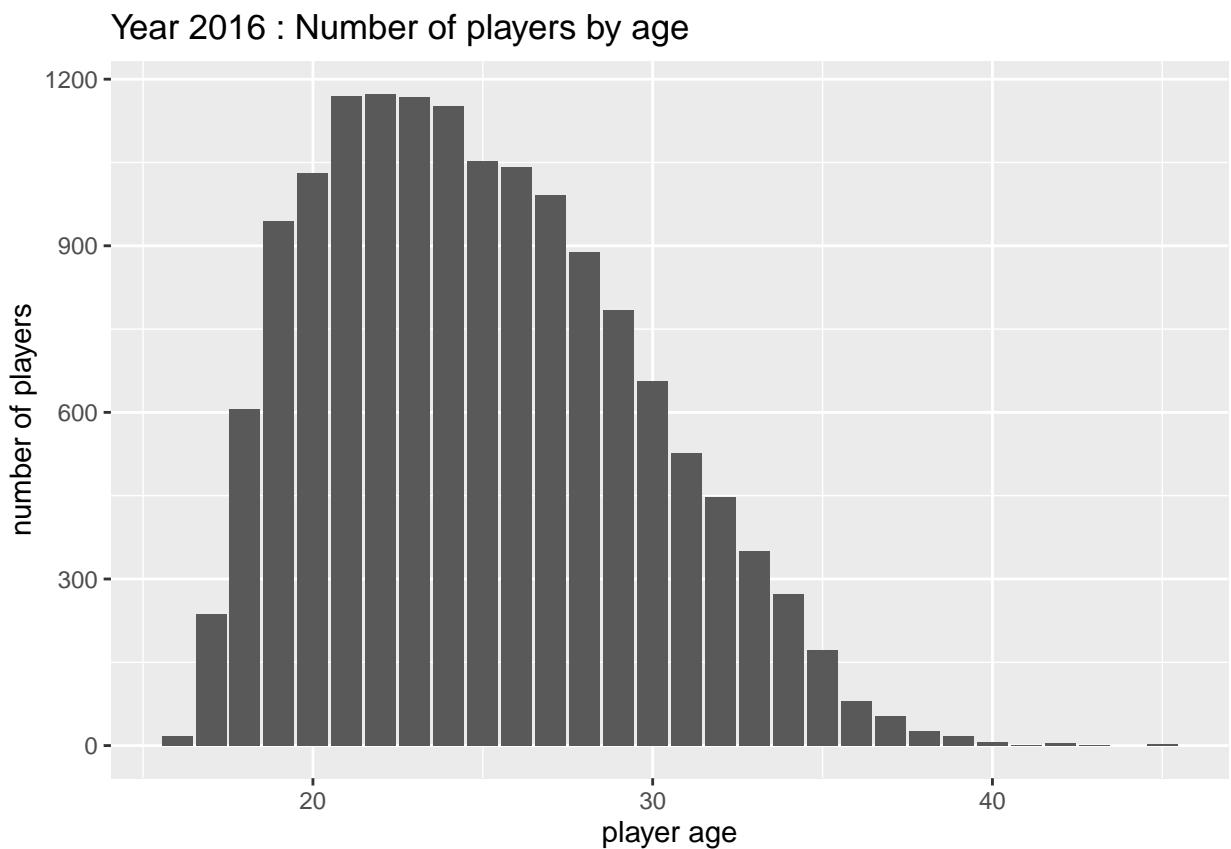
```

Other Supplementary EDA

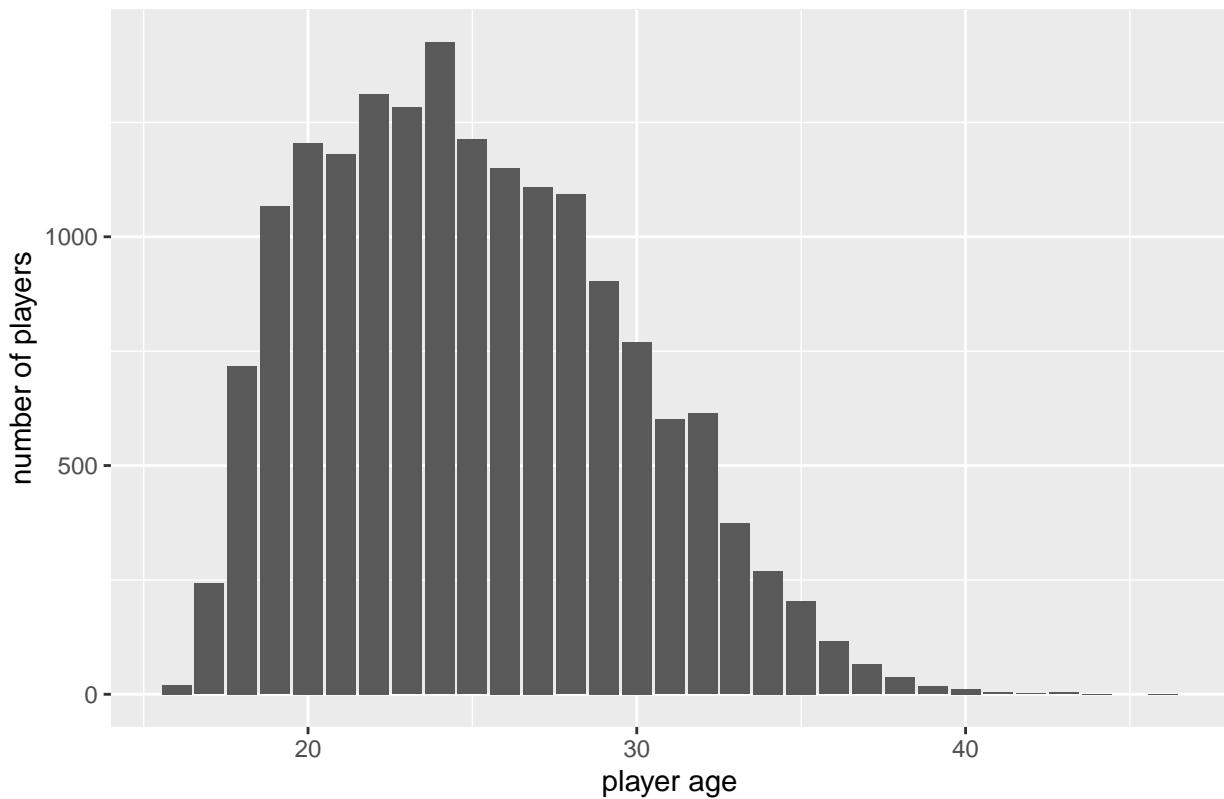
```

# Histogram of player age by year
for (i in seq_along(fifa_datasets_list)) {
  player_age_by_year <- fifa_datasets_list[[i]] %>% ggplot(aes(age)) +
    geom_bar() +
    labs(x="player age", y="number of players",
         title=paste("Year", years[[i]], ":", "Number of players by age"))
  print(player_age_by_year)
}

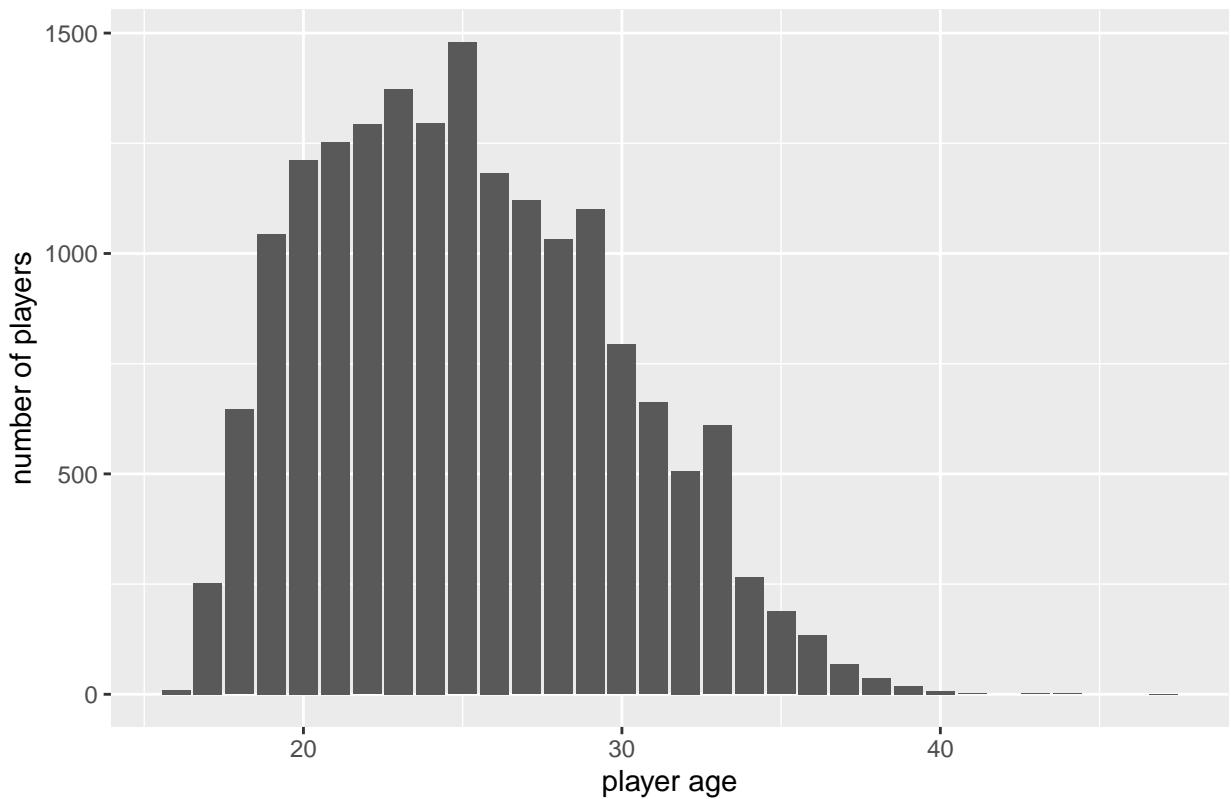
```



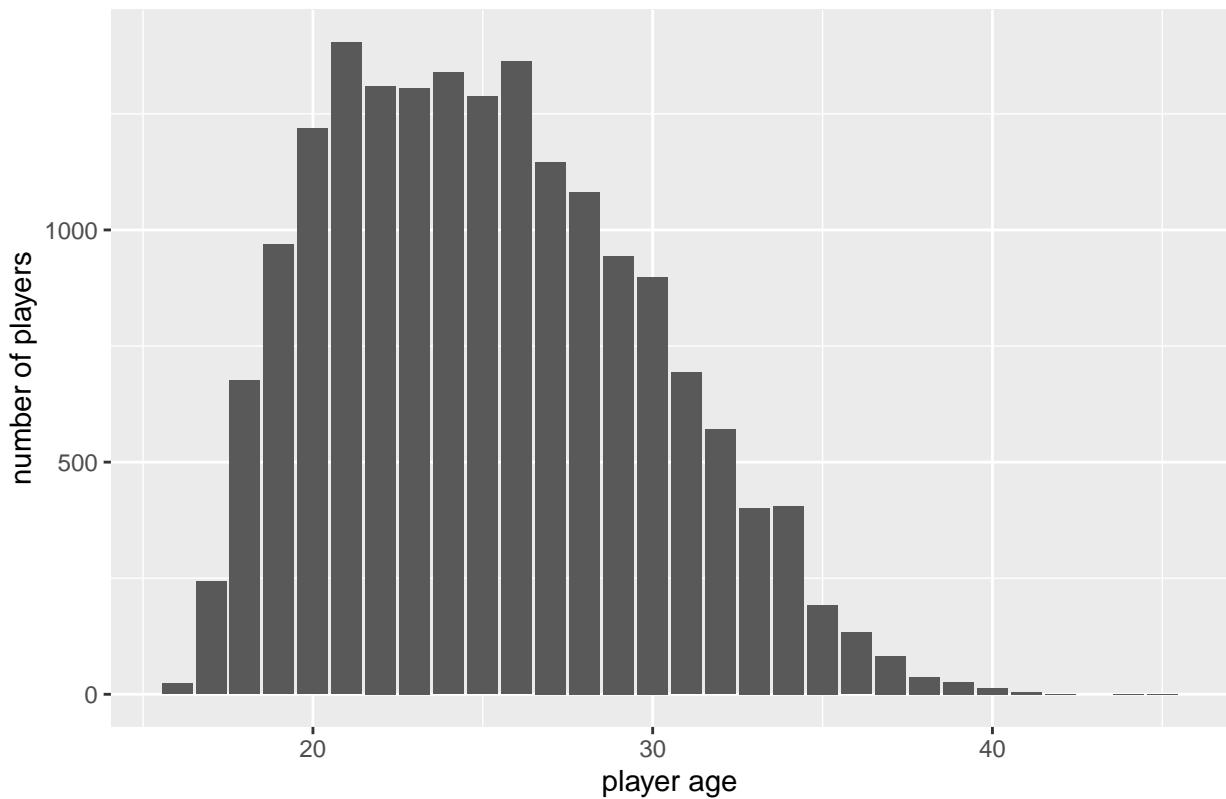
Year 2017 : Number of players by age

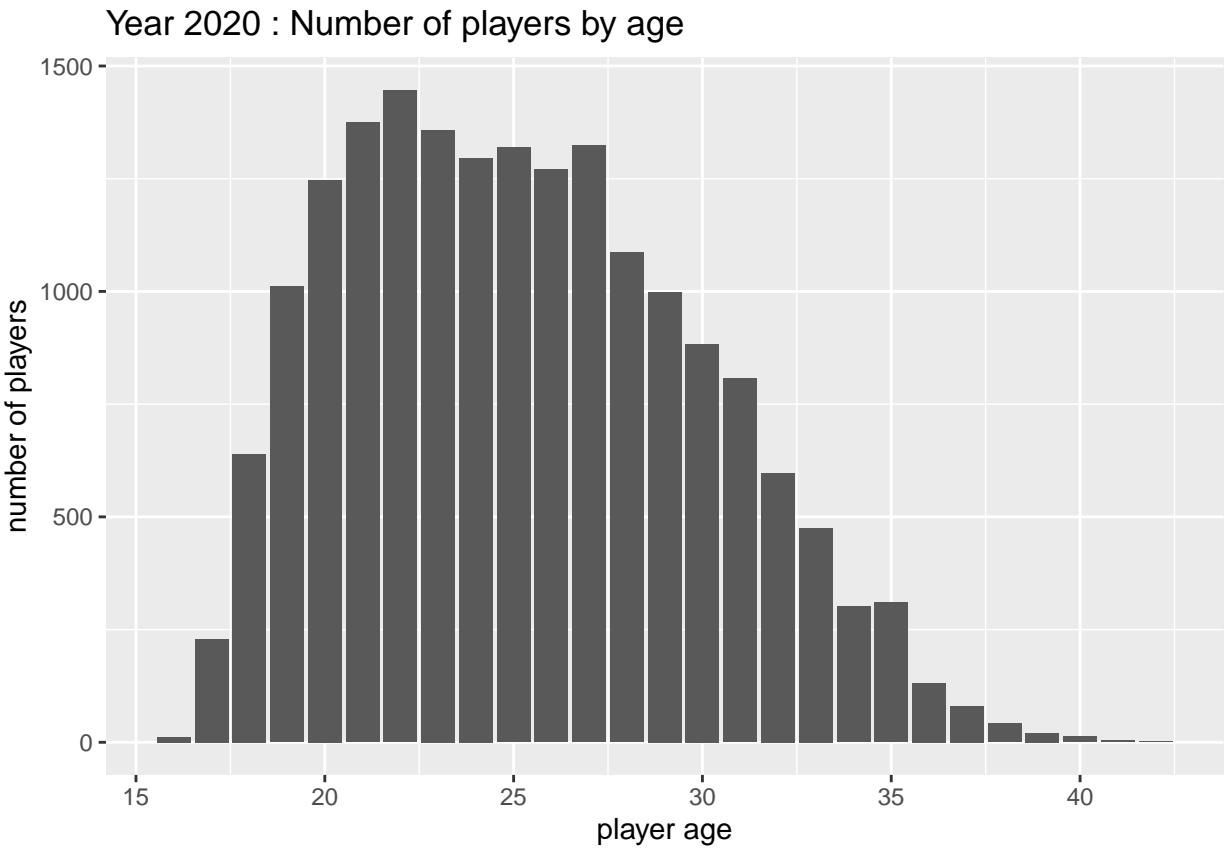


Year 2018 : Number of players by age



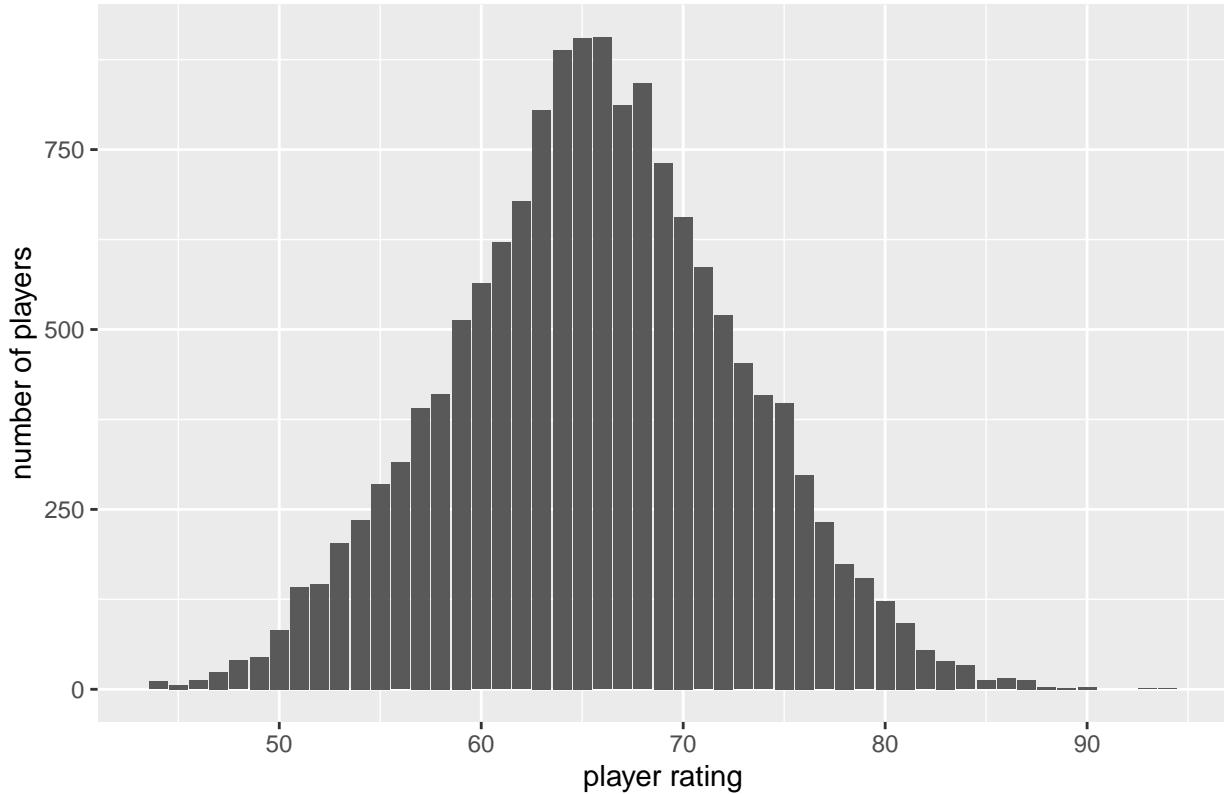
Year 2019 : Number of players by age



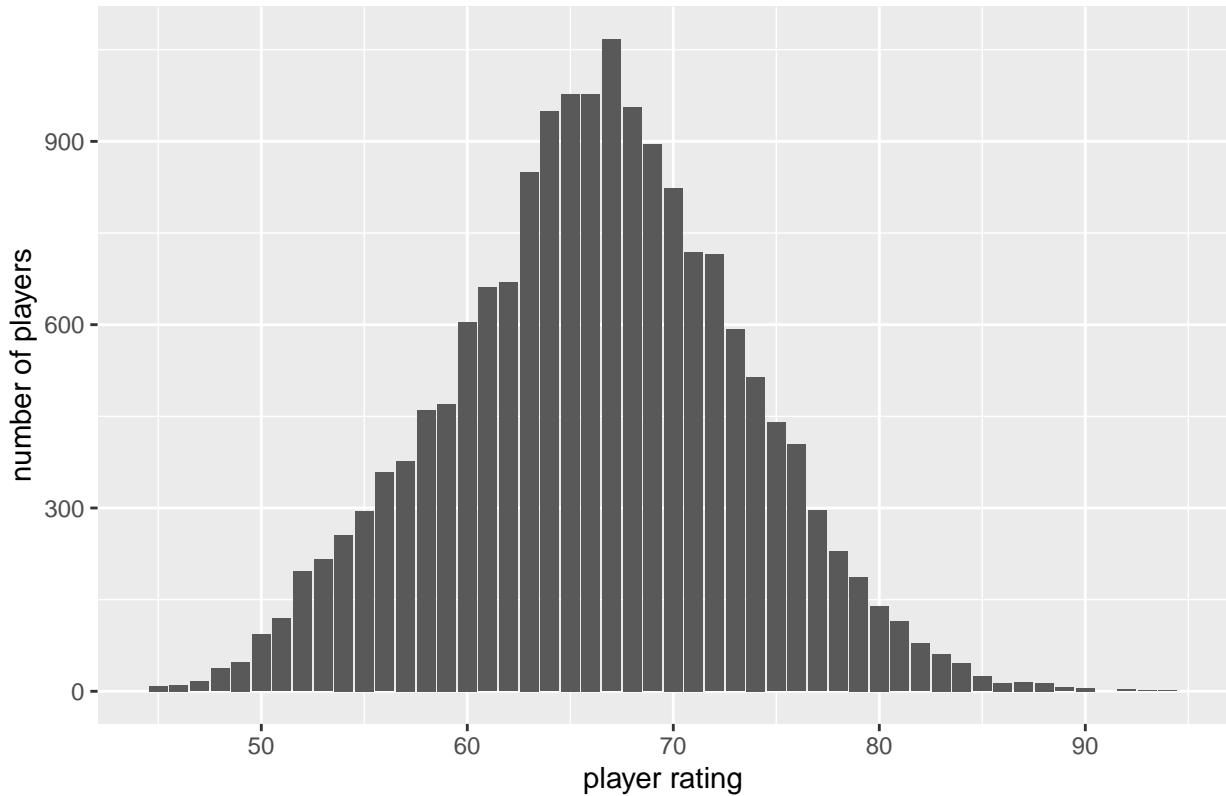


```
# Histogram of player rating by year
for (i in seq_along(fifa_datasets_list)) {
  player_rating_by_year <- fifa_datasets_list[[i]] %>% ggplot(aes(overall)) +
    geom_bar() +
    labs(x="player rating", y="number of players",
         title=paste("Year", years[[i]], ":", "Number of players by rating"))
  print(player_rating_by_year)
}
```

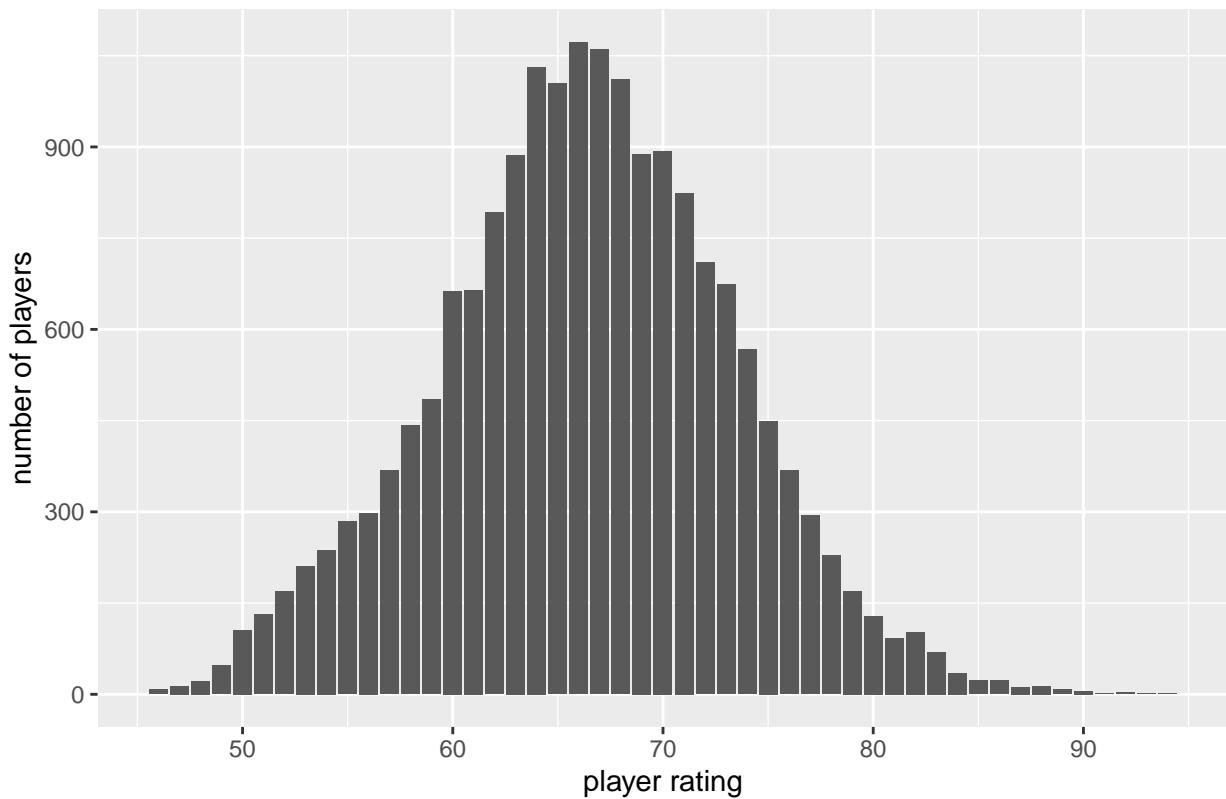
Year 2016 : Number of players by rating



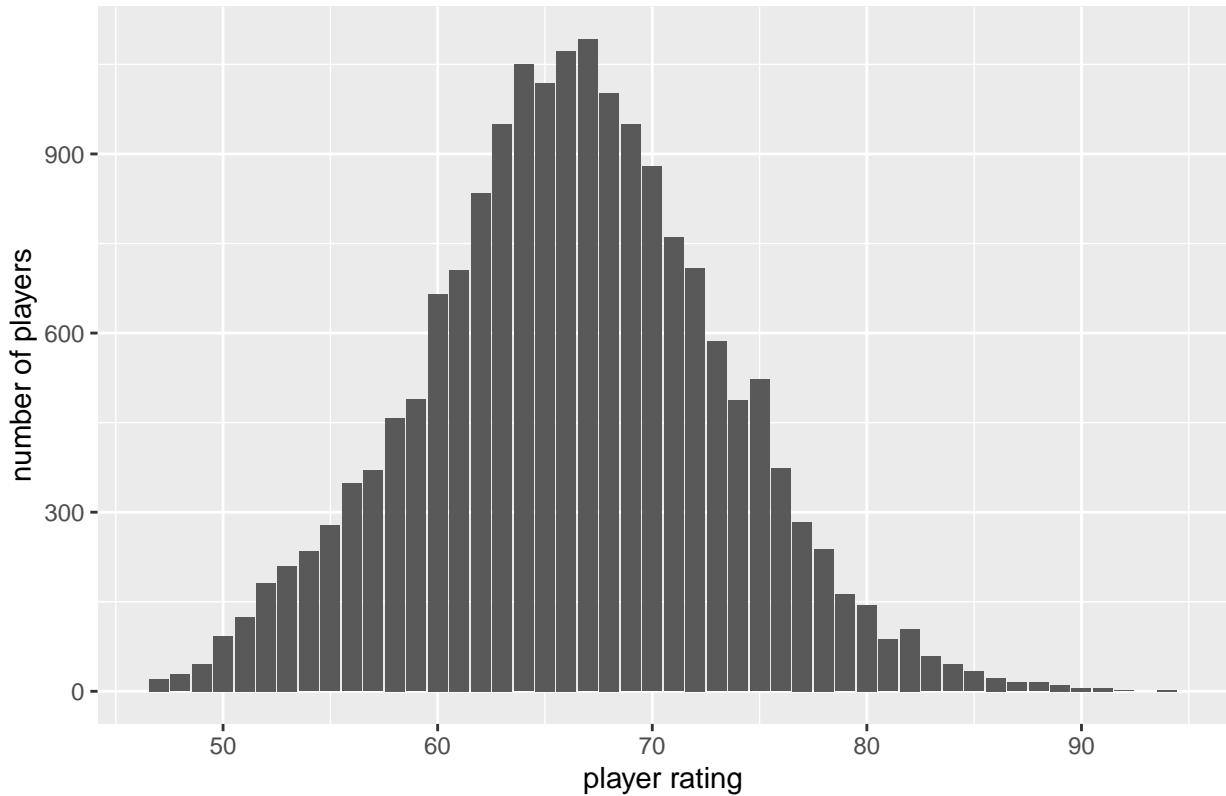
Year 2017 : Number of players by rating



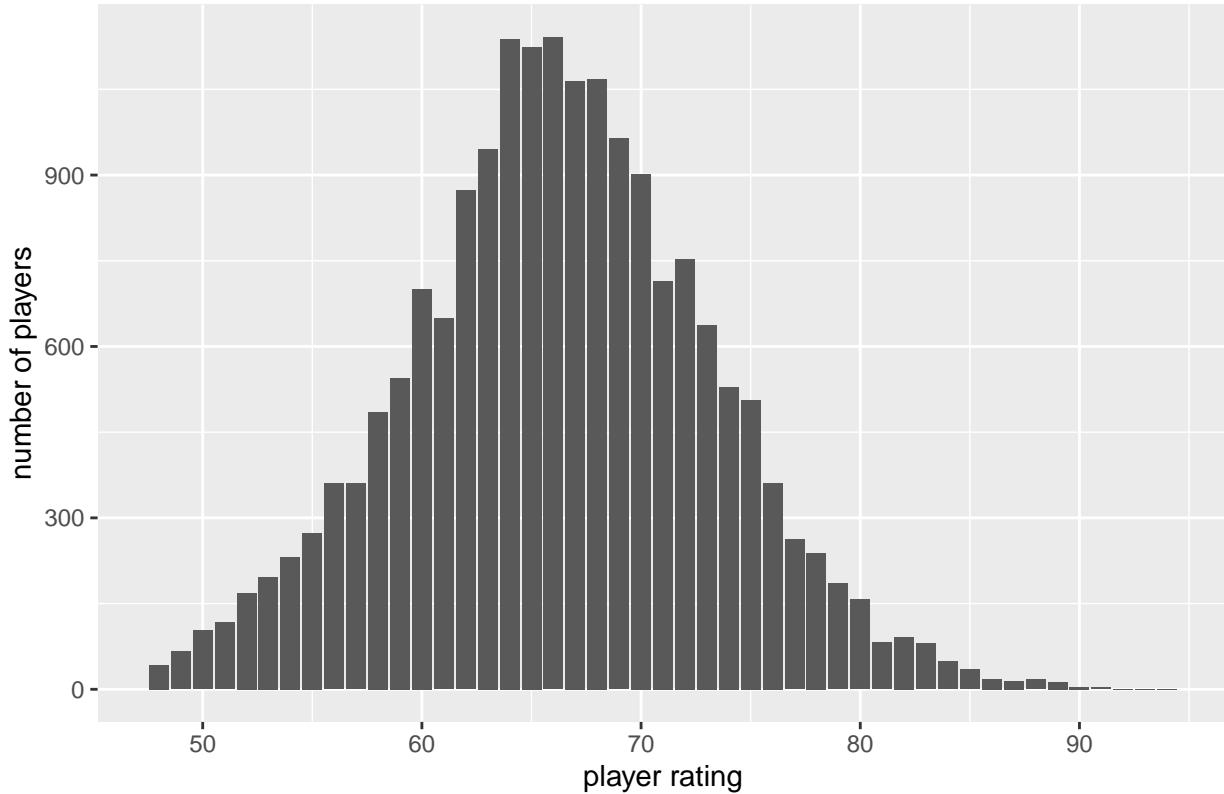
Year 2018 : Number of players by rating



Year 2019 : Number of players by rating



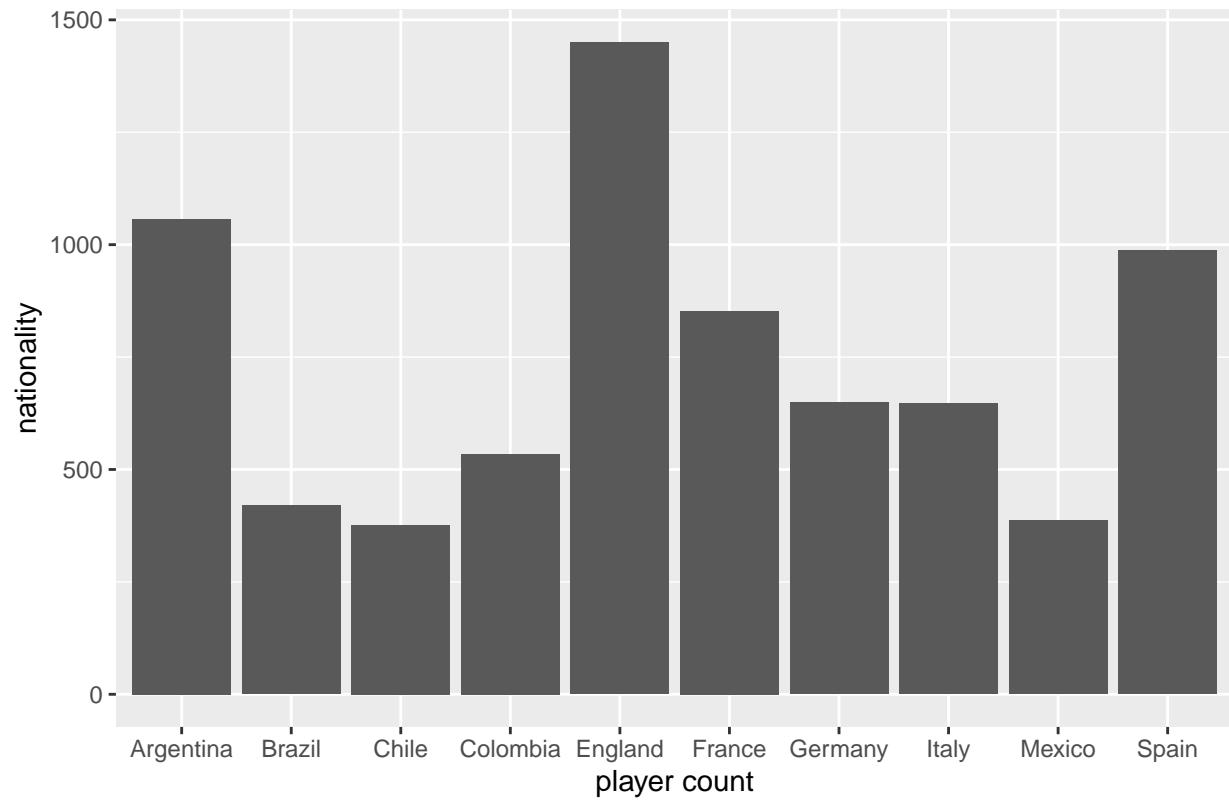
Year 2020 : Number of players by rating



```
# Which country has the most players by year
for (i in seq_along(fifa_datasets_list)) {
  country_by_players_count <- fifa_datasets_list[[i]] %>% group_by(nationality) %>%
    summarise(count=n()) %>% arrange(desc(count)) %>% top_n(10) %>%
    ggplot(aes(x=nationality,y=count)) + geom_bar(stat = "identity") +
    labs(x="player count", y="nationality",
         title=paste("Year", years[[i]], ":", "Which Country has the most Players?"))
  print(country_by_players_count)
}

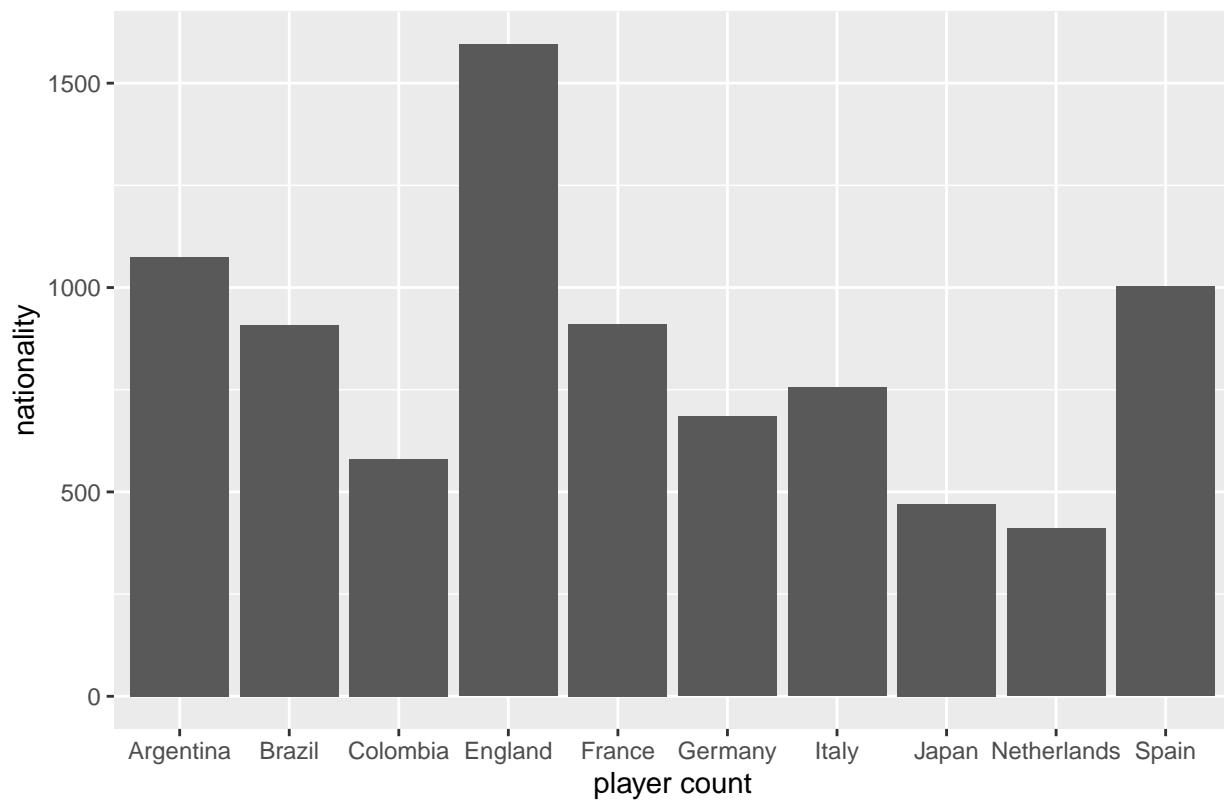
## Selecting by count
## Selecting by count
```

Year 2016 : Which Country has the most Players?



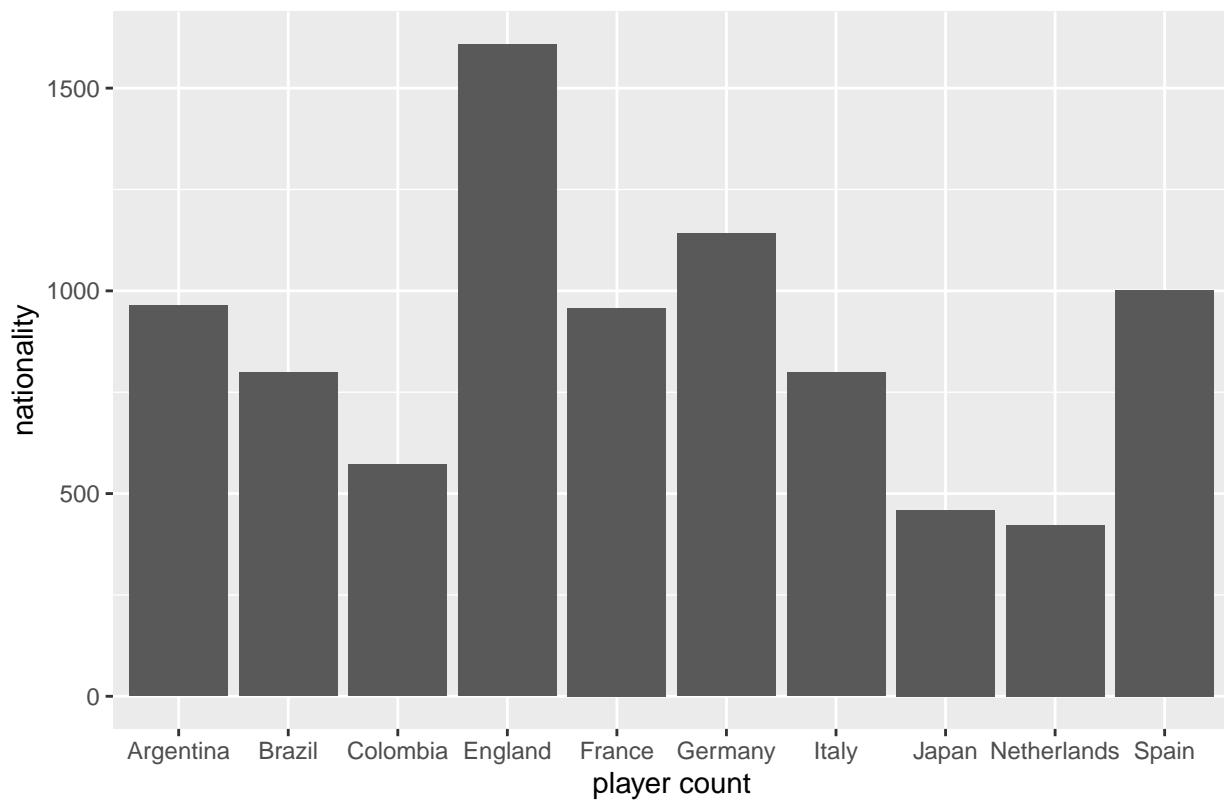
```
## Selecting by count
```

Year 2017 : Which Country has the most Players?



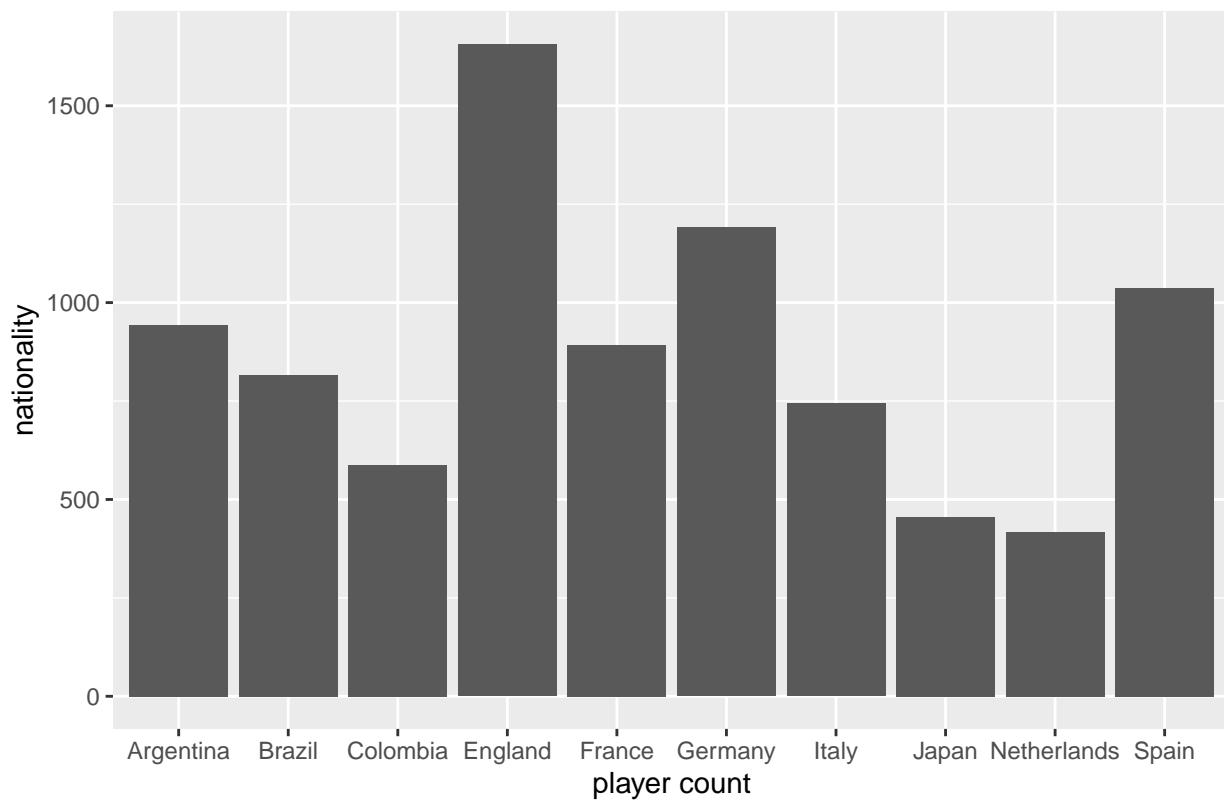
```
## Selecting by count
```

Year 2018 : Which Country has the most Players?

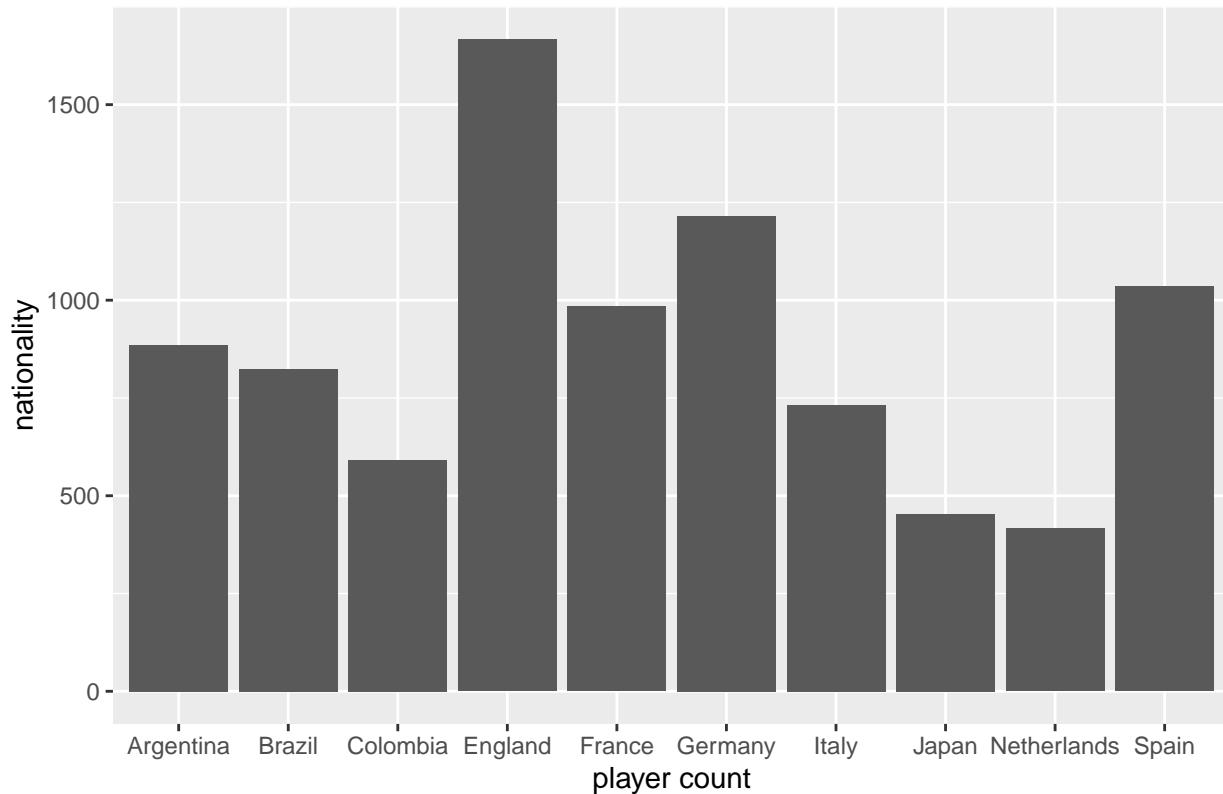


```
## Selecting by count
```

Year 2019 : Which Country has the most Players?

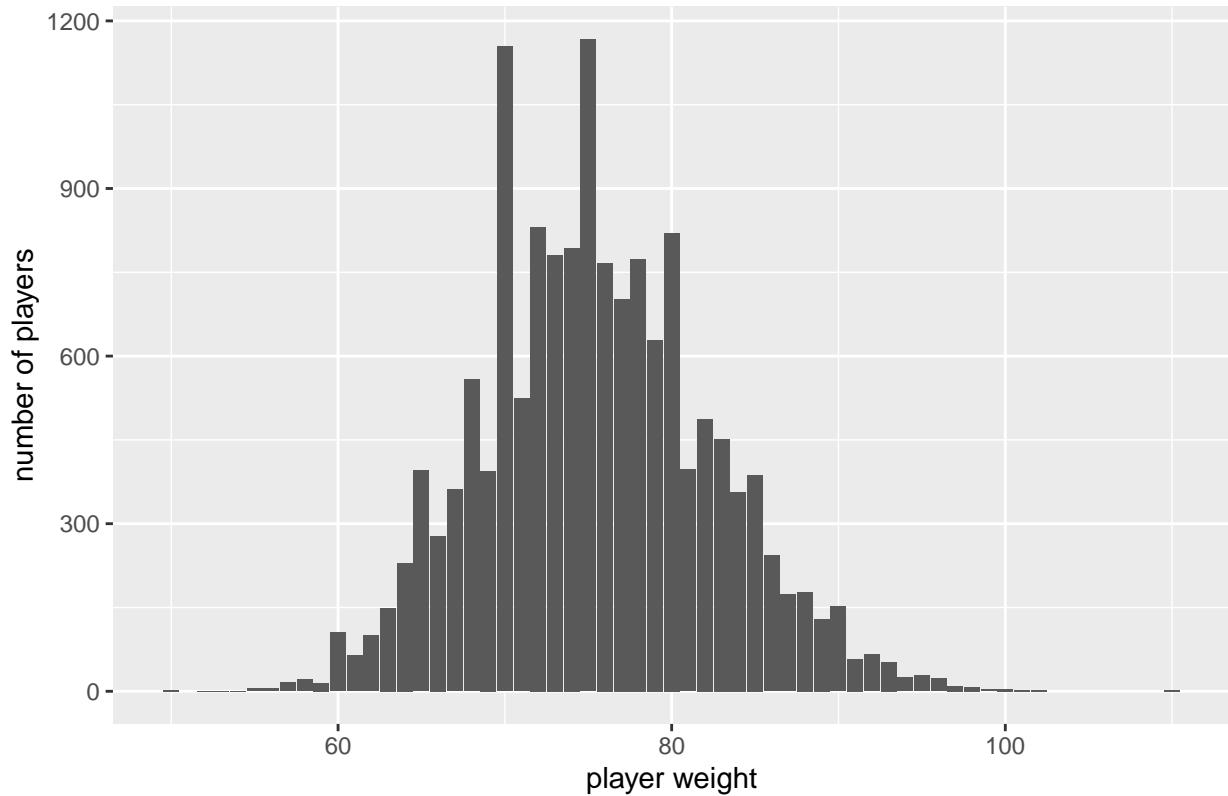


Year 2020 : Which Country has the most Players?

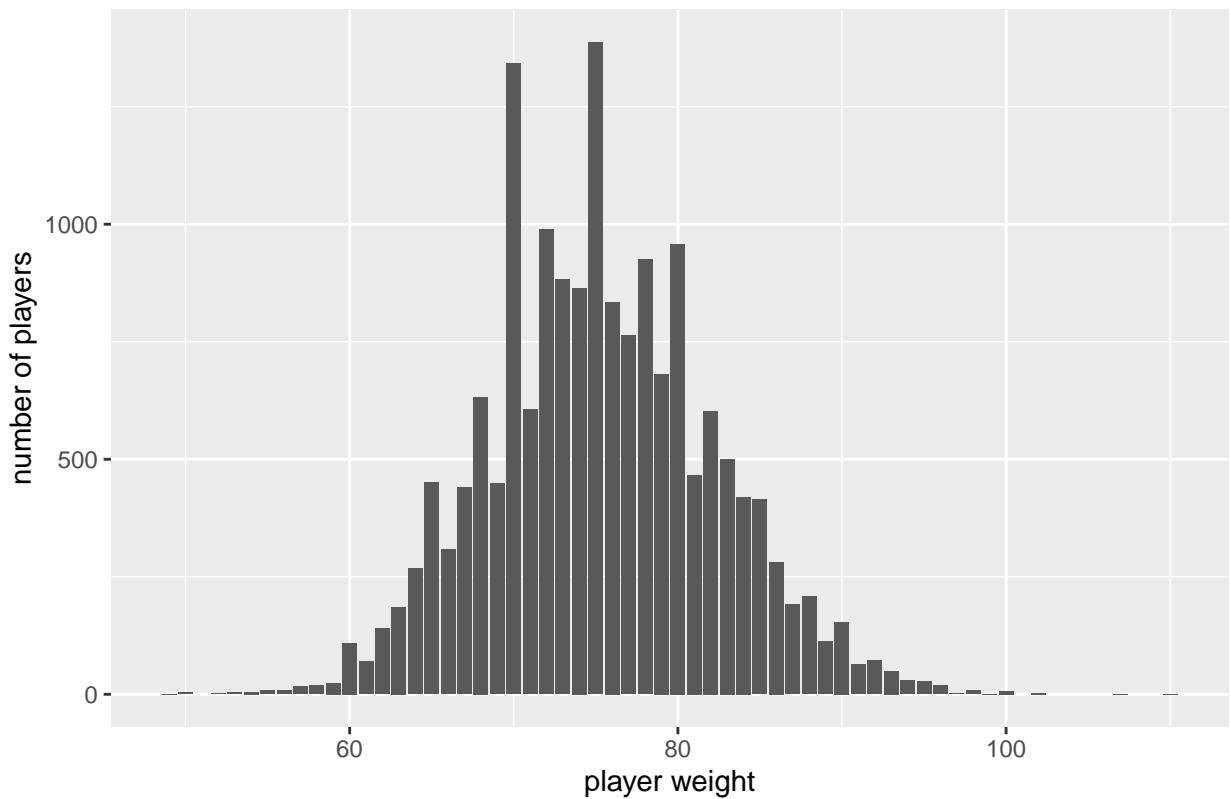


```
# Histogram of weight in kgs by year
for (i in seq_along(fifa_datasets_list)) {
  player_weight_by_year <- fifa_datasets_list[[i]] %>%
    ggplot(aes(weight_kg)) +
    geom_bar() +
    labs(x="player weight", y="number of players",
         title=paste("Year", years[[i]], ":", "Number of players by weight in kgs" ))
  print(player_weight_by_year)
}
```

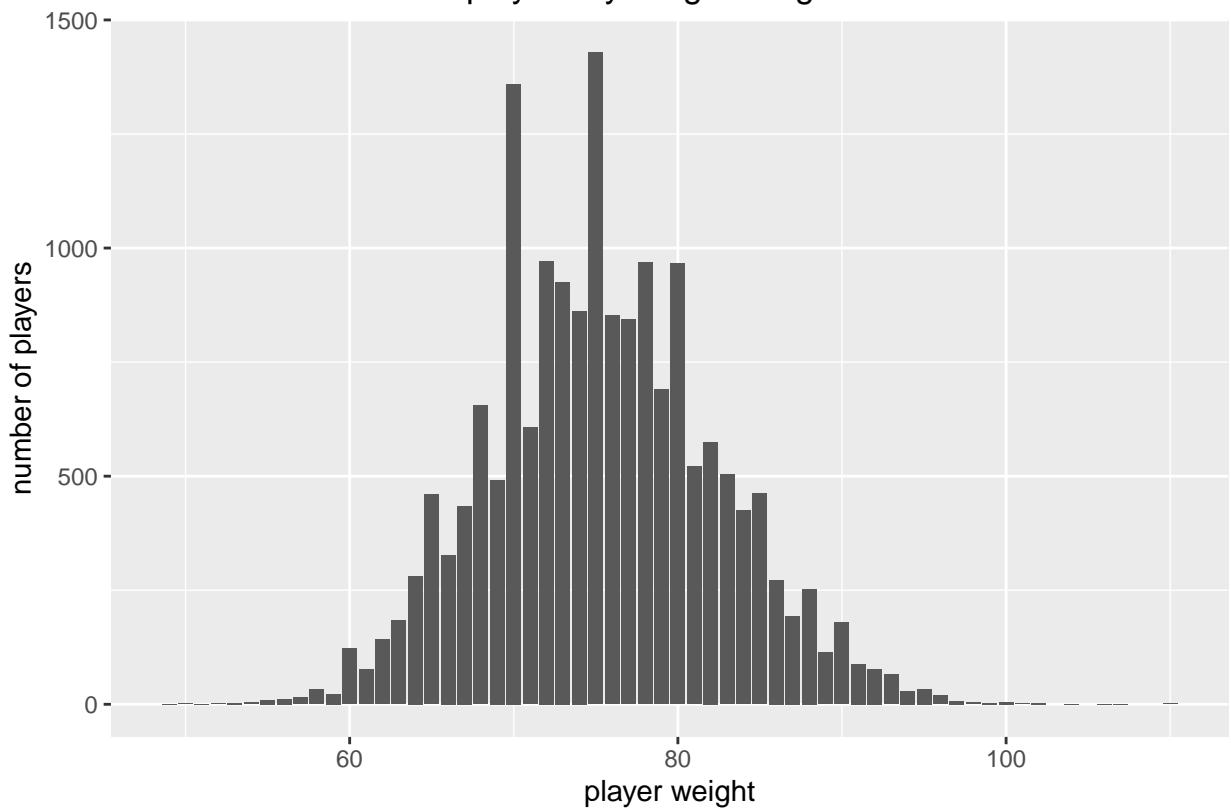
Year 2016 : Number of players by weight in kgs



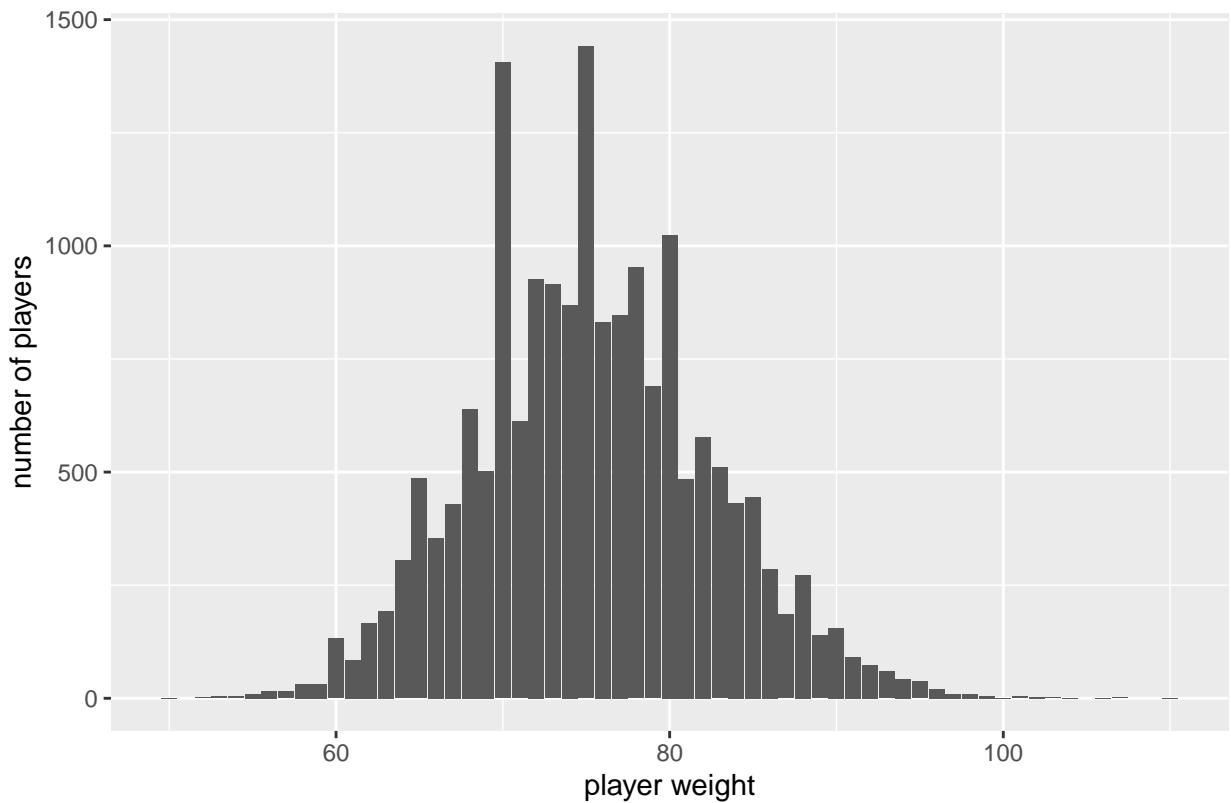
Year 2017 : Number of players by weight in kgs



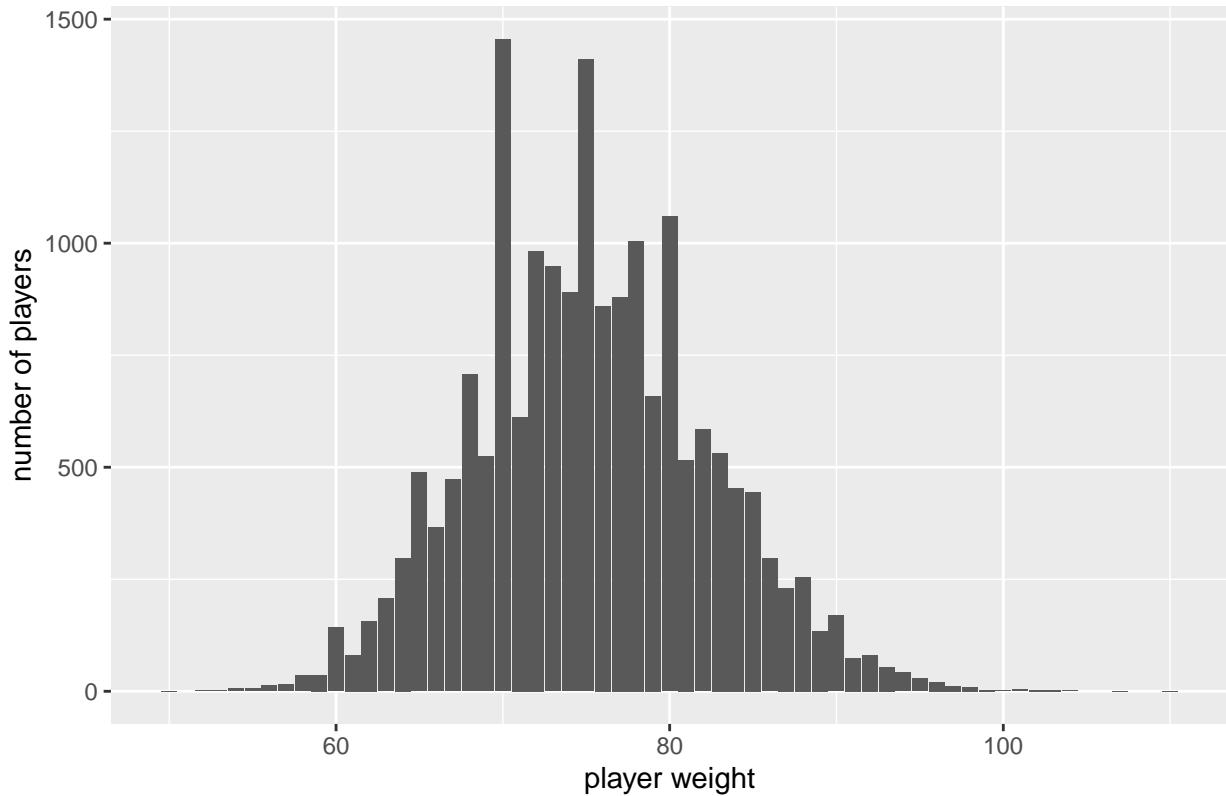
Year 2018 : Number of players by weight in kgs



Year 2019 : Number of players by weight in kgs

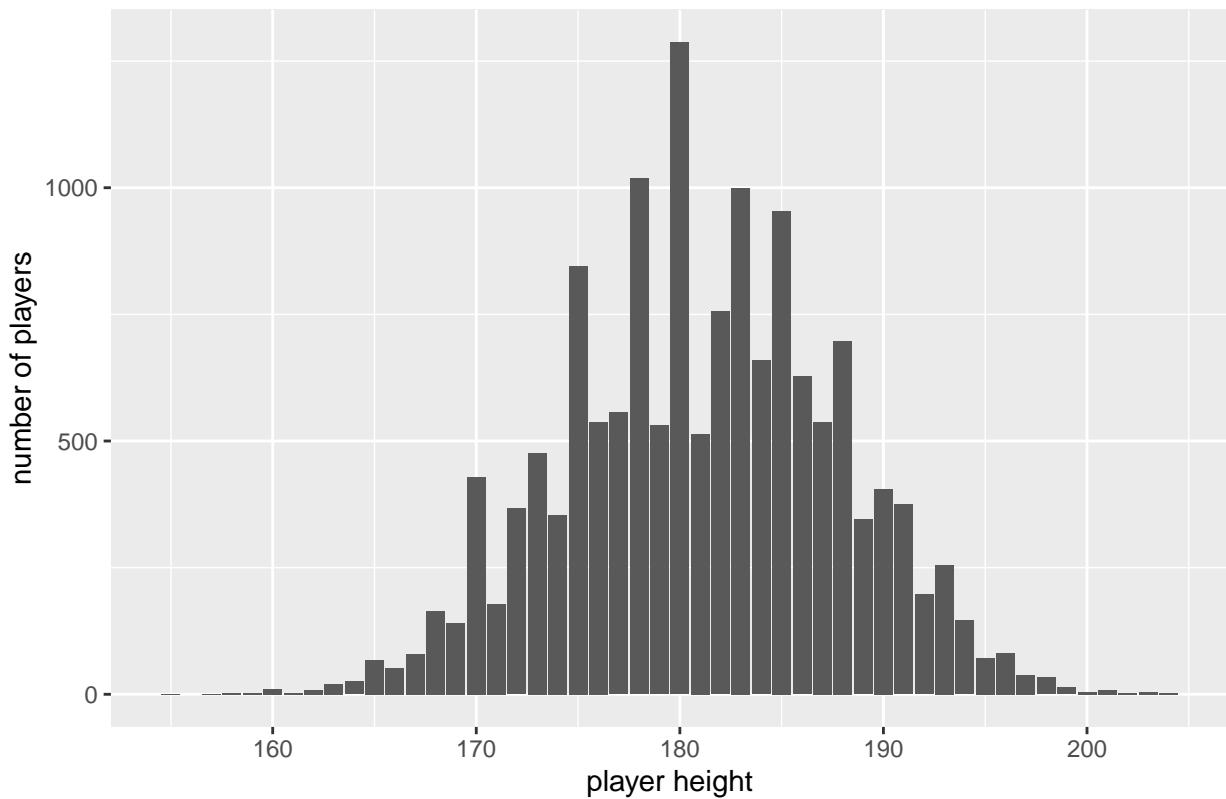


Year 2020 : Number of players by weight in kgs

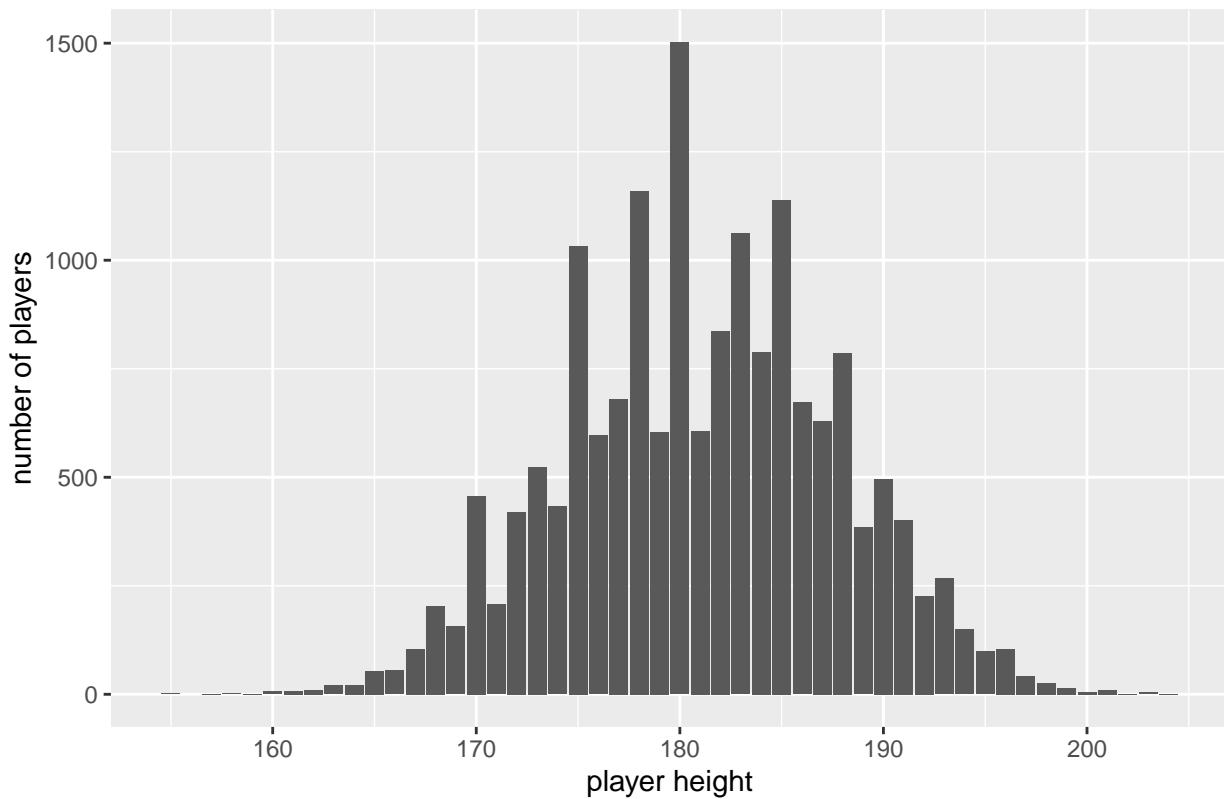


```
# Histogram of height in cms by year
for (i in seq_along(fifa_datasets_list)) {
  player_height_by_year <- fifa_datasets_list[[i]] %>%
    ggplot(aes(height_cm)) +
    geom_bar() +
    labs(x="player height", y="number of players",
         title=paste("Year", years[[i]], ":", "Number of players by height in cms" ))
  print(player_height_by_year)
}
```

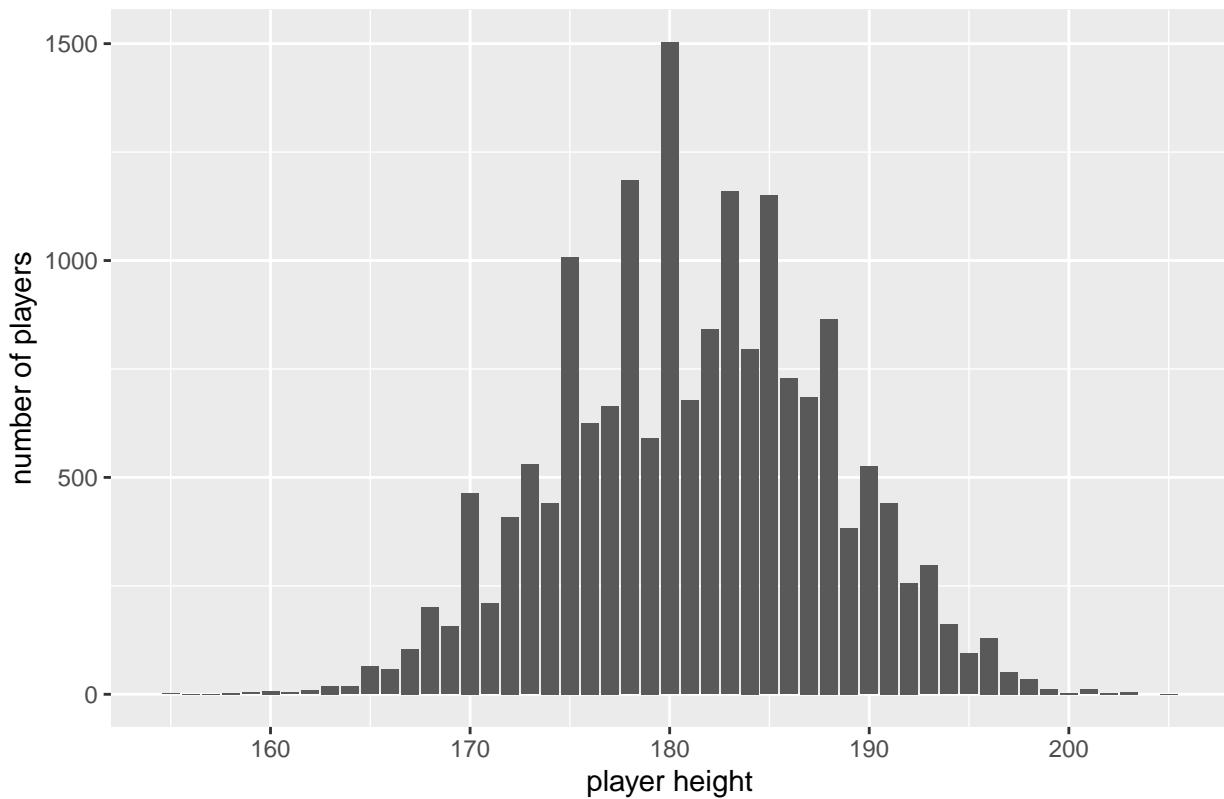
Year 2016 : Number of players by height in cms



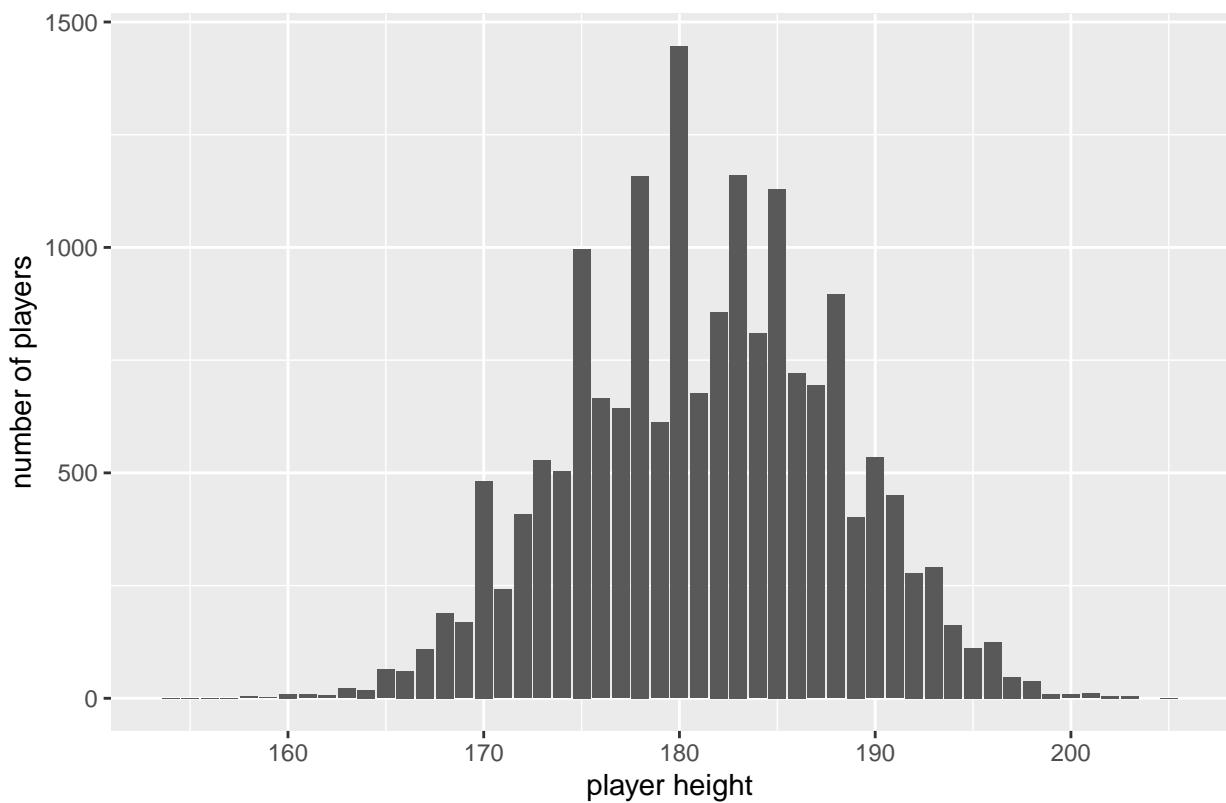
Year 2017 : Number of players by height in cms



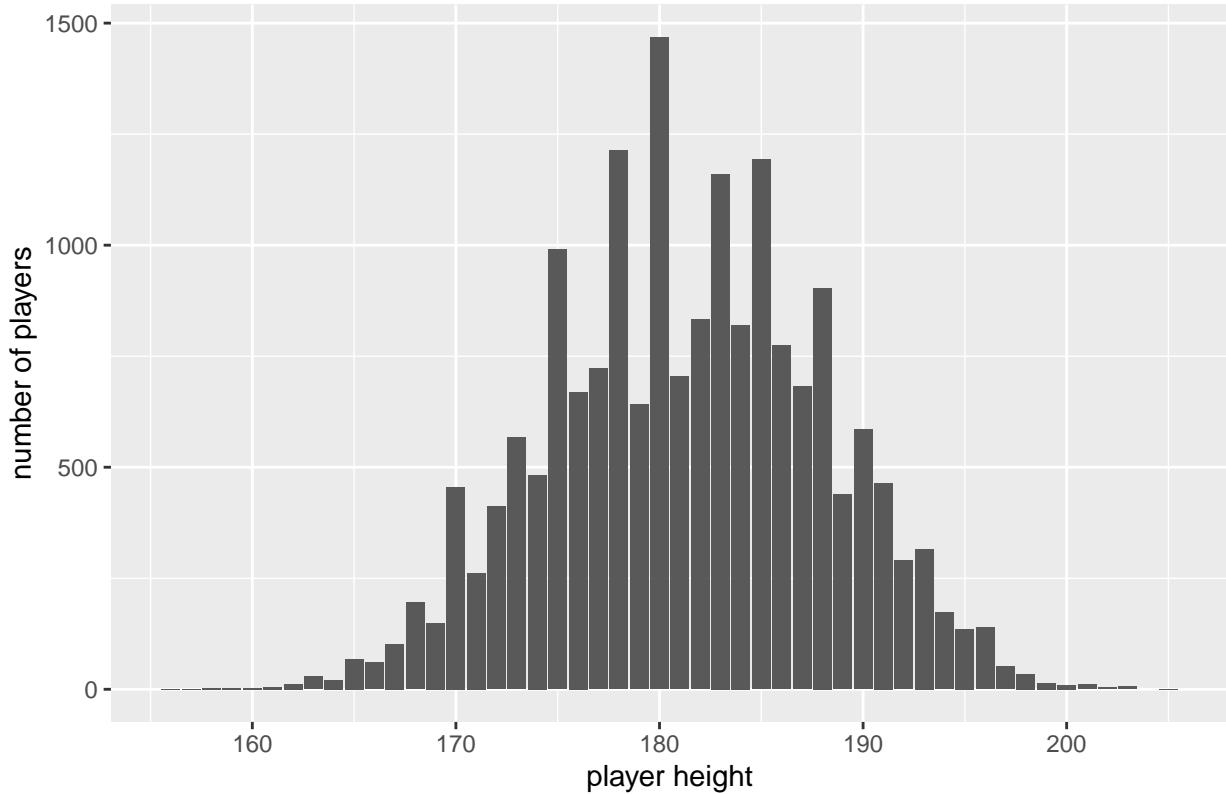
Year 2018 : Number of players by height in cms



Year 2019 : Number of players by height in cms



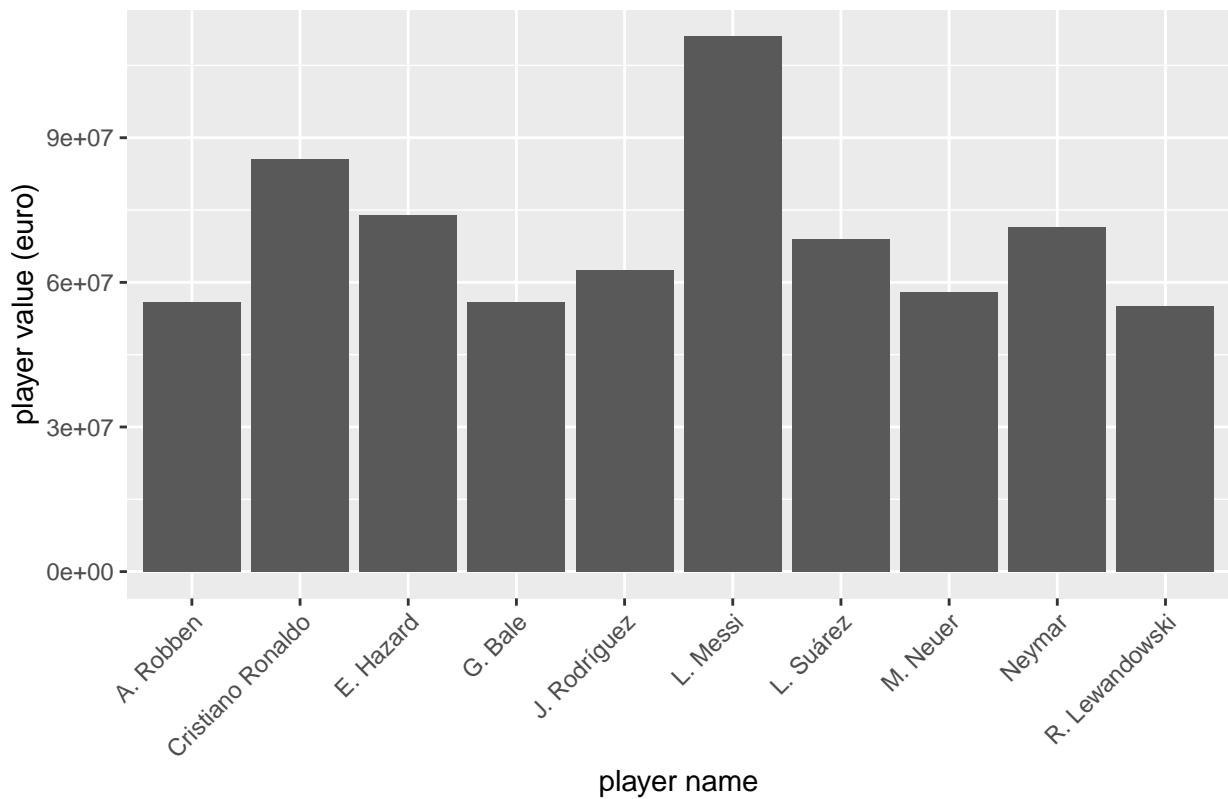
Year 2020 : Number of players by height in cms



```
# Top 10 players with highest value in euros
for (i in seq_along(fifa_datasets_list)) {
  top10_value_players <- fifa_datasets_list[[i]] %>% arrange(desc(value_eur)) %>%
    select(short_name, club, nationality, overall, value_eur) %>% top_n(10) %>%
    ggplot(aes(x=short_name, y=value_eur)) + geom_bar(stat = "identity") +
    labs(x="player name", y="player value (euro)",
         title=paste("Year", years[[i]], ":", "Top 10 players highest value in euros" )) +
    theme(axis.text.x = element_text(angle = 45, hjust = 1))
  print(top10_value_players)
}

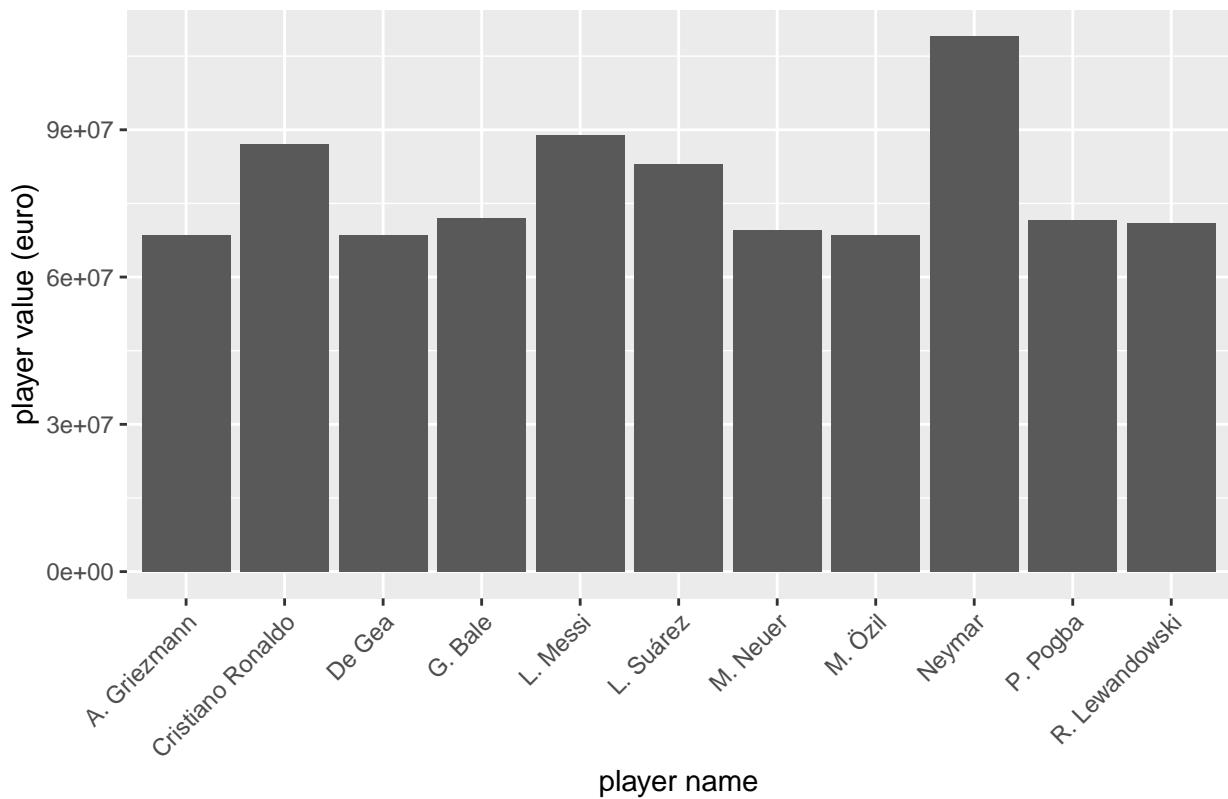
## Selecting by value_eur
## Selecting by value_eur
```

Year 2016 : Top 10 players highest value in euros



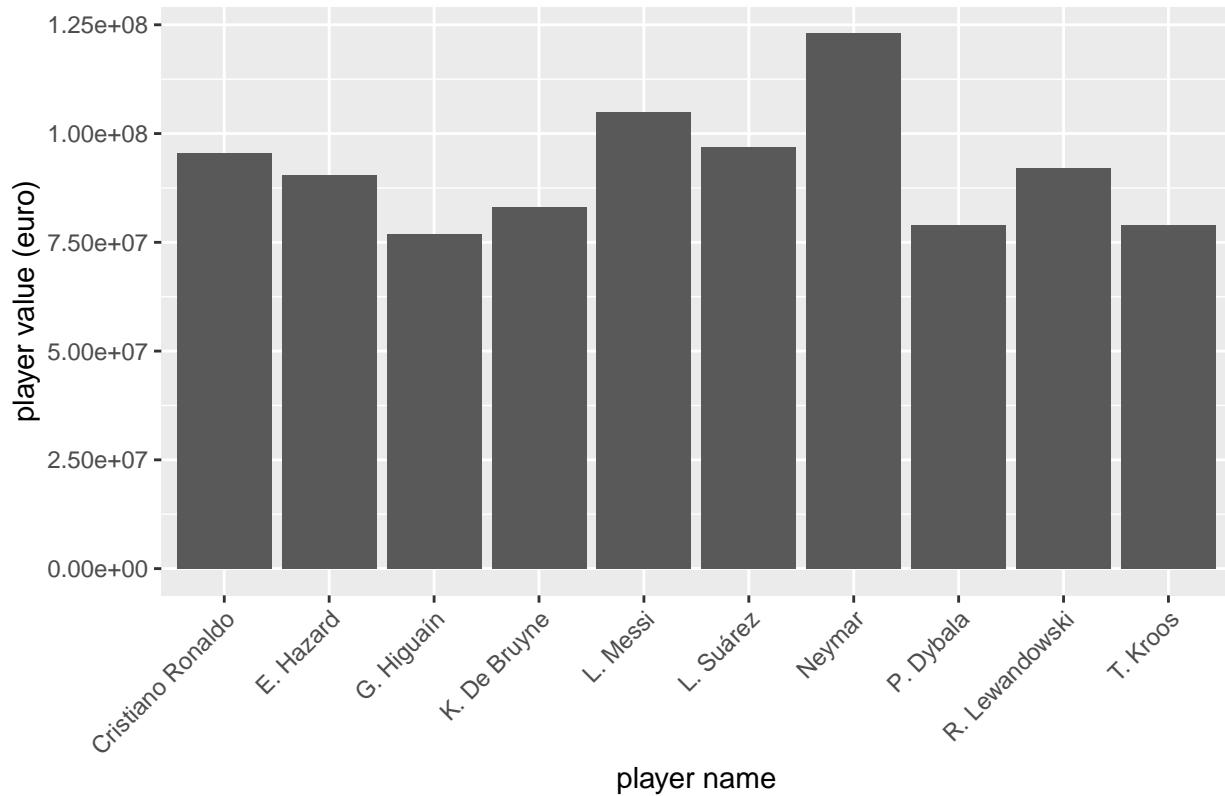
```
## Selecting by value_eur
```

Year 2017 : Top 10 players highest value in euros



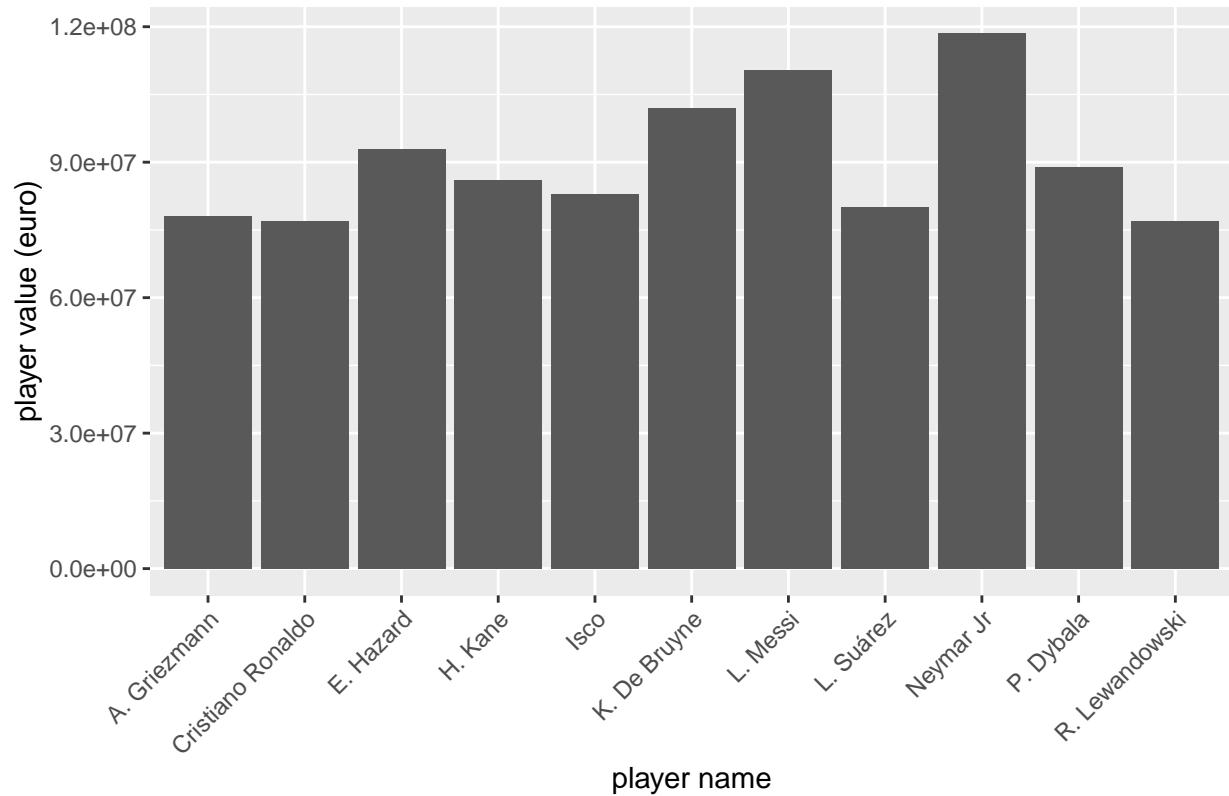
```
## Selecting by value_eur
```

Year 2018 : Top 10 players highest value in euros

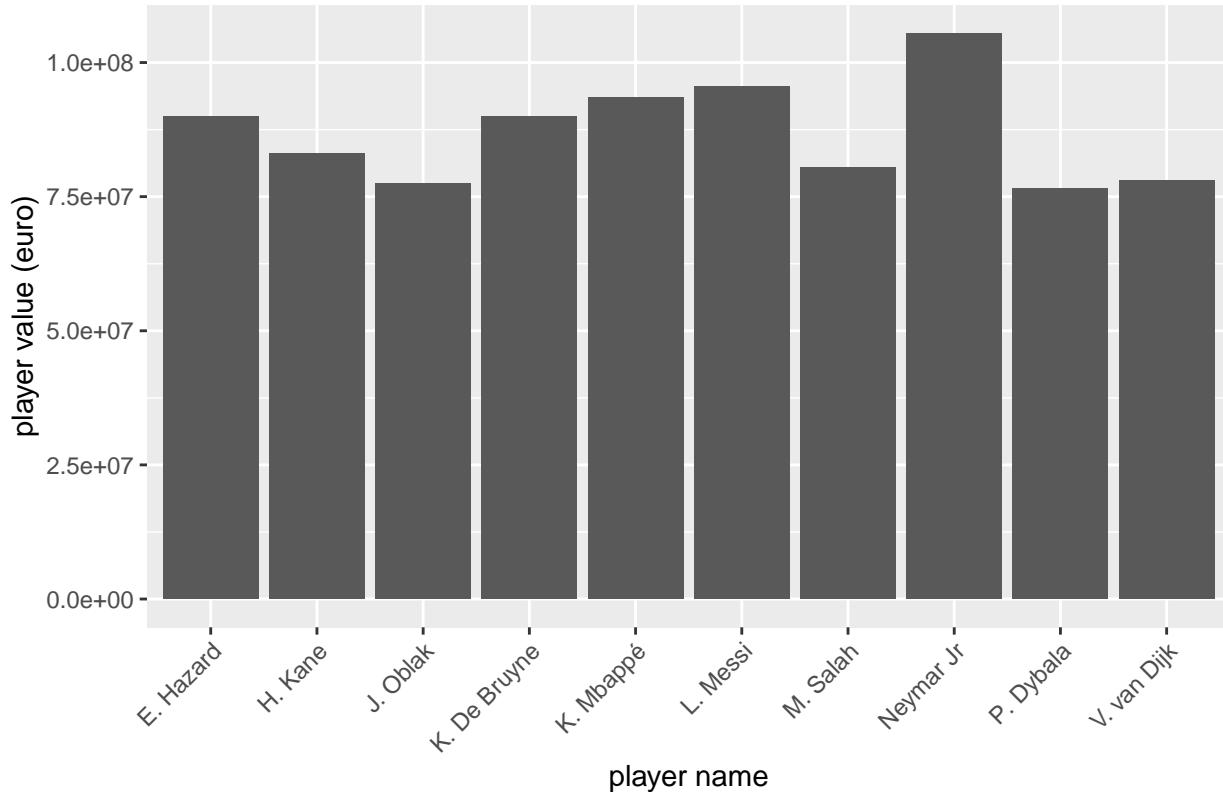


```
## Selecting by value_eur
```

Year 2019 : Top 10 players highest value in euros



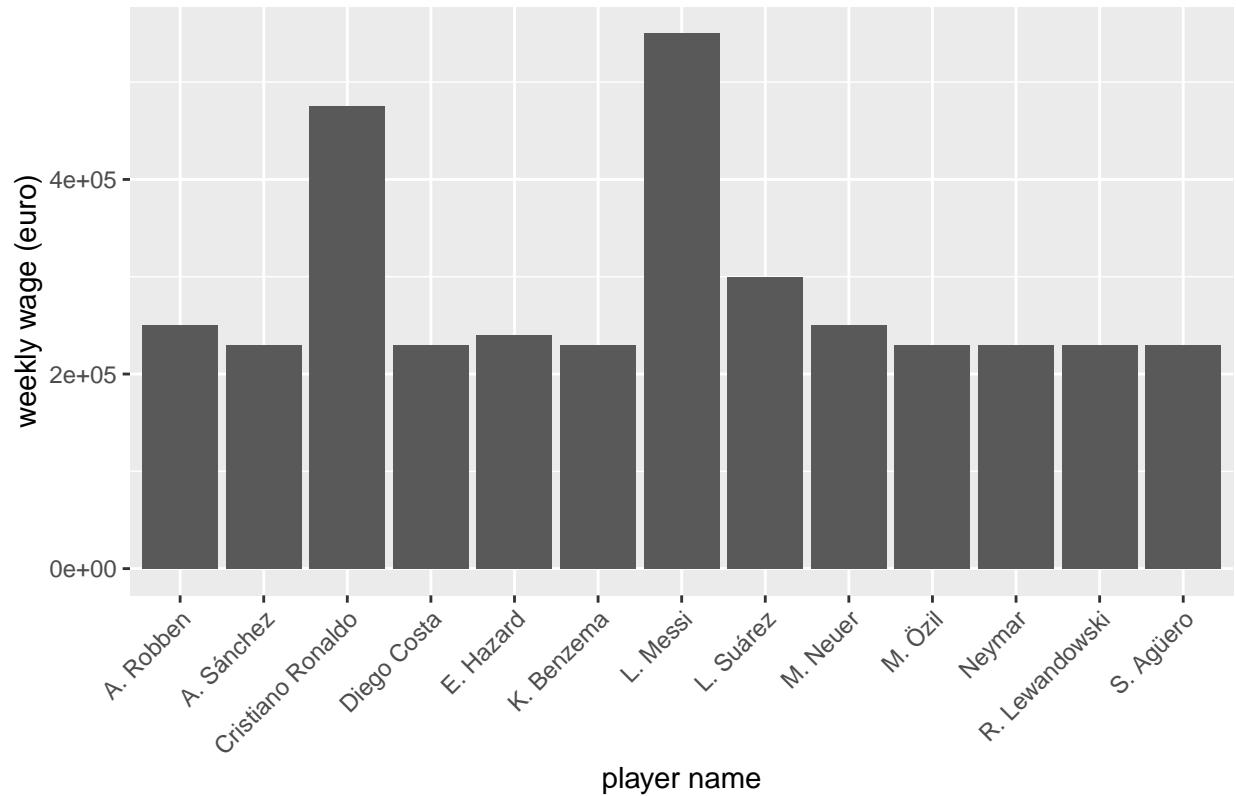
Year 2020 : Top 10 players highest value in euros



```
# Top 10 players with highest weekly wage in euros
for (i in seq_along(fifa_datasets_list)) {
  top10_weekly_wage_players <- fifa_datasets_list[[i]] %>% arrange(desc(wage_eur)) %>%
    select(short_name, club, nationality, overall, wage_eur) %>% top_n(10) %>%
    ggplot(aes(x=short_name, y=wage_eur)) + geom_bar(stat = "identity") +
    labs(x="player name", y="weekly wage (euro)",
         title=paste("Year", years[[i]], ":", "Top 10 players weekly wage in euros" )) +
    theme(axis.text.x = element_text(angle = 45, hjust = 1))
  print(top10_weekly_wage_players)
}

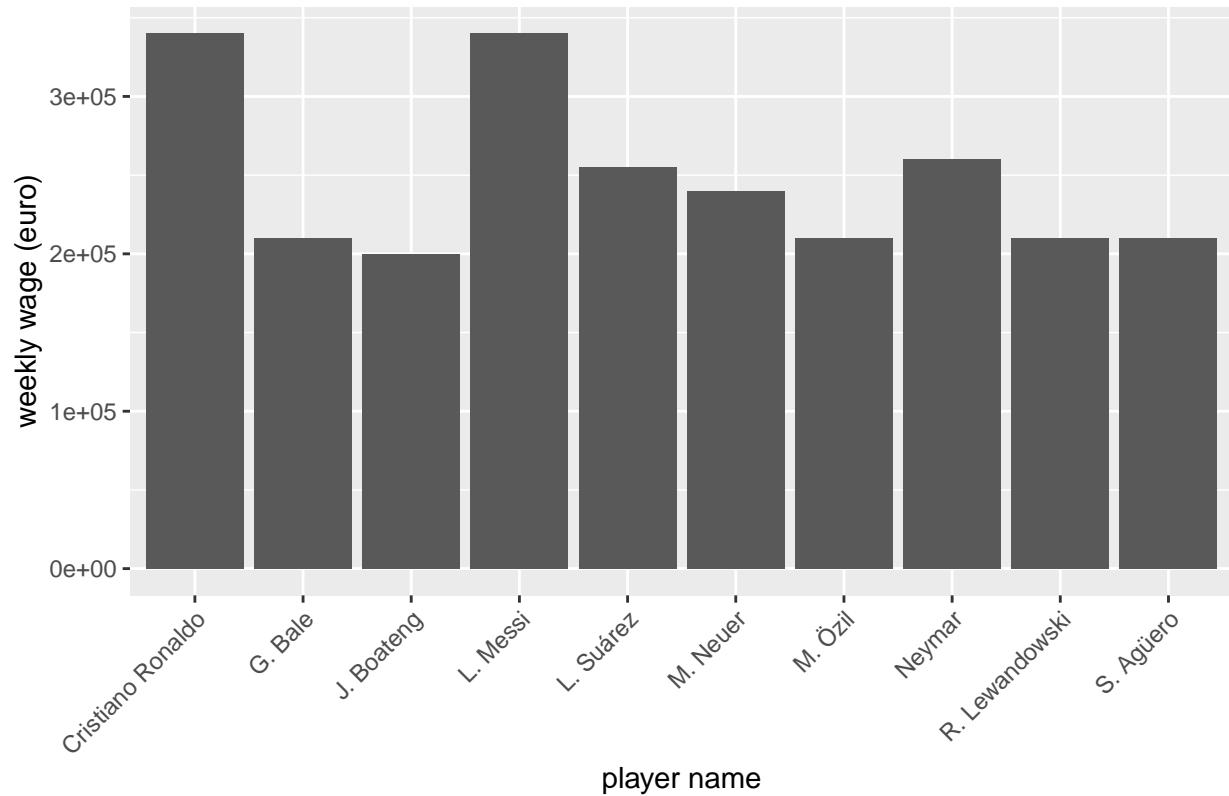
## Selecting by wage_eur
## Selecting by wage_eur
```

Year 2016 : Top 10 players weekly wage in euros



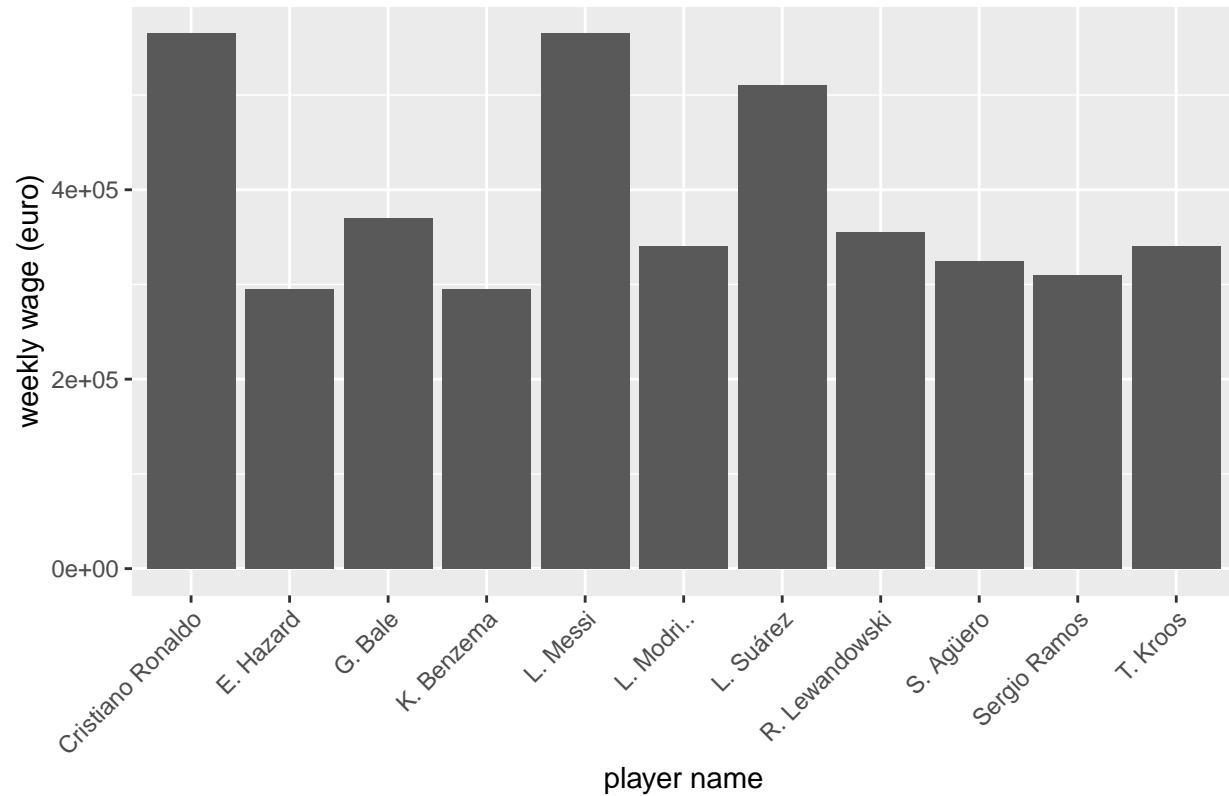
```
## Selecting by wage_eur
```

Year 2017 : Top 10 players weekly wage in euros



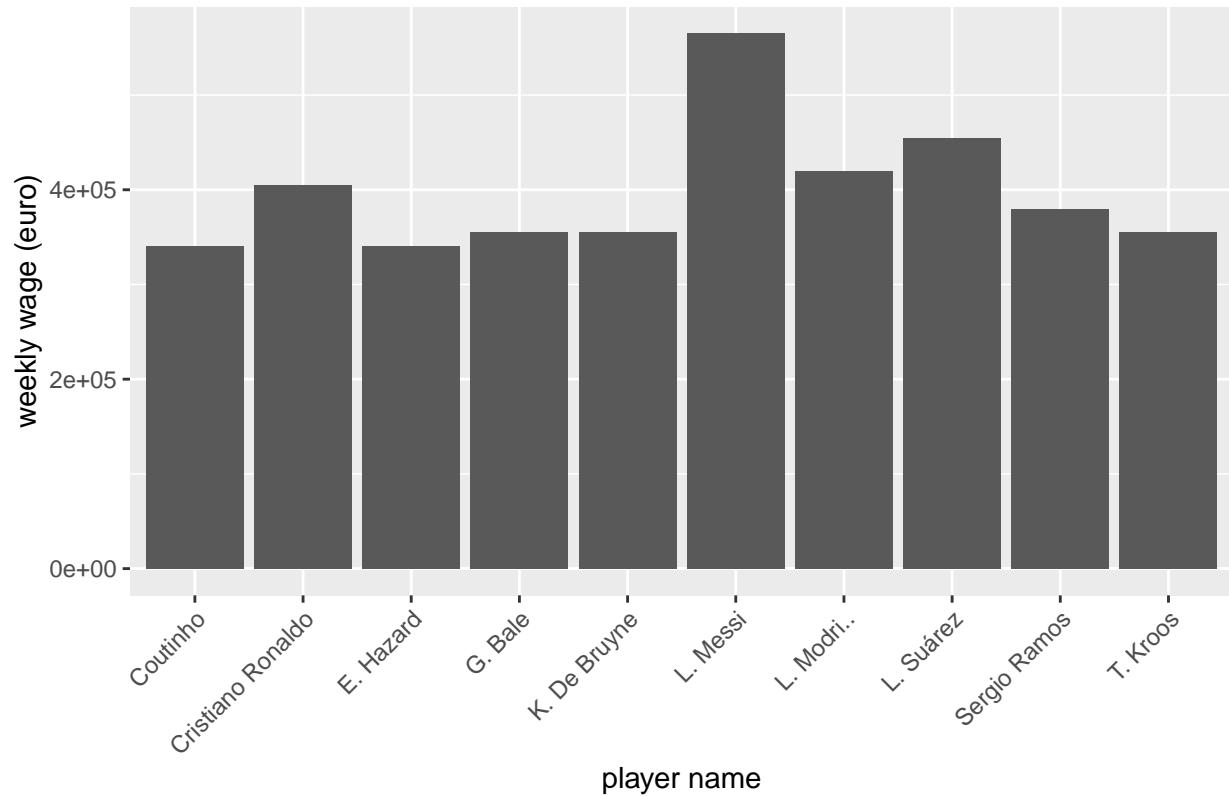
```
## Selecting by wage_eur
```

Year 2018 : Top 10 players weekly wage in euros

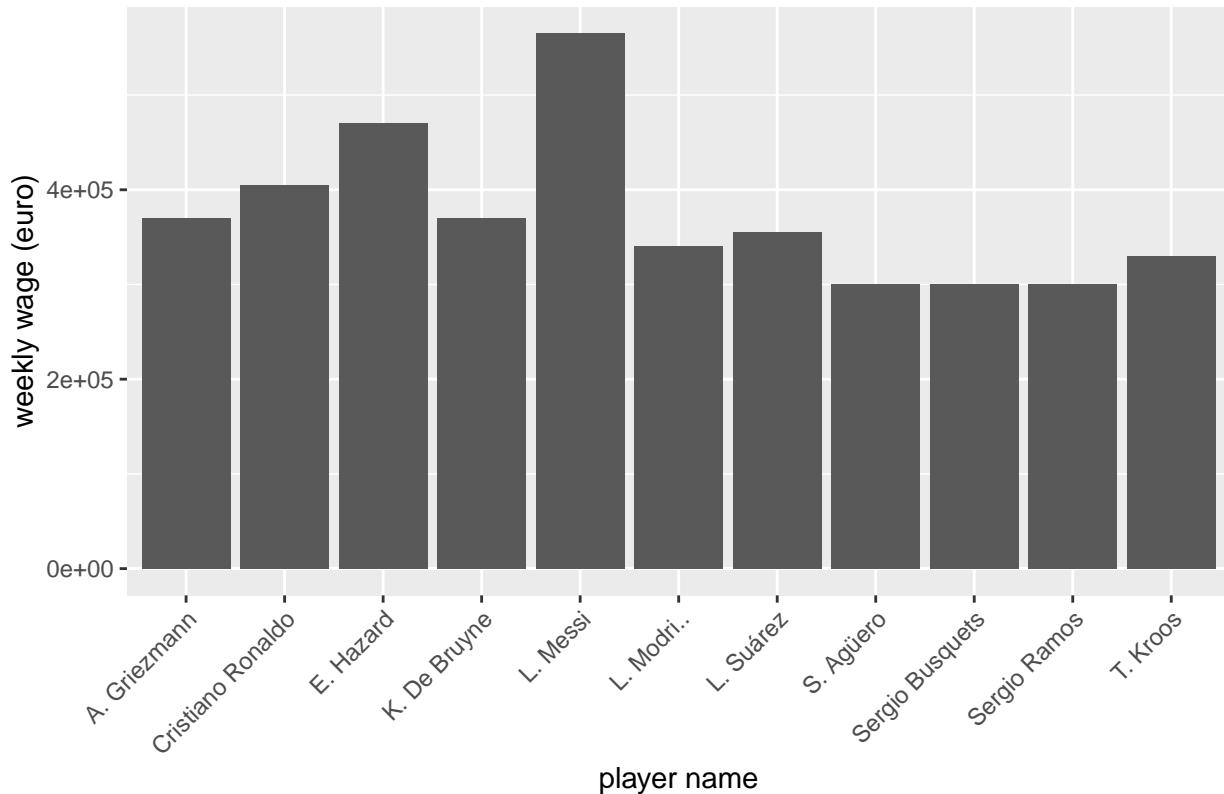


```
## Selecting by wage_eur
```

Year 2019 : Top 10 players weekly wage in euros



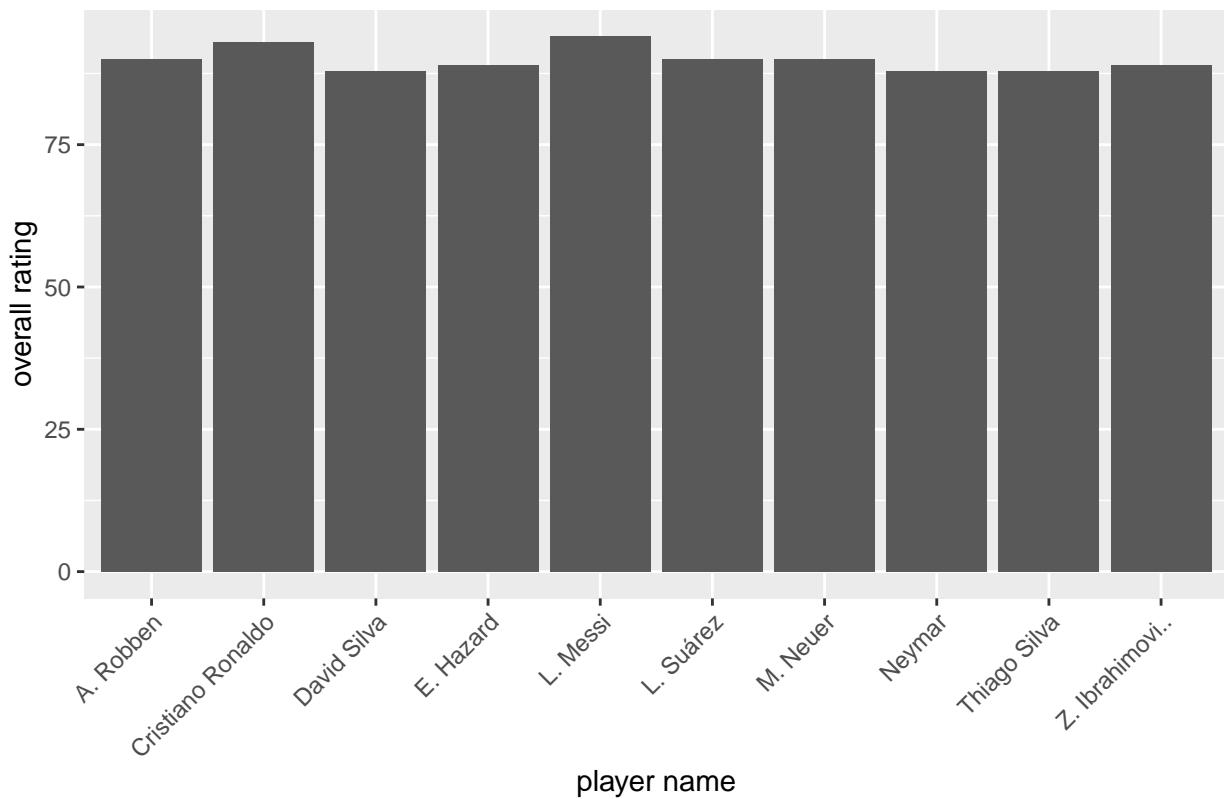
Year 2020 : Top 10 players weekly wage in euros



```
# TTop 10 players with best rating
for (i in seq_along(fifa_datasets_list)) {
  top10_players <- fifa_datasets_list[[i]] %>% arrange(desc(overall)) %>%
    select(short_name, club, nationality, overall, overall) %>% top_n(10) %>%
    ggplot(aes(x=short_name, y=overall)) + geom_bar(stat = "identity") +
    labs(x="player name", y="overall rating",
         title=paste("Year", years[[i]], ":", "Top 10 Players with highest rating" )) +
    theme(axis.text.x = element_text(angle = 45, hjust = 1))
  print(top10_players)
}

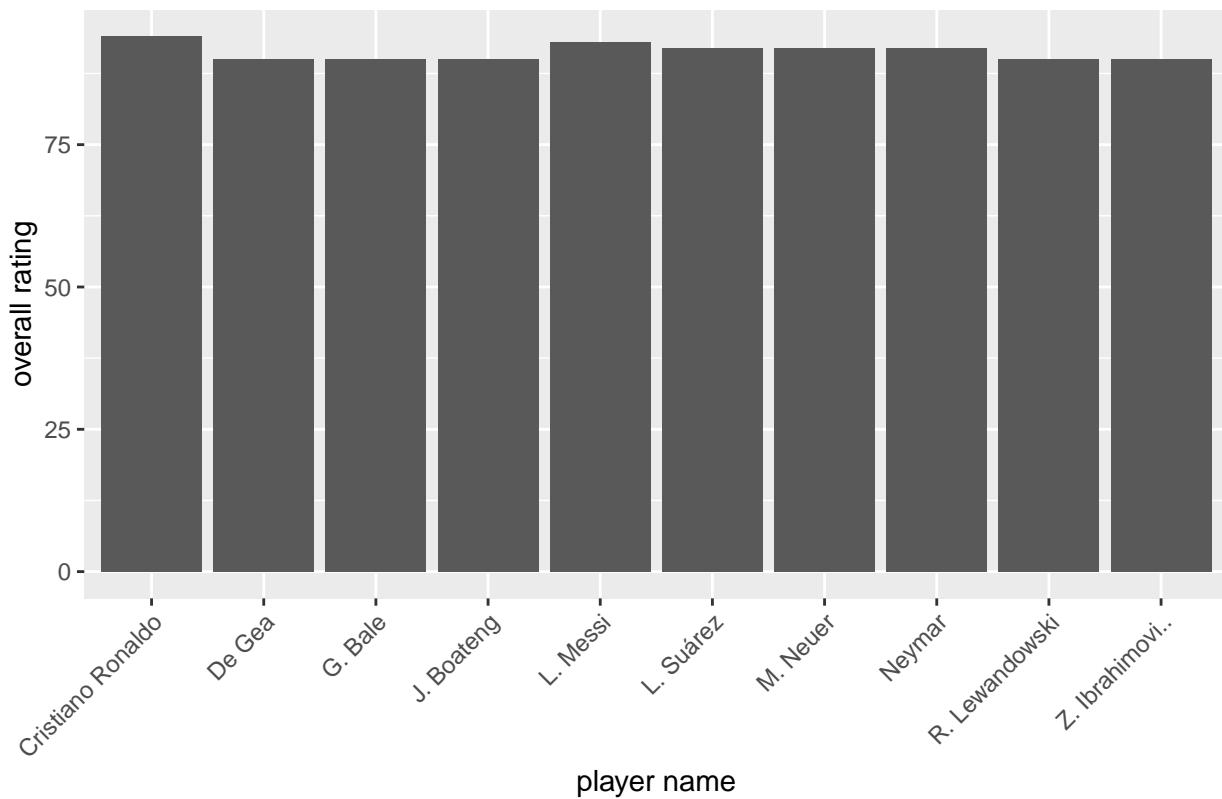
## Selecting by overall
## Selecting by overall
```

Year 2016 : Top 10 Players with highest rating



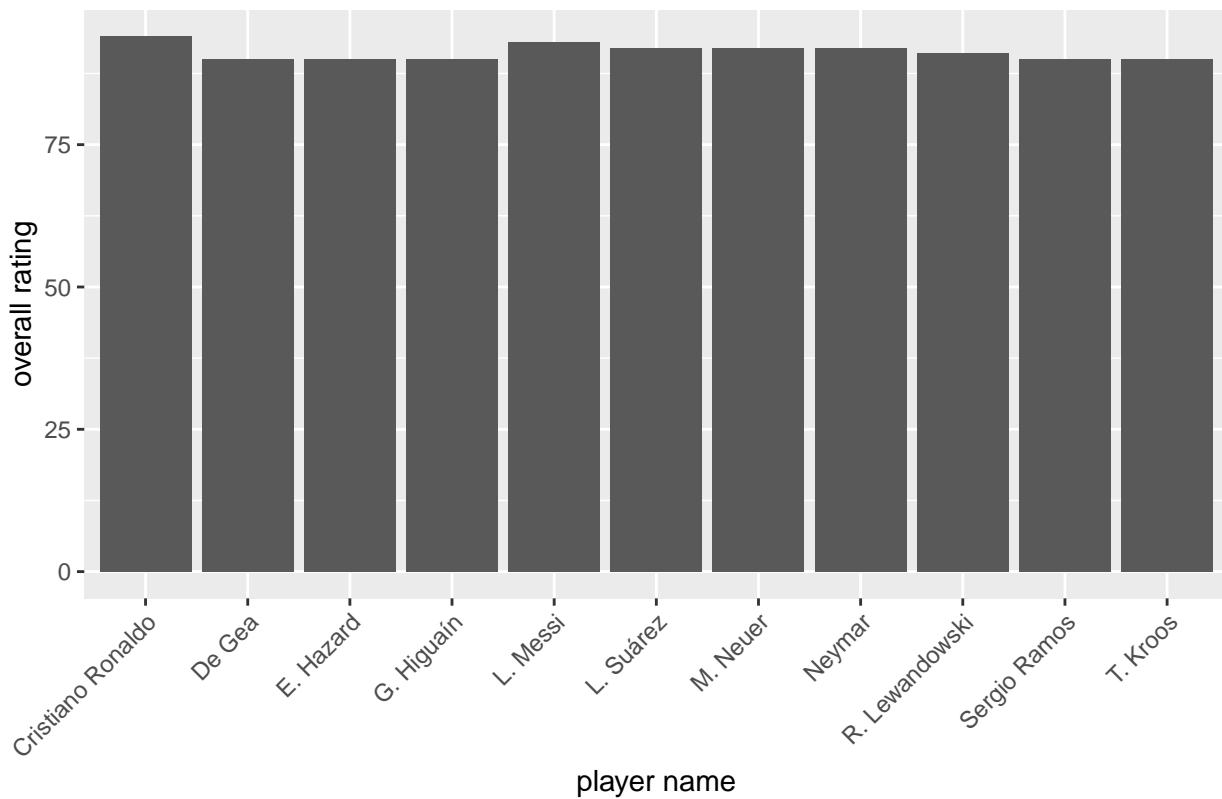
```
## Selecting by overall
```

Year 2017 : Top 10 Players with highest rating



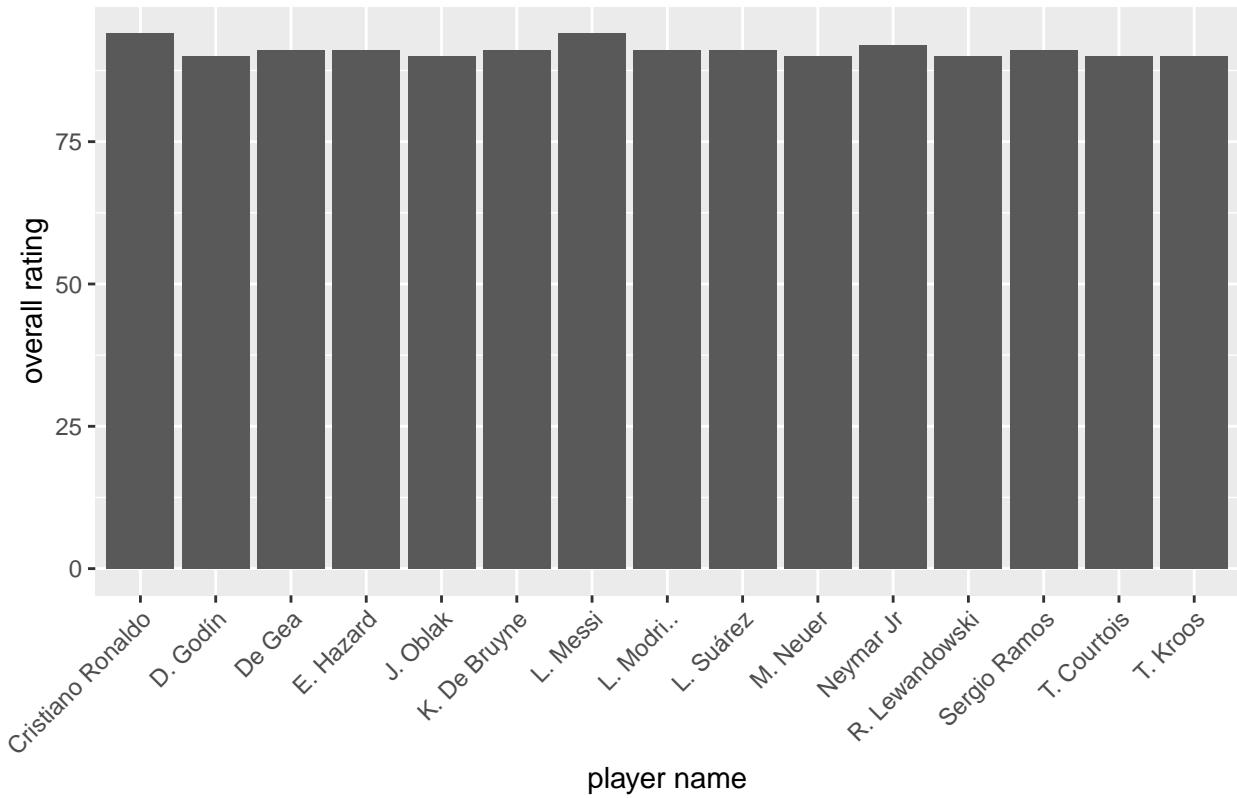
```
## Selecting by overall
```

Year 2018 : Top 10 Players with highest rating

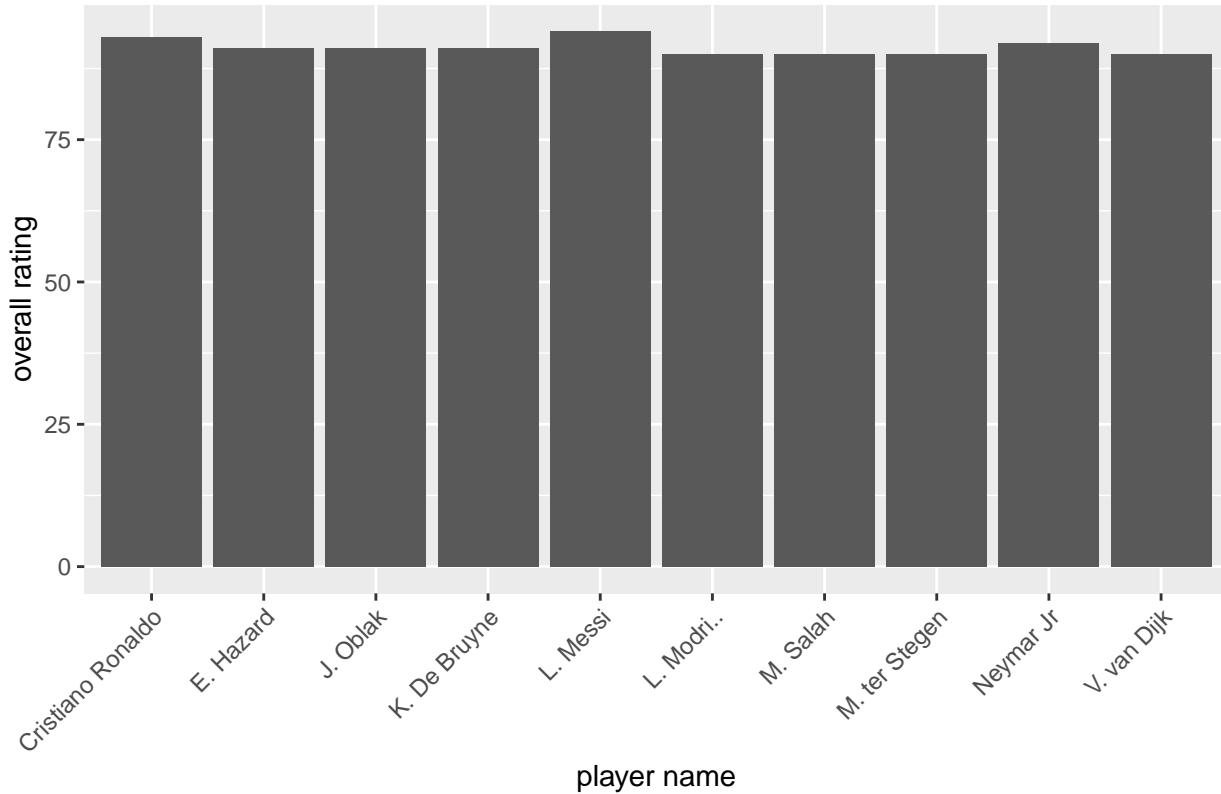


```
## Selecting by overall
```

Year 2019 : Top 10 Players with highest rating



Year 2020 : Top 10 Players with highest rating



```
# Top 10 players with the best potential overall
for (i in seq_along(fifa_datasets_list)) {
  top10_best_potential <- fifa_datasets_list[[i]] %>% arrange(desc(potential)) %>%
    select(short_name, club, nationality, overall, potential) %>% top_n(10)
  print(top10_best_potential)
}
```

Selecting by potential

```
## # A tibble: 14 x 5
##   short_name       club      nationality overall potential
##   <chr>        <chr>      <chr>        <int>     <int>
## 1 L. Messi     FC Barcelona Argentina      94      95
## 2 Cristiano Ronaldo Real Madrid Portugal      93      93
## 3 Neymar       FC Barcelona Brazil        88      93
## 4 J. Rodríguez Real Madrid Colombia     87      93
## 5 P. Pogba      Juventus      France       86      92
## 6 E. Hazard     Chelsea       Belgium      89      91
## 7 G. Bale       Real Madrid    Wales        87      91
## 8 A. Robben     FC Bayern München Netherlands  90      90
## 9 M. Neuer      FC Bayern München Germany     90      90
## 10 L. Suárez    FC Barcelona    Uruguay     90      90
## 11 T. Kroos     Real Madrid    Germany      87      90
## 12 T. Courtois  Chelsea       Belgium      86      90
## 13 A. Halilović Real Sporting de Gijón Croatia     76      90
## 14 Y. Tielemans RSC Anderlecht Belgium      76      90
```

```

## Selecting by potential

##      short_name          club nationality overall potential
## 1       Neymar    FC Barcelona     Brazil      92      95
## 2 Cristiano Ronaldo  Real Madrid   Portugal      94      94
## 3       P. Pogba Manchester United France       88      94
## 4       L. Messi   FC Barcelona Argentina     93      93
## 5      T. Courtois    Chelsea Belgium      89      93
## 6       M. Neuer FC Bayern München Germany      92      92
## 7       L. Suárez   FC Barcelona Uruguay      92      92
## 8       De Gea   Manchester United Spain       90      92
## 9      A. Griezmann Atlético Madrid France       88      92
## 10     J. Rodríguez  Real Madrid Colombia     87      92
## 11     P. Dybala    Juventus Argentina     85      92

## Selecting by potential

## # A tibble: 17 x 5
##   short_name   club   nationality overall potential
##   <chr>        <chr>   <chr>      <int>      <int>
## 1 Cristiano Ronaldo Real Madrid Portugal      94      94
## 2 Neymar        Paris Saint-Germain Brazil       92      94
## 3 K. Mbappé     Paris Saint-Germain France      83      94
## 4 G. Donnarumma Milan           Italy       82      94
## 5 L. Messi      FC Barcelona Argentina     93      93
## 6 J. Oblak       Atlético Madrid Slovenia     88      93
## 7 P. Dybala     Juventus Argentina      88      93
## 8 M. Neuer      FC Bayern München Germany      92      92
## 9 L. Suárez     FC Barcelona Uruguay      92      92
## 10 De Gea       Manchester United Spain       90      92
## 11 T. Courtois  Chelsea           Belgium     89      92
## 12 K. De Bruyne Manchester City Belgium      89      92
## 13 P. Pogba     Manchester United France      87      92
## 14 R. Varane    Real Madrid           France     85      92
## 15 Marco Asensio Real Madrid           Spain      84      92
## 16 O. Dembélé   FC Barcelona           France     83      92
## 17 Gabriel Jesus Manchester City Brazil       81      92

## Selecting by potential

## # A tibble: 10 x 5
##   short_name   club   nationality overall potential
##   <chr>        <chr>   <chr>      <int>      <int>
## 1 K. Mbappé     Paris Saint-Germain France      87      95
## 2 Cristiano Ronaldo Juventus Portugal      94      94
## 3 L. Messi      FC Barcelona Argentina     94      94
## 4 P. Dybala     Juventus Argentina      89      94
## 5 Neymar Jr     Paris Saint-Germain Brazil      92      93
## 6 De Gea       Manchester United Spain       91      93
## 7 J. Oblak       Atlético Madrid Slovenia     90      93
## 8 L. Sané       Manchester City Germany      86      93
## 9 Marco Asensio Real Madrid           Spain      85      93
## 10 G. Donnarumma Milan           Italy       82      93

```

```

## Selecting by potential

## # A tibble: 14 x 5
##   short_name     club      nationality overall potential
##   <chr>       <chr>      <chr>        <int>      <int>
## 1 K. Mbappé    Paris Saint-Germain France         89      95
## 2 L. Messi     FC Barcelona Argentina       94      94
## 3 Cristiano Ronaldo Juventus Portugal        93      93
## 4 J. Oblak     Atlético Madrid Slovenia       91      93
## 5 M. ter Stegen FC Barcelona Germany        90      93
## 6 M. de Ligt    Juventus Netherlands      85      93
## 7 João Félix   Atlético Madrid Portugal       80      93
## 8 Neymar Jr    Paris Saint-Germain Brazil        92      92
## 9 P. Dybala    Juventus Argentina       88      92
## 10 L. Sané     Manchester City Germany        86      92
## 11 G. Donnarumma Milan Italy             85      92
## 12 J. Sancho    Borussia Dortmund England       84      92
## 13 K. Havertz   Bayer 04 Leverkusen Germany      84      92
## 14 Vinícius Jr. Real Madrid Brazil            79      92

# Players aged 25 or less with best potential:
for (i in seq_along(fifa_datasets_list)) {
  top_potential_below_25 <- fifa_datasets_list[[i]] %>% filter(age <= 25) %>%
    arrange(desc(potential)) %>% top_n(50) %>%
    select(short_name, club, nationality, overall, potential)
  print(top_potential_below_25)
}

```

```

## Selecting by rb

## # A tibble: 57 x 5
##   short_name     club      nationality overall potential
##   <chr>       <chr>      <chr>        <int>      <int>
## 1 P. Pogba     Juventus France         86      92
## 2 M. Verratti  Paris Saint-Germain Italy        84      89
## 3 L. Shaw      Manchester United England       78      89
## 4 D. Alaba     FC Bayern München Austria       85      88
## 5 William Carvalho Sporting CP Portugal       81      88
## 6 L. Kurzawa   Paris Saint-Germain France       80      88
## 7 R. Rodriguez  VfL Wolfsburg Switzerland     83      87
## 8 M. Musacchio Villarreal CF Argentina       81      87
## 9 Marquinhos   Paris Saint-Germain Brazil        81      87
## 10 Gayà        Valencia CF Spain            80      87
## # ... with 47 more rows

```

```

## Selecting by rb

##   short_name     club      nationality overall
## 1 P. Pogba     Manchester United France        88
## 2 R. Varane    Real Madrid France        84
## 3 D. Alaba     FC Bayern München Austria       87
## 4 M. Verratti  Paris Saint-Germain Italy        85

```

## 5	E. Bailly	Manchester United	Ivory Coast	82
## 6	L. Shaw	Manchester United	England	81
## 7	A. Laporte	Athletic Club de Bilbao	France	84
## 8	S. Mustafi	Arsenal	Germany	83
## 9	S. Aurier	Paris Saint-Germain	Ivory Coast	83
## 10	Marquinhos	Paris Saint-Germain	Brazil	82
## 11	L. Kurzawa	Paris Saint-Germain	France	81
## 12	Saúl	Atlético Madrid	Spain	80
## 13	J. Stones	Manchester City	England	78
## 14	Alex Sandro	Juventus	Brazil	84
## 15	M. Musacchio	Villarreal CF	Argentina	83
## 16	Danilo Pereira	FC Porto	Portugal	82
## 17	S. Umtiti	FC Barcelona	France	82
## 18	Héctor Bellerín	Arsenal	Spain	79
## 19	Fabinho	AS Monaco	Brazil	79
## 20	João Cancelo	Valencia CF	Portugal	79
## 21	V. Koziello	OGC Nice	France	79
## 22	J. Kimmich	FC Bayern München	Germany	78
## 23	R. Rodríguez	VfL Wolfsburg	Switzerland	83
## 24	Carvajal	Real Madrid	Spain	83
## 25	T. Kolodziejczak	Sevilla FC	France	80
## 26	E. Can	Liverpool	Germany	80
## 27	J. Willems	PSV	Netherlands	79
## 28	L. Goretzka	FC Schalke 04	Germany	79
## 29	Danilo	SL Benfica	Brazil	79
## 30	A. Florenzi	Roma	Italy	82
## 31	N. Clyne	Liverpool	England	81
## 32	N. Kanté	Chelsea	France	81
## 33	Hugo Mallo	RC Celta	Spain	80
## 34	Gayà	Valencia CF	Spain	80
## 35	A. Baba	FC Schalke 04	Ghana	78
## 36	Ricardo Pereira	OGC Nice	Portugal	78
## 37	Wendell	Bayer 04 Leverkusen	Brazil	78
## 38	J. Matip	Liverpool	Cameroon	82
## 39	J. McCarthy	Everton	Republic of Ireland	81
## 40	F. Coquelin	Arsenal	France	81
## 41	Marc Bartra	Borussia Dortmund	Spain	81
## 42	Mario Gaspar	Villarreal CF	Spain	80
## 43	L. Digne	FC Barcelona	France	79
## 44	D. Sidibé	AS Monaco	France	79
## 45	N. Mendy	Leicester City	France	78
## 46	Allan	Napoli	Brazil	81
## 47	Mário Fernandes	PFC CSKA Moscow	Brazil	80
## 48	Danilo	Real Madrid	Brazil	80
## 49	S. Vrsaljko	Atlético Madrid	Croatia	79
## 50	Bernat	FC Bayern München	Spain	79
## 51	E. Hysaj	Napoli	Albania	79
## 52	A. Mandi	Real Betis	Algeria	78
## 53	D. Rose	Tottenham Hotspur	England	80
## 54	J. Guilavogui	VfL Wolfsburg	France	80
## 55	S. Rode	Borussia Dortmund	Germany	80
## 56	Montoya	Valencia CF	Spain	79
## 57	F. Ghoulam	Napoli	Algeria	79
## 58	Cédric	Southampton	Portugal	78

## 59	B. Davies	Tottenham Hotspur	Wales	78
## 60	Alberto Moreno	Liverpool	Spain	77
## 61	Alex Telles	FC Porto	Brazil	77
## 62	Mário Rui	Roma	Portugal	78
## 63	S. Arias	PSV	Colombia	77
## 64	Rafael	Olympique Lyonnais	Brazil	78
## 65	S. Corchia	LOSC Lille	France	77
## 66	Marcos Alonso	Chelsea	Spain	77
## 67	T. Meunier	Paris Saint-Germain	Belgium	77
## potential				
## 1	94			
## 2	91			
## 3	90			
## 4	90			
## 5	90			
## 6	89			
## 7	88			
## 8	88			
## 9	88			
## 10	88			
## 11	88			
## 12	88			
## 13	88			
## 14	87			
## 15	87			
## 16	87			
## 17	87			
## 18	87			
## 19	87			
## 20	87			
## 21	87			
## 22	87			
## 23	86			
## 24	86			
## 25	86			
## 26	86			
## 27	86			
## 28	86			
## 29	86			
## 30	85			
## 31	85			
## 32	85			
## 33	85			
## 34	85			
## 35	85			
## 36	85			
## 37	85			
## 38	84			
## 39	84			
## 40	84			
## 41	84			
## 42	84			
## 43	84			
## 44	84			

```

## 45      84
## 46      83
## 47      83
## 48      83
## 49      83
## 50      83
## 51      83
## 52      83
## 53      82
## 54      82
## 55      82
## 56      82
## 57      82
## 58      82
## 59      82
## 60      82
## 61      82
## 62      81
## 63      81
## 64      80
## 65      80
## 66      80
## 67      80

## Selecting by rb

## # A tibble: 64 x 5
##   short_name club          nationality overall potential
##   <chr>     <chr>        <chr>      <int>     <int>
## 1 R. Varane  Real Madrid  France       85        92
## 2 M. Verratti Paris Saint-Germain Italy        87        91
## 3 Saúl      Atlético Madrid Spain        82        90
## 4 Casemiro  Real Madrid  Brazil       85        89
## 5 A. Laporte Athletic Club de Bilbao France      84        89
## 6 E. Bailly  Manchester United Ivory Coast    84        89
## 7 Marquinhos Paris Saint-Germain Brazil       83        89
## 8 C. Tolisso FC Bayern München France       82        89
## 9 D. Alaba   FC Bayern München Austria     86        88
## 10 S. Umtiti FC Barcelona France       83        88
## # ... with 54 more rows

## Selecting by rb

## # A tibble: 70 x 5
##   short_name club          nationality overall potential
##   <chr>     <chr>        <chr>      <int>     <int>
## 1 S. Umtiti FC Barcelona France       87        92
## 2 R. Varane  Real Madrid  France       86        92
## 3 M. Škriniar Inter         Slovakia     85        92
## 4 Saúl      Atlético Madrid Spain       85        91
## 5 S. Milinković-Savić Lazio        Serbia      85        90
## 6 M. Verratti Paris Saint-Germain Italy       86        89
## 7 Fabinho   Liverpool      Brazil       85        89

```

```

## 8 Marquinhos          Paris Saint-Germain Brazil      84      89
## 9 D. Sánchez         Tottenham Hotspur Colombia    84      89
## 10 P. Kimpembe        Paris Saint-Germain France   83      89
## # ... with 60 more rows

```

```
## Selecting by rb
```

```

## # A tibble: 54 x 5
##   short_name   club      nationality overall potential
##   <chr>       <chr>      <chr>        <int>     <int>
## 1 F. de Jong  FC Barcelona Netherlands    85      91
## 2 A. Laporte  Manchester City France      87      90
## 3 Marquinhos Paris Saint-Germain Brazil    86      90
## 4 Rodri      Manchester City Spain       85      90
## 5 S. Umtiti   FC Barcelona   France      86      89
## 6 Saúl       Atlético Madrid Spain       85      89
## 7 Fabinho    Liverpool      Brazil      85      89
## 8 A. Robertson Liverpool      Scotland    85      89
## 9 C. Lenglet  FC Barcelona   France      85      89
## 10 João Cancelo Manchester City Portugal   84      89
## # ... with 44 more rows

```

```

# Players aged 21 or less with best potential:
for (i in seq_along(fifa_datasets_list)) {
  top_potential_below_21 <- fifa_datasets_list[[i]] %>% filter(age <= 21) %>%
    arrange(desc(potential)) %>% top_n(50) %>%
    select(short_name, club, nationality, overall, potential)
  print(top_potential_below_21)
}

```

```
## Selecting by rb
```

```

## # A tibble: 71 x 5
##   short_name   club      nationality overall potential
##   <chr>       <chr>      <chr>        <int>     <int>
## 1 L. Shaw     Manchester United England    78      89
## 2 D. Rugani   Juventus      Italy       78      88
## 3 R. Bazoer   Ajax         Netherlands  75      88
## 4 A. Laporte  Athletic Club de Bilbao France    83      87
## 5 Marquinhos Paris Saint-Germain Brazil    81      87
## 6 Gayà       Valencia CF   Spain      80      87
## 7 J. Stones   Everton      England    77      87
## 8 K. Zouma    Chelsea      France     77      87
## 9 J. Geis     FC Schalke 04 Germany    79      86
## 10 J. Willems PSV         Netherlands  78      86
## # ... with 61 more rows

```

```
## Selecting by rb
```

```

##           short_name   club      nationality overall
## 1 Renato Sanches FC Bayern München Portugal    78
## 2 L. Shaw       Manchester United England    81

```

## 3	K. Zouma	Chelsea	France	80
## 4	J. Giménez	Atlético Madrid	Uruguay	83
## 5	Saúl	Atlético Madrid	Spain	80
## 6	M. Lemos	UD Las Palmas	Uruguay	80
## 7	J. Tah	Bayer 04 Leverkusen	Germany	79
## 8	N. Süle	TSG 1899 Hoffenheim	Germany	81
## 9	Héctor Bellerín	Arsenal	Spain	79
## 10	D. Rugani	Juventus	Italy	79
## 11	V. Koziello	OGC Nice	France	79
## 12	J. Kimmich	FC Bayern München	Germany	78
## 13	A. Christensen	Borussia Mönchengladbach	Denmark	78
## 14	T. Fosu-Mensah	Manchester United	Netherlands	71
## 15	L. Goretzka	FC Schalke 04	Germany	79
## 16	J. Weigl	Borussia Dortmund	Germany	79
## 17	Danilo	SL Benfica	Brazil	79
## 18	A. Romagnoli	Milan	Italy	78
## 19	C. Tolisso	Olympique Lyonnais	France	78
## 20	V. Nilsson Lindelöf	SL Benfica	Sweden	78
## 21	Grimaldo	SL Benfica	Spain	77
## 22	J. Riedewald	Ajax	Netherlands	76
## 23	Gayà	Valencia CF	Spain	80
## 24	A. Baba	FC Schalke 04	Ghana	78
## 25	A. Rabiot	Paris Saint-Germain	France	78
## 26	R. Bazoer	Ajax	Netherlands	77
## 27	T. Jedvaj	Bayer 04 Leverkusen	Croatia	75
## 28	G. Donsah	Bologna	Ghana	75
## 29	Rúben Neves	FC Porto	Portugal	75
## 30	M. Grujić	Liverpool	Serbia	71
## 31	M. Sanson	Montpellier HSC	France	78
## 32	C. Mbemba	Newcastle United	DR Congo	77
## 33	E. Gutiérrez	Pachuca	Mexico	76
## 34	D. Amartey	Leicester City	Ghana	75
## 35	K. Linetty	Sampdoria	Poland	74
## 36	N. Stark	Hertha BSC	Germany	74
## 37	J. Denayer	Sunderland	Belgium	74
## 38	A. Diawara	Napoli	Guinea	74
## 39	A. Cubas	Boca Juniors	Argentina	73
## 40	F. Mattiello	Juventus	Italy	72
## 41	E. Nabiullin	Rubin Kazan	Russia	72
## 42	L. Klostermann	RB Leipzig	Germany	72
## 43	A. Nagy	Bologna	Hungary	72
## 44	Rafa Soares	Rio Ave FC	Portugal	71
## 45	P. Galdames	Unión Española	Chile	71
## 46	S. Ascacíbar	Estudiantes de La Plata	Argentina	71
## 47	K. Tete	Ajax	Netherlands	77
## 48	L. Dendoncker	RSC Anderlecht	Belgium	76
## 49	J. Hendrix	PSV	Netherlands	76
## 50	S. Milinković-Savić	Lazio	Serbia	76
## 51	D. Cataldi	Lazio	Italy	75
## 52	J. Lerma	Levante UD	Colombia	75
## 53	O. Tufan	Fenerbahçe SK	Turkey	75
## 54	F. Ricca	Málaga CF	Uruguay	75
## 55	J. Gbamin	1. FSV Mainz 05	France	73
## 56	Marín	CD Leganés	Spain	73

## 57	O. Ndidi	KRC Genk	Nigeria	72
## 58	T. Vilhena	Feyenoord	Netherlands	76
## 59	R. Karsdorp	Feyenoord	Netherlands	76
## 60	C. Chambers	Middlesbrough	England	72
## 61	P. Højbjerg	Southampton	Denmark	74
## 62	T. Bakayoko	AS Monaco	France	74
## 63	N. Aké	Bournemouth	Netherlands	72
## 64	Varela	Real Oviedo	Spain	71
## 65	K. Diks	Fiorentina	Netherlands	71
## 66	T. Foket	KAA Gent	Belgium	73
## 67	Vigaray	Deportivo Alavés	Spain	71
## 68	B. Mendy	AS Monaco	France	75
## 69	J. Lukaku	Lazio	Belgium	73
## 70	J. Toljan	TSG 1899 Hoffenheim	Germany	73
## 71	S. Moreira	FC Lorient	France	72
## 72	C. Fiore	Standard de Liège	Belgium	72
## 73	Rubén Duarte	RCD Espanyol	Spain	72
## 74	R. Gosens	Heracles Almelo	Germany	71
## potential				
## 1	90			
## 2	89			
## 3	89			
## 4	88			
## 5	88			
## 6	88			
## 7	88			
## 8	87			
## 9	87			
## 10	87			
## 11	87			
## 12	87			
## 13	87			
## 14	87			
## 15	86			
## 16	86			
## 17	86			
## 18	86			
## 19	86			
## 20	86			
## 21	86			
## 22	86			
## 23	85			
## 24	85			
## 25	85			
## 26	85			
## 27	85			
## 28	85			
## 29	85			
## 30	85			
## 31	84			
## 32	84			
## 33	84			
## 34	84			
## 35	84			

```

## 36      84
## 37      84
## 38      84
## 39      84
## 40      84
## 41      84
## 42      84
## 43      84
## 44      84
## 45      84
## 46      84
## 47      83
## 48      83
## 49      83
## 50      83
## 51      83
## 52      83
## 53      83
## 54      83
## 55      83
## 56      83
## 57      83
## 58      82
## 59      82
## 60      82
## 61      81
## 62      81
## 63      81
## 64      81
## 65      81
## 66      80
## 67      80
## 68      79
## 69      79
## 70      79
## 71      79
## 72      79
## 73      79
## 74      75

## Selecting by rb

## # A tibble: 54 x 5
##   short_name    club      nationality overall potential
##   <chr>        <chr>      <chr>       <int>     <int>
## 1 T. Lemar    AS Monaco   France        83        91
## 2 D. Alli     Tottenham Hotspur England       84        90
## 3 N. Süle     FC Bayern München Germany      83        89
## 4 A. Christensen Chelsea Denmark      81        89
## 5 J. Tah      Bayer 04 Leverkusen Germany      82        88
## 6 D. Sánchez  Tottenham Hotspur Colombia     81        88
## 7 Dani Ceballos Real Madrid Spain          78        88
## 8 M. Sarr     OGC Nice   France         75        88
## 9 J. Weigl    Borussia Dortmund Germany      81        87

```

```

## 10 Grimaldo      SL Benfica       Spain        80        87
## # ... with 44 more rows

## Selecting by rb

## # A tibble: 56 x 5
##   short_name     club    nationality overall potential
##   <chr>         <chr>    <chr>        <int>     <int>
## 1 M. de Ligt    Ajax     Netherlands    80        91
## 2 Arthur        FC Barcelona Brazil     82        90
## 3 T. Alexander-Arnold Liverpool England    78        88
## 4 N. Barella    Cagliari Italy      76        88
## 5 Rúben Neves  Wolverhampton Wanderers Portugal 79        87
## 6 Dani Ceballos Real Madrid Spain      78        87
## 7 F. Kessié     Milan    Ivory Coast 78        87
## 8 T. Ndombele   Olympique Lyonnais France    78        87
## 9 J. Gomez      Liverpool England    77        87
## 10 D. Calabria  Milan    Italy      77        87
## # ... with 46 more rows

## Selecting by rb

## # A tibble: 56 x 5
##   short_name     club    nationality overall potential
##   <chr>         <chr>    <chr>        <int>     <int>
## 1 M. de Ligt    Juventus Netherlands 85        93
## 2 T. Alexander-Arnold Liverpool England 83        89
## 3 H. Aouar       Olympique Lyonnais France 81        89
## 4 S. Tonali     Brescia   Italy      75        89
## 5 Éder Militão  Real Madrid Brazil    81        88
## 6 A. Wan-Bissaka Manchester United England 79        88
## 7 I. Konaté     RB Leipzig France    79        88
## 8 S. Berge       KRC Genk   Norway    79        87
## 9 D. Rice        West Ham United England 78        87
## 10 E. Palacios   River Plate Argentina 77        87
## # ... with 46 more rows

#Player with highest scope for increase in overall
for (i in seq_along(fifa_datasets_list)) {
  pot_inc <- fifa_datasets_list[[i]] %>%
    mutate(pot_increase = potential - overall) %>%
    arrange(desc(pot_increase)) %>%
    select(short_name, club, nationality, age, overall, potential, pot_increase)

  #we see that young players have scope for highest increase in rating.
  #so are pot_increase and age positively correlated?

  pot_inc_age_pot_inc <- pot_inc %>% select(age, pot_increase)
  cor_pot_inc_age_pot_inc <- cor(pot_inc_age_pot_inc)
  print(paste("Year", years[[i]], ":"))
  print(round(cor_pot_inc_age_pot_inc, 2))
}

}

```

```

## [1] "Year 2016 :"
##           age pot_increase
## age      1.00     -0.87
## pot_increase -0.87      1.00
## [1] "Year 2017 :"
##           age pot_increase
## age      1.00     -0.86
## pot_increase -0.86      1.00
## [1] "Year 2018 :"
##           age pot_increase
## age      1.00     -0.86
## pot_increase -0.86      1.00
## [1] "Year 2019 :"
##           age pot_increase
## age      1.00     -0.87
## pot_increase -0.87      1.00
## [1] "Year 2020 :"
##           age pot_increase
## age      1.00     -0.87
## pot_increase -0.87      1.00

# 6 PHYSICAL ATTRIBUTES: pace, shooting, passing, dribbling, defending and physique

pace_dfs <- vector(mode = "list", length = 5)
shooting_dfs <- vector(mode = "list", length = 5)
passing_dfs <- vector(mode = "list", length = 5)
dribble_dfs <- vector(mode = "list", length = 5)
defend_dfs <- vector(mode = "list", length = 5)
physic_dfs <- vector(mode = "list", length = 5)

for (i in seq_along(fifa_datasets_list)) {

  # pace
  pace_ <- fifa_datasets_list[[i]] %>% arrange(desc(pace)) %>%
    select(short_name, club, nationality, overall, team_position, pace) %>% top_n(1)
  pace_ <- add_column(pace_, years[[i]], .before = "short_name")
  pace_dfs[[i]] <- data.frame(pace_)

  # shooting
  shooting_ <- fifa_datasets_list[[i]] %>% arrange(desc(shooting)) %>%
    select(short_name, club, nationality, overall, team_position, shooting) %>% top_n(1)
  shooting_ <- add_column(shooting_, years[[i]], .before = "short_name")
  shooting_dfs[[i]] <- data.frame(shooting_)

  # passing
  passing_ <- fifa_datasets_list[[i]] %>% arrange(desc(passing)) %>%
    select(short_name, club, nationality, overall, team_position, passing) %>% top_n(1)
  passing_ <- add_column(passing_, years[[i]], .before = "short_name")
  passing_dfs[[i]] <- data.frame(passing_)

  # dribble
  dribble_ <- fifa_datasets_list[[i]] %>% arrange(desc(dribbling)) %>%
    select(short_name, club, nationality, overall, team_position, dribbling) %>% top_n(1)
  dribble_ <- add_column(dribble_, years[[i]], .before = "short_name")
}

```

```

dribble_dfs[[i]] <- data.frame(dribble_)

# defending
defend_ <- fifa_datasets_list[[i]] %>% arrange(desc(defending)) %>%
  select(short_name, club, nationality, overall, team_position, defending) %>% top_n(1)
defend_ <- add_column(defend_, years[[i]], .before = "short_name")
defend_dfs[[i]] <- data.frame(defend_)

# physic
physic_ <- fifa_datasets_list[[i]] %>% arrange(desc(phsic)) %>%
  select(short_name, club, nationality, overall, team_position, physic) %>% top_n(1)
physic_ <- add_column(physic_, years[[i]], .before = "short_name")
physic_dfs[[i]] <- data.frame(physic_)

}

## Selecting by pace

## Selecting by shooting

## Selecting by passing

## Selecting by dribbling

## Selecting by defending

## Selecting by physic

## Selecting by pace

## Selecting by shooting

## Selecting by passing

## Selecting by dribbling

## Selecting by defending

## Selecting by physic

## Selecting by pace

## Selecting by shooting

## Selecting by passing

## Selecting by dribbling

## Selecting by defending

```

```

## Selecting by physic

## Selecting by pace

## Selecting by shooting

## Selecting by passing

## Selecting by dribbling

## Selecting by defending

## Selecting by physic

## Selecting by pace

## Selecting by shooting

## Selecting by passing

## Selecting by dribbling

## Selecting by defending

## Selecting by physic

pace_df <- do.call("rbind", pace_dfs)
shooting_df <- do.call("rbind", shooting_dfs)
passing_df <- do.call("rbind", passing_dfs)
dribble_df <- do.call("rbind", dribble_dfs)
defend_df <- do.call("rbind", defend_dfs)
physic_df <- do.call("rbind", physic_dfs)

print(pace_df)

##      years...i...    short_name          club nationality overall
## 1        2016     T. Walcott       Arsenal     England     81
## 2        2016     M. Bolly   Fortuna Düsseldorf Ivory Coast     67
## 3        2017 P. Aubameyang Borussia Dortmund     Gabon     86
## 4        2017     M. Bolly     SpVgg Greuther Fürth Ivory Coast     67
## 5        2018 P. Aubameyang Borussia Dortmund     Gabon     88
## 6        2018 J. Biabiany      Sparta Praha     France     75
## 7        2019 K. Mbappé    Paris Saint-Germain     France     87
## 8        2019     Adama Wolverhampton Wanderers     Spain     75
## 9        2020 K. Mbappé    Paris Saint-Germain     France     89
## 10       2020 Adama Traoré Wolverhampton Wanderers     Spain     74
##      team_position pace
## 1             ST   96
## 2            SUB   96
## 3             ST   96

```

```

## 4          SUB  96
## 5          ST   96
## 6          RM   96
## 7          RW   96
## 8          SUB  96
## 9          RW   96
## 10         SUB  96

print(shooting_df)

```

```

##   years...i...      short_name      club nationality overall
## 1    2016 Cristiano Ronaldo Real Madrid Portugal     93
## 2    2017 Cristiano Ronaldo Real Madrid Portugal     94
## 3    2018 Cristiano Ronaldo Real Madrid Portugal     94
## 4    2019 Cristiano Ronaldo Juventus Portugal     94
## 5    2020 Cristiano Ronaldo Juventus Portugal     93
##   team_position shooting
## 1            LM      93
## 2            LW      92
## 3            LW      93
## 4            LW      93
## 5            LW      93

```

```

print(passing_df)

```

```

##   years...i...      short_name      club nationality overall
## 1    2016 A. Pirlo New York City FC Italy     84
## 2    2017 A. Pirlo New York City FC Italy     82
## 3    2018 T. Kroos Real Madrid Germany    90
## 4    2018 A. Pirlo New York City FC Italy     79
## 5    2019 K. De Bruyne Manchester City Belgium   91
## 6    2020 L. Messi FC Barcelona Argentina  94
## 7    2020 K. De Bruyne Manchester City Belgium   91
##   team_position passing
## 1            CDM     93
## 2            LCM     91
## 3            LCM     89
## 4            SUB     89
## 5            RCM     92
## 6            RW      92
## 7            RCM     92

```

```

print(dribble_df)

```

```

##   years...i... short_name      club nationality overall team_position
## 1    2016 L. Messi FC Barcelona Argentina     94          RW
## 2    2017 L. Messi FC Barcelona Argentina     93          RW
## 3    2018 L. Messi FC Barcelona Argentina     93          RW
## 4    2019 L. Messi FC Barcelona Argentina     94          RW
## 5    2020 L. Messi FC Barcelona Argentina     94          RW
##   dribbling
## 1      95

```

```

## 2      96
## 3      96
## 4      96
## 5      96

print(defend_df)

##   years...i... short_name          club nationality overall
## 1    2016 Thiago Silva Paris Saint-Germain Brazil     88
## 2    2016 G. Chiellini Juventus Italy      87
## 3    2017 J. Boateng FC Bayern München Germany    90
## 4    2017 Thiago Silva Paris Saint-Germain Brazil     89
## 5    2017 G. Chiellini Juventus Italy      88
## 6    2018 G. Chiellini Juventus Italy      89
## 7    2019 Sergio Ramos Real Madrid Spain      91
## 8    2019 G. Chiellini Juventus Italy      89
## 9    2020 V. van Dijk Liverpool Netherlands 90
## 10   2020 G. Chiellini Juventus Italy      89
##   team_position defending
## 1            RCB      90
## 2            LCB      90
## 3            RCB      90
## 4            LCB      90
## 5            LCB      90
## 6            LCB      90
## 7            LCB      91
## 8            LCB      91
## 9            LCB      90
## 10           LCB      90

```

```

print(physic_df)

##   years...i... short_name          club nationality overall
## 1    2016 G. Medel Inter Chile     81
## 2    2016 M. Fellaini Manchester United Belgium    78
## 3    2016 V. Wanyama Southampton Kenya      77
## 4    2016 J. Van Damme Standard de Liège Belgium    72
## 5    2016 C. Paterson Heart of Midlothian Scotland   65
## 6    2017 M. Fellaini Manchester United Belgium    78
## 7    2017 C. N'Doye Angers SCO Senegal    77
## 8    2017 C. Paterson Heart of Midlothian Scotland   68
## 9    2018 J. Van Damme Royal Antwerp FC Belgium    77
## 10   2019 S. Nzonzi Roma France     82
## 11   2019 D. Hediger FC Thun Switzerland 68
## 12   2020 M. Marega FC Porto Mali      80
##   team_position physic
## 1            CDM      89
## 2            SUB      89
## 3            RDM      89
## 4            LB       89
## 5            RB       89
## 6            RDM      90
## 7            RCM      90

```

```

## 8          RB    90
## 9          SUB   92
## 10         SUB   89
## 11         RDM   89
## 12         RS    90

# Goalkeeping stats
top_gks_dfs <- vector(mode = "list", length = 5)
gk_diving_dfs <- vector(mode = "list", length = 5)
gk_handling_dfs <- vector(mode = "list", length = 5)
gk_kicking_dfs <- vector(mode = "list", length = 5)
gk_reflex_dfs <- vector(mode = "list", length = 5)
gk_speed_dfs <- vector(mode = "list", length = 5)
gk_position_dfs <- vector(mode = "list", length = 5)

for (i in seq_along(fifa_datasets_list)) {

  # Top 5 best goalkeepers by year
  top_5_gk <- fifa_datasets_list[[i]] %>% filter(team_position=="GK") %>% arrange(desc(overall)) %>%
    select(short_name, club, nationality, overall) %>% top_n(5)
  top_5_gk <- add_column(top_5_gk, years[[i]], .before = "short_name")
  top_gks_dfs[[i]] <- data.frame(top_5_gk)

  # Top 5 best divers by year
  top_5_divers <- fifa_datasets_list[[i]] %>% filter(team_position=="GK") %>% arrange(desc(gk_diving)) %
    select(short_name, club, nationality, gk_diving) %>% top_n(5)
  top_5_divers <- add_column(top_5_divers, years[[i]], .before = "short_name")
  gk_diving_dfs[[i]] <- data.frame(top_5_divers)

  # Top 5 best handlers by year
  top_5_handlers <- fifa_datasets_list[[i]] %>% filter(team_position=="GK") %>%
    arrange(desc(gk_handling)) %>% select(short_name, club, nationality, gk_handling) %>% top_n(5)
  top_5_handlers <- add_column(top_5_handlers, years[[i]], .before = "short_name")
  gk_handling_dfs[[i]] <- data.frame(top_5_handlers)

  # Top 5 best kickers by year
  top_5_kickers <- fifa_datasets_list[[i]] %>% filter(team_position=="GK") %>%
    arrange(desc(gk_kicking)) %>% select(short_name, club, nationality, gk_kicking) %>% top_n(5)
  top_5_kickers <- add_column(top_5_kickers, years[[i]], .before = "short_name")
  gk_kicking_dfs[[i]] <- data.frame(top_5_kickers)

  # Top 5 best reflexes by year
  top_5_reflex <- fifa_datasets_list[[i]] %>% filter(team_position=="GK") %>%
    arrange(desc(gk_reflexes)) %>% select(short_name, club, nationality, gk_reflexes) %>% top_n(5)
  top_5_reflex <- add_column(top_5_reflex, years[[i]], .before = "short_name")
  gk_reflex_dfs[[i]] <- data.frame(top_5_reflex)

  # Top 5 best speed by year
  top_5_speed <- fifa_datasets_list[[i]] %>% filter(team_position=="GK") %>%
    arrange(desc(gk_speed)) %>% select(short_name, club, nationality, gk_speed) %>% top_n(5)
  top_5_speed <- add_column(top_5_speed, years[[i]], .before = "short_name")
  gk_speed_dfs[[i]] <- data.frame(top_5_speed)

  # Top 5 best position by year
}

```

```

top_5_position <- fifa_datasets_list[[i]] %>% filter(team_position=="GK") %>%
  arrange(desc(gk_positioning)) %>% select(short_name, club, nationality, gk_positioning) %>% top_n(5)
top_5_position <- add_column(top_5_position, years[[i]], .before = "short_name")
gk_position_dfs[[i]] <- data.frame(top_5_position)
}

## Selecting by overall

## Selecting by gk_diving

## Selecting by gk_handling

## Selecting by gk_kicking

## Selecting by gk_reflexes

## Selecting by gk_speed

## Selecting by gk_positioning

## Selecting by overall

## Selecting by gk_diving

## Selecting by gk_handling

## Selecting by gk_kicking

## Selecting by gk_reflexes

## Selecting by gk_speed

## Selecting by gk_positioning

## Selecting by overall

## Selecting by gk_diving

## Selecting by gk_handling

## Selecting by gk_kicking

## Selecting by gk_reflexes

## Selecting by gk_speed

## Selecting by gk_positioning

```

```

## Selecting by overall

## Selecting by gk_diving

## Selecting by gk_handling

## Selecting by gk_kicking

## Selecting by gk_reflexes

## Selecting by gk_speed

## Selecting by gk_positioning

## Selecting by overall

## Selecting by gk_diving

## Selecting by gk_handling

## Selecting by gk_kicking

## Selecting by gk_reflexes

## Selecting by gk_speed

## Selecting by gk_positioning

top_5_gks_yearly_df <- do.call("rbind", top_gks_dfs)
gk_diving_yearly_df <- do.call("rbind", gk_diving_dfs)
gk_handling_yearly_df <- do.call("rbind", gk_handling_dfs)
gk_kicking_yearly_df <- do.call("rbind", gk_kicking_dfs)
gk_reflexes_yearly_df <- do.call("rbind", gk_reflex_dfs)
gk_speed_yearly_df <- do.call("rbind", gk_speed_dfs)
gk_position_yearly_df <- do.call("rbind", gk_position_dfs)

print(top_5_gks_yearly_df )

##   years...i..    short_name           club   nationality overall
## 1      2016     M. Neuer   FC Bayern München       Germany     90
## 2      2016     De Gea   Manchester United        Spain      86
## 3      2016     P. Čech      Arsenal Czech Republic     85
## 4      2016     H. Lloris   Tottenham Hotspur      France      85
## 5      2016     B. Leno   Bayer 04 Leverkusen       Germany      84
## 6      2016     G. Buffon      Juventus       Italy      84
## 7      2016     Casillas      FC Porto        Spain      84
## 8      2016     J. Hart   Manchester City      England      84
## 9      2017     M. Neuer   FC Bayern München       Germany     92
## 10     2017     De Gea   Manchester United        Spain      90
## 11     2017     T. Courtois      Chelsea      Belgium      89

```

```

## 12    2017   G. Buffon      Juventus       Italy     88
## 13    2017   P. Čech        Arsenal Czech Republic 88
## 14    2017   H. Lloris      Tottenham Hotspur   France    88
## 15    2018   M. Neuer       FC Bayern München  Germany   92
## 16    2018   De Gea        Manchester United  Spain     90
## 17    2018   T. Courtois    Chelsea          Belgium   89
## 18    2018   G. Buffon      Juventus       Italy     89
## 19    2018   J. Oblak        Atlético Madrid Slovenia 88
## 20    2018   H. Lloris      Tottenham Hotspur   France    88
## 21    2019   De Gea        Manchester United  Spain     91
## 22    2019   J. Oblak        Atlético Madrid Slovenia 90
## 23    2019   T. Courtois    Real Madrid      Belgium   90
## 24    2019   M. Neuer       FC Bayern München  Germany   90
## 25    2019   M. ter Stegen   FC Barcelona    Germany   89
## 26    2020   J. Oblak        Atlético Madrid Slovenia 91
## 27    2020   M. ter Stegen   FC Barcelona    Germany   90
## 28    2020   Alisson        Liverpool        Brazil    89
## 29    2020   De Gea        Manchester United  Spain     89
## 30    2020   Ederson        Manchester City  Brazil    88
## 31    2020   T. Courtois    Real Madrid      Belgium   88
## 32    2020   S. Handanovič   Inter          Slovenia 88
## 33    2020   M. Neuer       FC Bayern München  Germany   88
## 34    2020   H. Lloris      Tottenham Hotspur   France   88

```

```
print(gk_diving_yearly_df)
```

	years...i..	short_name	club	nationality	gk_diving
## 1	2016	De Gea	Manchester United	Spain	88
## 2	2016	H. Lloris	Tottenham Hotspur	France	87
## 3	2016	Casillas	FC Porto	Spain	87
## 4	2016	S. Handanovič	Inter	Slovenia	87
## 5	2016	M. Neuer	FC Bayern München	Germany	85
## 6	2016	G. Buffon	Juventus	Italy	85
## 7	2016	J. Hart	Manchester City	England	85
## 8	2016	S. Mandanda	Olympique de Marseille	France	85
## 9	2016	A. Lopes	Olympique Lyonnais	Portugal	85
## 10	2017	M. Neuer	FC Bayern München	Germany	89
## 11	2017	De Gea	Manchester United	Spain	88
## 12	2017	Diego Alves	Valencia CF	Brazil	88
## 13	2017	G. Buffon	Juventus	Italy	87
## 14	2017	H. Lloris	Tottenham Hotspur	France	87
## 15	2017	K. Navas	Real Madrid	Costa Rica	87
## 16	2018	M. Neuer	FC Bayern München	Germany	91
## 17	2018	De Gea	Manchester United	Spain	90
## 18	2018	G. Buffon	Juventus	Italy	89
## 19	2018	H. Lloris	Tottenham Hotspur	France	88
## 20	2018	G. Donnarumma	Milan	Italy	88
## 21	2019	M. Neuer	FC Bayern München	Germany	91
## 22	2019	De Gea	Manchester United	Spain	90
## 23	2019	H. Lloris	Tottenham Hotspur	France	88
## 24	2019	G. Donnarumma	Milan	Italy	88
## 25	2019	T. Courtois	Real Madrid	Belgium	87
## 26	2019	M. ter Stegen	FC Barcelona	Germany	87
## 27	2019	S. Handanovič	Inter	Slovenia	87

## 28	2019	Casillas	FC Porto	Spain	87
## 29	2020	De Gea	Manchester United	Spain	90
## 30	2020	G. Donnarumma	Milan	Italy	90
## 31	2020	H. Lloris	Tottenham Hotspur	France	89
## 32	2020	M. ter Stegen	FC Barcelona	Germany	88
## 33	2020	S. Handanović	Inter	Slovenia	88

```
print(gk_handling_yearly_df)
```

##	years...i..	short_name	club	nationality
## 1	2016	M. Neuer	FC Bayern München	Germany
## 2	2016	P. Čech	Arsenal	Czech Republic
## 3	2016	B. Leno	Bayer 04 Leverkusen	Germany
## 4	2016	J. Cillessen	Ajax	Netherlands
## 5	2016	J. Oblak	Atlético Madrid	Slovenia
## 6	2017	T. Courtois	Chelsea	Belgium
## 7	2017	M. Neuer	FC Bayern München	Germany
## 8	2017	P. Čech	Arsenal	Czech Republic
## 9	2017	J. Oblak	Atlético Madrid	Slovenia
## 10	2017	S. Handanovič	Inter	Slovenia
## 11	2018	T. Courtois	Chelsea	Belgium
## 12	2018	M. Neuer	FC Bayern München	Germany
## 13	2018	J. Oblak	Atlético Madrid	Slovenia
## 14	2018	G. Buffon	Juventus	Italy
## 15	2018	P. Čech	Arsenal	Czech Republic
## 16	2019	J. Oblak	Atlético Madrid	Slovenia
## 17	2019	T. Courtois	Real Madrid	Belgium
## 18	2019	M. Neuer	FC Bayern München	Germany
## 19	2019	S. Handanovič	Inter	Slovenia
## 20	2019	De Gea	Manchester United	Spain
## 21	2019	M. ter Stegen	FC Barcelona	Germany
## 22	2020	J. Oblak	Atlético Madrid	Slovenia
## 23	2020	T. Courtois	Real Madrid	Belgium
## 24	2020	M. Neuer	FC Bayern München	Germany
## 25	2020	P. Gulácsi	RB Leipzig	Hungary
## 26	2020	M. ter Stegen	FC Barcelona	Germany
## 27	2020	S. Handanovič	Inter	Slovenia
## 28	2020	Y. Sommer	Borussia Mönchengladbach	Switzerland
##		gk_handling		
## 1		87		
## 2		84		
## 3		84		
## 4		84		
## 5		84		
## 6		91		
## 7		90		
## 8		90		
## 9		90		
## 10		89		
## 11		91		
## 12		90		
## 13		90		
## 14		88		
## 15		87		

```

## 16      92
## 17      91
## 18      88
## 19      86
## 20      85
## 21      85
## 22      92
## 23      89
## 24      87
## 25      86
## 26      85
## 27      85
## 28      85

print(gk_kicking_yearly_df)

##   years...i.. short_name          club nationality
## 1    2016     M. Neuer  FC Bayern München  Germany
## 2    2016     C. Bravo   FC Barcelona    Chile
## 3    2016     De Gea   Manchester United Spain
## 4    2016     I. Khune  Kaizer Chiefs  South Africa
## 5    2016     Y. Sommer Borussia Mönchengladbach Switzerland
## 6    2016 K. Schmeichel  Leicester City Denmark
## 7    2017     M. Neuer  FC Bayern München  Germany
## 8    2017     I. Khune  Kaizer Chiefs  South Africa
## 9    2017     De Gea   Manchester United Spain
## 10   2017     C. Bravo   Manchester City Chile
## 11   2017     Y. Sommer Borussia Mönchengladbach Switzerland
## 12   2017 K. Schmeichel  Leicester City Denmark
## 13   2018     M. Neuer  FC Bayern München  Germany
## 14   2018     M. Ryan   Brighton & Hove Albion Australia
## 15   2018     De Gea   Manchester United Spain
## 16   2018 M. ter Stegen   FC Barcelona  Germany
## 17   2018     J. Pickford  Everton  England
## 18   2019     M. Neuer  FC Bayern München  Germany
## 19   2019     Ederson  Manchester City Brazil
## 20   2019     I. Khune  Kaizer Chiefs  South Africa
## 21   2019 M. ter Stegen   FC Barcelona  Germany
## 22   2019     J. Pickford  Everton  England
## 23   2020     Ederson  Manchester City Brazil
## 24   2020     M. Neuer  FC Bayern München  Germany
## 25   2020 M. ter Stegen   FC Barcelona  Germany
## 26   2020     J. Pickford  Everton  England
## 27   2020     Kepa    Chelsea  Spain
## 28   2020     A. Onana   Ajax  Cameroon

##   gk_kicking
## 1      91
## 2      87
## 3      86
## 4      86
## 5      85
## 6      85
## 7      95
## 8      90

```

```

## 9      87
## 10     87
## 11     85
## 12     85
## 13     95
## 14     90
## 15     87
## 16     87
## 17     85
## 18     91
## 19     90
## 20     90
## 21     88
## 22     88
## 23     93
## 24     91
## 25     88
## 26     87
## 27     86
## 28     86

print(gk_reflexes_yearly_df)

##   years...i.. short_name          club nationality gk_reflexes
## 1    2016      M. Perin        Genoa      Italy       90
## 2    2016      V. Enyeama     L OSC Lille  Nigeria       90
## 3    2016      De Gea  Manchester United  Spain       89
## 4    2016      H. Lloris  Tottenham Hotspur  France       88
## 5    2016      Casillas      FC Porto  Spain       88
## 6    2017      De Gea  Manchester United  Spain       90
## 7    2017      H. Lloris  Tottenham Hotspur  France       90
## 8    2017      V. Enyeama     L OSC Lille  Nigeria       90
## 9    2017      M. Neuer  FC Bayern München  Germany       89
## 10   2017      T. Courtois      Chelsea  Belgium       89
## 11   2018      De Gea  Manchester United  Spain       90
## 12   2018      H. Lloris  Tottenham Hotspur  France       90
## 13   2018      M. Perin        Genoa      Italy       90
## 14   2018      M. Neuer  FC Bayern München  Germany       89
## 15   2018      T. Courtois      Chelsea  Belgium       88
## 16   2018      G. Donnarumma      Milan      Italy       88
## 17   2019      De Gea  Manchester United  Spain       94
## 18   2019      H. Lloris  Tottenham Hotspur  France       92
## 19   2019      M. ter Stegen  FC Barcelona  Germany       90
## 20   2019      J. Oblak  Atlético Madrid  Slovenia       89
## 21   2019      S. Handanovič      Inter  Slovenia       89
## 22   2020      De Gea  Manchester United  Spain       92
## 23   2020      H. Lloris  Tottenham Hotspur  France       91
## 24   2020      M. ter Stegen  FC Barcelona  Germany       90
## 25   2020      G. Donnarumma      Milan      Italy       90
## 26   2020      J. Oblak  Atlético Madrid  Slovenia       89
## 27   2020      Alisson      Liverpool  Brazil       89
## 28   2020      S. Handanovič      Inter  Slovenia       89
## 29   2020      A. Lopes Olympique Lyonnais  Portugal       89
## 30   2020      R. Bürki  Borussia Dortmund  Switzerland       89

```

```
print(gk_speed_yearly_df)
```

##	years...i..	short_name	club	nationality	gk_speed
## 1	2016	H. Lloris	Tottenham Hotspur	France	64
## 2	2016	Casillas	FC Porto	Spain	64
## 3	2016	F. Muslera	Galatasaray SK	Uruguay	62
## 4	2016	A. Lopes	Olympique Lyonnais	Portugal	62
## 5	2016	J. Orozco	Monterrey	Mexico	61
## 6	2016	J. Villalpando	Jaguares de Chiapas	Mexico	61
## 7	2017	Jairo Farnias	Joinville	Brazil	68
## 8	2017	G. Ochoa	Granada CF	Mexico	67
## 9	2017	O. Kivrak	Trabzonspor	Turkey	65
## 10	2017	H. Lloris	Tottenham Hotspur	France	64
## 11	2017	Casillas	FC Porto	Spain	64
## 12	2017	A. Belenov	FC Anzhí Makhachkala	Russia	64
## 13	2018	H. Lloris	Tottenham Hotspur	France	64
## 14	2018	Palatsí	Cultural Leonesa	Spain	64
## 15	2018	Ederson	Manchester City	Brazil	63
## 16	2018	A. Onana	Ajax	Cameroon	63
## 17	2018	Alberto	Rayo Vallecano	Spain	63
## 18	2019	A. Lopes	Olympique Lyonnais	Portugal	64
## 19	2019	H. Lloris	Tottenham Hotspur	France	63
## 20	2019	Ederson	Manchester City	Brazil	63
## 21	2019	A. Onana	Ajax	Cameroon	63
## 22	2019	Alberto	Rayo Vallecano	Spain	63
## 23	2019	Z. Zlámal	Heart of Midlothian	Czech Republic	63
## 24	2020	Jordi Masip	Real Valladolid CF	Spain	65
## 25	2020	A. Lopes	Olympique Lyonnais	Portugal	64
## 26	2020	Ederson	Manchester City	Brazil	63
## 27	2020	H. Lloris	Tottenham Hotspur	France	63
## 28	2020	A. Onana	Ajax	Cameroon	63
## 29	2020	Alberto	Rayo Vallecano	Spain	63

```
print(gk_position_yearly_df)
```

##	years...i..	short_name	club	nationality
## 1	2016	M. Neuer	FC Bayern München	Germany
## 2	2016	G. Buffon	Juventus	Italy
## 3	2016	Diego López	Milan	Spain
## 4	2016	S. Handanović	Inter	Slovenia
## 5	2016	J. Hart	Manchester City	England
## 6	2016	Iraizoz	Athletic Club de Bilbao	Spain
## 7	2017	M. Neuer	FC Bayern München	Germany
## 8	2017	G. Buffon	Juventus	Italy
## 9	2017	J. Oblak	Atlético Madrid	Slovenia
## 10	2017	T. Courtois	Chelsea	Belgium
## 11	2017	S. Handanović	Inter	Slovenia
## 12	2017	B. Leno	Bayer 04 Leverkusen	Germany
## 13	2018	M. Neuer	FC Bayern München	Germany
## 14	2018	G. Buffon	Juventus	Italy
## 15	2018	J. Oblak	Atlético Madrid	Slovenia
## 16	2018	S. Handanović	Inter	Slovenia

```

## 17      2018   R. Jarstein        Hertha BSC      Norway
## 18      2019   S. Handanovič     Inter          Slovenia
## 19      2019   De Gea           Manchester United    Spain
## 20      2019   J. Oblak          Atlético Madrid  Slovenia
## 21      2019   M. Neuer          FC Bayern München Germany
## 22      2019   T. Courtois       Real Madrid      Belgium
## 23      2020   J. Oblak          Atlético Madrid  Slovenia
## 24      2020   Alisson          Liverpool       Brazil
## 25      2020   S. Handanovič     Inter          Slovenia
## 26      2020   M. ter Stegen     FC Barcelona    Germany
## 27      2020   Ederson          Manchester City  Brazil
## 28      2020   W. Szczęsny       Juventus      Poland
## 29      2020   R. Jarstein       Hertha BSC      Norway

##   gk_positioning
## 1      90
## 2      89
## 3      87
## 4      86
## 5      84
## 6      84
## 7      91
## 8      90
## 9      87
## 10     86
## 11     86
## 12     86
## 13     91
## 14     90
## 15     87
## 16     87
## 17     87
## 18     89
## 19     88
## 20     88
## 21     88
## 22     87
## 23     90
## 24     90
## 25     89
## 26     88
## 27     86
## 28     86
## 29     86

```

```

# Attacking Stats: attacking_crossing, attacking_finishing and attacking_heading_accuracy
attack_crossing_dfs <- vector(mode = "list", length = 5)
attack_finish_dfs <- vector(mode = "list", length = 5)
attack_head_acc_dfs <- vector(mode = "list", length = 5)

for (i in seq_along(fifa_datasets_list)) {

  # Top 5 best crossers by year
  top_attack_crossing <- fifa_datasets_list[[i]] %>% arrange(desc(attacking_crossing)) %>%
    select(short_name, club, nationality, overall, attacking_crossing) %>% top_n(5)
}
```

```

top_attack_crossing <- add_column(top_attack_crossing, years[[i]], .before = "short_name")
attack_crossing_dfs[[i]] <- data.frame(top_attack_crossing)

# Top 5 best finishers by year
top_attack_finish <- fifa_datasets_list[[i]] %>% arrange(desc(attacking_finishing)) %>%
  select(short_name, club, nationality, overall, attacking_finishing) %>% top_n(5)
top_attack_finish <- add_column(top_attack_finish, years[[i]], .before = "short_name")
attack_finish_dfs[[i]] <- data.frame(top_attack_finish)
# ARE FINISHING AND SHOOTING CORRELATED?

# Top 5 players most likely to score a goal via a header each year
top_head_acc <- fifa_datasets_list[[i]] %>% arrange(desc(attacking_heading_accuracy)) %>%
  select(short_name, club, nationality, overall, attacking_heading_accuracy) %>% top_n(5)
top_head_acc <- add_column(top_head_acc, years[[i]], .before = "short_name")
attack_head_acc_dfs[[i]] <- data.frame(top_head_acc)
}

## Selecting by attacking_crossing

## Selecting by attacking_finishing

## Selecting by attacking_heading_accuracy

## Selecting by attacking_crossing

## Selecting by attacking_finishing

## Selecting by attacking_heading_accuracy

## Selecting by attacking_crossing

## Selecting by attacking_finishing

## Selecting by attacking_heading_accuracy

## Selecting by attacking_crossing

## Selecting by attacking_finishing

## Selecting by attacking_heading_accuracy

```

```
print(do.call("rbind", attack_crossing_dfs))
```

##	years...i..	short_name	club	nationality	overall
## 1	2016	A. Pirlo	New York City FC	Italy	84
## 2	2016	R. Rodriguez	VfL Wolfsburg	Switzerland	83
## 3	2016	L. Baines	Everton	England	83
## 4	2016	A. Kolarov	Manchester City	Serbia	79
## 5	2016	S. Larsson	Sunderland	Sweden	74
## 6	2017	L. Baines	Everton	England	83
## 7	2017	A. Pirlo	New York City FC	Italy	82
## 8	2017	R. Rodriguez	VfL Wolfsburg	Switzerland	83
## 9	2017	K. De Bruyne	Manchester City	Belgium	88
## 10	2017	A. Di María	Paris Saint-Germain	Argentina	87
## 11	2017	A. Kolarov	Manchester City	Serbia	79
## 12	2017	S. Larsson	Sunderland	Sweden	75
## 13	2018	A. Pirlo	New York City FC	Italy	79
## 14	2018	M. Plattenhardt	Hertha BSC	Germany	78
## 15	2018	Marcelo	Real Madrid	Brazil	87
## 16	2018	K. De Bruyne	Manchester City	Belgium	89
## 17	2018	Pedro León	SD Eibar	Spain	80
## 18	2019	K. De Bruyne	Manchester City	Belgium	91
## 19	2019	Quaresma	Beşiktaş JK	Portugal	84
## 20	2019	P. Max	FC Augsburg	Germany	78
## 21	2019	A. Kolarov	Roma	Serbia	82
## 22	2019	K. Trippier	Tottenham Hotspur	England	82
## 23	2019	Pedro León	SD Eibar	Spain	81
## 24	2020	K. De Bruyne	Manchester City	Belgium	91
## 25	2020	J. Kimmich	FC Bayern München	Germany	86
## 26	2020	Quaresma	Beşiktaş JK	Portugal	81
## 27	2020	Pedro León	SD Eibar	Spain	80
## 28	2020	J. Rodríguez	Real Madrid	Colombia	85
## 29	2020	A. Kolarov	Roma	Serbia	82
##	attacking_crossing				
## 1		93+11			
## 2		92+4			
## 3		91+3			
## 4		90+5			
## 5		90+3			
## 6		91			
## 7		91			
## 8		90-2			
## 9		90			
## 10		90			
## 11		90			
## 12		90			
## 13		91			
## 14		90+4			
## 15		90+3			
## 16		90			
## 17		90			
## 18		93			
## 19		92			
## 20		91+1			

```

## 21          91
## 22          91
## 23          91
## 24          93
## 25          91
## 26          91
## 27          91
## 28          90
## 29          90

print(do.call("rbind", attack_finish_dfs))

##   years...i.. short_name      club nationality overall
## 1    2016 Cristiano Ronaldo Real Madrid Portugal     93
## 2    2016 L. Messi FC Barcelona Argentina     94
## 3    2016 L. Suárez FC Barcelona Uruguay      90
## 4    2016 Z. Ibrahimović Paris Saint-Germain Sweden      89
## 5    2016 S. Agüero Manchester City Argentina     87
## 6    2016 Diego Costa Chelsea Spain      86
## 7    2017 L. Messi FC Barcelona Argentina     93
## 8    2017 L. Suárez FC Barcelona Uruguay      92
## 9    2017 Cristiano Ronaldo Real Madrid Portugal     94
## 10   2017 R. Lewandowski FC Bayern München Poland      90
## 11   2017 G. Higuaín Juventus Argentina     88
## 12   2018 L. Messi FC Barcelona Argentina     93
## 13   2018 Cristiano Ronaldo Real Madrid Portugal     94
## 14   2018 L. Suárez FC Barcelona Uruguay      92
## 15   2018 G. Higuaín Juventus Argentina     90
## 16   2018 R. Lewandowski FC Bayern München Poland      91
## 17   2019 L. Messi FC Barcelona Argentina     94
## 18   2019 Cristiano Ronaldo Juventus Portugal     94
## 19   2019 L. Suárez FC Barcelona Uruguay      91
## 20   2019 H. Kane Tottenham Hotspur England      89
## 21   2019 S. Agüero Manchester City Argentina     89
## 22   2020 L. Messi FC Barcelona Argentina     94
## 23   2020 Cristiano Ronaldo Juventus Portugal     93
## 24   2020 H. Kane Tottenham Hotspur England      89
## 25   2020 S. Agüero Manchester City Argentina     89
## 26   2020 L. Suárez FC Barcelona Uruguay      89

##   attacking_finishing
## 1          95
## 2         93-1
## 3         90-1
## 4          90
## 5          90
## 6          90
## 7        95+2
## 8        94+4
## 9        93-2
## 10       91+2
## 11       91+1
## 12          95
## 13       94+1
## 14          94

```

```

## 15          91-1
## 16          91
## 17          95
## 18          94
## 19          94
## 20          94
## 21          93
## 22          95
## 23          94
## 24          94
## 25          93
## 26          91

print(do.call("rbind", attack_head_acc_dfs))

##   years...i.. short_name           club nationality overall
## 1    2016     T. Cahill      Australia     Australia    73
## 2    2016     Aduriz      Athletic Club de Bilbao       Spain    82
## 3    2016     Naldo      VfL Wolfsburg       Brazil    85
## 4    2016     D. Godín      Atlético Madrid     Uruguay    85
## 5    2016     L. de Jong        PSV Netherlands    79
## 6    2017     Aduriz      Athletic Club de Bilbao       Spain    84
## 7    2017     T. Cahill      Melbourne City FC     Australia    74
## 8    2017     Naldo      FC Schalke 04       Brazil    84
## 9    2017     D. Godín      Atlético Madrid     Uruguay    88
## 10   2017    I. Slimani      Leicester City     Algeria    83
## 11   2017     L. de Jong        PSV Netherlands    79
## 12   2018     Aduriz      Athletic Club de Bilbao       Spain    84
## 13   2018     B. Dost      Sporting CP Netherlands    83
## 14   2018     T. Cahill      Melbourne City FC     Australia    70
## 15   2018     D. Godín      Atlético Madrid     Uruguay    88
## 16   2018    Sergio Ramos      Real Madrid       Spain    90
## 17   2019     Naldo      FC Schalke 04       Brazil    86
## 18   2019     Aduriz      Athletic Club de Bilbao       Spain    83
## 19   2019     B. Dost      Sporting CP Netherlands    83
## 20   2019    M. Fellaini      Manchester United     Belgium    79
## 21   2019     D. Godín      Atlético Madrid     Uruguay    90
## 22   2019    E. Adebayor      Medipol Başakşehir FK      Togo    79
## 23   2019     L. de Jong        PSV Netherlands    78
## 24   2020     B. Dost      Sporting CP Netherlands    82
## 25   2020     L. de Jong      Sevilla FC Netherlands    82
## 26   2020    L. Pavoletti      Cagliari       Italy    78
## 27   2020    Sergio Ramos      Real Madrid       Spain    89
## 28   2020     Aduriz      Athletic Club de Bilbao       Spain    82
## 29   2020    M. Fellaini      Shandong Luneng TaiShan FC     Belgium    76

##   attacking_heading_accuracy
## 1                      95+1
## 2                      95
## 3                      93
## 4                      92+5
## 5                      92+4
## 6                      94-1
## 7                      93-2
## 8                      93

```

```

## 9          92
## 10         92
## 11         92
## 12         94
## 13        93+1
## 14         93
## 15         92
## 16        91+1
## 17         94
## 18         94
## 19         94
## 20         93
## 21         92
## 22         92
## 23         92
## 24         93
## 25         93
## 26         93
## 27         92
## 28         92
## 29         92

# Movement Stats: movement_acceleration and movement_balance
mov_acc_dfs <- vector(mode = "list", length = 5)
mov_bal_dfs <- vector(mode = "list", length = 5)

for (i in seq_along(fifa_datasets_list)) {

  # Top 5 players with best acceleration
  top_acc <- fifa_datasets_list[[i]] %>% arrange(desc(movement_acceleration)) %>%
    select(short_name, club, nationality, overall, movement_acceleration) %>% top_n(5)
  top_acc <- add_column(top_acc, years[[i]], .before = "short_name")
  mov_acc_dfs[[i]] <- data.frame(top_acc)

  # Top 5 players with best balance
  top_bal <- fifa_datasets_list[[i]] %>% arrange(desc(movement_balance)) %>%
    select(short_name, club, nationality, overall, movement_balance) %>% top_n(5)
  top_bal <- add_column(top_bal, years[[i]], .before = "short_name")
  mov_bal_dfs[[i]] <- data.frame(top_bal)
  # ARE BALANCE AND DRIBBLING CORRELATED?
}

## Selecting by movement_acceleration

## Selecting by movement_balance

## Selecting by movement_acceleration

## Selecting by movement_balance

## Selecting by movement_acceleration

## Selecting by movement_balance

```

```

## Selecting by movement_acceleration

## Selecting by movement_balance

## Selecting by movement_acceleration

## Selecting by movement_balance

print(do.call("rbind", mov_acc_dfs))

##   years...i..    short_name      club  nationality
## 1     2016      M. Bolly Fortuna Düsseldorf Ivory Coast
## 2     2016      P. Aubameyang Borussia Dortmund Gabon
## 3     2016      J. Damm   Tigres U.A.N.L. Mexico
## 4     2016      T. Walcott      Arsenal England
## 5     2016      L. Messi FC Barcelona Argentina
## 6     2017      M. Bolly SpVgg Greuther Fürth Ivory Coast
## 7     2017 Douglas Costa   FC Bayern München Brazil
## 8     2017 Héctor Bellerín      Arsenal Spain
## 9     2017      P. Aubameyang Borussia Dortmund Gabon
## 10    2017      Lucas Paris Saint-Germain Brazil
## 11    2017      A. Musa Leicester City Nigeria
## 12    2017      J. Damm   Tigres U.A.N.L. Mexico
## 13    2017      Cedrick Columbus Crew SC DR Congo
## 14    2018 Douglas Costa      Juventus Brazil
## 15    2018 Héctor Bellerín      Arsenal Spain
## 16    2018      K. Manneh Columbus Crew SC Gambia
## 17    2018 Gelson Martins Sporting CP Portugal
## 18    2018      J. Biabiany      Sparta Praha France
## 19    2019 Douglas Costa      Juventus Brazil
## 20    2019      Adama Wolverhampton Wanderers Spain
## 21    2019      K. Mbappé Paris Saint-Germain France
## 22    2019      K. Manneh   FC St. Gallen United States
## 23    2019      E. List      Gillingham England
## 24    2020 Adama Traoré Wolverhampton Wanderers Spain
## 25    2020      K. Mbappé Paris Saint-Germain France
## 26    2020      R. Sterling Manchester City England
## 27    2020      S. Mané      Liverpool Senegal
## 28    2020 Douglas Costa      Juventus Brazil
## 29    2020      Lucas Moura Tottenham Hotspur Brazil
## 30    2020 Gelson Martins AS Monaco Portugal
## 31    2020      I. Sarr      Watford Senegal
## 32    2020      A. Musa      Al Nassr Nigeria
## 33    2020      K. Nagai      FC Tokyo Japan
## 34    2020      K. Manneh FC Cincinnati United States
## 35    2020      E. List      Gillingham England
## overall movement_acceleration
## 1     67          97
## 2     82          96
## 3     73         95+1
## 4     81         95-2
## 5     94         95-1
## 6     67          97

```

```

## 7      84      96
## 8      79      96
## 9      86      95
## 10     82      95
## 11     78      95
## 12     73      95
## 13     69      95
## 14     82      96
## 15     81      96
## 16     70      96
## 17     81      95+1
## 18     75      95+1
## 19     86      97
## 20     75      97
## 21     87      96
## 22     69      96
## 23     60      95+1
## 24     74      97
## 25     89      96
## 26     88      96
## 27     88      95
## 28     84      95
## 29     83      95
## 30     82      95
## 31     78      95
## 32     73      95
## 33     69      95
## 34     68      95
## 35     62      95

print(do.call("rbind", mov_bal_dfs))

##   years...i... short_name          club nationality
## 1      2016    G. Krebs Karlsruher SC      France
## 2      2016    V. Hernández Junior FC      Colombia
## 3      2016    Bernard Shakhtar Donetsk      Brazil
## 4      2016    E. Oztumer Peterborough United      England
## 5      2016    D. Villalva Tiburones Rojos de Veracruz Argentina
## 6      2017    E. Oztumer Walsall      England
## 7      2017    Bernard Shakhtar Donetsk      Brazil
## 8      2017    D. Buonanotte Universidad Católica Argentina
## 9      2017    D. Villalva Tiburones Rojos de Veracruz Argentina
## 10     2017    G. Krebs Karlsruher SC      France
## 11     2017    Fer Cano RCD Mallorca      Spain
## 12     2018    E. Oztumer Walsall      England
## 13     2018    Bernard Shakhtar Donetsk      Brazil
## 14     2018    S. Wharton Blackburn Rovers      England
## 15     2018    K. Kadyrov Terek Grozny      Russia
## 16     2018    L. Messi FC Barcelona      Argentina
## 17     2018    P. De Blasis 1. FSV Mainz 05 Argentina
## 18     2018    M. Sau Cagliari      Italy
## 19     2019    Ronald Boavista FC      Brazil
## 20     2019    Bernard Everton      Brazil
## 21     2019    T. Itō Hamburger SV      Japan

```

```

## 22      2019   E. Oztumer      Bolton Wanderers      England
## 23      2019   T. Mizutani      Shimizu S-Pulse      Japan
## 24      2020   E. Oztumer      Charlton Athletic      England
## 25      2020   R. Fraser       Bournemouth      Scotland
## 26      2020   T. Itō          Hamburger SV      Japan
## 27      2020   L. Messi        FC Barcelona      Argentina
## 28      2020   Bernard         Everton          Brazil
## 29      2020   S. Kaneko       Shimizu S-Pulse      Japan
## 30      2020   Aridai          RCD Mallorca      Spain
## 31      2020   S. Horvath      SG Dynamo Dresden    Austria
## 32      2020   Isi Ros         AD Alcorcón      Spain
## 33      2020   K. Holzweiler    Viktoria Köln      Germany
##     overall movement_balance
## 1      66           96+4
## 2      70           96+2
## 3      78           96-1
## 4      65           96-1
## 5      70           96
## 6      67           97+1
## 7      79           96
## 8      76           96
## 9      73           96
## 10     67           96
## 11     64           96
## 12     70           96-1
## 13     79           96
## 14     59           95+3
## 15     58           95+3
## 16     93           95
## 17     77           95
## 18     74           95
## 19     60           99
## 20     80           96
## 21     71           96
## 22     70           96
## 23     56           96
## 24     69           97
## 25     81           96
## 26     68           96
## 27     94           95
## 28     80           95
## 29     70           95
## 30     70           95
## 31     67           95
## 32     65           95
## 33     64           95

```

```

# Power Stats: power_shot_power, power_jumping, power_strength
shot_dfs <- vector(mode = "list", length = 5)
jump_dfs <- vector(mode = "list", length = 5)
strength_dfs <- vector(mode = "list", length = 5)

for (i in seq_along(fifa_datasets_list)) {

```

```

# Top 5 players with best shot power by year
top_shot <- fifa_datasets_list[[i]] %>% arrange(desc(power_shot_power)) %>%
  select(short_name, club, nationality, overall, power_shot_power) %>% top_n(5)
top_shot <- add_column(top_shot, years[[i]], .before = "short_name")
shot_dfs[[i]] <- data.frame(top_shot)
# ARE SHOOTING AND SHOT POWER CORRELATED?

# Top 5 players with best power jump by year
top_jump <- fifa_datasets_list[[i]] %>% arrange(desc(power_jumping)) %>%
  select(short_name, club, nationality, overall, power_jumping) %>% top_n(5)
top_jump <- add_column(top_jump, years[[i]], .before = "short_name")
jump_dfs[[i]] <- data.frame(top_jump)
# ARE JUMPING AND ATTACKING_HEADING_ACCURACY CORRELATED?

# Top 5 players with most power strength by year
top_strength <- fifa_datasets_list[[i]] %>% arrange(desc(power_strength)) %>%
  select(short_name, club, nationality, overall, power_strength) %>% top_n(5)
top_strength <- add_column(top_strength, years[[i]], .before = "short_name")
strength_dfs[[i]] <- data.frame(top_strength)

}

## Selecting by power_shot_power

## Selecting by power_jumping

## Selecting by power_strength

## Selecting by power_shot_power

## Selecting by power_jumping

## Selecting by power_strength

## Selecting by power_shot_power

## Selecting by power_jumping

## Selecting by power_strength

## Selecting by power_shot_power

## Selecting by power_jumping

## Selecting by power_strength

```

```

print(do.call("rbind", shot_dfs))

##   years...i..      short_name          club nationality
## 1     2016           Ronny       Hertha BSC      Brazil
## 2     2016 Cristiano Ronaldo    Real Madrid    Portugal
## 3     2016           Hulk      Zenit St. Petersburg      Brazil
## 4     2016 L. Podolski   Galatasaray SK    Germany
## 5     2016 Z. Ibrahimović Paris Saint-Germain      Sweden
## 6     2017 Cristiano Ronaldo    Real Madrid    Portugal
## 7     2017 Z. Ibrahimović Manchester United      Sweden
## 8     2017 L. Podolski   Galatasaray SK    Germany
## 9     2017           Naldo FC Schalke 04      Brazil
## 10    2017           G. Bale  Real Madrid      Wales
## 11    2018 Cristiano Ronaldo    Real Madrid    Portugal
## 12    2018           Naldo FC Schalke 04      Brazil
## 13    2018 L. Podolski   Vissel Kobe    Germany
## 14    2018 Z. Ibrahimović Manchester United      Sweden
## 15    2018           G. Bale  Real Madrid      Wales
## 16    2018 A. Kolarov        Roma        Serbia
## 17    2019 Cristiano Ronaldo Juventus      Portugal
## 18    2019           Hulk Shanghai SIPG FC      Brazil
## 19    2019 F. Guarín Shanghai Greenland Shenhua FC Colombia
## 20    2019 V. Ayala Gimnasia y Esgrima La Plata Paraguay
## 21    2019           G. Bale  Real Madrid      Wales
## 22    2019           Naldo FC Schalke 04      Brazil
## 23    2019 L. Podolski   Vissel Kobe    Germany
## 24    2020 Cristiano Ronaldo Juventus      Portugal
## 25    2020 A. Kolarov        Roma        Serbia
## 26    2020           Hulk Shanghai SIPG FC      Brazil
## 27    2020           G. Bale  Real Madrid      Wales
## 28    2020 K. De Bruyne Manchester City    Belgium

##   overall power_shot_power
## 1     72           95-1
## 2     93            94
## 3     84            94
## 4     77           93+1
## 5     89            93
## 6     94            94
## 7     90            93
## 8     80            93
## 9     84            92
## 10    90           91+4
## 11    94           94+2
## 12    82            92
## 13    80            92
## 14    88           91-2
## 15    89            91
## 16    79            91
## 17    94            95
## 18    81            94
## 19    76            93
## 20    73            93
## 21    88            92

```

```

## 22      86      92
## 23      78      92
## 24      93      95
## 25      82      95
## 26      80      94
## 27      85      92
## 28      91      91

print(do.call("rbind", jump_dfs))

##   years...i..    short_name          club
## 1    2016       Aduriz  Athletic Club de Bilbao
## 2    2016       Rodri    Real Valladolid CF
## 3    2016     A. Caracciolo        Brescia
## 4    2016     C. Beauvue  Olympique Lyonnais
## 5    2016     M. Le Marchand        OGC Nice
## 6    2016     R. Azeez      UD Almería
## 7    2017     D. Mattocks  Portland Timbers
## 8    2017 Cristiano Ronaldo      Real Madrid
## 9    2017     A. Caracciolo      Hellas Verona
## 10   2017     K. Igboananike      DC United
## 11   2017     Regalón      CD Numancia
## 12   2018 Cristiano Ronaldo      Real Madrid
## 13   2018     A. Caracciolo      Hellas Verona
## 14   2018       Aduriz  Athletic Club de Bilbao
## 15   2018     D. Odoi      Fulham
## 16   2018     T. Cahill  Melbourne City FC
## 17   2018     J. Aidoo      KRC Genk
## 18   2018     J. Núñez      Club Tijuana
## 19   2018     D. Mattocks  Portland Timbers
## 20   2019 Cristiano Ronaldo      Juventus
## 21   2019     E. Sabbi      Hobro IK
## 22   2019     M. Icardi      Inter
## 23   2019       Aduriz  Athletic Club de Bilbao
## 24   2019     S. Aurier  Tottenham Hotspur
## 25   2019     S. Long      Southampton
## 26   2019     M. Barbieri      Rosario Central
## 27   2020 Cristiano Ronaldo      Juventus
## 28   2020     E. Sabbi      Hobro IK
## 29   2020     T. Hasegawa  Kawasaki Frontale
## 30   2020     M. Icardi      Inter
## 31   2020     O. Lewicki      Malmö FF
## 32   2020     M. Barbieri      Rosario Central
## 33   2020     T. Sugimoto  Matsumoto Yamaga
##   nationality overall power_jumping
## 1      Spain      82      96+1
## 2      Spain      71      95+3
## 3      Italy      67      95+3
## 4      France     79      95-1
## 5      France     73      94+3
## 6      Nigeria     71      94+3
## 7      Jamaica     66      97
## 8      Portugal     94      95+1
## 9      Italy       70      95

```

```

## 10          Nigeria    67      95
## 11          Spain      70      94+1
## 12          Portugal   94      95
## 13          Italy      71      95
## 14          Spain      84      94+1
## 15          Belgium   72      94
## 16          Australia  70      94
## 17          Ghana      67      94
## 18          Mexico     67      94
## 19          Jamaica    66      94
## 20          Portugal   94      95
## 21          United States 64      94+25
## 22          Argentina  87      94
## 23          Spain      83      94
## 24          Ivory Coast 81      94
## 25 Republic of Ireland 74      94
## 26          Argentina  70      94
## 27          Portugal   93      95
## 28          United States 68      95
## 29          Japan      66      95
## 30          Argentina  85      94
## 31          Sweden     72      94
## 32          Argentina  71      94
## 33          Japan      61      94

```

```
print(do.call("rbind", strength_dfs))
```

##	years...i..	short_name	club	nationality
## 1	2016	A. Akinfenwa	AFC Wimbledon	England
## 2	2016	C. Samba	Dinamo Moscow	Congo
## 3	2016	R. Torres	Seattle Sounders FC	Panama
## 4	2016	F. Baloy	Club Atlas	Panama
## 5	2016	J. Olave	Real Salt Lake	Colombia
## 6	2016	G. Elokobi	Colchester United	Cameroon
## 7	2016	A. Ba	Racing Club de Lens	Mauritania
## 8	2017	A. Akinfenwa	Wycombe Wanderers	England
## 9	2017	C. Samba	Panathinaikos FC	Congo
## 10	2017	R. Torres	Seattle Sounders FC	Panama
## 11	2017	A. Ba	Racing Club de Lens	Mauritania
## 12	2017	G. Elokobi	Colchester United	Cameroon
## 13	2018	A. Akinfenwa	Wycombe Wanderers	England
## 14	2018	C. Samba	Aston Villa	Congo
## 15	2018	O. Onyewu	Philadelphia Union	United States
## 16	2018	K. Sobieraj	Arka Gdynia	Poland
## 17	2018	K. Mbodj	RSC Anderlecht	Senegal
## 18	2019	A. Akinfenwa	Wycombe Wanderers	England
## 19	2019	Wesley	Club Brugge KV	Brazil
## 20	2019	T. Chorý	Viktoria Plzeň	Czech Republic
## 21	2019	K. Koulibaly	Napoli	Senegal
## 22	2019	R. Lukaku	Manchester United	Belgium
## 23	2019	N. Süle	FC Bayern München	Germany
## 24	2019	S. Coates	Sporting CP	Uruguay
## 25	2019	J. Vestergaard	Southampton	Denmark
## 26	2019	K. Mbodji	FC Nantes	Senegal

## 27	2019	R. Civelli	Club Atlético Banfield	Argentina
## 28	2019	A. Cerri	Cagliari	Italy
## 29	2019	M. Torsiglieri	Club Atlético Lanús	Argentina
## 30	2019	R. Torres	Seattle Sounders FC	Panama
## 31	2019	F. Ballas	SG Dynamo Dresden	Germany
## 32	2019	U. Ikpeazu	Heart of Midlothian	England
## 33	2019	F. Carvalho	Vålerenga Fotball	Uruguay
## 34	2019	M. Rhead	Lincoln City	England
## 35	2020	A. Akinfenwa	Wycombe Wanderers	England
## 36	2020	K. Koulibaly	Napoli	Senegal
## 37	2020	R. Lukaku	Inter	Belgium
## 38	2020	Wesley	Aston Villa	Brazil
## 39	2020	N. Süle	FC Bayern München	Germany
## 40	2020	S. Coates	Sporting CP	Uruguay
## 41	2020	D. Zapata	Atalanta	Colombia
## 42	2020	K. Waston	FC Cincinnati	Costa Rica
## 43	2020	A. Cerri	Cagliari	Italy
## 44	2020	O. Oularé	Standard de Liège	Belgium
## 45	2020	F. Ballas	SG Dynamo Dresden	Germany
## 46	2020	U. Ikpeazu	Heart of Midlothian	England
## 47	2020	I. Marega	La Berrichonne de Châteauroux	France
## 48	2020	T. Petrášek	Raków Częstochowa	Czech Republic
## overall power_strength				
## 1	64	98+1		
## 2	78	96+1		
## 3	71	95+2		
## 4	72	95		
## 5	71	95		
## 6	69	95		
## 7	64	95		
## 8	64	98		
## 9	78	96		
## 10	72	95		
## 11	65	95		
## 12	63	95		
## 13	64	98		
## 14	74	96		
## 15	69	96		
## 16	67	95+4		
## 17	78	94+6		
## 18	66	97		
## 19	76	95+3		
## 20	61	95		
## 21	87	94		
## 22	87	94		
## 23	84	94		
## 24	82	94		
## 25	80	94		
## 26	78	94		
## 27	76	94		
## 28	72	94		
## 29	72	94		
## 30	72	94		
## 31	70	94		

```

## 32      68      94
## 33      67      94
## 34      60      94
## 35      65      97
## 36      89      95
## 37      85      95
## 38      79      95
## 39      85      94
## 40      82      94
## 41      82      94
## 42      73      94
## 43      72      94
## 44      71      94
## 45      70      94
## 46      67      94
## 47      65      94
## 48      65      94

# Mentality Stats: mentality_positioning, mentality_penalties and mentality_vision
position_dfs <- vector(mode = "list", length = 5)
penalty_dfs <- vector(mode = "list", length = 5)
vision_dfs <- vector(mode = "list", length = 5)

for (i in seq_along(fifa_datasets_list)) {

  # Top 5 players with best position sense by year
  top_posit <- fifa_datasets_list[[i]] %>% arrange(desc(mentality_positioning)) %>%
    select(short_name, club, nationality, overall, team_position, mentality_positioning) %>% top_n(5)
  top_posit <- add_column(top_posit, years[[i]], .before = "short_name")
  position_dfs[[i]] <- data.frame(top_posit)

  # Top 5 best penalty takers by year
  top_penalty <- fifa_datasets_list[[i]] %>% arrange(desc(mentality_penalties)) %>%
    select(short_name, club, nationality, overall, mentality_penalties) %>% top_n(5)
  top_penalty <- add_column(top_penalty, years[[i]], .before = "short_name")
  penalty_dfs[[i]] <- data.frame(top_penalty)
  # ARE ATTACKING FINISHING AND PENALTIES CORRELATED?

  # Top 5 players with best vision by year
  top_vision <- fifa_datasets_list[[i]] %>% arrange(desc(mentality_vision)) %>%
    select(short_name, club, nationality, overall, mentality_vision) %>% top_n(5)
  top_vision <- add_column(top_vision, years[[i]], .before = "short_name")
  vision_dfs[[i]] <- data.frame(top_vision)
  # ARE VISION AND PASSING CORRELATED?

}

## Selecting by mentality_positioning
## Selecting by mentality_penalties
## Selecting by mentality_vision
## Selecting by mentality_positioning

```

```

## Selecting by mentality_penalties

## Selecting by mentality_vision

## Selecting by mentality_positioning

## Selecting by mentality_penalties

## Selecting by mentality_vision

## Selecting by mentality_positioning

## Selecting by mentality_penalties

## Selecting by mentality_vision

## Selecting by mentality_positioning

## Selecting by mentality_penalties

## Selecting by mentality_vision

print(do.call("rbind", position_dfs))

```

	years...i..	short_name	club	nationality	overall
## 1	2016	T. Müller	FC Bayern München	Germany	86
## 2	2016	Cristiano Ronaldo	Real Madrid	Portugal	93
## 3	2016	L. Suárez	FC Barcelona	Uruguay	90
## 4	2016	C. Tévez	Boca Juniors	Argentina	86
## 5	2016	L. Messi	FC Barcelona	Argentina	94
## 6	2017	T. Müller	FC Bayern München	Germany	87
## 7	2017	Cristiano Ronaldo	Real Madrid	Portugal	94
## 8	2017	L. Messi	FC Barcelona	Argentina	93
## 9	2017	G. Higuaín	Juventus	Argentina	88
## 10	2017	L. Suárez	FC Barcelona	Uruguay	92
## 11	2018	Cristiano Ronaldo	Real Madrid	Portugal	94
## 12	2018	L. Messi	FC Barcelona	Argentina	93
## 13	2018	T. Müller	FC Bayern München	Germany	86
## 14	2018	E. Cavani	Paris Saint-Germain	Uruguay	87
## 15	2018	L. Suárez	FC Barcelona	Uruguay	92
## 16	2018	G. Higuaín	Juventus	Argentina	90
## 17	2019	Cristiano Ronaldo	Juventus	Portugal	94
## 18	2019	L. Messi	FC Barcelona	Argentina	94
## 19	2019	H. Kane	Tottenham Hotspur	England	89
## 20	2019	E. Cavani	Paris Saint-Germain	Uruguay	89
## 21	2019	T. Müller	FC Bayern München	Germany	86
## 22	2020	Cristiano Ronaldo	Juventus	Portugal	93
## 23	2020	L. Messi	FC Barcelona	Argentina	94
## 24	2020	H. Kane	Tottenham Hotspur	England	89
## 25	2020	S. Agüero	Manchester City	Argentina	89
## 26	2020	E. Cavani	Paris Saint-Germain	Uruguay	88

```

##      team_position mentality_positioning
## 1          CF                  94
## 2          LM                 93+2
## 3          ST                  91+3
## 4         CAM                 91+1
## 5          RW                  90-2
## 6          RW                  96+2
## 7          LW                  94+1
## 8          RW                  93+3
## 9          LS                  92+2
## 10         ST                  92+1
## 11         LW                  95+1
## 12         RW                  93
## 13         RM                  93
## 14         ST                  92+3
## 15         ST                  92
## 16         ST                  92
## 17         LW                  95
## 18         RW                  94
## 19         ST                  93
## 20         ST                  93
## 21        RCM                 93
## 22         LW                  95
## 23         RW                  94
## 24         ST                  93
## 25         ST                  93
## 26         ST                  93

print(do.call("rbind", penalty_dfs))

##   years..i..    short_name           club nationality overall
## 1     2016     R. Lambert West Bromwich Albion    England    75
## 2     2016     M. Balotelli            Milan      Italy     80
## 3     2016     David Villa New York City FC     Spain     80
## 4     2016     N. Ortigoza San Lorenzo de Almagro Paraguay    72
## 5     2016     Z. Ibrahimović Paris Saint-Germain Sweden     89
## 6     2017     R. Lambert    Cardiff City    England    75
## 7     2017     M. Balotelli      OGC Nice      Italy     79
## 8     2017     Z. Ibrahimović Manchester United Sweden     90
## 9     2017     N. Ortigoza San Lorenzo de Almagro Paraguay    75
## 10    2017     L. Baines       Everton    England     83
## 11    2017     T. Simons Club Brugge KV Belgium    74
## 12    2018     M. Balotelli      OGC Nice      Italy     82
## 13    2018     Fabinho      AS Monaco    Brazil     83
## 14    2018     Z. Ibrahimović Manchester United Sweden     88
## 15    2018     P. Verhaegh    VfL Wolfsburg Netherlands    77
## 16    2018     D. Perotti        Roma Argentina    81
## 17    2019     M. Balotelli      OGC Nice      Italy     83
## 18    2019     Fabinho      Liverpool    Brazil     85
## 19    2019     H. Kane Tottenham Hotspur    England     89
## 20    2019     D. Perotti        Roma Argentina    81
## 21    2019     R. Boudebouz     Real Betis Algeria     80
## 22    2019     R. Jiménez Wolverhampton Wanderers Mexico     78
## 23    2019     L. Baines       Everton    England     78

```

```

## 24      2020      M. Kruse      Fenerbahçe SK      Germany      83
## 25      2020      Fabinho      Liverpool      Brazil       85
## 26      2020      S. Haller      West Ham United      France       83
## 27      2020      M. Balotelli      Brescia      Italy        82
## 28      2020 L. Milivojević      Crystal Palace      Serbia       81
##   mentality_penalties
## 1          96+1
## 2          92
## 3          92
## 4          91+1
## 5          91
## 6          96
## 7          92
## 8          91
## 9          91
## 10         90
## 11         90
## 12         92
## 13         91+3
## 14         91
## 15         90+4
## 16         90+2
## 17         92
## 18         91
## 19         90
## 20         90
## 21         90
## 22         90
## 23         90
## 24         92
## 25         91
## 26         91
## 27         91
## 28         91

```

```
print(do.call("rbind", vision_dfs))
```

	years..i..	short_name	club	nationality	overall
## 1	2016	A. Pirlo	New York City FC	Italy	84
## 2	2016	David Silva	Manchester City	Spain	88
## 3	2016	Cesc Fàbregas	Chelsea	Spain	87
## 4	2016	M. Özil	Arsenal	Germany	87
## 5	2016	L. Messi	FC Barcelona	Argentina	94
## 6	2016	F. Totti	Roma	Italy	80
## 7	2017	A. Pirlo	New York City FC	Italy	82
## 8	2017	M. Özil	Arsenal	Germany	89
## 9	2017	David Silva	Manchester City	Spain	87
## 10	2017	F. Totti	Roma	Italy	80
## 11	2017	Cesc Fàbregas	Chelsea	Spain	86
## 12	2018	M. Özil	Arsenal	Germany	88
## 13	2018	David Silva	Manchester City	Spain	87
## 14	2018	Cesc Fàbregas	Chelsea	Spain	86
## 15	2018	K. De Bruyne	Manchester City	Belgium	89
## 16	2018	C. Eriksen	Tottenham Hotspur	Denmark	87

```

## 17      2019     L. Messi     FC Barcelona    Argentina    94
## 18      2019   K. De Bruyne   Manchester City    Belgium     91
## 19      2019     L. Modrić     Real Madrid    Croatia     91
## 20      2019     David Silva   Manchester City     Spain      89
## 21      2019     C. Eriksen   Tottenham Hotspur   Denmark     88
## 22      2019     M. Özil       Arsenal      Germany     86
## 23      2019   Cesc Fàbregas     Chelsea      Spain      84
## 24      2020     L. Messi     FC Barcelona    Argentina    94
## 25      2020   K. De Bruyne   Manchester City    Belgium     91
## 26      2020     C. Eriksen   Tottenham Hotspur   Denmark     88
## 27      2020     L. Modrić     Real Madrid    Croatia     90
## 28      2020     David Silva   Manchester City     Spain      88
##   mentality_vision
## 1          94
## 2         93+3
## 3          93
## 4          92
## 5          90
## 6          90
## 7          94
## 8          93
## 9         92-1
## 10        91+1
## 11        91-1
## 12        92-1
## 13        92
## 14        91
## 15        90+2
## 16        90+1
## 17        94
## 18        94
## 19        92
## 20        92
## 21        91
## 22        91
## 23        91
## 24        94
## 25        94
## 26        92
## 27        91
## 28        91

# Defending Stats: defending_marking, defending_standing_tackle, defending_sliding_tackle
marking_dfs <- vector(mode = "list", length = 5)
stand_tackle_dfs <- vector(mode = "list", length = 5)
slide_tackle_dfs <- vector(mode = "list", length = 5)

for (i in seq_along(fifa_datasets_list)) {

  # Top 5 players best markers by year
  top_mark <- fifa_datasets_list[[i]] %>% arrange(desc(defending_marking)) %>%
    select(short_name, club, nationality, overall, defending_marking) %>% top_n(5)
  top_mark <- add_column(top_mark, years[[i]], .before = "short_name")
  marking_dfs[[i]] <- data.frame(top_mark)
}

```

```

# Top 5 best players at standing tackle by year
top_stand_t <- fifa_datasets_list[[i]] %>% arrange(desc(defending_standing_tackle)) %>%
  select(short_name, club, nationality, overall, defending_standing_tackle) %>% top_n(5)
top_stand_t <- add_column(top_stand_t, years[[i]], .before = "short_name")
stand_tackle_dfs[[i]] <- data.frame(top_stand_t)

# Top 5 best players at sliding tackle by year
top_slide_t <- fifa_datasets_list[[i]] %>% arrange(desc(defending_sliding_tackle)) %>%
  select(short_name, club, nationality, overall, defending_sliding_tackle) %>% top_n(5)
top_slide_t <- add_column(top_slide_t, years[[i]], .before = "short_name")
slide_tackle_dfs[[i]] <- data.frame(top_slide_t)

}

## Selecting by defending_marking

## Selecting by defending_standing_tackle

## Selecting by defending_sliding_tackle

## Selecting by defending_marking

## Selecting by defending_standing_tackle

## Selecting by defending_sliding_tackle

## Selecting by defending_marking

## Selecting by defending_standing_tackle

## Selecting by defending_sliding_tackle

## Selecting by defending_marking

## Selecting by defending_standing_tackle

## Selecting by defending_sliding_tackle

## Selecting by defending_marking

## Selecting by defending_standing_tackle

## Selecting by defending_sliding_tackle

print(do.call("rbind", marking_dfs))

```

##	years...i..	short_name	club
## 1	2016	G. Chiellini	Juventus
## 2	2016	Thiago Silva	Paris Saint-Germain
## 3	2016	F. Wiedwald	SV Werder Bremen
## 4	2016	Ederson	SL Benfica
## 5	2016	S. Viera	Junior FC
## 6	2016	B. Khuzwayo	Kaizer Chiefs
## 7	2016	J. Wiland	Malmö FF
## 8	2016	M. Müller	1. FC Kaiserslautern
## 9	2016	A. Weis	FSV Frankfurt
## 10	2016	E. Lobos	CD Cobresal
## 11	2016	R. Cierzniak	Wisła Kraków
## 12	2016	B. Samba	AS Nancy Lorraine
## 13	2016	M. McGovern	Hamilton Academical FC
## 14	2016	A. Stoltz	TSG 1899 Hoffenheim
## 15	2016	G. Vailati	FC Basel 1893
## 16	2016	S. Radlinger	Hannover 96
## 17	2016	S. Bain	Dundee FC
## 18	2016	C. Day	Stevenage
## 19	2016	Kim Min Sik	Jeonnam Dragons
## 20	2016	H. Bonmann	Borussia Dortmund
## 21	2016	P. Camara	FC Sochaux-Montbéliard
## 22	2016	A. Favre	FC Zürich
## 23	2016	M. Herzog	FC St. Gallen
## 24	2016	R. Mandanda	AC Ajaccio
## 25	2016	C. Abella	Atlético Huila
## 26	2016	G. Sava	Dundalk
## 27	2016	J. Hall	Adelaide United
## 28	2017	G. Chiellini	Juventus
## 29	2017	J. Boateng	FC Bayern München
## 30	2017	Thiago Silva	Paris Saint-Germain
## 31	2017	A. Barzagli	Juventus
## 32	2017	P. Klandt	SC Freiburg
## 33	2018	G. Chiellini	Juventus
## 34	2018	Thiago Silva	Paris Saint-Germain
## 35	2018	A. Barzagli	Juventus
## 36	2018	M. Böcskör	SV Mattersburg
## 37	2018	Ederson	Manchester City
## 38	2018	Sergio	RC Celta
## 39	2018	D. Boyko	Besiktas JK
## 40	2018	F. Wiedwald	Leeds United
## 41	2018	M. Dmitrović	SD Eibar
## 42	2018	Edgar Badía	CF Reus Deportiu
## 43	2018	J. Wiland	Hammarby IF
## 44	2018	M. Higashiguchi	Gamba Osaka
## 45	2018	Y. Sanpian	CD O'Higgins
## 46	2018	S. Viera	Junior FC
## 47	2018	André Milazisco	Ponte Preta
## 48	2018	F. Nita	Romania
## 49	2018	K. Müller	1. FC Heidenheim 1846
## 50	2018	A. Weis	SSV Jahn Regensburg
## 51	2018	B. Khuzwayo	Kaizer Chiefs
## 52	2018	P. Klandt	SC Freiburg
## 53	2018	D. Bernhardt	VfR Aalen

## 54	2018	J. Contreras	Venezuela
## 55	2018	M. Müller	1. FC Kaiserslautern
## 56	2018	E. Mendy	Stade de Reims
## 57	2018	A. Camura	CD Huachipato
## 58	2018	M. McGovern	Norwich City
## 59	2018	Márcio Velinha	Palmeiras
## 60	2018	R. Mandanda	AC Ajaccio
## 61	2018	L. Bostyn	SV Zulte-Waregem
## 62	2018	B. Uphoff	Karlsruher SC
## 63	2018	H. Koffi	LOSC Lille
## 64	2018	K. Broll	SG Sonnenhof Großaspach
## 65	2018	S. Şahin-Radlinger	Hannover 96
## 66	2018	A. Stoltz	TSG 1899 Hoffenheim
## 67	2018	P. Dahlberg	IFK Göteborg
## 68	2018	S. Bain	Dundee FC
## 69	2018	B. Samba	Stade Malherbe Caen
## 70	2018	C. Merville	Valenciennes FC
## 71	2018	A. Poggenborg	SC Fortuna Köln
## 72	2018	S. Arai	Kawasaki Frontale
## 73	2018	Adrián López	RCD Espanyol
## 74	2018	G. Vailati	FC Basel 1893
## 75	2018	N. Kato	Omiya Ardija
## 76	2018	Ricardo Moura	CD Tondela
## 77	2018	D. Sappa	Estudiantes de La Plata
## 78	2018	J. Castillo	U.N.A.M.
## 79	2018	R. Martínez	Godoy Cruz
## 80	2018	Y. van Osch	PSV
## 81	2018	Quique Cebriá	SD Eibar
## 82	2018	K. Shimura	Júbilo Iwata
## 83	2018	V. Vorel	Sparta Praha
## 84	2018	E. Zelazny	ESTAC Troyes
## 85	2018	S. Anchoverrí	Club Olimpo
## 86	2018	Rafael Broetto	Clube Sport Marítimo
## 87	2018	F. Lončarić	Tromsø IL
## 88	2018	M. Cavallotti	Argentinos Juniors
## 89	2018	M. van de Meulenhof	PSV
## 90	2018	T. Nobile	FC Pro Vercelli 1892
## 91	2018	T. Casali	SV Mattersburg
## 92	2018	T. Aupic	Paris FC
## 93	2018	B. Gaye	DSC Arminia Bielefeld
## 94	2018	Sergio García	Real Zaragoza
## 95	2018	G. Gómez	Racing Club
## 96	2018	M. Funk	SpVgg Greuther Fürth
## 97	2018	F. Stritzel	SV Darmstadt 98
## 98	2018	M. Bruhn	FC Helsingør
## 99	2018	T. Okubo	FC Tokyo
## 100	2018	F. Dmitrovic	SCR Altach
## 101	2018	E. Dahlin	IFK Göteborg
## 102	2018	R. Hironaga	Sanfrecce Hiroshima
## 103	2018	C. Day	Stevenage
## 104	2018	L. Radliński	Sandecja Nowy Sącz
## 105	2018	J. Albrecht	SV Wehen Wiesbaden
## 106	2018	Lee Jae Hyeong	Jeonbuk Hyundai Motors
## 107	2018	Gorka Giralt	Real Oviedo

## 108	2018	B. DerkSEN	Roda JC Kerkrade
## 109	2018	S. Cleveland	Chicago Fire
## 110	2018	L. Chiappero	Defensa y Justicia
## 111	2018	V. Karakuş	Kayserispor
## 112	2018	S. Custers	VVV-Venlo
## 113	2018	G. Banaziak	Amiens SC
## 114	2018	R. Jendrusch	FC Erzgebirge Aue
## 115	2018	A. García	Atlético Huila
## 116	2018	F. Due	Randers FC
## 117	2018	G. Sava	Dundalk
## 118	2018	K. Martin	FC Lausanne-Sport
## 119	2018	N. Berchtold	FC Sion
## 120	2018	K. Chorążka	Wisła Kraków
## 121	2018	J. Holmes	Bournemouth
## 122	2018	J. Bruhns	SC Fortuna Köln
## 123	2018	R. Lovett	Cheltenham Town
## 124	2018	R. Piscitelli	Benevento
## 125	2018	J. Turner	Bolton Wanderers
## 126	2018	S. George	Carlisle United
## 127	2018	B. Gómez	Rionegro Águilas
## 128	2018	H. Acevedo	Deportivo Cali
## 129	2018	P. Ovchinnikov	PFC CSKA Moscow
## 130	2018	M. Bleve	Ternana
## 131	2018	E. Benedettini	Novara
## 132	2018	A. Yiğiter	Fenerbahçe SK
## 133	2018	V. Cabezas	Deportivo Pasto
## 134	2018	G. Coudert	Tours FC
## 135	2018	M. Nilsson	Malmö FF
## 136	2018	P. Burke	Finn Harps
## 137	2018	B. Petersen	Kaizer Chiefs
## 138	2018	R. Diaz	Querétaro
## 139	2018	Lee Hyun Woo	Daegu FC
## 140	2018	J. Caicedo	Deportivo Pasto
## 141	2018	T. Brinkmann	SC Paderborn 07
## 142	2018	D. Thürkauf	SV Werder Bremen II
## 143	2018	H. Hawsawi	Al Fayha
## 144	2018	S. Schmidt	FC Carl Zeiss Jena
## 145	2018	K. Humeler	Club Atlético Talleres
## 146	2018	J. Muñoz	Club León
## 147	2018	G. Nyberg	AIK
## 148	2018	A. André Jr	Bristol Rovers
## 149	2018	K. Nasurov	Terek Grozny
## 150	2018	S. Tsuji	Sagan Tosu
## 151	2018	J. García	Santos Laguna
## 152	2018	D. Adamov	FC Krasnodar
## 153	2018	L. Wackerle	SKN St. Pölten
## 154	2018	Park Hyeong Min	GwangJu FC
## 155	2018	S. Więckowicz	Arka Gdynia
## 156	2018	W. Henry	Swindon Town
## 157	2018	M. Cerofolini	Fiorentina
## 158	2018	A. Kelsey	Scunthorpe United
## 159	2019	A. Barzagli	Juventus
## 160	2019	G. Chiellini	Juventus
## 161	2019	M. Škriniar	Inter

## 162	2019	K. Koulibaly	Napoli
## 163	2019	Piqué	FC Barcelona
## 164	2020	G. Chiellini	Juventus
## 165	2020	M. Škriniar	Inter
## 166	2020	V. van Dijk	Liverpool
## 167	2020	K. Koulibaly	Napoli
## 168	2020	N. Kanté	Chelsea
## 169	2020	Sergio Busquets	FC Barcelona
## 170	2020	D. Godín	Inter
## 171	2020	M. Hummels	Borussia Dortmund
## 172	2020	T. Alderweireld	Tottenham Hotspur
## 173	2020	L. Bonucci	Juventus
## 174	2020	C. Lenglet	FC Barcelona
## 175	2020	D. De Rossi	Boca Juniors
##		nationality	overall
##		defending_marking	
## 1		Italy	91+1
## 2		Brazil	90+2
## 3		Germany	9-16
## 4		Brazil	9-16
## 5		Uruguay	9-16
## 6		South Africa	9-16
## 7		Sweden	9-16
## 8		Germany	9-16
## 9		Germany	9-16
## 10		Chile	9-16
## 11		Poland	9-16
## 12		Congo	9-16
## 13	Northern Ireland		9-16
## 14		Germany	9-16
## 15		Switzerland	9-16
## 16		Austria	9-16
## 17		Scotland	9-16
## 18		England	9-16
## 19	Korea Republic		9-16
## 20		Germany	9-16
## 21		Senegal	9-16
## 22		Switzerland	9-16
## 23		Switzerland	9-16
## 24		France	9-16
## 25		Colombia	9-16
## 26		Italy	9-16
## 27	Australia		9-16
## 28		Italy	92+2
## 29		Germany	91+7
## 30		Brazil	90
## 31		Italy	90
## 32		Germany	9-5
## 33		Italy	92
## 34		Brazil	90
## 35		Italy	90
## 36		Austria	9-13
## 37		Brazil	9
## 38		Spain	9
## 39	Ukraine		9

## 40	Germany	76	9
## 41	Serbia	74	9
## 42	Spain	72	9
## 43	Sweden	72	9
## 44	Japan	72	9
## 45	Chile	71	9
## 46	Uruguay	71	9
## 47	Brazil	71	9
## 48	Romania	70	9
## 49	Germany	69	9
## 50	Germany	69	9
## 51	South Africa	69	9
## 52	Germany	69	9
## 53	Germany	69	9
## 54	Venezuela	68	9
## 55	Germany	68	9
## 56	France	68	9
## 57	Chile	68	9
## 58	Northern Ireland	68	9
## 59	Brazil	68	9
## 60	DR Congo	67	9
## 61	Belgium	67	9
## 62	Germany	67	9
## 63	Burkina Faso	66	9
## 64	Germany	66	9
## 65	Austria	66	9
## 66	Germany	66	9
## 67	Sweden	65	9
## 68	Scotland	65	9
## 69	Congo	65	9
## 70	France	65	9
## 71	Germany	65	9
## 72	Japan	65	9
## 73	Spain	64	9
## 74	Switzerland	64	9
## 75	Japan	64	9
## 76	Portugal	64	9
## 77	Argentina	63	9
## 78	Mexico	63	9
## 79	Argentina	63	9
## 80	Netherlands	62	9
## 81	Spain	62	9
## 82	Japan	62	9
## 83	Czech Republic	62	9
## 84	France	62	9
## 85	Argentina	62	9
## 86	Brazil	62	9
## 87	Croatia	62	9
## 88	Argentina	62	9
## 89	Netherlands	61	9
## 90	Italy	61	9
## 91	Austria	61	9
## 92	France	61	9
## 93	Germany	60	9

## 94	Spain	60	9
## 95	Argentina	60	9
## 96	Germany	60	9
## 97	Germany	60	9
## 98	Denmark	60	9
## 99	Japan	60	9
## 100	Serbia	59	9
## 101	Sweden	59	9
## 102	Japan	59	9
## 103	England	59	9
## 104	Poland	59	9
## 105	Germany	58	9
## 106	Korea Republic	58	9
## 107	Spain	58	9
## 108	Netherlands	58	9
## 109	United States	58	9
## 110	Argentina	58	9
## 111	Turkey	57	9
## 112	Netherlands	57	9
## 113	France	57	9
## 114	Germany	57	9
## 115	Colombia	57	9
## 116	Denmark	57	9
## 117	Romania	57	9
## 118	Switzerland	56	9
## 119	Switzerland	55	9
## 120	Poland	55	9
## 121	Australia	55	9
## 122	Germany	55	9
## 123	England	55	9
## 124	Italy	55	9
## 125	England	54	9
## 126	England	54	9
## 127	Colombia	54	9
## 128	Colombia	54	9
## 129	Russia	54	9
## 130	Italy	54	9
## 131	San Marino	54	9
## 132	Turkey	53	9
## 133	Colombia	53	9
## 134	France	53	9
## 135	Sweden	53	9
## 136	Republic of Ireland	53	9
## 137	South Africa	53	9
## 138	Mexico	53	9
## 139	Korea Republic	53	9
## 140	Colombia	53	9
## 141	Germany	53	9
## 142	Switzerland	52	9
## 143	Saudi Arabia	52	9
## 144	Germany	52	9
## 145	Argentina	52	9
## 146	Mexico	52	9
## 147	Sweden	52	9

```

## 148      France    52
## 149      Russia    51
## 150      Japan     51
## 151      Mexico    50
## 152      Russia    50
## 153      Austria   50
## 154      Korea Republic 50
## 155      Poland    49
## 156      England   49
## 157      Italy     48
## 158      England   46
## 159      Italy     84
## 160      Italy     89
## 161      Slovakia  85
## 162      Senegal   87
## 163      Spain     87
## 164      Italy     89
## 165      Slovakia  86
## 166      Netherlands 90
## 167      Senegal   89
## 168      France    89
## 169      Spain     89
## 170      Uruguay   88
## 171      Germany   87
## 172      Belgium   87
## 173      Italy     86
## 174      France    85
## 175      Italy     82

```

```
print(do.call("rbind", stand_tackle_dfs))
```

	years...i..	short_name	club	nationality
## 1	2016	Thiago Silva	Paris Saint-Germain	Brazil
## 2	2016	G. Chiellini	Juventus	Italy
## 3	2016	J. Boateng	FC Bayern München	Germany
## 4	2016	V. Kompany	Manchester City	Belgium
## 5	2016	A. Pyatov	Shakhtar Donetsk	Ukraine
## 6	2016	G. Curci	1. FSV Mainz 05	Italy
## 7	2016	P. Garcés	Colo-Colo	Chile
## 8	2016	H. Lindner	Eintracht Frankfurt	Austria
## 9	2016	S. Viera	Junior FC	Uruguay
## 10	2016	B. Khuzwayo	Kaizer Chiefs	South Africa
## 11	2016	S. Kotsolis	Panathinaikos FC	Greece
## 12	2016	N. Mäenpää	Brighton & Hove Albion	Finland
## 13	2016	O. Werner	FC Sochaux-Montbéliard	Belgium
## 14	2016	Z. MacMath	Colorado Rapids	United States
## 15	2016	J. Carrasco	FC Metz	France
## 16	2016	D. Davari	DSC Arminia Bielefeld	Iran
## 17	2016	L. Hirschfeld	Vålerenga Fotball	Canada
## 18	2016	K. Stamatopoulos	AIK	Canada
## 19	2016	R. Pillot	KV Kortrijk	France
## 20	2016	R. Vollath	Karlsruher SC	Germany
## 21	2016	L. Staw	FK Bodø/Glimt	Norway
## 22	2016	E. Horvath	Molde FK	United States

## 23	2016	A. Favre	FC Zürich	Switzerland
## 24	2016	C. Abella	Atlético Huila	Colombia
## 25	2016	G. Sava	Dundalk	Italy
## 26	2016	E. Balayev	Eintracht Frankfurt	Azerbaijan
## 27	2017	J. Boateng	FC Bayern München	Germany
## 28	2017	G. Chiellini	Juventus	Italy
## 29	2017	M. Hummels	FC Bayern München	Germany
## 30	2017	Thiago Silva	Paris Saint-Germain	Brazil
## 31	2017	A. Barzagli	Juventus	Italy
## 32	2017	V. Kompany	Manchester City	Belgium
## 33	2017	Miranda	Inter	Brazil
## 34	2018	G. Chiellini	Juventus	Italy
## 35	2018	M. Hummels	FC Bayern München	Germany
## 36	2018	J. Boateng	FC Bayern München	Germany
## 37	2018	T. Alderweireld	Tottenham Hotspur	Belgium
## 38	2018	Sokratis	Borussia Dortmund	Greece
## 39	2019	G. Chiellini	Juventus	Italy
## 40	2019	Sergio Ramos	Real Madrid	Spain
## 41	2019	M. Hummels	FC Bayern München	Germany
## 42	2019	N. Kanté	Chelsea	France
## 43	2019	T. Alderweireld	Tottenham Hotspur	Belgium
## 44	2020	V. van Dijk	Liverpool	Netherlands
## 45	2020	N. Kanté	Chelsea	France
## 46	2020	G. Chiellini	Juventus	Italy
## 47	2020	K. Koulibaly	Napoli	Senegal
## 48	2020	T. Alderweireld	Tottenham Hotspur	Belgium
## 49	2020	I. Gueye	Paris Saint-Germain	Senegal
## overall defending_standing_tackle				
## 1	88		91+1	
## 2	87		91+1	
## 3	87		90+2	
## 4	85		90+2	
## 5	79		9-16	
## 6	72		9-16	
## 7	72		9-16	
## 8	70		9-16	
## 9	70		9-16	
## 10	68		9-16	
## 11	68		9-16	
## 12	67		9-16	
## 13	67		9-16	
## 14	66		9-16	
## 15	66		9-16	
## 16	65		9-16	
## 17	63		9-16	
## 18	63		9-16	
## 19	62		9-16	
## 20	61		9-16	
## 21	61		9-16	
## 22	60		9-16	
## 23	60		9-16	
## 24	57		9-16	
## 25	56		9-16	
## 26	55		9-16	

```

## 27      90          94+4
## 28      88          92+2
## 29      87          91+4
## 30      89          91
## 31      86          90
## 32      86          90
## 33      86          90
## 34      89          92
## 35      88          92
## 36      88          91-1
## 37      86          90+2
## 38      86          90+1
## 39      89          93
## 40      91          92
## 41      89          92
## 42      89          91
## 43      85          91
## 44      90          92
## 45      89          91
## 46      89          91
## 47      89          90
## 48      87          90
## 49      83          90

```

```
print(do.call("rbind", slide_tackle_dfs))
```

	years..i..	short_name	club
## 1	2016	P. Lahm	FC Bayern München
## 2	2016	G. Chiellini	Juventus
## 3	2016	J. Boateng	FC Bayern München
## 4	2016	Sergio Ramos	Real Madrid
## 5	2016	Pepe	Real Madrid
## 6	2017	P. Lahm	FC Bayern München
## 7	2017	J. Boateng	FC Bayern München
## 8	2017	A. Barzagli	Juventus
## 9	2017	Sergio Ramos	Real Madrid
## 10	2017	Pepe	Real Madrid
## 11	2017	G. Chiellini	Juventus
## 12	2018	Sergio Ramos	Real Madrid
## 13	2018	M. Hummels	FC Bayern München
## 14	2018	J. Boateng	FC Bayern München
## 15	2018	G. Chiellini	Juventus
## 16	2018	A. Schwolow	SC Freiburg
## 17	2018	Dani Hernández	CD Tenerife
## 18	2018	V. Acerval	Colo-Colo
## 19	2018	Victorino Magela	Palmeiras
## 20	2018	A. El-Shenawy	Egypt
## 21	2018	H. Donadell	Universidad de Chile
## 22	2018	Nivo Serpinho	Grêmio
## 23	2018	Joel Pereira	Manchester United
## 24	2018	Mika	Sunderland
## 25	2018	S. Viera	Junior FC
## 26	2018	A. Adamuy	CD Huachipato
## 27	2018	P. Leciejewski	SK Brann

## 28	2018	A. Lukse	SCR Altach
## 29	2018	Victor Fachinhas	Atlético Mineiro
## 30	2018	R. Zapata	Independiente Santa Fe
## 31	2018	T. Kirschbaum	1. FC Nürnberg
## 32	2018	T. Wellenreuther	Willem II
## 33	2018	S. Bruzzese	KV Kortrijk
## 34	2018	K. Kronholm	Holstein Kiel
## 35	2018	J. Mall	SV Darmstadt 98
## 36	2018	Y. Thuram	Le Havre AC
## 37	2018	D. Albil	Independiente
## 38	2018	T. Boss	SC Fortuna Köln
## 39	2018	M. Caillard	En Avant de Guingamp
## 40	2018	E. Redoga	San Luis de Quillota
## 41	2018	Alminho Boas	Vitória
## 42	2018	K. Eisele	FC Hansa Rostock
## 43	2018	A. Meyer	VfB Stuttgart
## 44	2018	A. Horwath	SK Brann
## 45	2018	T. Königsmann	SpVgg Greuther Fürth
## 46	2018	D. Reimann	Borussia Dortmund
## 47	2018	G. Doherty	Derry City
## 48	2018	E. Gründemann	FC Hansa Rostock
## 49	2018	F. Sollacaro	AC Ajaccio
## 50	2018	K. Martin	FC Lausanne-Sport
## 51	2018	R. Coulter	Bray Wanderers
## 52	2018	F. Kraft	VfL Bochum 1848
## 53	2019	Sergio Ramos	Real Madrid
## 54	2019	G. Chiellini	Juventus
## 55	2019	M. Hummels	FC Bayern München
## 56	2019	R. Nainggolan	Inter
## 57	2019	A. Schwołow	SC Freiburg
## 58	2019	M. Kozáčik	Viktoria Plzeň
## 59	2019	Victorino Magela	Bahia
## 60	2019	Nivo Serpinho	Chapecoense
## 61	2019	S. Viera	Junior FC
## 62	2019	Dani Hernández	CD Tenerife
## 63	2019	Joel Pereira	Vitória de Setúbal
## 64	2019	K. Kronholm	Holstein Kiel
## 65	2019	Victor Fachinhas	Ceará Sporting Club
## 66	2019	Mika	Os Belenenses
## 67	2019	R. Zapata	Independiente Santa Fe
## 68	2019	Cheng Yuelei	Guangzhou R&F FC
## 69	2019	T. Kirschbaum	Bayer 04 Leverkusen
## 70	2019	Kaique Mutto	Atlético Mineiro
## 71	2019	Y. Thuram	Le Havre AC
## 72	2019	T. Boss	SG Dynamo Dresden
## 73	2019	S. Bruzzese	KV Kortrijk
## 74	2019	A. Lukse	SCR Altach
## 75	2019	T. Wellenreuther	Willem II
## 76	2019	P. Leciejewski	Zagłębie Lubin
## 77	2019	Z. Laaroubi	Ohod Club
## 78	2019	B. Maubleu	Grenoble Foot 38
## 79	2019	J. Deumeland	IK Start
## 80	2019	C. Patterson-Sewell	Toronto FC
## 81	2019	D. Reimann	Holstein Kiel

## 82	2019	K. Eisele	Hallescher FC
## 83	2019	M. Caillard	En Avant de Guingamp
## 84	2019	A. Meyer	VfB Stuttgart
## 85	2019	P. Gori	Benevento
## 86	2019	Yang Jun	Tianjin Quanjian FC
## 87	2019	A. Horwath	Real Salt Lake
## 88	2019	T. Königsmann	SpVgg Greuther Fürth
## 89	2019	G. Doherty	Derry City
## 90	2019	L. Weinkauf	Hannover 96
## 91	2019	E. Gründemann	FC Hansa Rostock
## 92	2019	N. Quindt	VfL Sportfreunde Lotte
## 93	2019	F. Maddaloni	Chamois Niortais Football Club
## 94	2019	F. Sollacaro	AC Ajaccio
## 95	2019	F. Kraft	VfL Bochum 1848
## 96	2019	K. Yoshimaru	Vissel Kobe
## 97	2019	N. Stephan	FC Würzburger Kickers
## 98	2020	Sergio Ramos	Real Madrid
## 99	2020	R. Nainggolan	Cagliari
## 100	2020	G. Chiellini	Juventus
## 101	2020	K. Manolas	Napoli
## 102	2020	A. Laporte	Manchester City
## 103	2020	J. Vertonghen	Tottenham Hotspur
## 104	2020	A. Vidal	FC Barcelona
## 105	2020	T. Delaney	Borussia Dortmund
##		nationality	overall
		defending	sliding_tackle
## 1	Germany	87	95
## 2	Italy	87	91+4
## 3	Germany	87	91+1
## 4	Spain	87	90
## 5	Portugal	84	90
## 6	Germany	88	95
## 7	Germany	90	91
## 8	Italy	86	90+2
## 9	Spain	89	90
## 10	Portugal	88	90
## 11	Italy	88	90
## 12	Spain	90	91+1
## 13	Germany	88	90+3
## 14	Germany	88	90-1
## 15	Italy	89	90
## 16	Germany	75	9
## 17	Venezuela	75	9
## 18	Chile	74	9
## 19	Brazil	74	9
## 20	Egypt	73	9
## 21	Chile	73	9
## 22	Brazil	73	9
## 23	Portugal	71	9
## 24	Portugal	71	9
## 25	Uruguay	71	9
## 26	Chile	70	9
## 27	Poland	70	9
## 28	Austria	70	9
## 29	Brazil	70	9

## 30	Colombia	69	9
## 31	Germany	69	9
## 32	Germany	68	9
## 33	Belgium	68	9
## 34	United States	68	9
## 35	Switzerland	67	9
## 36	France	66	9
## 37	Argentina	64	9
## 38	Germany	63	9
## 39	France	63	9
## 40	Chile	63	9
## 41	Brazil	63	9
## 42	Germany	62	9
## 43	Germany	62	9
## 44	United States	62	9
## 45	Germany	61	9
## 46	Germany	60	9
## 47	Northern Ireland	60	9
## 48	Germany	58	9
## 49	France	57	9
## 50	Switzerland	56	9
## 51	Republic of Ireland	54	9
## 52	Germany	52	9
## 53	Spain	91	91
## 54	Italy	89	90
## 55	Germany	89	90
## 56	Belgium	85	90
## 57	Germany	77	9
## 58	Slovakia	75	9
## 59	Brazil	74	9
## 60	Brazil	73	9
## 61	Uruguay	72	9
## 62	Venezuela	72	9
## 63	Portugal	71	9
## 64	United States	70	9
## 65	Brazil	70	9
## 66	Portugal	69	9
## 67	Colombia	69	9
## 68	China PR	69	9
## 69	Germany	69	9
## 70	Brazil	69	9
## 71	France	68	9
## 72	Germany	67	9
## 73	Belgium	67	9
## 74	Austria	67	9
## 75	Germany	66	9
## 76	Poland	66	9
## 77	Morocco	66	9
## 78	France	64	9
## 79	Germany	64	9
## 80	United States	64	9
## 81	Germany	63	9
## 82	Germany	63	9
## 83	France	63	9

## 84	Germany	63	9
## 85	Italy	63	9
## 86	China PR	62	9
## 87	United States	62	9
## 88	Germany	61	9
## 89	Northern Ireland	60	9
## 90	Germany	59	9
## 91	Germany	58	9
## 92	Germany	58	9
## 93	France	58	9
## 94	France	57	9
## 95	Germany	55	9
## 96	Japan	54	9
## 97	Germany	49	9
## 98	Spain	89	90
## 99	Belgium	83	90
## 100	Italy	89	89
## 101	Greece	85	89
## 102	France	87	88
## 103	Belgium	87	88
## 104	Chile	84	88
## 105	Denmark	82	88

```
# Team Stats

for (i in seq_along(fifa_datasets_list)) {

  # Top 10 teams with highest average player overall
  top_10_teams <- fifa_datasets_list[[i]] %>%
    filter(!club %in% c("Uruguay", "Colombia", "Mexico", "Netherlands")) %>%
    group_by(club) %>% summarise(avg_player_ovr = mean(overall)) %>%
    arrange(desc(avg_player_ovr)) %>% top_n(10)
  print(paste("Year", years[[i]], ":"))

  print(top_10_teams)

  # Top 10 teams with highest average player overall in
  # the starting 11 excluding subs and reserves
  top_10_special <- fifa_datasets_list[[i]] %>%
    filter(!club %in% c("Uruguay", "Colombia", "Mexico", "Netherlands")) %>%
    filter(!team_position %in% c("SUB", "RES")) %>%
    group_by(club) %>% summarise(avg_player_ovr = mean(overall)) %>%
    arrange(desc(avg_player_ovr)) %>% top_n(10)
  print(paste("Year", years[[i]], ":", "excluding reserves and substitute players"))
  print(top_10_special)

  # Worst 10 teams:
  worst_teams <- fifa_datasets_list[[i]] %>%
    filter(!club %in% c("Uruguay", "Colombia", "Mexico", "Netherlands", "India")) %>%
    filter(!team_position %in% c("SUB", "RES")) %>%
    group_by(club) %>%
    summarise(avg_player_ovr = mean(overall)) %>%
    arrange(avg_player_ovr) %>% top_n(10)
  print(paste("Year", years[[i]], ":", "worst 10 teams"))
  print(worst_teams)
}
```

```

# Top 10 most valuable squads:
most_val_team <- fifa_datasets_list[[i]] %>% group_by(club)%>%
  summarise(squad_value_eur = sum(value_eur)) %>% arrange(desc(squad_value_eur)) %>% top_n(10)
print(paste("Year", years[[i]], ":", "most valuable squads"))
print(most_val_team)

# Top 10 high weekly wage teams:
most_wage_team <- fifa_datasets_list[[i]] %>% group_by(club)%>%
  summarise(wage_value_eur = sum(wage_eur)) %>% arrange(desc(wage_value_eur)) %>% top_n(10)
print(paste("Year", years[[i]], ":", "high weekly wage"))
print(most_wage_team)
}

## Selecting by avg_player_ovr

## [1] "Year 2016 :"
## # A tibble: 10 x 2
##   club           avg_player_ovr
##   <chr>          <dbl>
## 1 Brazil          81
## 2 Juventus       79.3
## 3 FC Bayern München 78.7
## 4 FC Barcelona    78.6
## 5 Austria          78
## 6 Manchester City 77.2
## 7 Real Madrid      77.1
## 8 Atlético Madrid 76.9
## 9 Paris Saint-Germain 76.8
## 10 Napoli          76.7

## Selecting by avg_player_ovr

## [1] "Year 2016 : excluding reserves ans substitute players"
## # A tibble: 10 x 2
##   club           avg_player_ovr
##   <chr>          <dbl>
## 1 FC Barcelona    86.1
## 2 Real Madrid      85.5
## 3 FC Bayern München 84.9
## 4 Paris Saint-Germain 83.6
## 5 Chelsea          83.4
## 6 Manchester City 82.4
## 7 Juventus          82
## 8 Manchester United 82
## 9 Arsenal            81.7
## 10 Atlético Madrid 81.5

## Selecting by avg_player_ovr

## [1] "Year 2016 : worst 10 teams"
## # A tibble: 10 x 2

```

```

##   club           avg_player_ovr
##   <chr>          <dbl>
## 1 Atlético Madrid      81.5
## 2 Arsenal             81.7
## 3 Juventus            82
## 4 Manchester United   82
## 5 Manchester City     82.4
## 6 Chelsea              83.4
## 7 Paris Saint-Germain 83.6
## 8 FC Bayern München   84.9
## 9 Real Madrid          85.5
## 10 FC Barcelona         86.1

## Selecting by squad_value_eur

## [1] "Year 2016 : most valuable squads"
## # A tibble: 10 x 2
##   club           squad_value_eur
##   <chr>          <int>
## 1 FC Bayern München 615490000
## 2 Real Madrid       610475000
## 3 FC Barcelona       584950000
## 4 Chelsea            484850000
## 5 Paris Saint-Germain 441390000
## 6 Manchester City    434150000
## 7 Arsenal             401890000
## 8 Juventus            390100000
## 9 Manchester United   366715000
## 10 Borussia Dortmund 349365000

## Selecting by wage_value_eur

## [1] "Year 2016 : high weekly wage"
## # A tibble: 10 x 2
##   club           wage_value_eur
##   <chr>          <int>
## 1 FC Barcelona      3501000
## 2 FC Bayern München 3472000
## 3 Real Madrid        3304000
## 4 Chelsea            2880000
## 5 Manchester City    2814000
## 6 Paris Saint-Germain 2759000
## 7 Juventus            2656000
## 8 Arsenal             2635000
## 9 Borussia Dortmund   2398000
## 10 Manchester United  2250000

## Selecting by avg_player_ovr

## [1] "Year 2017 :"
## # A tibble: 10 x 2
##   club           avg_player_ovr

```

```

##      <chr>                <dbl>
## 1 Juventus                  81
## 2 Argentina                 80
## 3 Italy                      80
## 4 Brazil                     79.7
## 5 FC Bayern München          79.5
## 6 Portugal                   79
## 7 Turkey                     79
## 8 Real Madrid                78.5
## 9 Manchester United          77.9
## 10 FC Barcelona               77.8

## Selecting by avg_player_ovr

## [1] "Year 2017 : excluding reserves ans substitute players"
## # A tibble: 10 x 2
##   club           avg_player_ovr
##   <chr>            <dbl>
## 1 Real Madrid             87.8
## 2 FC Bayern München        87.5
## 3 FC Barcelona              87
## 4 Juventus                 85.4
## 5 Arsenal                  84.5
## 6 Chelsea                  84.5
## 7 Atlético Madrid           83.9
## 8 Paris Saint-Germain       83.9
## 9 Manchester City           83.6
## 10 Manchester United         82.9

## Selecting by avg_player_ovr

## [1] "Year 2017 : worst 10 teams"
## # A tibble: 10 x 2
##   club           avg_player_ovr
##   <chr>            <dbl>
## 1 Manchester United          82.9
## 2 Manchester City            83.6
## 3 Atlético Madrid            83.9
## 4 Paris Saint-Germain         83.9
## 5 Arsenal                  84.5
## 6 Chelsea                  84.5
## 7 Juventus                 85.4
## 8 FC Barcelona                87
## 9 FC Bayern München           87.5
## 10 Real Madrid                87.8

## Selecting by squad_value_eur

## [1] "Year 2017 : most valuable squads"
## # A tibble: 10 x 2
##   club           squad_value_eur
##   <chr>            <int>

```

```

## 1 Real Madrid           772175000
## 2 FC Barcelona          702575000
## 3 FC Bayern München     651890000
## 4 Manchester United     565235000
## 5 Chelsea                519480000
## 6 Arsenal                 512225000
## 7 Atlético Madrid        493245000
## 8 Paris Saint-Germain    492475000
## 9 Juventus               485125000
## 10 Manchester City       483045000

## Selecting by wage_value_eur

## [1] "Year 2017 : high weekly wage"
## # A tibble: 10 x 2
##   club            wage_value_eur
##   <chr>           <int>
## 1 Real Madrid      2734000
## 2 FC Barcelona     2550000
## 3 FC Bayern München 2484000
## 4 Manchester United 2225000
## 5 Juventus        2177000
## 6 Chelsea          2090000
## 7 Arsenal          2064000
## 8 Manchester City  1958000
## 9 Borussia Dortmund 1897000
## 10 Paris Saint-Germain 1872000

## Selecting by avg_player_ovr

## [1] "Year 2018 :"
## # A tibble: 11 x 2
##   club            avg_player_ovr
##   <chr>           <dbl>
## 1 Portugal          83
## 2 FC Barcelona      82.4
## 3 Belgium           82
## 4 Juventus          81.7
## 5 Real Madrid       81.0
## 6 Brazil             80
## 7 Sweden             80
## 8 FC Bayern München 79.4
## 9 Paris Saint-Germain 78.0
## 10 Manchester United 77.7
## 11 Napoli            77.7

## Selecting by avg_player_ovr

## [1] "Year 2018 : excluding reserves ans substitute players"
## # A tibble: 10 x 2
##   club            avg_player_ovr
##   <chr>           <dbl>

```

```

## 1 Real Madrid           87.6
## 2 FC Bayern München    87.2
## 3 FC Barcelona          86.2
## 4 Juventus              85.6
## 5 Chelsea                84.6
## 6 Atlético Madrid        84.5
## 7 Paris Saint-Germain   84.1
## 8 Tottenham Hotspur      83.8
## 9 Arsenal                 83.7
## 10 Manchester United     83.7

```

```
## Selecting by avg_player_ovr
```

```

## [1] "Year 2018 : worst 10 teams"
## # A tibble: 10 x 2
##   club           avg_player_ovr
##   <chr>          <dbl>
## 1 Arsenal          83.7
## 2 Manchester United 83.7
## 3 Tottenham Hotspur 83.8
## 4 Paris Saint-Germain 84.1
## 5 Atlético Madrid 84.5
## 6 Chelsea          84.6
## 7 Juventus          85.6
## 8 FC Barcelona       86.2
## 9 FC Bayern München 87.2
## 10 Real Madrid       87.6

```

```
## Selecting by squad_value_eur
```

```

## [1] "Year 2018 : most valuable squads"
## # A tibble: 10 x 2
##   club           squad_value_eur
##   <chr>          <int>
## 1 Real Madrid      826750000
## 2 FC Bayern München 748825000
## 3 FC Barcelona     715000000
## 4 Chelsea          671910000
## 5 Paris Saint-Germain 631750000
## 6 Juventus          617100000
## 7 Manchester United 610625000
## 8 Manchester City   578715000
## 9 Atlético Madrid    566150000
## 10 Tottenham Hotspur 525955000

```

```
## Selecting by wage_value_eur
```

```

## [1] "Year 2018 : high weekly wage"
## # A tibble: 10 x 2
##   club           wage_value_eur
##   <chr>          <int>
## 1 Real Madrid      4751000

```

```

## 2 FC Barcelona          4532000
## 3 Manchester United    3557000
## 4 Chelsea                3545000
## 5 FC Bayern München      3273000
## 6 Juventus               3165000
## 7 Manchester City        3157000
## 8 Arsenal                 3007000
## 9 Liverpool               2752000
## 10 Everton                2499000

## Selecting by avg_player_ovr

## [1] "Year 2019 :"
## # A tibble: 10 x 2
##   club           avg_player_ovr
##   <chr>            <dbl>
## 1 Juventus          82.2
## 2 FC Barcelona       80.3
## 3 Argentina          80
## 4 Napoli              79.8
## 5 Inter                79.7
## 6 FC Bayern München  78.5
## 7 Milan                78.0
## 8 Real Madrid         77.8
## 9 Sweden               77.7
## 10 Manchester United  77.5

## Selecting by avg_player_ovr

## [1] "Year 2019 : excluding reserves ans substitute players"
## # A tibble: 10 x 2
##   club           avg_player_ovr
##   <chr>            <dbl>
## 1 Real Madrid        87.7
## 2 FC Barcelona        87.6
## 3 FC Bayern München  86.4
## 4 Juventus            86.3
## 5 Manchester City     86.2
## 6 Atlético Madrid     85.3
## 7 Paris Saint-Germain 84.7
## 8 Tottenham Hotspur    84.7
## 9 Chelsea              84.4
## 10 Manchester United   84.1

## Selecting by avg_player_ovr

## [1] "Year 2019 : worst 10 teams"
## # A tibble: 10 x 2
##   club           avg_player_ovr
##   <chr>            <dbl>
## 1 Manchester United    84.1
## 2 Chelsea                84.4

```

```

## 3 Paris Saint-Germain      84.7
## 4 Tottenham Hotspur       84.7
## 5 Atlético Madrid         85.3
## 6 Manchester City         86.2
## 7 Juventus                 86.3
## 8 FC Bayern München        86.4
## 9 FC Barcelona              87.6
## 10 Real Madrid             87.7

## Selecting by squad_value_eur

## [1] "Year 2019 : most valuable squads"
## # A tibble: 10 x 2
##   club           squad_value_eur
##   <chr>            <int>
## 1 Real Madrid     880075000
## 2 FC Barcelona    837925000
## 3 Manchester City 757395000
## 4 FC Bayern München 715310000
## 5 Juventus       691975000
## 6 Atlético Madrid 641280000
## 7 Manchester United 627550000
## 8 Chelsea          620360000
## 9 Paris Saint-Germain 612725000
## 10 Tottenham Hotspur 600710000

## Selecting by wage_value_eur

## [1] "Year 2019 : high weekly wage"
## # A tibble: 10 x 2
##   club           wage_value_eur
##   <chr>            <int>
## 1 Real Madrid     4961000
## 2 FC Barcelona    4747000
## 3 Manchester City 3721000
## 4 Manchester United 3522000
## 5 Juventus       3271000
## 6 Chelsea          3266000
## 7 Liverpool        2911000
## 8 Tottenham Hotspur 2528000
## 9 Arsenal          2514000
## 10 FC Bayern München 2413000

## Selecting by avg_player_ovr

## [1] "Year 2020 :"
## # A tibble: 10 x 2
##   club           avg_player_ovr
##   <chr>            <dbl>
## 1 FC Bayern München 81.3
## 2 Real Madrid       80.1
## 3 Juventus          80.1

```

```

## 4 FC Barcelona          78.4
## 5 Bayer 04 Leverkusen   77.3
## 6 Chelsea                77.1
## 7 Manchester City        77
## 8 Napoli                  76.9
## 9 Manchester United      76.8
## 10 Tottenham Hotspur     76.5

## Selecting by avg_player_ovr

## [1] "Year 2020 : excluding reserves ans substitute players"
## # A tibble: 10 x 2
##   club           avg_player_ovr
##   <chr>            <dbl>
## 1 FC Barcelona       87.6
## 2 Real Madrid        86.7
## 3 Manchester City    86.4
## 4 Liverpool           85.7
## 5 FC Bayern München  85.5
## 6 Juventus             85.3
## 7 Paris Saint-Germain 85.2
## 8 Tottenham Hotspur    84.1
## 9 Borussia Dortmund   83.6
## 10 Atlético Madrid     83.2

## Selecting by avg_player_ovr

## [1] "Year 2020 : worst 10 teams"
## # A tibble: 10 x 2
##   club           avg_player_ovr
##   <chr>            <dbl>
## 1 Atlético Madrid     83.2
## 2 Borussia Dortmund   83.6
## 3 Tottenham Hotspur    84.1
## 4 Paris Saint-Germain 85.2
## 5 Juventus             85.3
## 6 FC Bayern München   85.5
## 7 Liverpool             85.7
## 8 Manchester City       86.4
## 9 Real Madrid           86.7
## 10 FC Barcelona          87.6

## Selecting by squad_value_eur

## [1] "Year 2020 : most valuable squads"
## # A tibble: 10 x 2
##   club           squad_value_eur
##   <chr>            <int>
## 1 Real Madrid      897850000
## 2 FC Barcelona      869300000
## 3 Manchester City   845745000
## 4 Juventus           735475000

```



```

## Selecting by overall

##           short_name team_position overall
## 1          K. Havertz        RF      84
## 2          K. Coman        LW      84
## 3          K. Mbappé       RW      89
## 4          D. Alli        CAM     84
## 5         L. Torreira      RDM     82
## 6        Rúben Neves      CM      82
## 7        F. de Jong      LCM     85
## 8        Grimaldo        LB      83
## 9 T. Alexander-Arnold    RB      83
## 10        L. Hernández     LCB     84
## 11        N. Süle        RCB     85
## 12        G. Donnarumma    GK      85

```

ONLY for Year 2020

```

# HIGHEST RATED PLAYERS FOR FAMOUS JERSEY NUMBERS: 1,2,3,4,5,6,7,8,9,10,11

fifa20 %>% filter(team_jersey_number==1) %>%
  arrange(desc(overall))%>%
  select(short_name, team_jersey_number, overall) %>% top_n(1)

```

```

## Selecting by overall

## # A tibble: 1 x 3
##   short_name  team_jersey_number overall
##   <chr>                <int>   <int>
## 1 M. ter Stegen            1       90

```

```

#Ter Stegen

fifa20 %>% filter(team_jersey_number==2) %>%
  arrange(desc(overall))%>%
  select(short_name, team_jersey_number, overall) %>% top_n(1)

```

```

## Selecting by overall

## # A tibble: 1 x 3
##   short_name  team_jersey_number overall
##   <chr>                <int>   <int>
## 1 D. Godín             2       88

```

```

#Godin

fifa20 %>% filter(team_jersey_number==3) %>%
  arrange(desc(overall))%>%
  select(short_name, team_jersey_number, overall) %>% top_n(1)

## Selecting by overall

## # A tibble: 1 x 3
##   short_name  team_jersey_number overall
##   <chr>           <int>     <int>
## 1 G. Chiellini            3        89

#Chiellini

fifa20 %>% filter(team_jersey_number==4) %>%
  arrange(desc(overall))%>%
  select(short_name, team_jersey_number, overall) %>% top_n(1)

## Selecting by overall

## # A tibble: 1 x 3
##   short_name  team_jersey_number overall
##   <chr>           <int>     <int>
## 1 V. van Dijk            4        90

#Van Dijk

fifa20 %>% filter(team_jersey_number==5) %>%
  arrange(desc(overall))%>%
  select(short_name, team_jersey_number, overall) %>% top_n(1)

## Selecting by overall

## # A tibble: 1 x 3
##   short_name  team_jersey_number overall
##   <chr>           <int>     <int>
## 1 Sergio Busquets          5        89

#Busquets

fifa20 %>% filter(team_jersey_number==6) %>%
  arrange(desc(overall))%>%
  select(short_name, team_jersey_number, overall) %>% top_n(1)

## Selecting by overall

## # A tibble: 1 x 3
##   short_name  team_jersey_number overall
##   <chr>           <int>     <int>
## 1 P. Pogba            6        88

```

```
#Pogba

fifa20 %>% filter(team_jersey_number==7) %>%
  arrange(desc(overall))%>%
  select(short_name, team_jersey_number, overall) %>% top_n(1)
```

```
## Selecting by overall

## # A tibble: 1 x 3
##   short_name      team_jersey_number overall
##   <chr>                <int>     <int>
## 1 Cristiano Ronaldo          7         93
```

```
#Ronaldo

fifa20 %>% filter(team_jersey_number==8) %>%
  arrange(desc(overall))%>%
  select(short_name, team_jersey_number, overall) %>% top_n(1)
```

```
## Selecting by overall

## # A tibble: 1 x 3
##   short_name team_jersey_number overall
##   <chr>            <int>     <int>
## 1 T. Kroos           8         88
```

```
#Toni Kroos

fifa20 %>% filter(team_jersey_number==9) %>%
  arrange(desc(overall))%>%
  select(short_name, team_jersey_number, overall) %>% top_n(1)
```

```
## Selecting by overall

## # A tibble: 2 x 3
##   short_name      team_jersey_number overall
##   <chr>                <int>     <int>
## 1 L. Suárez             9         89
## 2 R. Lewandowski        9         89
```

```
#Lewandowski

fifa20 %>% filter(team_jersey_number==10) %>%
  arrange(desc(overall))%>%
  select(short_name, team_jersey_number, overall) %>% top_n(1)
```

```
## Selecting by overall

## # A tibble: 1 x 3
##   short_name team_jersey_number overall
##   <chr>            <int>     <int>
## 1 L. Messi            10         94
```

```
#Messi
```

```
fifa20 %>% filter(team_jersey_number==11) %>%
  arrange(desc(overall))%>%
  select(short_name, team_jersey_number, overall) %>% top_n(1)
```

```
## Selecting by overall
```

```
## # A tibble: 1 x 3
##   short_name team_jersey_number overall
##   <chr>           <int>     <int>
## 1 M. Salah            11        90
```

```
#Salah
```

```
# PLAYERS WITH THE BEST SKILL MOVES WITH OVERALL >=85
fifa20 %>% filter(overall>=85,skill_moves==5)%>%arrange(desc(skill_moves)) %>%
  select(short_name, club, nationality, team_position,overall,skill_moves) %>%
  group_by(skill_moves) %>% top_n(1) %>% ungroup()
```

```
## Selecting by skill_moves
```

```
## # A tibble: 9 x 6
##   short_name   club      nationality team_position overall skill_moves
##   <chr>       <chr>      <chr>       <chr>      <int>     <int>
## 1 Cristiano Ron~ Juventus    Portugal    LW          93        5
## 2 Neymar Jr    Paris Saint~ Brazil     CAM         92        5
## 3 K. Mbappé    Paris Saint~ France    RW          89        5
## 4 P. Pogba     Manchester ~ France  LDM         88        5
## 5 Thiago       FC Bayern M~ Spain    CDM         87        5
## 6 A. Di María  Paris Saint~ Argentina LW          86        5
## 7 Coutinho     FC Bayern M~ Brazil   LCM         86        5
## 8 Z. Ibrahimović LA Galaxy    Sweden     ST          85        5
## 9 Marcelo      Real Madrid  Brazil    LB          85        5
```

```
# PLAYERS WITH BEST WEAK FOOT WITH OVERALL >=85
```

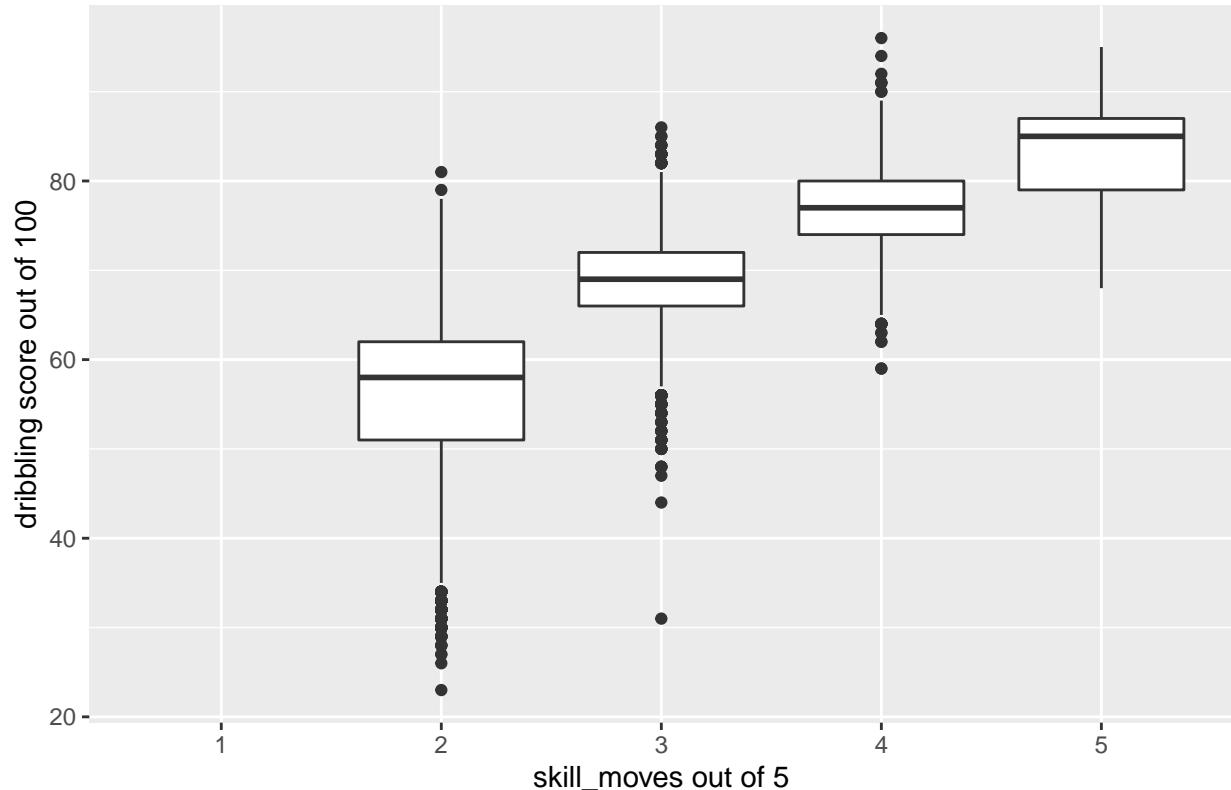
```
fifa20 %>% filter(overall>=85,weak_foot==5)%>%arrange(desc(weak_foot)) %>%
  select(short_name, club, nationality, team_position,overall,weak_foot) %>%
  group_by(weak_foot) %>% top_n(1) %>% ungroup()
```

```
## Selecting by weak_foot
```

```
## # A tibble: 5 x 6
##   short_name   club      nationality team_position overall weak_foot
##   <chr>       <chr>      <chr>       <chr>      <int>     <int>
## 1 Neymar Jr    Paris Saint-G~ Brazil     CAM         92        5
## 2 K. De Bruyne  Manchester Ci~ Belgium   RCM         91        5
## 3 C. Eriksen    Tottenham Hot~ Denmark   RM          88        5
## 4 T. Kroos      Real Madrid  Germany    LCM         88        5
## 5 H. Son        Tottenham Hot~ Korea Republ~ LM          87        5
```

```
# Are skill_moves and dribbling correlated?
# Boxplot of skill_moves vs dribbling
fifa20 %>% ggplot(aes(as.factor(skill_moves),dribbling)) + geom_boxplot() +
  labs(x = "skill_moves out of 5", y = "dribbling score out of 100",
       title = "Boxplot of skill_moves vs dribbling")
```

Boxplot of skill_moves vs dribbling



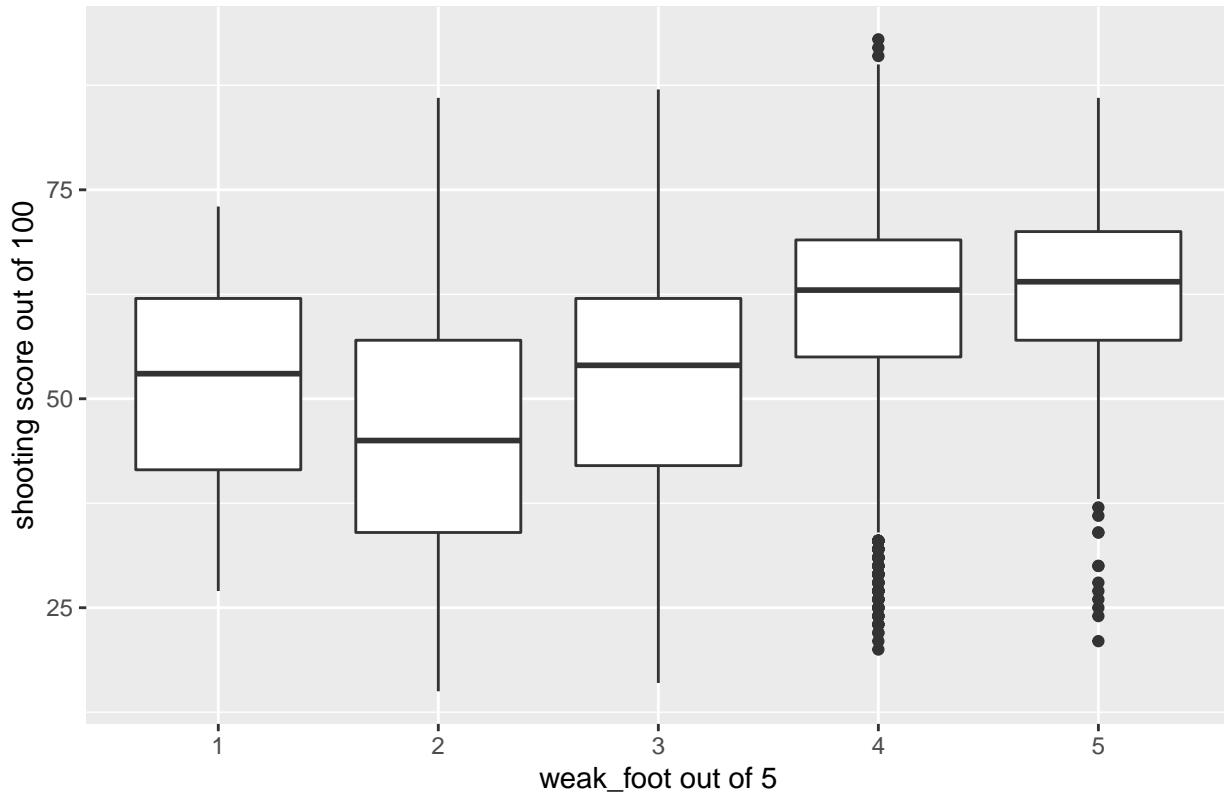
```
# They are positively correlated
# Strength of correlation:
cor(fifa20$skill_moves, fifa20$dribbling, method = "spearman",
     use = "complete.obs")
```

```
## [1] 0.7873962
```

```
# High positive correlation.

# Are players with a strong weak foot good at shooting?
# Boxplot of weak foot vs shooting
fifa20 %>% ggplot(aes(as.factor(weak_foot), shooting)) + geom_boxplot() +
  labs(x = "weak_foot out of 5", y = "shooting score out of 100",
       title = "Boxplot of weak foot vs shooting")
```

Boxplot of weak foot vs shooting



```
# Strength of correlation:
cor(fifa20$weak_foot, fifa20$shooting, method = "spearman",
    use = "complete.obs")

## [1] 0.3237961

# Weak positive correlation

# Split work rate into 2 columns: attack and defence work rate:
fifa20 <- separate(fifa20, work_rate, into = c("attack_workrate", "defence_workrate"),
                    sep = "/")

# Good players with high attack and defence workrates:
fifa20 %>% filter(overall >= 85, attack_workrate == "High", defence_workrate == "High") %>%
  arrange(desc(overall)) %>%
  select(short_name, club, nationality, team_position,
         attack_workrate, defence_workrate, overall) %>% group_by(overall) %>%
  top_n(1) %>% ungroup()

## Selecting by overall

## # A tibble: 18 x 7
##   short_name club  nationality team_position attack_workrate
##   <chr>      <chr> <chr>       <chr>           <chr>
## 1 K. De Bru~ Manc~ Belgium     RCM            High
## 2 L. Muriel ~ Manch~ England    ST             High
## 3 J. S. Guedes ~ Manch~ Portugal   ST             High
## 4 D. Ceballos ~ Manch~ Argentina  Midfielder    High
## 5 J. M. Alava ~ Manch~ Spain     Midfielder    High
## 6 J. M. Alava ~ Manch~ Spain     Midfielder    High
## 7 J. M. Alava ~ Manch~ Spain     Midfielder    High
## 8 J. M. Alava ~ Manch~ Spain     Midfielder    High
## 9 J. M. Alava ~ Manch~ Spain     Midfielder    High
## 10 J. M. Alava ~ Manch~ Spain    Midfielder    High
## 11 J. M. Alava ~ Manch~ Spain    Midfielder    High
## 12 J. M. Alava ~ Manch~ Spain    Midfielder    High
## 13 J. M. Alava ~ Manch~ Spain    Midfielder    High
## 14 J. M. Alava ~ Manch~ Spain    Midfielder    High
## 15 J. M. Alava ~ Manch~ Spain    Midfielder    High
## 16 J. M. Alava ~ Manch~ Spain    Midfielder    High
## 17 J. M. Alava ~ Manch~ Spain    Midfielder    High
## 18 J. M. Alava ~ Manch~ Spain    Midfielder    High
```

```

## 2 L. Modrić Real~ Croatia RCM High
## 3 H. Kane Tott~ England ST High
## 4 A. Griezm~ FC B~ France LW High
## 5 C. Eriksen Tott~ Denmark RM High
## 6 E. Cavani Pari~ Uruguay ST High
## 7 Bernardo ~ Manc~ Portugal RW High
## 8 H. Son Tott~ Korea Repu~ LM High
## 9 J. Verton~ Tott~ Belgium LCB High
## 10 Roberto F~ Live~ Brazil CF High
## 11 T. Müller FC B~ Germany SUB High
## 12 A. Lacaze~ Arse~ France ST High
## 13 Saúl Atlé~ Spain LCM High
## 14 A. Robert~ Live~ Scotland LB High
## 15 Bruno Fer~ Spor~ Portugal RCM High
## 16 Carvajal Real~ Spain RB High
## 17 Iago Aspas RC C~ Spain RS High
## 18 Koke Atlé~ Spain RM High
## # ... with 2 more variables: defence_workrate <chr>, overall <int>

```

```

# Laziest players on fifa20
fifa20 %>% filter(attack_workrate == "Low", defence_workrate == "Low") %>%
  arrange(desc(overall)) %>%
  select(short_name, club, nationality, team_position,
         attack_workrate, defence_workrate, overall) %>% group_by(overall) %>%
  top_n(1) %>% ungroup()

```

```
## Selecting by overall
```

```

## # A tibble: 35 x 7
##   short_name club  nationality team_position attack_workrate
##   <chr>      <chr> <chr>       <chr>        <chr>
## 1 C. Strand~ Öreb~ Sweden     LS           Low
## 2 M. Kramer  ADO ~ Netherlands SUB          Low
## 3 A. Fink    Karl~ Germany   SUB          Low
## 4 S. Ameobi  Nott~ England   SUB          Low
## 5 P. Forsell HJK ~ Finland  RES          Low
## 6 C. Kazim~~ Tibu~ Turkey   RS           Low
## 7 N. Schmidt VfL ~ Germany  SUB          Low
## 8 A. Ba      AJ A~ Mauritania SUB          Low
## 9 Abraham G~ Tibu~ Spain    LDM          Low
## 10 E. Kujović Djur~ Sweden  RES          Low
## # ... with 25 more rows, and 2 more variables: defence_workrate <chr>,
## #   overall <int>

```

```

# SUMMARIES OF FEW COLUMNS
sum_stats <- fifa20 %>% select(overall, potential, value_eur, wage_eur,
                                 release_clause_eur,
                                 pace, shooting, passing,
                                 dribbling, physic, defending)
summary(sum_stats)

```

```
##      overall      potential      value_eur      wage_eur
```

```

## Min. :48.00  Min. :49.00  Min. :      0  Min. :     0
## 1st Qu.:62.00 1st Qu.:67.00 1st Qu.: 325000 1st Qu.: 1000
## Median :66.00 Median :71.00 Median : 700000 Median : 3000
## Mean   :66.24 Mean   :71.55 Mean   : 2484038 Mean   : 9457
## 3rd Qu.:71.00 3rd Qu.:75.00 3rd Qu.:2100000 3rd Qu.: 8000
## Max.   :94.00  Max.   :95.00  Max.   :105500000 Max.   :565000
##
## release_clause_eur      pace      shooting      passing
## Min.   : 13000  Min.   :24.0  Min.   :15.0  Min.   :24.00
## 1st Qu.: 563000 1st Qu.:61.0 1st Qu.:42.0 1st Qu.:50.00
## Median :1200000 Median :69.0  Median :54.0  Median :58.00
## Mean   :4740717  Mean   :67.7  Mean   :52.3  Mean   :57.23
## 3rd Qu.:3700000 3rd Qu.:75.0 3rd Qu.:63.0 3rd Qu.:64.00
## Max.   :195800000 Max.   :96.0  Max.   :93.0  Max.   :92.00
## NA's   :1298    NA's   :2036  NA's   :2036  NA's   :2036
## dribbling      physic      defending
## Min.   :23.00  Min.   :27.00  Min.   :15.00
## 1st Qu.:57.00 1st Qu.:59.00 1st Qu.:36.00
## Median :64.00  Median :66.00  Median :56.00
## Mean   :62.53  Mean   :64.88  Mean   :51.55
## 3rd Qu.:69.00 3rd Qu.:72.00 3rd Qu.:65.00
## Max.   :96.00  Max.   :90.00  Max.   :90.00
## NA's   :2036  NA's   :2036  NA's   :2036

```

#release_clause_eur is NA for 1298 players, this is because these players do not have a release clause included in their current contract.

#pace, shooting, passing, dribbling, defending and physic is NA for 2036 players, lets find out why

```

pace_na <- fifa20 %>% filter(is.na(pace),is.na(dribbling),is.na(shooting),
                                is.na(passing),is.na(defending),is.na(phovic)) %>%
  select(short_name, club, nationality, team_position, overall)
dim(pace_na) #2036 players with NAs.

```

```
## [1] 2036    5
```

#team positions of these players:

```
unique(pace_na$team_position)
```

```
## [1] "GK"  "SUB" "RES" "
```

#We can see that goalkeepers, subs and reserve team players do not have values for these 6 attributes.

```
pace_na %>% filter(team_position=="")
```

```

## # A tibble: 40 x 5
##   short_name   club   nationality team_position overall
##   <chr>        <chr>  <chr>          <chr>       <int>
## 1 J. Serendero Uruguay Uruguay      ""           80
## 2 A. Lunev      Russia Russia      ""           79
## 3 L. Sáreda     Uruguay Uruguay      ""           79
## 4 P. Dárenas    Uruguay Uruguay      ""           75

```

```

## 5 H. Lindner Austria Austria    ""
## 6 M. Borjan Canada Canada    ""
## 7 J. Santigaro Ecuador Ecuador    ""
## 8 A. El-Shenawy Egypt Egypt    ""
## 9 A. Shunin Russia Russia    ""
## 10 V. Belec Slovenia Slovenia    ""
## # ... with 30 more rows

```

#There are 40 rows in this dataframe where the position is "". These players are fictional and do not belong to any club.

```

# RELEASE CLAUSE EDA
# Players with the highest release clauses in euros:
fifa20 %>% arrange(desc(release_clause_eur)) %>%
  select(short_name, club, nationality, overall, wage_eur,
         value_eur, release_clause_eur)

```

```

## # A tibble: 18,278 x 7
##   short_name club  nationality overall wage_eur value_eur release_clause_~
##   <chr>      <chr> <chr>       <int>    <int>    <int>        <int>
## 1 L. Messi  FC B~ Argentina     94    565000  95500000  195800000
## 2 Neymar Jr Pari~ Brazil       92    290000  105500000  195200000
## 3 K. Mbappé Pari~ France      89    155000  93500000  191700000
## 4 E. Hazard Real~ Belgium     91    470000  90000000  184500000
## 5 K. De Bru~ Manc~ Belgium     91    370000  90000000  166500000
## 6 J. Oblak   Atlé~ Slovenia    91    125000  77500000  164700000
## 7 H. Kane    Tott~ England     89    220000  83000000  159800000
## 8 V. van Di~ Live~ Netherlands 90    200000  78000000  150200000
## 9 M. Salah   Live~ Egypt      90    240000  80500000  148900000
## 10 M. ter St~ FC B~ Germany    90    250000  67500000  143400000
## # ... with 18,268 more rows

```

Messi and Neymar have the highest release clauses in euros

```

# Are value and release clause correlated?
cor(fifa20$value_eur, fifa20$release_clause_eur, method = "pearson",
     use = "complete.obs")

```

```
## [1] 0.9937346
```

We see that value and release clause have very high positive correlation, correlation coefficient almost equal to 1.

```

# Are wage and release clause correlated?
cor(fifa20$wage_eur, fifa20$release_clause_eur, method = "pearson",
     use = "complete.obs")

```

```
## [1] 0.8538087
```

We also see that wage and release clause have high positive correlation.

```

# Do talented young players have high release clauses?
elite_young <- fifa20 %>% filter(age <= 23)%>%
  mutate(elite_pot_inc = potential-overall)%>%
  select(short_name, club, nationality, overall, potential,
         elite_pot_inc, release_clause_eur) %>%
  arrange(desc(elite_pot_inc))
elite_young

```

A tibble: 7,318 x 7

	short_name	club	nationality	overall	potential	elite_pot_inc
	<chr>	<chr>	<chr>	<int>	<int>	<int>
## 1	G. Bazunu	Manc~	Republic o~	59	84	25
## 2	S. Ramos	Boca~	Argentina	56	81	25
## 3	B. Mumba	Sund~	England	55	80	25
## 4	S. Spasov	Oxfo~	Bulgaria	49	74	25
## 5	Tao Qiang~	Hebe~	China PR	48	73	25
## 6	B. McPher~	Grim~	England	48	73	25
## 7	K. Bafoun~	Boru~	France	59	83	24
## 8	L. Cheval~	LOSC~	France	58	82	24
## 9	J. García	Cruz~	Mexico	55	79	24
## 10	H. Mnoga	Port~	England	53	77	24
## # ... with 7,308 more rows, and 1 more variable: release_clause_eur <int>						

```

# Check if 'elite_pot_inc' and 'release_clause_eur' are correlated
cor(elite_young$elite_pot_inc, elite_young$release_clause_eur,
    method = "pearson", use = "complete.obs")

```

```
## [1] -0.2187238
```

```

# They have a low negative correlation. One would expect, higher possibility of
# increase in overall would result in the player having a bigger release clause
# but that is not the case here.

```

```

# Do older players have smaller release clauses?
cor(fifa20$age, fifa20$release_clause_eur, method = "pearson",
    use = "complete.obs")

```

```
## [1] 0.06574811
```

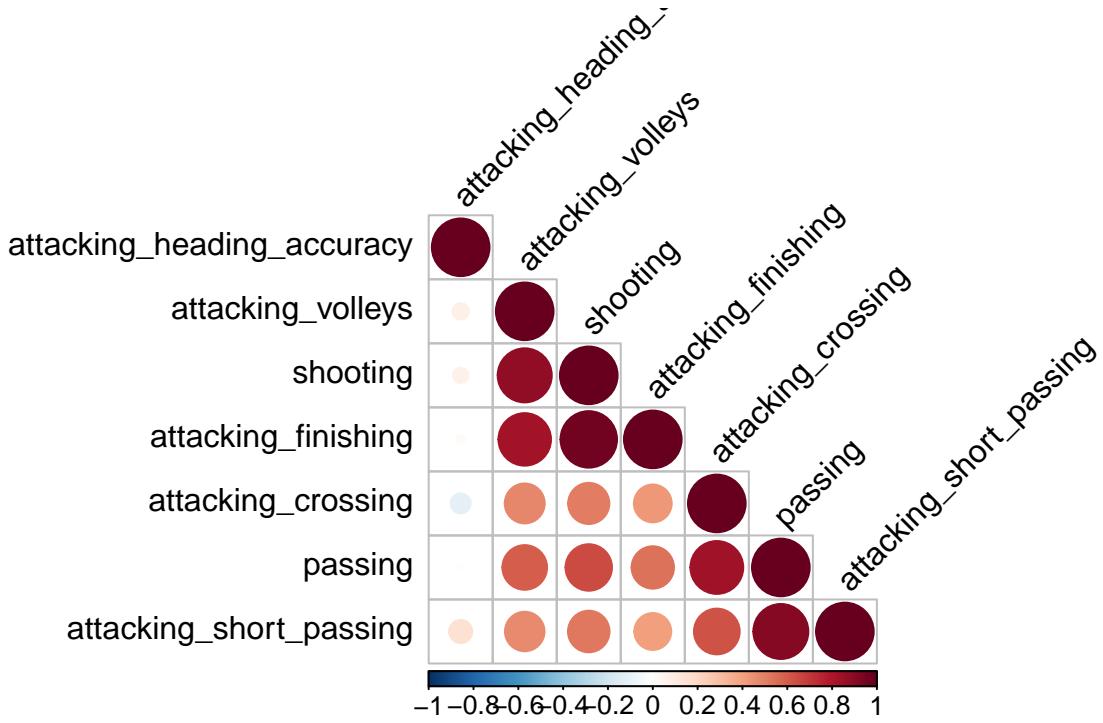
```
# There is negligible correlation between these 2 variables which is surprising.
```

```

# Correlation for attack, goalkeeping, defending and power stats

# ATTACK STATS:
attack_stats <- fifa20%>% select(shooting, passing, attacking_crossing,
                                      attacking_finishing, attacking_heading_accuracy,
                                      attacking_short_passing, attacking_volleys)
source("http://www.sthda.com/upload/rquery_cormat.r")
require("corrplot")
rquery.cormat(attack_stats)

```



```

## $r
##          attacking_heading_accuracy attacking_volleys
## attacking_heading_accuracy           1
## attacking_volleys                  0.081           1
## shooting                         0.071           0.88
## attacking_finishing                0.021           0.83
## attacking_crossing                 -0.12            0.48
## passing                          0.0092           0.6
## attacking_short_passing            0.16            0.47
##          shooting attacking_finishing attacking_crossing
## attacking_heading_accuracy           1
## attacking_volleys                  0.96            1
## shooting                         0.51            0.43
## attacking_finishing                0.65            0.54
## attacking_crossing                 0.52            0.41
## passing                          1
##          passing attacking_short_passing
## attacking_heading_accuracy           1
## attacking_volleys                  0.91            1
## shooting
## attacking_finishing
## attacking_crossing
## passing
## attacking_short_passing
##
```

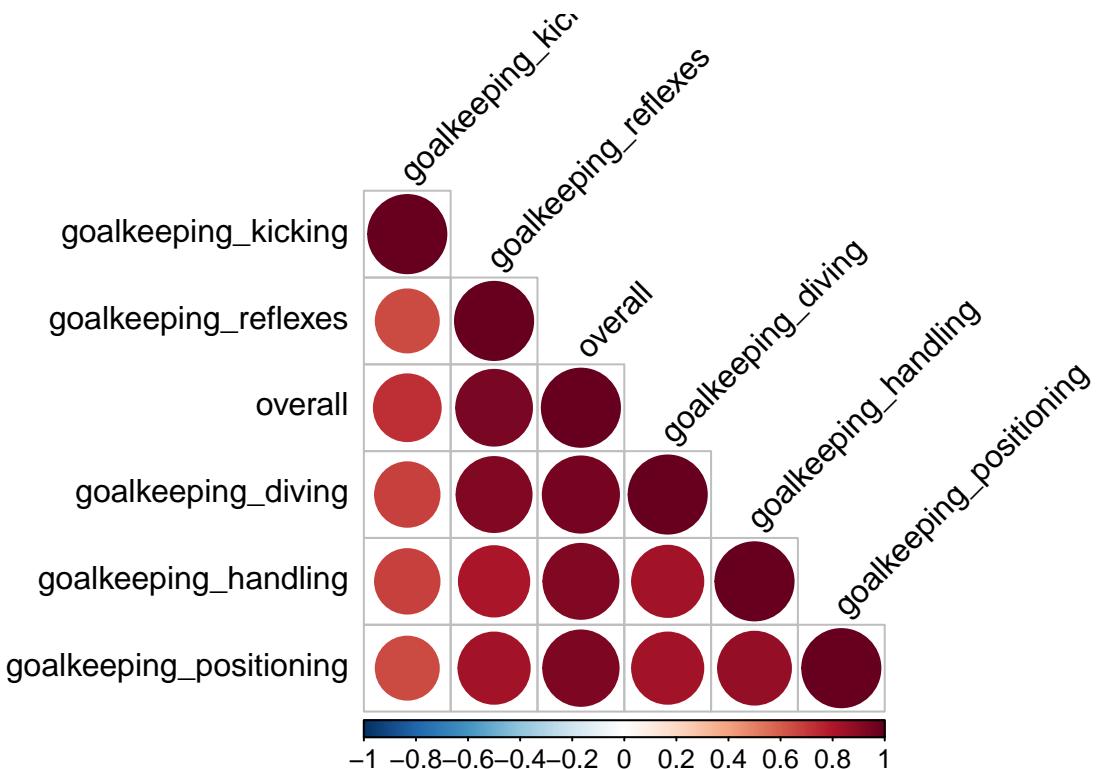
```

## $p
##          attacking_heading_accuracy attacking_volleys
## attacking_heading_accuracy          0
## attacking_volleys                  0          0
## shooting                          2e-19      0
## attacking_finishing               0          0
## attacking_crossing                0          0
## passing                           0.24      0
## attacking_short_passing          0          0
##          shooting attacking_finishing attacking_crossing
## attacking_heading_accuracy
## attacking_volleys
## shooting                         0
## attacking_finishing              0          0
## attacking_crossing               0          0          0
## passing                          0          0          0
## attacking_short_passing          0          0          0
##          passing attacking_short_passing
## attacking_heading_accuracy
## attacking_volleys
## shooting
## attacking_finishing
## attacking_crossing
## passing                         0
## attacking_short_passing          0          0
##
## $sym
##          attacking_heading_accuracy attacking_volleys
## attacking_heading_accuracy 1
## attacking_volleys                 1
## shooting                         +
## attacking_finishing               +
## attacking_crossing                .
## passing                           .
## attacking_short_passing          .
##          shooting attacking_finishing attacking_crossing
## attacking_heading_accuracy
## attacking_volleys
## shooting                         1
## attacking_finishing              B     1
## attacking_crossing               .     .
## passing                          ,     .
## attacking_short_passing          .     .
##          passing attacking_short_passing
## attacking_heading_accuracy
## attacking_volleys
## shooting
## attacking_finishing
## attacking_crossing
## passing                         1
## attacking_short_passing          *     1
## attr(,"legend")
## [1] 0 ' ' 0.3 '.' 0.6 ',' 0.8 '+' 0.9 '*' 0.95 'B' 1

```

```
#Almost all pairs are positively correlated to each other.
#One exception is the correlation b/w heading and crossing. There is a -ve
#correlation b/w these 2 variables and it makes sense since a good crosser of the
#ball is the one delivering the crosses to the player whos good at heading.
```

```
# GOALKEEPING STATS:
gk_stats <- fifa20%>% filter(team_position=="GK")%>%
  select(overall, goalkeeping_diving, goalkeeping_handling,goalkeeping_kicking,
         goalkeeping_positioning, goalkeeping_reflexes)
source("http://www.sthda.com/upload/rquery_cormat.r")
require("corrplot")
rquery.cormat(gk_stats)
```



```
## $r
##           goalkeeping_kicking goalkeeping_reflexes overall
## goalkeeping_kicking          1
## goalkeeping_reflexes        0.65          1
## overall                     0.73        0.94      1
## goalkeeping_diving          0.68        0.92      0.95
## goalkeeping_handling        0.68        0.81      0.92
## goalkeeping_positioning     0.65        0.83      0.93
##           goalkeeping_diving goalkeeping_handling
## goalkeeping_kicking        0.65
## goalkeeping_reflexes       0.65
```

```

## overall
## goalkeeping_diving           1
## goalkeeping_handling          0.83          1
## goalkeeping_positioning       0.83          0.87
##                               goalkeeping_positioning
## goalkeeping_kicking
## goalkeeping_reflexes
## overall
## goalkeeping_diving
## goalkeeping_handling
## goalkeeping_positioning      1
##
## $p
##                               goalkeeping_kicking  goalkeeping_reflexes  overall
## goalkeeping_kicking          0
## goalkeeping_reflexes         2.8e-82          0
## overall                      2.3e-111 1.50000000019285e-315  0
## goalkeeping_diving          1.1e-89          4.9e-272          0
## goalkeeping_handling         2.9e-90          1.1e-154 1.5e-272
## goalkeeping_positioning     1e-81           1.5e-169 2.7e-290
##                               goalkeeping_diving  goalkeeping_handling
## goalkeeping_kicking
## goalkeeping_reflexes
## overall
## goalkeeping_diving          0
## goalkeeping_handling         2.9e-168          0
## goalkeeping_positioning     1.9e-168          1e-204
##                               goalkeeping_positioning
## goalkeeping_kicking
## goalkeeping_reflexes
## overall
## goalkeeping_diving
## goalkeeping_handling
## goalkeeping_positioning      0
##
## $sym
##                               goalkeeping_kicking  goalkeeping_reflexes  overall
## goalkeeping_kicking          1
## goalkeeping_reflexes         ,           1
## overall                      ,           *
## goalkeeping_diving          ,           *
## goalkeeping_handling         ,           +
## goalkeeping_positioning     ,           +
##                               goalkeeping_diving  goalkeeping_handling
## goalkeeping_kicking
## goalkeeping_reflexes
## overall
## goalkeeping_diving          1
## goalkeeping_handling         +           1
## goalkeeping_positioning     +           +
##                               goalkeeping_positioning
## goalkeeping_kicking
## goalkeeping_reflexes
## overall

```

```

## goalkeeping_diving
## goalkeeping_handling
## goalkeeping_positioning 1
## attr(,"legend")
## [1] 0 ' ' 0.3 '.' 0.6 ',' 0.8 '+' 0.9 '*' 0.95 'B' 1

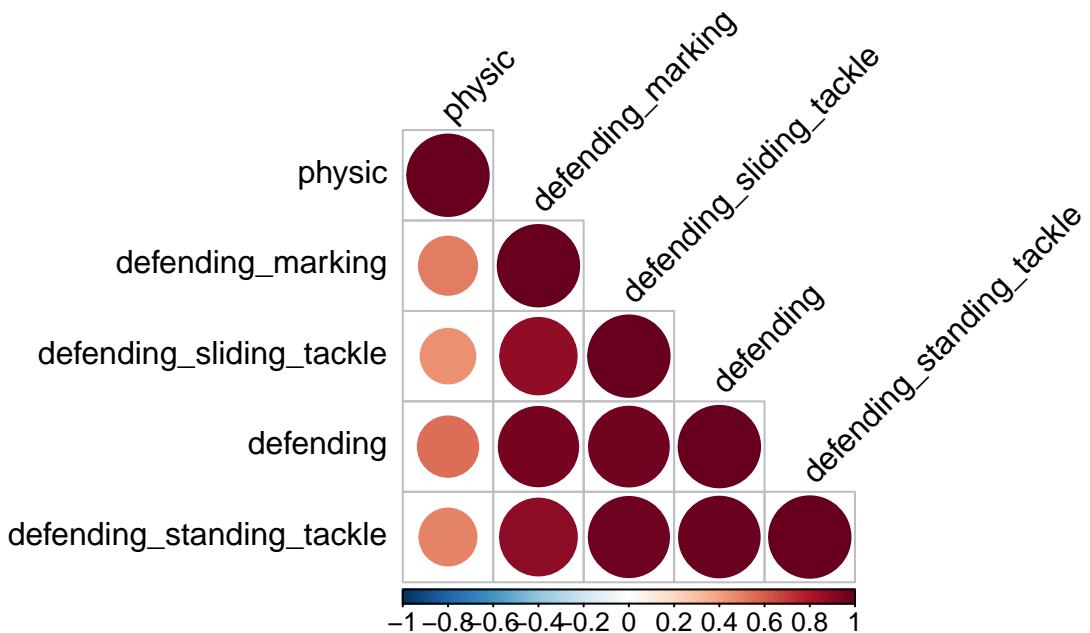
#kicking is not as highly correlated to GK overall when compared to other goalkeeping attributes.

```

```

# DEFENDING STATS:
defence_stats <- fifa20%>% select(defending, defending_marking,
                                         defending_standing_tackle, defending_sliding_tackle,
                                         physic)
source("http://www.sthda.com/upload/rquery_cormat.r")
require("corrplot")
rquery.cormat(defence_stats)

```



```

## $r
##          physic   defending_marking
## physic           1
## defending_marking 0.51           1
## defending_sliding_tackle 0.45       0.88
## defending         0.55       0.95
## defending_standing_tackle 0.49       0.89

```

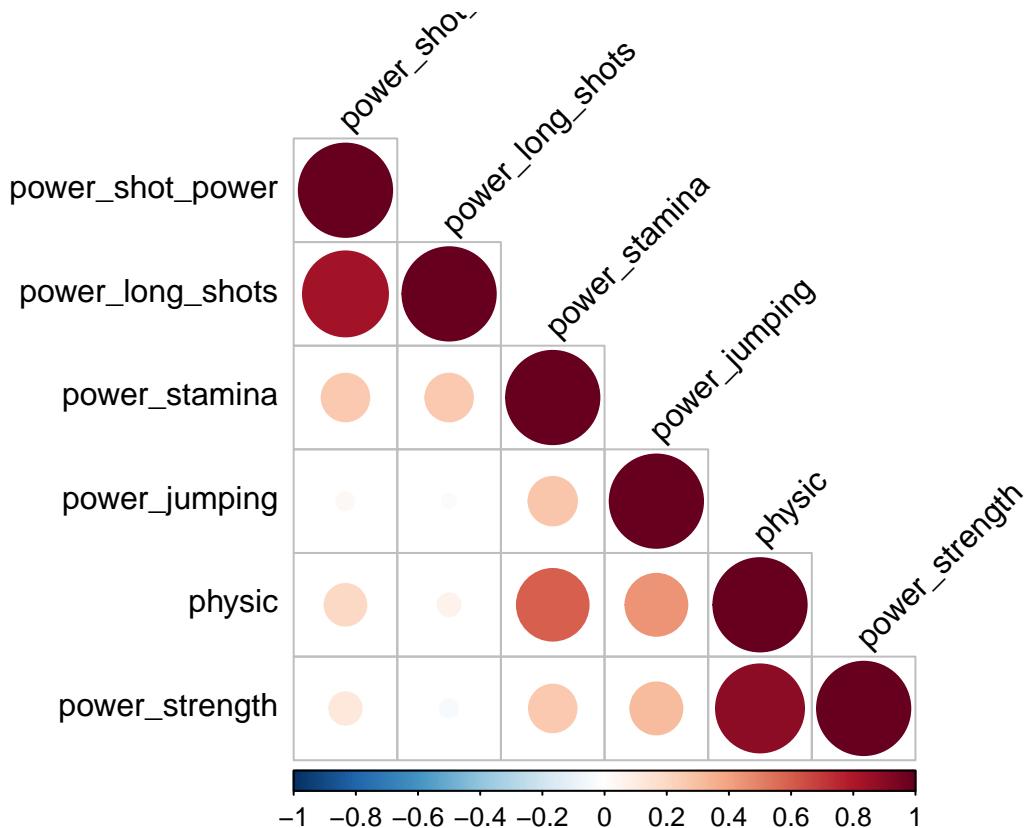
```

##                               defending_sliding_tackle defending
## physic
## defending_marking
## defending_sliding_tackle          1
## defending                      0.96      1
## defending_standing_tackle        0.97      0.98
##                               defending_standing_tackle
## physic
## defending_marking
## defending_sliding_tackle
## defending
## defending_standing_tackle          1
##
## $p
##                               physic defending_marking
## physic          0
## defending_marking 0          0
## defending_sliding_tackle 0          0
## defending          0          0
## defending_standing_tackle 0          0
##                               defending_sliding_tackle defending
## physic
## defending_marking
## defending_sliding_tackle          0
## defending                      0      0
## defending_standing_tackle        0      0
##                               defending_standing_tackle
## physic
## defending_marking
## defending_sliding_tackle
## defending
## defending_standing_tackle          0
##
## $sym
##                               physic defending_marking
## physic          1
## defending_marking .      1
## defending_sliding_tackle .      +
## defending          .      *
## defending_standing_tackle .      +
##                               defending_sliding_tackle defending
## physic
## defending_marking
## defending_sliding_tackle  1
## defending          B          1
## defending_standing_tackle B          B
##                               defending_standing_tackle
## physic
## defending_marking
## defending_sliding_tackle
## defending
## defending_standing_tackle 1
## attr(,"legend")
## [1] 0 ' ' 0.3 '.' 0.6 ',' 0.8 '+' 0.9 '*' 0.95 'B' 1

```

```
#Though physique is not highly correlated to defence stats, having a high
#physique rating out of 100 implies that the player is good at defending.
```

```
# POWER STATS:
power_stats <- fifa20%>%select(physic, power_shot_power, power_jumping,
                                 power_stamina, power_strength, power_long_shots)
source("http://www.sthda.com/upload/rquery_cormat.r")
require("corrplot")
rquery.cormat(power_stats)
```



```
## $r
##          power_shot_power power_long_shots power_stamina
## power_shot_power           1
## power_long_shots        0.83           1
## power_stamina         0.26           0.26           1
## power_jumping        0.037          -0.023          0.27
## physic                0.2            0.06          0.59
## power_strength       0.12          -0.038          0.26
##          power_jumping physic power_strength
## power_shot_power
## power_long_shots
## power_stamina
## power_jumping        1
## physic              0.44           1
```

```

## power_strength          0.31   0.89           1
##
## $p
##                  power_shot_power power_long_shots      power_stamina
## power_shot_power          0
## power_long_shots          0           0
## power_stamina            0           0           0
## power_jumping            2.3e-56    9.8e-72           0
## physic                  4.3e-152   1.5e-14           0
## power_strength           6e-110     5.1e-17 1.6999999988919e-314
##                  power_jumping physic power_strength
## power_shot_power
## power_long_shots
## power_stamina
## power_jumping          0
## physic                 0       0
## power_strength          0       0           0
##
## $sym
##                  power_shot_power power_long_shots power_stamina
## power_shot_power 1
## power_long_shots +           1
## power_stamina           1
## power_jumping
## physic
## power_strength          .
##                  power_jumping physic power_strength
## power_shot_power
## power_long_shots
## power_stamina
## power_jumping          1
## physic               .       1
## power_strength         .       +       1
## attr(),"legend")
## [1] 0 ' ' 0.3 '.' 0.6 ',' 0.8 '+' 0.9 '*' 0.95 'B' 1

```

*#long shots and sho power have high +ve correlation which makes sense
#power strength and physique have high +ve correlation too which makes sense.*

```

# INTERCEPTIONS AND DEFENDING:
cor(fifa20$defending, fifa20$mentality_interceptions, method = "pearson",
     use = "complete.obs")

```

```
## [1] 0.961099
```

Very high +ve correlation

INTERCEPTIONS FOR DEFNSIVE MIDS, WING BACKS AND CENTRE BACKS:

```

# DEFENSIVE MIDS:
mid_int_def <- fifa20%>%filter(team_position %in% c("CDM", "LDM", "RCM", "LCM", "CM"))
cor(mid_int_def$defending, mid_int_def$mentality_interceptions)

```

```

## [1] 0.9254998

# Very high positive correlation(.93)

# WING BACKS:
wb_int_def <- fifa20%>%filter(team_position %in% c("LB", "RB", "LWB", "RWB"))
cor(wb_int_def$defending, wb_int_def$mentality_interceptions)

## [1] 0.9085694

# CENTRE BACKS:
cb_int_def <- fifa20%>%filter(team_position %in% c("LCB", "RCB"))
cor(cb_int_def$defending, cb_int_def$mentality_interceptions)

## [1] 0.9202419

# Mid way between defensive mids and wingbacks

# POSITIONING AND FINISHING:
cor(fifa20$mentality_positioning, fifa20$attacking_finishing, method = "pearson",
     use = "complete.obs")

## [1] 0.895442

# Very high positive correlation.

# STANDING TACKLING AND DEFENDING

# STANDING TACKLING FOR DEFENSIVE MIDS, WING BACKS AND CENTRE BACKS:

# DEFENSIVE MIDS:
mid_sttack_def <- fifa20%>%filter(team_position %in% c("CDM", "LDM", "RCM", "LCM", "CM"))
cor(mid_sttack_def$defending, mid_sttack_def$defending_standing_tackle)

## [1] 0.9506021

# Very high positive correlation(.95)

# WING BACKS:
wb_sttack_def <- fifa20%>%filter(team_position %in% c("LB", "RB", "LWB", "RWB"))
cor(wb_sttack_def$defending, wb_sttack_def$defending_standing_tackle)

## [1] 0.9444266

# CENTRE BACKS:
cb_sttack_def <- fifa20%>%filter(team_position %in% c("LCB", "RCB"))
cor(cb_sttack_def$defending, cb_sttack_def$defending_standing_tackle)

## [1] 0.9554827

```

```

# VISION AND PASSING:
cor(fifa20$passing, fifa20$mentality_vision, method = "pearson",
    use = "complete.obs")

## [1] 0.8792501

# Very high +ve correlation.

# FINISHING AND PENALTIES:
cor(fifa20$attacking_finishing, fifa20$mentality_penalties, method = "pearson",
    use = "complete.obs")

## [1] 0.8471015

# Very high +ve correlation.

```

DIFFERENCES BETWEEN FORWARD LINE, MIDFIELD AND DEFENCE:

```

# PACE

# Wingers:
fifa20 %>% filter(team_position %in% c("RW", "LW")) %>%
  summarise(avg_pace = mean(pace)) #78.6

## # A tibble: 1 x 1
##   avg_pace
##       <dbl>
## 1     78.6

# Strikers and forwards:
fifa20 %>% filter(team_position %in% c("ST", "CF", "LS", "RS", "RF", "LF")) %>%
  summarise(avg_pace = mean(pace)) #70.4

## # A tibble: 1 x 1
##   avg_pace
##       <dbl>
## 1     70.4

# Attacking mids:
fifa20 %>% filter(team_position %in% c("CAM", "RM", "LM", "RAM", "LAM")) %>%
  summarise(avg_pace = mean(pace)) #75.9

## # A tibble: 1 x 1
##   avg_pace
##       <dbl>
## 1     75.9

```

```

# Defensive mids:
fifa20 %>% filter(team_position %in% c("RCM", "CDM", "LDM", "LCM", "RDM", "CM")) %>%
  summarise(avg_pace = mean(pace))    #64.7

## # A tibble: 1 x 1
##   avg_pace
##       <dbl>
## 1      64.7

# Wing backs:
fifa20 %>% filter(team_position %in% c("RB", "LB", "LWB", "RWB")) %>%
  summarise(avg_pace = mean(pace))    #73.7

## # A tibble: 1 x 1
##   avg_pace
##       <dbl>
## 1      73.7

# Centre backs:
fifa20 %>% filter(team_position %in% c("RCB", "LCB", "CB")) %>%
  summarise(avg_pace = mean(pace))    #57.5

## # A tibble: 1 x 1
##   avg_pace
##       <dbl>
## 1      57.5

# Wingers are the fastest and cb's are the slowest.

# SHOOTING:

# Wingers:
fifa20 %>% filter(team_position %in% c("RW", "LW")) %>%
  summarise(avg_shooting = mean(shooting))    #65.7

## # A tibble: 1 x 1
##   avg_shooting
##       <dbl>
## 1      65.7

# Strikers and forwards:
fifa20 %>% filter(team_position %in% c("ST", "CF", "LS", "RS", "RF", "LF")) %>%
  summarise(avg_shooting = mean(shooting))    #68.6

## # A tibble: 1 x 1
##   avg_shooting
##       <dbl>
## 1      68.6

```

```
#Attacking mids:  
fifa20 %>% filter(team_position %in% c("CAM", "RM", "LM", "RAM", "LAM")) %>%  
  summarise(avg_shooting = mean(shooting)) #63.1
```

```
## # A tibble: 1 x 1  
##   avg_shooting  
##       <dbl>  
## 1      63.1
```

```
#Defensive mids:  
fifa20 %>% filter(team_position %in% c("RCM", "CDM", "LDM", "LCM", "RDM", "CM")) %>%  
  summarise(avg_shooting = mean(shooting)) #57.8
```

```
## # A tibble: 1 x 1  
##   avg_shooting  
##       <dbl>  
## 1      57.8
```

```
#Wing backs:  
fifa20 %>% filter(team_position %in% c("RB", "LB", "LWB", "RWB")) %>%  
  summarise(avg_shooting = mean(shooting)) #47.8
```

```
## # A tibble: 1 x 1  
##   avg_shooting  
##       <dbl>  
## 1      47.8
```

```
#Centre backs:  
fifa20 %>% filter(team_position %in% c("RCB", "LCB", "CB")) %>%  
  summarise(avg_shooting = mean(shooting)) #38.3
```

```
## # A tibble: 1 x 1  
##   avg_shooting  
##       <dbl>  
## 1      38.3
```

```
# Strikers have the best shooting and centre backs have the worst shooting.
```

```
# PASSING
```

```
# Wingers:  
fifa20 %>% filter(team_position %in% c("RW", "LW")) %>%  
  summarise(avg_passing = mean(passing)) #63.8
```

```
## # A tibble: 1 x 1  
##   avg_passing  
##       <dbl>  
## 1      63.8
```

```

# Strikers and forwards:
fifa20 %>% filter(team_position %in% c("ST", "CF", "LS", "RS", "RF", "LF")) %>%
  summarise(avg_passing = mean(passing)) #57.6

## # A tibble: 1 x 1
##   avg_passing
##       <dbl>
## 1      57.6

# Attacking mids:
fifa20 %>% filter(team_position %in% c("CAM", "RM", "LM", "RAM", "LAM")) %>%
  summarise(avg_passing = mean(passing)) #64.9

## # A tibble: 1 x 1
##   avg_passing
##       <dbl>
## 1      64.9

# Defensive mids:
fifa20 %>% filter(team_position %in% c("RCM", "CDM", "LDM", "LCM", "RDM", "CM")) %>%
  summarise(avg_passing = mean(passing)) #65.5

## # A tibble: 1 x 1
##   avg_passing
##       <dbl>
## 1      65.5

# Wing backs:
fifa20 %>% filter(team_position %in% c("RB", "LB", "LWB", "RWB")) %>%
  summarise(avg_passing = mean(passing)) #60.6

## # A tibble: 1 x 1
##   avg_passing
##       <dbl>
## 1      60.6

# Centre backs:
fifa20 %>% filter(team_position %in% c("RCB", "LCB", "CB")) %>%
  summarise(avg_passing = mean(passing)) #50.8

## # A tibble: 1 x 1
##   avg_passing
##       <dbl>
## 1      50.8

# Defensive mids have the best passing and centre backs have the worst passing.

```

```

# DRIBBLING

# Wingers
fifa20 %>% filter(team_position %in% c("RW", "LW")) %>%
  summarise(avg_dribbling = mean(dribbling)) #72.3

```

```

## # A tibble: 1 x 1
##   avg_dribbling
##       <dbl>
## 1      72.3

# Strikers and forwards:
fifa20 %>% filter(team_position %in% c("ST", "CF", "LS", "RS", "RF", "LF")) %>%
  summarise(avg_dribbling = mean(dribbling))    #67.7

## # A tibble: 1 x 1
##   avg_dribbling
##       <dbl>
## 1      67.7

# Attacking mids:
fifa20 %>% filter(team_position %in% c("CAM", "RM", "LM", "RAM", "LAM")) %>%
  summarise(avg_dribbling = mean(dribbling))    #71.1

## # A tibble: 1 x 1
##   avg_dribbling
##       <dbl>
## 1      71.1

# Defensive mids:
fifa20 %>% filter(team_position %in% c("RCM", "CDM", "LDM", "LCM", "RDM", "CM")) %>%
  summarise(avg_dribbling = mean(dribbling))    #67.3

## # A tibble: 1 x 1
##   avg_dribbling
##       <dbl>
## 1      67.3

# Wing backs:
fifa20 %>% filter(team_position %in% c("RB", "LB", "LWB", "RWB")) %>%
  summarise(avg_dribbling = mean(dribbling))    #65.3

## # A tibble: 1 x 1
##   avg_dribbling
##       <dbl>
## 1      65.3

# Centre backs:
fifa20 %>% filter(team_position %in% c("RCB", "LCB", "CB")) %>%
  summarise(avg_dribbling = mean(dribbling))    #51.9

## # A tibble: 1 x 1
##   avg_dribbling
##       <dbl>
## 1      51.9

```

```
#Wingers have the best dribbling and centre backs have the worst dribbling.
```

```
# DEFENDING
```

```
# Wingers
```

```
fifa20 %>% filter(team_position %in% c("RW", "LW")) %>%
  summarise(avg_defending = mean(defending)) #37.0
```

```
## # A tibble: 1 x 1
##   avg_defending
##       <dbl>
## 1         37.0
```

```
# Strikers and forwards:
```

```
fifa20 %>% filter(team_position %in% c("ST", "CF", "LS", "RS", "RF", "LF")) %>%
  summarise(avg_defending = mean(defending)) #33.4
```

```
## # A tibble: 1 x 1
##   avg_defending
##       <dbl>
## 1         33.4
```

```
# Attacking mids:
```

```
fifa20 %>% filter(team_position %in% c("CAM", "RM", "LM", "RAM", "LAM")) %>%
  summarise(avg_defending = mean(defending)) #42.6
```

```
## # A tibble: 1 x 1
##   avg_defending
##       <dbl>
## 1         42.6
```

```
# Defensive mids:
```

```
fifa20 %>% filter(team_position %in% c("RCM", "CDM", "LDM", "LCM", "RDM", "CM")) %>%
  summarise(avg_defending = mean(defending)) #61.8
```

```
## # A tibble: 1 x 1
##   avg_defending
##       <dbl>
## 1         61.8
```

```
# Wing backs:
```

```
fifa20 %>% filter(team_position %in% c("RB", "LB", "LWB", "RWB")) %>%
  summarise(avg_defending = mean(defending)) #64.3
```

```
## # A tibble: 1 x 1
##   avg_defending
##       <dbl>
## 1         64.3
```

```

# Centre backs:
fifa20 %>% filter(team_position %in% c("RCB", "LCB", "CB")) %>%
  summarise(avg_defending = mean(defending)) #68.4

## # A tibble: 1 x 1
##   avg_defending
##       <dbl>
## 1         68.4

# Centre backs have the best defense and forwards/strikers have the worst defense.

# PHYSIC

# Wingers
fifa20 %>% filter(team_position %in% c("RW", "LW")) %>%
  summarise(avg_physic = mean(physic)) #61.5

## # A tibble: 1 x 1
##   avg_physic
##       <dbl>
## 1         61.5

# Strikers and forwards:
fifa20 %>% filter(team_position %in% c("ST", "CF", "LS", "RS", "RF", "LF")) %>%
  summarise(avg_physic = mean(physic)) #68.9

## # A tibble: 1 x 1
##   avg_physic
##       <dbl>
## 1         68.9

# Attacking mids:
fifa20 %>% filter(team_position %in% c("CAM", "RM", "LM", "RAM", "LAM")) %>%
  summarise(avg_physic = mean(physic)) #61.6

## # A tibble: 1 x 1
##   avg_physic
##       <dbl>
## 1         61.6

# Defensive mids:
fifa20 %>% filter(team_position %in% c("RCM", "CDM", "LDM", "LCM", "RDM", "CM")) %>%
  summarise(avg_physic = mean(physic)) #69.4

## # A tibble: 1 x 1
##   avg_physic
##       <dbl>
## 1         69.4

```

```
# Wing backs:
fifa20 %>% filter(team_position %in% c("RB", "LB", "LWB", "RWB")) %>%
  summarise(avg_physic = mean(physic)) #68.5
```

```
## # A tibble: 1 x 1
##   avg_physic
##       <dbl>
## 1      68.5
```

```
# Centre backs:
fifa20 %>% filter(team_position %in% c("RCB", "LCB", "CB")) %>%
  summarise(avg_physic = mean(physic)) #73.6
```

```
## # A tibble: 1 x 1
##   avg_physic
##       <dbl>
## 1      73.6
```

Centre backs have the best physic and wingers/attacking mids have the worst physic.

```
# Very good players who are slow:
good_slow <- fifa20 %>% filter(overall >= 85) %>%
  arrange(pace) %>%
  select(short_name, club, team_position, overall, pace)
head(good_slow, 5)
```

```
## # A tibble: 5 x 5
##   short_name     club      team_position overall  pace
##       <chr>      <chr>      <chr>      <int> <int>
## 1 Parejo        Valencia CF    RCM          86    41
## 2 Sergio Busquets FC Barcelona CDM          89    42
## 3 T. Kroos       Real Madrid   LCM          88    45
## 4 M. Hummels     Borussia Dortmund LCB          87    51
## 5 J. Rodríguez  Real Madrid   SUB          85    55
```

```
# Very fast players who are bad overall
fast_bad <- fifa20 %>% filter(overall <= 70) %>%
  arrange(desc(pace)) %>%
  select(short_name, club, team_position, overall, pace)
head(fast_bad, 5)
```

```
## # A tibble: 5 x 5
##   short_name club      team_position overall  pace
##       <chr>     <chr>      <chr>      <int> <int>
## 1 K. Nagai    FC Tokyo    LS           69    95
## 2 A. Chalá    Deportivo Toluca LWB          66    95
## 3 K. Manneh   FC Cincinnati SUB          68    94
## 4 C. Bărbuță Universitatea Craiova RW           68    94
## 5 J. Aguirre Rosario Central SUB          68    94
```

```

# Good players who are physically weak:
good_weak <- fifa20 %>% filter(overall >= 85) %>%
  arrange(physic)%>%
  select(short_name, club, team_position, overall, physic)
head(good_weak, 5)

## # A tibble: 5 x 5
##   short_name   club      team_position overall  physic
##   <chr>        <chr>      <chr>          <int>   <int>
## 1 L. Insigne Napoli       LS            87     47
## 2 D. Mertens Napoli      SUB           87     53
## 3 A. Gómez  Atalanta     CAM           85     55
## 4 R. Sterling Manchester City LW            88     57
## 5 David Silva Manchester City LCM          88     57

# Strong players who are bad overall:
strong_bad <- fifa20 %>% filter(overall <= 70) %>%
  arrange(desc(physic))%>%
  select(short_name, club, team_position, overall, physic)
head(strong_bad, 5)

## # A tibble: 5 x 5
##   short_name   club      team_position overall  physic
##   <chr>        <chr>      <chr>          <int>   <int>
## 1 M. Bostwick Lincoln City   RCB           68     88
## 2 B. Fofana   Gaz Metan Mediaș  SUB           68     88
## 3 A. Coly     Kristiansund BK   RB            65     88
## 4 Fali        Cádiz CF        SUB           70     87
## 5 J. Marquis  Portsmouth    ST            69     87

# Centre backs attack the goal during set pieces to chip in with headers

# Which centre backs are good at attacking the goal with their heads?
fifa20 %>% filter(team_position %in% c("LCB", "RCB", "CB"))%>%
  arrange(desc(attacking_heading_accuracy)) %>%
  select(short_name, club, overall, attacking_heading_accuracy) %>% top_n(1)

## Selecting by attacking_heading_accuracy

## # A tibble: 1 x 4
##   short_name   club      overall attacking_heading_accuracy
##   <chr>        <chr>      <int>                  <int>
## 1 Sergio Ramos Real Madrid     89                      92

# Sergio Ramos expected.

# Wing backs overlap with the wingers while attacking to deliver key crosses into the box

# Which wing/full backs are the best crossers?
fifa20 %>% filter(team_position %in% c("RB", "RWB", "LWB", "LB")) %>%
  arrange(desc(attacking_crossing)) %>%
  select(short_name, club, overall, attacking_crossing) %>% top_n(1)

```

```

## Selecting by attacking_crossing

## # A tibble: 1 x 4
##   short_name club           overall attacking_crossing
##   <chr>      <chr>          <int>            <int>
## 1 J. Kimmich FC Bayern München     86              91

#Joshua Kimmich expected.

# Wingers who are very good crossers:
fifa20 %>% filter(team_position %in% c("RW", "LW")) %>%
  arrange(desc(attacking_crossing)) %>%
  select(short_name, club, overall, attacking_crossing) %>% top_n(5)

## Selecting by attacking_crossing

## # A tibble: 7 x 4
##   short_name club           overall attacking_crossing
##   <chr>      <chr>          <int>            <int>
## 1 L. Messi    FC Barcelona    94              88
## 2 M. Acuña    Sporting CP     81              87
## 3 A. Di María  Paris Saint-Germain  86              86
## 4 Bernardo Silva Manchester City   87              85
## 5 Cristiano Ronaldo Juventus      93              84
## 6 D. Payet     Olympique de Marseille 81              84
## 7 P. Groß     Brighton & Hove Albion    78              84

#Target men are strikers who are tall, strong and good at heading.
# Best target men:
fifa20 %>% filter(height_cm >= 180, physic >= 75) %>%
  filter(team_position %in% c("ST", "CF", "LS", "RS", "RF", "LF", "SUB")) %>%
  arrange(desc(attacking_heading_accuracy)) %>%
  select(short_name, club, overall, attacking_heading_accuracy) %>% top_n(5)

## Selecting by attacking_heading_accuracy

## # A tibble: 5 x 4
##   short_name club           overall attacking_heading_accuracy
##   <chr>      <chr>          <int>            <int>
## 1 B. Dost    Sporting CP     82              93
## 2 L. de Jong  Sevilla FC     82              93
## 3 L. Pavletti Cagliari      78              93
## 4 O. Giroud   Chelsea       82              91
## 5 M. Smith    Millwall      68              91

# Very good players who are poor at penalties: excluding fbs, wbs, cbs, gks and subs
# since they dont generally take penalties

fifa20 %>% filter(overall >= 85) %>%
  filter(!team_position %in% c("RB", "RWB", "LWB", "LB", "GK", "LCB", "RCB", "CB", "SUB")) %>%
  arrange(mentality_penalties) %>%
  select(short_name, club, overall, mentality_penalties) %>% top_n(5)

```

```

## Selecting by mentality_penalties

## # A tibble: 5 x 4
##   short_name     club      overall mentality_penalties
##   <chr>       <chr>      <int>            <int>
## 1 Z. Ibrahimović LA Galaxy        85             89
## 2 Neymar Jr    Paris Saint-Germain    92             90
## 3 H. Kane      Tottenham Hotspur      89             90
## 4 M. Reus      Borussia Dortmund      88             90
## 5 Fabinho     Liverpool          85             91

```

Wingers who cut in and shoot to score goals:

```

# They are false wingers: right wingers with preferred foot as
# left and have good shooting and vice versa

fifa20 %>% filter(team_position=="RW", preferred_foot=="Left")%>%
  arrange(desc(shooting))%>%
  select(short_name, club, shooting, overall) %>% top_n(1)

```

Selecting by overall

```

## # A tibble: 1 x 4
##   short_name club      shooting overall
##   <chr>       <chr>      <int>    <int>
## 1 L. Messi   FC Barcelona        92      94

```

```

fifa20 %>% filter(team_position=="LW", preferred_foot=="Right")%>%
  arrange(desc(shooting))%>%
  select(short_name, club, shooting, overall) %>% top_n(1)

```

Selecting by overall

```

## # A tibble: 1 x 4
##   short_name     club      shooting overall
##   <chr>       <chr>      <int>    <int>
## 1 Cristiano Ronaldo Juventus        93      93

```

COMPARISON BETWEEN MESSI AND RONALDO: MAJOR STATS OUT OF 100

```

#BASIC STATS:
messi_ronaldo_basic <- fifa20 %>%
  filter(short_name == "L. Messi" | short_name=="Cristiano Ronaldo") %>%
  select(age, height_cm, weight_kg, overall, value_eur, wage_eur, release_clause_eur,
         international_reputation, weak_foot, skill_moves)

# 6 MAIN ATTRIBUTES:

```

```

messi_ronaldo_6main <- fifa20 %>%
  filter(short_name == "L. Messi" | short_name == "Cristiano Ronaldo") %>%
  select(pace, shooting, passing, dribbling, defending, physic)

# ATTACK ATTRIBUTES:
messi_ronaldo_attack <- fifa20 %>%
  filter(short_name == "L. Messi" | short_name == "Cristiano Ronaldo") %>%
  select(attacking_crossing, attacking_finishing, attacking_heading_accuracy,
         attacking_short_passing, attacking_volleys)

# MOVEMENT ATTRIBUTES:
messi_ronaldo_move <- fifa20 %>%
  filter(short_name == "L. Messi" | short_name == "Cristiano Ronaldo") %>%
  select(movement_acceleration, movement_sprint_speed, movement_agility,
         movement_reactions, movement_balance)

# POWER ATTRIBUTES:
messi_ronaldo_power <- fifa20 %>%
  filter(short_name == "L. Messi" | short_name == "Cristiano Ronaldo") %>%
  select(power_shot_power, power_jumping, power_stamina,
         power_strength, power_long_shots)

# DEFENSE ATTRIBUTES:
messi_ronaldo_def <- fifa20 %>%
  filter(short_name == "L. Messi" | short_name == "Cristiano Ronaldo") %>%
  select(defending_marking, defending_standing_tackle, defending_sliding_tackle)

# MENTALITY ATTRIBUTES:
messi_ronaldo_ment <- fifa20 %>%
  filter(short_name == "L. Messi" | short_name == "Cristiano Ronaldo") %>%
  select(mentality_aggression, mentality_interceptions, mentality_positioning,
         mentality_penalties, mentality_vision, mentality_composure)

# Difference in basic stats:
diff_basic <- data.frame(diff(as.matrix(messi_ronaldo_basic)))
diff_basic

##   age height_cm weight_kg overall value_eur wage_eur release_clause_eur
## 1    2        17       11      -1 -37000000  -160000          -99300000
##   international_reputation weak_foot skill_moves
## 1                      0          0           1

# Difference in 6 main attributes:
diff_6main <- data.frame(diff(as.matrix(messi_ronaldo_6main)))
diff_6main

##   pace shooting passing dribbling defending physic
## 1    3        1     -10       -7       -4      12

# Difference in attack attributes:
diff_attack <- data.frame(diff(as.matrix(messi_ronaldo_attack)))
diff_attack

```

```

##   attacking_crossing attacking_finishing attacking_heading_accuracy
## 1             -4                  -1                   19
##   attacking_short_passing attacking_volleys
## 1                 -9                  -1

# Difference in movement attributes:
diff_move <- data.frame(diff(as.matrix(messi_ronaldo_move)))
diff_move

##   movement_acceleration movement_sprint_speed movement_agility
## 1              -2                      7                  -6
##   movement_reactions movement_balance
## 1                 1                 -24

# Difference in defence attributes:
diff_def <- data.frame(diff(as.matrix(messi_ronaldo_def)))
diff_def

##   defending_marking defending_standing_tackle defending_sliding_tackle
## 1                 -5                  -5                  -2

# Difference in power attributes:
diff_power <- data.frame(diff(as.matrix(messi_ronaldo_power)))
diff_power

##   power_shot_power power_jumping power_stamina power_strength
## 1                 9                  27                  10                  10
##   power_long_shots
## 1                 -1

# Difference in mentality attributes:
diff_ment <- data.frame(diff(as.matrix(messi_ronaldo_ment)))
diff_ment

##   mentality_aggression mentality_interceptions mentality_positioning
## 1                 15                 -11                   1
##   mentality_penalties mentality_vision mentality_composure
## 1                 10                 -12                  -1

# These are the differences between messi and ronaldo.
# Who has got the best overall stats?

total_diff <- bind_cols(diff_6main, diff_attack, diff_def, diff_ment,
                        diff_move, diff_power)
total_diff

##   pace shooting passing dribbling defending physic attacking_crossing
## 1     3        1      -10      -7      -4     12      -4
##   attacking_finishing attacking_heading_accuracy attacking_short_passing
## 1                 -1                  19                  -9
##   attacking_volleys defending_marking defending_standing_tackle

```

```

## 1           -1           -5           -5
##   defending_sliding_tackle mentality_aggression mentality_interceptions
## 1           -2           15          -11
##   mentality_positioning mentality_penalties mentality_vision
## 1           1            10          -12
##   mentality_composure movement_acceleration movement_sprint_speed
## 1           -1           -2            7
##   movement_agility movement_reactions movement_balance power_shot_power
## 1           -6            1          -24            9
##   power_jumping power_stamina power_strength power_long_shots
## 1           27           10           10          -1

```

Adding values across columns:

```

sum <- 0
for (i in 1:length(total_diff))
{
  sum <- sum + total_diff[[i]]
}
print(sum)

```

```
## [1] 20
```

OVERALL RONALDO LEADS MESSI BY 20 POINTS IN NUMERIC STATS.