

Data Taming Assignment 1

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Setup

```
#Load the required packages
library(tidyverse)
library(inspectdf)
```

Q1. Loading the data

```
# Your student number goes here
ysn = 1942340
# Calculate your student number modulo 3
filenum <- ysn %% 3
filenum
```

```
## [1] 2
```

```
filename <- paste0("./data/afl_",filenum,".csv")
filename
```

```
## [1] "./data/afl_2.csv"
```

```
# Read in the data
afl<-read_csv("./data/afl_2.csv")
# Display the first 10 lines of the data
afl
```

```
## # A tibble: 18 x 24
##   Team      State Round01 Round02 Round03 Round04 Round05 Round06 Round07 Round08
##   <chr>    <chr> <chr>    <chr>    <chr>    <chr>    <chr>    <chr>    <chr>    <chr>
## 1 Collin~ VIC   away g~ home g~ away g~ home g~ home g~ away g~ home g~ away g~
## 2 St Kil~ VIC   away g~ home g~ home g~ home g~ away g~ away g~ home g~ home g~
## 3 Carlton VIC   away g~ away g~ home g~ away g~ home g~ home g~ away g~ away g~
## 4 North ~ VIC   away g~ away g~ home g~ home g~ away g~ home g~ away g~ home g~
## 5 Essend~ VIC   away g~ home g~ away g~ away g~ away g~ home g~ home g~ away g~
## 6 Melbou~ VIC   home g~ away g~ home g~ away g~ home g~ away g~ home g~ home g~
```

```
## 7 Hawtho~ bict~ away g~ home g~ away g~ away g~ home g~ away g~ away g~ away g~
## 8 Wester~ VIC   home g~ away g~ home g~ away g~ home g~ home g~ away g~ home g~
## 9 testX1 test~ testX1 testX1 testX1 testX1 testX1 testX1 testX1 testX1
## 10 Geelong VIC   home g~ away g~ away g~ home g~ away g~ home g~ home g~ away g~
## 11 Port A~ SA     home g~ away g~ home g~ away g~ home g~ away g~ away g~ home g~
## 12 Freman~ WA     home g~ away g~ home g~ away g~ home g~ away g~ away g~ home g~
## 13 Brisba~ Quee~ home g~ home g~ away g~ home g~ away g~ away g~ home g~ home g~
## 14 Sydney NSW    home g~ away g~ home g~ away g~ home g~ home g~ away g~ away g~
## 15 Carlton VIC  away g~ away g~ home g~ away g~ home g~ home g~ away g~ away g~
## 16 Richmo~ VIC    home g~ home g~ away g~ home g~ away g~ away g~ away g~ home g~
## 17 Adelai~ New ~ away g~ home g~ away g~ home g~ away g~ home g~ home g~ away g~
## 18 West C~ WA     away g~ home g~ away g~ home g~ away g~ home g~ home g~ away g~
## # i 14 more variables: Round09 <chr>, Round10 <chr>, Round11 <chr>,
## #   Round12 <chr>, Round13 <chr>, Round14 <chr>, Round15 <chr>, Round16 <chr>,
## #   Round17 <chr>, Round18 <chr>, Round19 <chr>, Round20 <chr>, Round21 <chr>,
## #   Round22 <chr>
```

Q2. The dimensions of the data set

```
#Use dim to show the numbers of rows and columns
dim(afl)
```

```
## [1] 18 24
```

The data set has 18 rows and 24 columns.

Q3. Random permutation of the rows

```
# Set the random seed
set.seed(1942340)
# Use sample_n to get the random permutation of the rows
afl1<-sample_n(afl,18,replace = FALSE)
afl1
```

```
## # A tibble: 18 x 24
##   Team   State Round01 Round02 Round03 Round04 Round05 Round06 Round07 Round08
##   <chr>   <chr> <chr>   <chr>   <chr>   <chr>   <chr>   <chr>   <chr>   <chr>
## 1 Carlton VIC   away g~ away g~ home g~ away g~ home g~ home g~ away g~ away g~
## 2 Port A~ SA     home g~ away g~ home g~ away g~ home g~ away g~ away g~ home g~
## 3 Geelong VIC   home g~ away g~ away g~ home g~ away g~ home g~ home g~ away g~
## 4 Brisba~ Quee~ home g~ home g~ away g~ home g~ away g~ away g~ home g~ home g~
## 5 Freman~ WA     home g~ away g~ home g~ away g~ home g~ away g~ away g~ home g~
## 6 testX1 test~ testX1 testX1 testX1 testX1 testX1 testX1 testX1 testX1
## 7 Collin~ VIC   away g~ home g~ away g~ home g~ home g~ away g~ home g~ away g~
## 8 West C~ WA     away g~ home g~ away g~ home g~ away g~ home g~ home g~ away g~
## 9 St Kil~ VIC   away g~ home g~ home g~ home g~ away g~ away g~ home g~ home g~
## 10 Adelai~ New ~ away g~ home g~ away g~ home g~ away g~ home g~ home g~ away g~
## 11 Carlton VIC  away g~ away g~ home g~ away g~ home g~ home g~ away g~ away g~
```

```
## 12 Richmo~ VIC    home g~ home g~ away g~ home g~ away g~ away g~ away g~ home g~
## 13 Sydney  NSW    home g~ away g~ home g~ away g~ home g~ home g~ away g~ away g~
## 14 North ~ VIC    away g~ away g~ home g~ home g~ away g~ home g~ away g~ home g~
## 15 Melbou~ VIC    home g~ away g~ home g~ away g~ home g~ away g~ home g~ home g~
## 16 Hawtho~ bict~ away g~ home g~ away g~ away g~ home g~ away g~ away g~ away g~
## 17 Wester~ VIC    home g~ away g~ home g~ away g~ home g~ home g~ away g~ home g~
## 18 Essend~ VIC    away g~ home g~ away g~ away g~ away g~ home g~ home g~ away g~
## # i 14 more variables: Round09 <chr>, Round10 <chr>, Round11 <chr>,
## #   Round12 <chr>, Round13 <chr>, Round14 <chr>, Round15 <chr>, Round16 <chr>,
## #   Round17 <chr>, Round18 <chr>, Round19 <chr>, Round20 <chr>, Round21 <chr>,
## #   Round22 <chr>
```

Q4. Adding an extra column of row numbers

```
# Use mutate to add a column at the far right of the data set
af11<-mutate(af11,RowNum=c(1:18))
# Then use relocate to move the new column to the far left
af11<-relocate(af11,"RowNum", .before = Team)
af11
```

```
## # A tibble: 18 x 25
##   RowNum Team    State Round01 Round02 Round03 Round04 Round05 Round06 Round07
##   <int> <chr>   <chr> <chr>   <chr>   <chr>   <chr>   <chr>   <chr>   <chr>
## 1     1  Carlton VIC    away g~ away g~ home g~ away g~ home g~ home g~ away g~
## 2     2  Port Ad~ SA     home g~ away g~ home g~ away g~ home g~ away g~ away g~
## 3     3  Geelong VIC    home g~ away g~ away g~ home g~ away g~ home g~ home g~
## 4     4  Brisban~ Quee~ home g~ home g~ away g~ home g~ away g~ away g~ home g~
## 5     5  Fremant~ WA     home g~ away g~ home g~ away g~ home g~ away g~ away g~
## 6     6  testX1  test~ testX1 testX1 testX1 testX1 testX1 testX1 testX1
## 7     7  Colling~ VIC    away g~ home g~ away g~ home g~ home g~ away g~ home g~
## 8     8  West Co~ WA     away g~ home g~ away g~ home g~ away g~ home g~ home g~
## 9     9  St Kilda VIC    away g~ home g~ home g~ home g~ away g~ away g~ home g~
## 10    10  Adelaide New ~ away g~ home g~ away g~ home g~ away g~ home g~ home g~
## 11    11  Carlton VIC    away g~ away g~ home g~ away g~ home g~ home g~ away g~
## 12    12  Richmond VIC    home g~ home g~ away g~ home g~ away g~ away g~ away g~
## 13    13  Sydney  NSW    home g~ away g~ home g~ away g~ home g~ home g~ away g~
## 14    14  North M~ VIC    away g~ away g~ home g~ home g~ away g~ home g~ away g~
## 15    15  Melbour~ VIC    home g~ away g~ home g~ away g~ home g~ away g~ home g~
## 16    16  Hawthorn bict~ away g~ home g~ away g~ away g~ home g~ away g~ away g~
## 17    17  Western~ VIC    home g~ away g~ home g~ away g~ home g~ home g~ away g~
## 18    18  Essendon VIC    away g~ home g~ away g~ away g~ away g~ home g~ home g~
## # i 15 more variables: Round08 <chr>, Round09 <chr>, Round10 <chr>,
## #   Round11 <chr>, Round12 <chr>, Round13 <chr>, Round14 <chr>, Round15 <chr>,
## #   Round16 <chr>, Round17 <chr>, Round18 <chr>, Round19 <chr>, Round20 <chr>,
## #   Round21 <chr>, Round22 <chr>
```

Q5 Data cleaning

Q5.(a) Remove column

```
# Use filter to extract the rows without test data.
afl1<-filter(afl1,Team!="testX1")
# Make sure the row numbers are updated
afl1<-mutate(afl1,RowNum=c(1:17))
```

Q5.(b) Fix the wrong names

```
# Change Team name "Adelaide" to "Port Adelaide"
afl1[9,]$Team<-str_replace(afl1[9,]$Team,"Adelaide","Port Adelaide")
# Change Team name "Melbourne" to "North Melbourne"
afl1[14,]$Team<-str_replace(afl1[14,]$Team,"Melbourne","North Melbourne")
# Change State "Queensld" to "QLD"
afl1[4,]$State<-str_replace(afl1[4,]$State,"Queensld","QLD")
# Change State "New South Wales" to "SA"
afl1[9,]$State<-str_replace(afl1[9,]$State,"New South Wales","SA")
# Change State "bictoria" to "VIC"
afl1[15,]$State<-str_replace(afl1[15,]$State,"bictoria","VIC")
```

Q5.(c) Sort by team names

```
# Use arrange to sort the tibble by team name
afl1<-arrange(afl1,Team)
afl1
```

```
## # A tibble: 17 x 25
##   RowNum Team    State Round01 Round02 Round03 Round04 Round05 Round06 Round07
##   <int> <chr>    <chr> <chr>    <chr>    <chr>    <chr>    <chr>    <chr>    <chr>
## 1      4 Brisban~ QLD    home g~ home g~ away g~ home g~ away g~ away g~ home g~
## 2      1 Carlton VIC    away g~ away g~ home g~ away g~ home g~ home g~ away g~
## 3     10 Carlton VIC    away g~ away g~ home g~ away g~ home g~ home g~ away g~
## 4      6 Colling~ VIC    away g~ home g~ away g~ home g~ home g~ away g~ home g~
## 5     17 Essendon VIC    away g~ home g~ away g~ away g~ away g~ home g~ home g~
## 6      5 Fremant~ WA     home g~ away g~ home g~ away g~ home g~ away g~ away g~
## 7      3 Geelong  VIC    home g~ away g~ away g~ home g~ away g~ home g~ home g~
## 8     15 Hawthorn VIC    away g~ home g~ away g~ away g~ home g~ away g~ away g~
## 9     13 North M~ VIC    away g~ away g~ home g~ home g~ away g~ home g~ away g~
## 10    14 North M~ VIC    home g~ away g~ home g~ away g~ home g~ away g~ home g~
## 11      2 Port Ad~ SA     home g~ away g~ home g~ away g~ home g~ away g~ away g~
## 12      9 Port Ad~ SA     away g~ home g~ away g~ home g~ away g~ home g~ home g~
## 13    11 Richmond VIC    home g~ home g~ away g~ home g~ away g~ away g~ away g~
## 14      8 St Kilda VIC    away g~ home g~ home g~ home g~ away g~ away g~ home g~
## 15    12 Sydney   NSW    home g~ away g~ home g~ away g~ home g~ home g~ away g~
## 16      7 West Co~ WA     away g~ home g~ away g~ home g~ away g~ home g~ home g~
## 17    16 Western~ VIC    home g~ away g~ home g~ away g~ home g~ home g~ away g~
```

```
## # i 15 more variables: Round08 <chr>, Round09 <chr>, Round10 <chr>,
## #   Round11 <chr>, Round12 <chr>, Round13 <chr>, Round14 <chr>, Round15 <chr>,
## #   Round16 <chr>, Round17 <chr>, Round18 <chr>, Round19 <chr>, Round20 <chr>,
## #   Round21 <chr>, Round22 <chr>
```

Q6. Data tidying

Q6.(a) Convert to long form

```
# Use gather to convert the data set to long form
afl1<- gather(afl1,key = "round",value = "details",'Round01':'Round22')
```

Q6.(b) Remove the characters

```
# Use sting replace to remove all the "Round" string in column round
afl1$round<-str_replace(afl1$round,"Round","")
```

Q6.(c) Create the new boolean column

```
# Judge is away in details column, and rename the result column 1 into home
afl1<-afl1 %>%
  mutate("home"=is.na(str_match(afl1$details,"away"))[,1])
```

Q6.(d) Seperate the detail column

```
# Dig the numbers by str_match and put the result into column goals and column behinds
afl1<-mutate(afl1,goals=str_match(afl1$details,"(\\d+) goals and (\\d+)")[,2])
afl1<-mutate(afl1,behinds=str_match(afl1$details,"(\\d+) goals and (\\d+)")[,3])
```

Q6.(e) Delete the column

```
# Delete the details column
afl1<-mutate(afl1,details=NULL)
```

Q6.(f) Add the new tidy row number column

```
# Add the TidyRowNum column right next to the origin RowNum
afl1<-mutate(afl1,TidyRowNum=(1:374), .after=RowNum)
afl1
```

```
## # A tibble: 374 x 8
##   RowNum TidyRowNum Team           State round home goals behinds
##   <int>    <int> <chr>           <chr> <chr> <lgl> <chr> <chr>
## 1      4          1 Brisbane Lions QLD    01    TRUE  16    18
## 2      1          2 Carlton        VIC    01    FALSE 18    12
## 3     10          3 Carlton        VIC    01    FALSE 18    12
## 4      6          4 Collingwood     VIC    01    FALSE 19    15
## 5     17          5 Essendon        VIC    01    FALSE 13    16
## 6      5          6 Fremantle       WA     01    TRUE  17    16
## 7      3          7 Geelong         VIC    01    TRUE  19    11
## 8     15          8 Hawthorn        VIC    01    FALSE 17    15
## 9     13          9 North Melbourne VIC    01    FALSE 12    10
## 10    14         10 North Melbourne VIC    01    TRUE   8    13
## # i 364 more rows
```

Q7. Identifying data types

- Row Num: Categorical Ordinal. The numbers represent the teams and round status is home or away. For example number 1 indicates team Carlton's away games.
- Tidy Row Num: Categorical Ordinal. The tidy row numbers are integers indicate the order of this data set.
- Team: Categorical Nominal. They are the names of teams in AFL.
- State: Categorical Nominal.. They are the names of the states.
- Round: Categorical Nominal. The characters represents the rounds in the match season, which is in the range of 01 to 22.
- home: Categorical Nominal. There are only two categories in this variables, TRUE means the game is home and FALSE means away.
- goals: Quantitative Discrete. The numbers are integers represent the goals' points in each game and they can be really huge theoretically.
- behinds: Quantitative Discrete. The numbers are integers represent the points in behinds and they can be really huge theoretically.

Q8. Taming the data

```
# Change the blank spaces in Team into "_"
afl1$Team<-str_replace(afl1$Team," ","_")
# Change the number characters into integers
afl1$round<-as.integer(afl1$round)
afl1$goals<-as.integer(afl1$goals)
afl1$behinds<-as.integer(afl1$behinds)
# Check if there is any NA
inspect_na(afl1)
```

```
## # A tibble: 8 x 3
##   col_name    cnt pcnt
```

```
##   <chr>      <int> <dbl>
## 1 RowNum      0      0
## 2 TidyRowNum  0      0
## 3 Team        0      0
## 4 State       0      0
## 5 round       0      0
## 6 home        0      0
## 7 goals       0      0
## 8 behinds     0      0
```

```
afl1
```

```
## # A tibble: 374 x 8
##   RowNum TidyRowNum Team      State round home goals behinds
##   <int>    <int> <chr>    <chr> <int> <lgl> <int>    <int>
## 1      4         1 Brisbane_Lions QLD      1 TRUE     16      18
## 2      1         2 Carlton      VIC      1 FALSE    18      12
## 3     10         3 Carlton      VIC      1 FALSE    18      12
## 4      6         4 Collingwood   VIC      1 FALSE    19      15
## 5     17         5 Essendon      VIC      1 FALSE    13      16
## 6      5         6 Fremantle     WA       1 TRUE     17      16
## 7      3         7 Geelong       VIC      1 TRUE     19      11
## 8     15         8 Hawthorn      VIC      1 FALSE    17      15
## 9     13         9 North_Melbourne VIC      1 FALSE    12      10
## 10    14        10 North_Melbourne VIC      1 TRUE      8      13
## # i 364 more rows
```

Q9. Set the new data set

```
set.seed(1942340)
afl2<-sample_n(afl1,200)
afl2
```

```
## # A tibble: 200 x 8
##   RowNum TidyRowNum Team      State round home goals behinds
##   <int>    <int> <chr>    <chr> <int> <lgl> <int>    <int>
## 1     12         15 Sydney      NSW      1 TRUE     13      10
## 2     14        299 North_Melbourne VIC     18 FALSE    11       8
## 3     16        170 Western_Bulldogs VIC     10 FALSE    14       6
## 4      9        301 Port_Adelaide SA      18 FALSE    11      14
## 5      1        172 Carlton      VIC     11 TRUE     15      11
## 6      6        174 Collingwood   VIC     11 TRUE     17      11
## 7     12        338 Sydney      NSW     20 FALSE    14      12
## 8     13        281 North_Melbourne VIC     17 TRUE     18      11
## 9      3         75 Geelong       VIC      5 FALSE     9      14
## 10     4        120 Brisbane_Lions QLD      8 TRUE     10      14
## # i 190 more rows
```

Q10. Caculation for data analyzing assistance

Q10.(a) Insert two new columns

```
# Calculate the score and accuracy and insert the new columns
afl2<-mutate(afl2,score=goals*6+behinds)
afl2<-mutate(afl2,accuracy=goals/(goals+behinds))
```

The score variable is Quantitative Discrete while the accuracy variable is Quantitative Continuous. The score's type is incorrect, it should be integers and the accuracy's is correct.

```
# Convert the score variable to integers
afl2$score<-as.integer(afl2$score)
afl2
```

```
## # A tibble: 200 x 10
##   RowNum TidyRowNum Team      State round home goals behinds score accuracy
##   <int>      <int> <chr>      <chr> <int> <lgl> <int>   <int> <int>   <dbl>
## 1     12         15 Sydney      NSW      1  TRUE    13      10     88    0.565
## 2     14        299 North_Melbo~ VIC     18 FALSE    11       8     74    0.579
## 3     16        170 Western_Bul~ VIC     10 FALSE    14       6     90     0.7
## 4      9        301 Port_Adelai~ SA      18 FALSE    11      14     80    0.44
## 5      1        172 Carlton    VIC     11 TRUE     15      11    101    0.577
## 6      6         174 Collingwood VIC     11 TRUE     17      11    113    0.607
## 7     12        338 Sydney      NSW     20 FALSE    14      12     96    0.538
## 8     13        281 North_Melbo~ VIC     17 TRUE     18      11    119    0.621
## 9      3         75 Geelong      VIC      5 FALSE     9      14     68    0.391
## 10    4        120 Brisbane_Li~ QLD      8 TRUE     10      14     74    0.417
## # i 190 more rows
```

Q10.(b) Summarize the data

```
# Use summarise and group_by to summarize the data needed
summarise(group_by(afl2,Team),mean_score=mean(score))
```

```
## # A tibble: 14 x 2
##   Team      mean_score
##   <chr>         <dbl>
## 1 Brisbane_Lions      81.4
## 2 Carlton           92.6
## 3 Collingwood        107.
## 4 Essendon           90.8
## 5 Fremantle          104.
## 6 Geelong            114.
## 7 Hawthorn           98.4
## 8 North_Melbourne     82.3
## 9 Port_Adelaide       82.9
## 10 Richmond           75.3
## 11 St_Kilda           87.7
```



```
## 12 Sydney                89.3
## 13 West_Coast            82.6
## 14 Western_Bulldogs      88.4
```

```
summarise(group_by(afl2,Team),mean_accuracy=mean(accuracy))
```

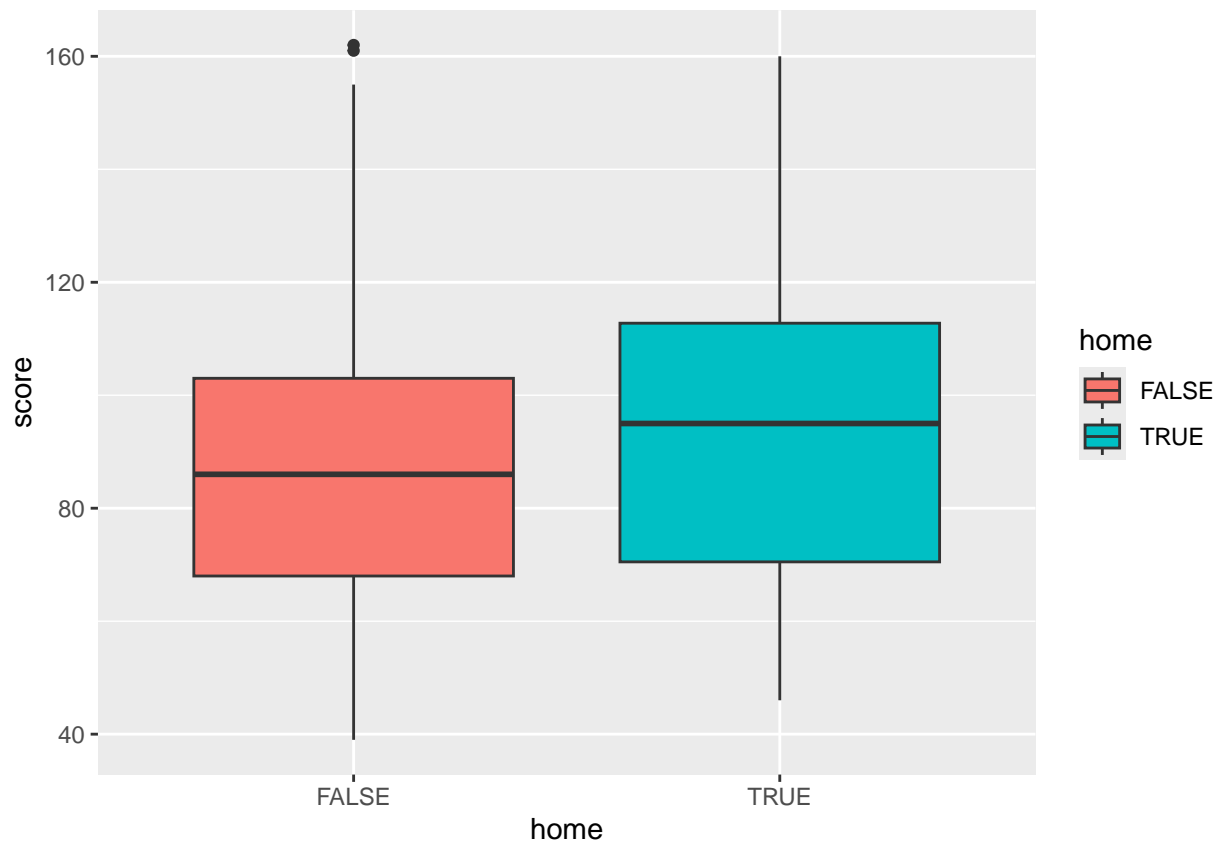
```
## # A tibble: 14 x 2
##   Team                mean_accuracy
##   <chr>                <dbl>
## 1 Brisbane_Lions      0.487
## 2 Carlton            0.564
## 3 Collingwood         0.477
## 4 Essendon            0.535
## 5 Fremantle           0.567
## 6 Geelong              0.565
## 7 Hawthorn            0.566
## 8 North_Melbourne     0.532
## 9 Port_Adelaide       0.498
## 10 Richmond           0.522
## 11 St_Kilda            0.529
## 12 Sydney              0.515
## 13 West_Coast          0.491
## 14 Western_Bulldogs    0.538
```

- i. Fremantle 104.50000
- ii. Richmond 75.33333
- iii. Fremantle 0.5674431
- iv. Collingwood 0.4771722

Q11. Box plots

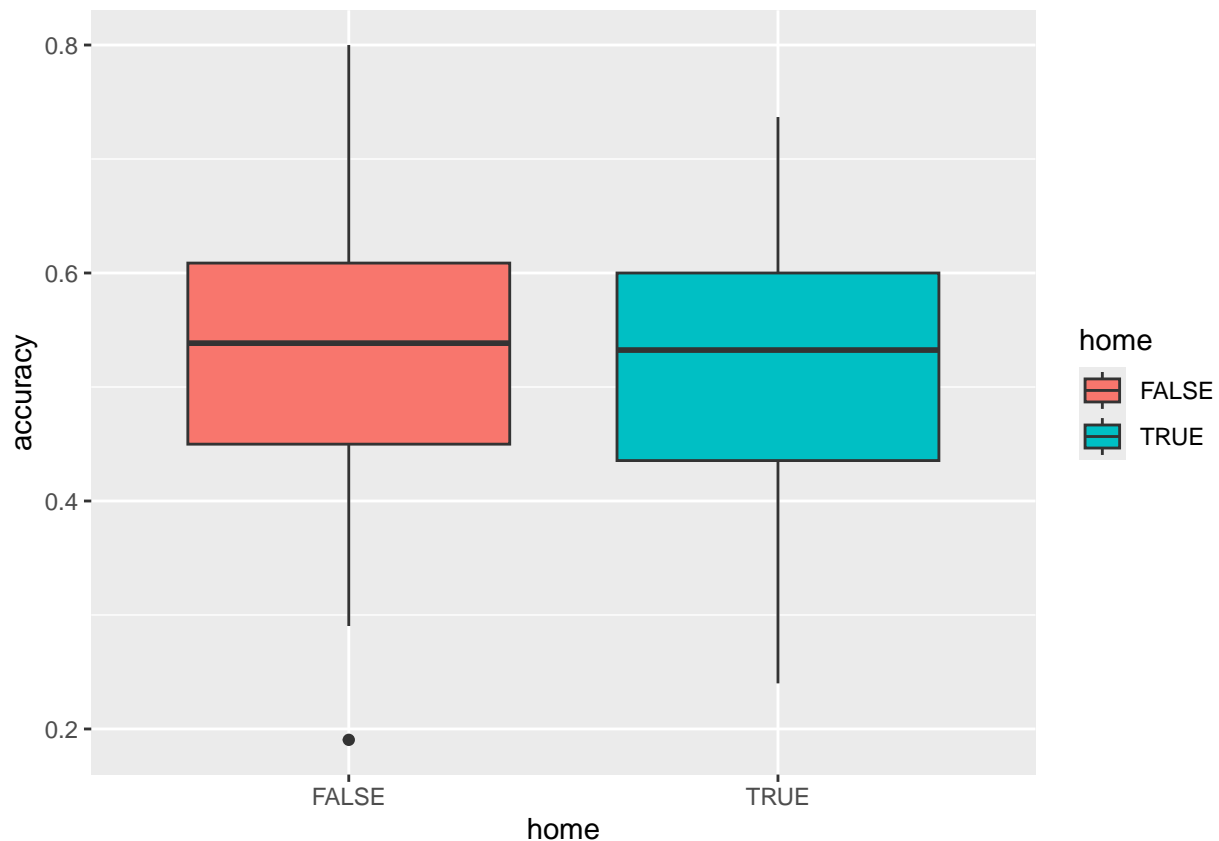
Q11.(a) Box plot of score and home

```
# Plot the data of home and score
ggplot(afl2,aes(home,score,fill=home))+
  geom_boxplot()
```



Q11.(b) Box plot of accuracy and home

```
# Plot the data of home and accuracy
ggplot(af12,aes(home,accuracy,fill=home))+
  geom_boxplot()
```



The home games have better probabilities to win more scores but the accuracy between home and away is very close. With the graph we can see the average line of home score is higher But when it comes to the accuracy graph their position is much closer. So from the average score lines we can see it's more likely to win in a home game.

Q12. Data screening

```
# Screen the data by home is home or away
afl_home<-filter(afl2,home==TRUE)
afl_away<-filter(afl2,home==FALSE)
afl_home
```

```
## # A tibble: 98 x 10
##   RowNum TidyRowNum Team      State round home goals behinds score accuracy
##   <int>    <int> <chr>    <chr> <int> <lgl> <int>    <int> <int>    <dbl>
## 1     12        15 Sydney    NSW     1 TRUE     13      10     88     0.565
## 2      1       172 Carlton  VIC    11 TRUE     15      11    101     0.577
## 3      6       174 Collingwood VIC    11 TRUE     17      11    113     0.607
## 4     13       281 North_Melbo~ VIC    17 TRUE     18      11    119     0.621
## 5      4       120 Brisbane_Li~ QLD     8 TRUE     10      14     74     0.417
## 6      7       186 West_Coast  WA     11 TRUE     14      14     98     0.5
## 7     17       345 Essendon    VIC    21 TRUE     10       8     68     0.556
## 8     15       212 Hawthorn    VIC    13 TRUE     14      18    102     0.438
## 9     12       253 Sydney     NSW    15 TRUE     12      13     85     0.48
```

```
## 10      4      290 Brisbane_Li~ QLD      18 TRUE      9      10      64      0.474
## # i 88 more rows
```

```
afl_away
```

```
## # A tibble: 102 x 10
##   RowNum TidyRowNum Team      State round home goals behinds score accuracy
##   <int>      <int> <chr>      <chr> <int> <lgl> <int>      <int> <int>      <dbl>
## 1      14      299 North_Melbo~ VIC      18 FALSE      11         8      74      0.579
## 2      16      170 Western_Bul~ VIC      10 FALSE      14         6      90      0.7
## 3       9      301 Port_Adelai~ SA       18 FALSE      11        14      80      0.44
## 4      12      338 Sydney      NSW      20 FALSE      14        12      96      0.538
## 5       3       75 Geelong      VIC       5 FALSE       9        14      68      0.391
## 6      13      230 North_Melbo~ VIC      14 FALSE       9         9      63      0.5
## 7       4       86 Brisbane_Li~ QLD       6 FALSE      13         9      87      0.591
## 8       6      310 Collingwood VIC      19 FALSE      14        23     107      0.378
## 9       2       62 Port_Adelai~ SA        4 FALSE      10         4      64      0.714
## 10      13      366 North_Melbo~ VIC      22 FALSE      17        11     113      0.607
## # i 92 more rows
```

Q13. Data summarizing separatly

```
# Summarize the data sets
inspect_num(afl_home)
```

```
## # A tibble: 7 x 10
##   col_name      min      q1 median      mean      q3      max      sd pcnt_na hist
##   <chr>      <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <named >
## 1 RowNum      1      6     10     9.58    13     17     4.77      0 <tibble>
## 2 TidyRowNum  1    89.5  172.   179.    271    370    109.      0 <tibble>
## 3 round       1      6     11    11.0    16     22     6.38      0 <tibble>
## 4 goals       6     10     14    13.6    16     24     4.44      0 <tibble>
## 5 behinds     4     10     12    12.4    15     23     3.84      0 <tibble>
## 6 score      46    70.5    95    94.1   113.   160    27.6      0 <tibble>
## 7 accuracy   0.24  0.435  0.532  0.522  0.6    0.737  0.105      0 <tibble>
```

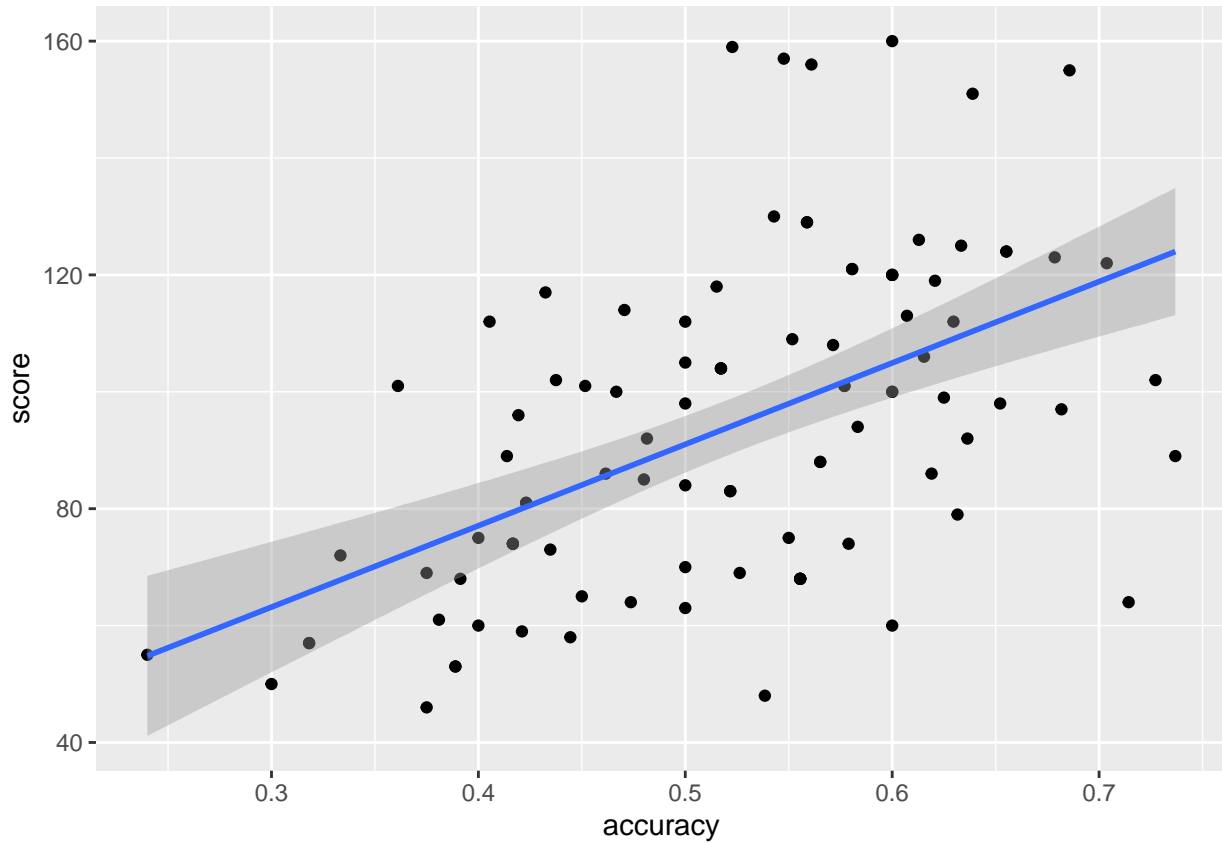
```
inspect_num(afl_away)
```

```
## # A tibble: 7 x 10
##   col_name      min      q1 median      mean      q3      max      sd pcnt_na hist
##   <chr>      <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <named >
## 1 RowNum      1     4.25    9.5    8.98    13     17     5.13      0 <tibble>
## 2 TidyRowN~  4     83    176.   181.   284.   373   112.      0 <tibble>
## 3 round       1     5.25    11    11.2    17     22     6.59      0 <tibble>
## 4 goals       4     10     12    12.6    15     25     4.23      0 <tibble>
## 5 behinds     3      8     10    11.1    14     23     4.39      0 <tibble>
## 6 score     39     68     86    87.0   103    162    26.7      0 <tibble>
## 7 accuracy   0.190  0.450  0.538  0.537  0.609  0.8    0.114      0 <tibble>
```

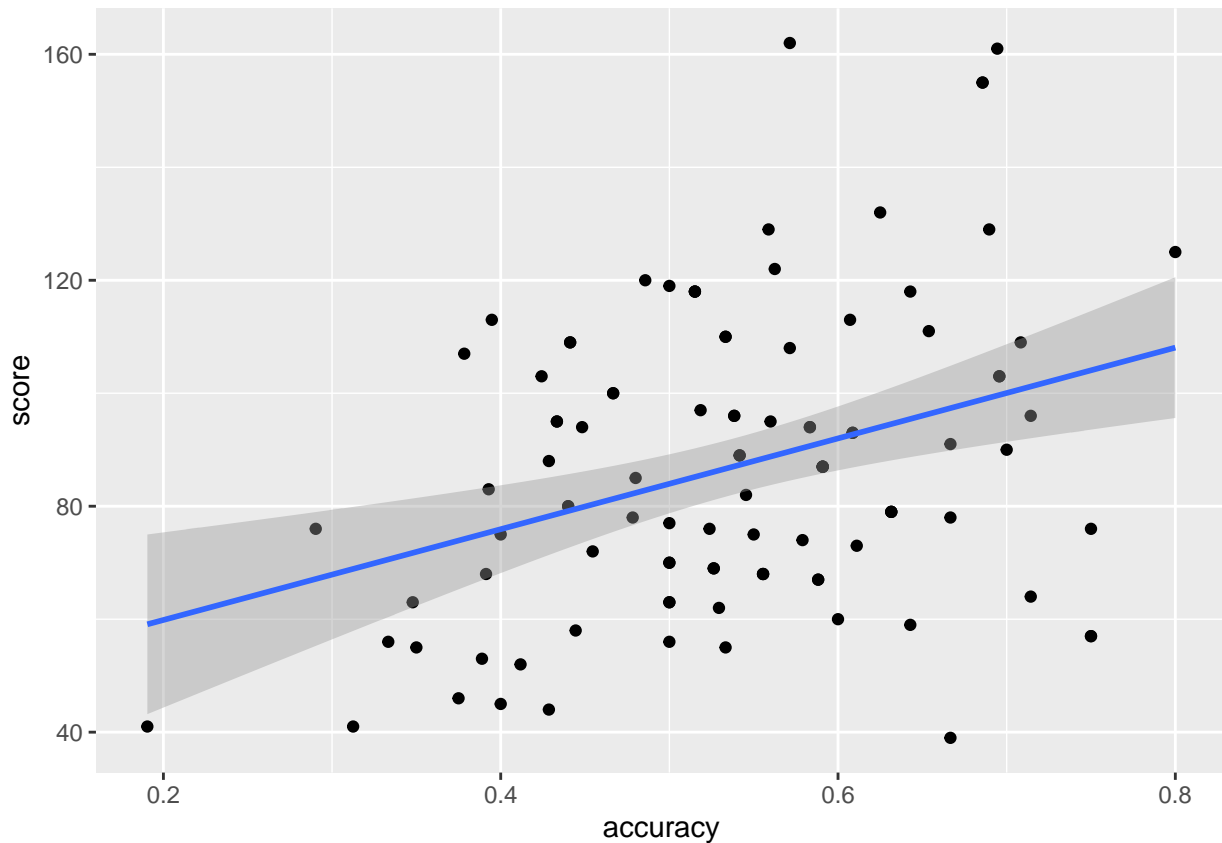
The average score of home games is 94.0510204 while the average accuracy is 0.5218593. Also the average score of away games 86.9803922 while the average accuracy is 86.9803922. The data does support the claim.

Q14. Scatter plots

```
# Plot the scatter plot of accuracy and score in afl_home  
ggplot(afl_home, aes(x = accuracy, y = score)) +  
  geom_point() +  
  geom_smooth(method="lm")
```



```
# Plot the scatter plot of accuracy and score in afl_away  
ggplot(afl_away, aes(x = accuracy, y = score)) +  
  geom_point() +  
  geom_smooth(method="lm")
```



The calculation of score is to multiple goals numbers with 6 and behinds just 1 time and the accuracy represent the proportion of goals, which infers that with higher accuracy come to higher goals. And the higher goals change into higher scores. So I choose the accuracy to be the independent variable and the score to be predictor.

Q15. Relationship between accuracy and score

As the scatter plots shown, when the accuracy data becomes higher, there are higher possibilities to win a high score. And it is similar for both home and away teams.