EECS349 Should I FF - Data Cleaning

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Load in librarys

```
library(tidyverse)
```

```
## ── Attaching packages ─────────────────────────────────────── tidyverse 1.
2.1 ──
```

```
## ✔ ggplot2 2.2.1     ✔ purrr   0.2.4
## ✔ tibble  1.3.4     ✔ dplyr   0.7.4
## ✔ tidyr   0.7.2     ✔ stringr 1.2.0
## ✔ readr   1.1.1     ✔ forcats 0.2.0
```

```
## ── Conflicts ────────────────────────────────────────── tidyverse_conflict
s() ──
## ✖ dplyr::filter() masks stats::filter()
## ✖ dplyr::lag()    masks stats::lag()
```

```
library(readr)
library(dplyr)
```

Read in datasets

```
champs <- read_csv("~/Desktop/Spring2018/349/league/champs.csv")
```

```
## Parsed with column specification:
## cols(
##   name = col_character(),
##   id = col_integer()
## )
```

```
matches <- read_csv("~/Desktop/Spring2018/349/league/matches.csv")
```

```
## Parsed with column specification:
## cols(
##   id = col_integer(),
##   gameid = col_double(),
##   platformid = col_character(),
##   queueid = col_integer(),
##   seasonid = col_integer(),
##   duration = col_integer(),
##   creation = col_double(),
##   version = col_character()
## )
```

```
participants <- read_csv("~/Desktop/Spring2018/349/league/participants.csv")
```

```
## Parsed with column specification:
## cols(
##   id = col_integer(),
##   matchid = col_integer(),
##   player = col_integer(),
##   championid = col_integer(),
##   ss1 = col_integer(),
##   ss2 = col_integer(),
##   role = col_character(),
##   position = col_character()
## )
```

```
stats1 <- read_csv("~/Desktop/Spring2018/349/league/stats1.csv")
```

```
## Parsed with column specification:
## cols(
##   .default = col_integer()
## )
```

```
## See spec(...) for full column specifications.
```

```
stats2 <- read_csv("~/Desktop/Spring2018/349/league/stats2.csv")
```

```
## Parsed with column specification:
## cols(
##   .default = col_integer()
## )
## See spec(...) for full column specifications.
```

```
## Warning in rbind(names(probs), probs_f): number of columns of result is not
## a multiple of vector length (arg 1)
```

```
## Warning: 415340 parsing failures.
## row # A tibble: 5 x 5 col      row         col   expected actual expected    <int>
    <chr>      <chr>  <chr> actual 1 419179 wardsbought an integer  "\\N" file 2 419180
wardsbought an integer  "\\N" row 3 419181 wardsbought an integer  "\\N" col 4 419182 wa
rdsbought an integer  "\\N" expected 5 419183 wardsbought an integer  "\\N" actual # ...
with 1 more variables: file <chr>
## ... ................. ... ..................................... ........
.......................................... ...... ......................................
.... ..................................... ... ......................................
... ..................................... ........
.......................................... ...... ......................................
## See problems(...) for more details.
```

```
teamstats <- read_csv("~/Desktop/Spring2018/349/league/teamstats.csv")
```

```
## Parsed with column specification:
## cols(
##   matchid = col_integer(),
##   teamid = col_integer(),
##   firstblood = col_integer(),
##   firsttower = col_integer(),
##   firstinhib = col_integer(),
##   firstbaron = col_integer(),
##   firstdragon = col_integer(),
##   firstharry = col_integer(),
##   towerkills = col_integer(),
##   inhibkills = col_integer(),
##   baronkills = col_integer(),
##   dragonkills = col_integer(),
##   harrykills = col_integer()
## )
```

Clean data and join subsets

```
names(champs) <- c("champion_name", "champion_id")

matches <- matches %>%
  select(id, seasonid)

names(matches) <- c("match_id", "season_id")

participants <- participants %>%
  select(id, matchid, player, championid)

names(participants) <- c("player_id", "match_id", "player_number", "champion_id")

stats1 <- stats1 %>%
  select(id, win, pinksbought, wardsbought, wardsplaced, firstblood)

names(stats1) <- c("player_id", "win", "pinksbought", "wardsbought", "wardsplaced", "fir
stblood")

stats2 <- stats2 %>%
  select(id, win, pinksbought, wardsbought, wardsplaced,firstblood)

# if wardsbought is NA, set value to 0
stats2$wardsbought[is.na(stats2$wardsbought)] <- 0

names(stats2) <- c("player_id", "win", "pinksbought", "wardsbought", "wardsplaced", "fir
stblood")

teamstats <- teamstats %>%
  select(matchid, teamid, firstblood, firsttower, firstinhib, firstbaron, firstdragon, f
irstharry)

names(teamstats) <- c("match_id", "team_id", "firstblood", "firsttower", "firstinhib",
"firstbaron", "firstdragon", "firstharry")

stats <- rbind(stats1, stats2)
```

Getting rid of games with missing values or players

```
player_info <- inner_join(stats, participants)
```

```
## Joining, by = "player_id"
```

```
# get rid of matches that dont have player_id in stats/participants
matches <- subset(matches, match_id != 127703 & match_id !=127715 & match_id != 127721)

#poison has matchid's of games we DONT want
poison <- filter(count(participants, match_id), n!=10)

#get rid of matches that are in poison
safe_matches <- matches[!matches$match_id%in%poison$match_id,]

safe_players_info <- player_info[!player_info$match_id%in%poison$match_id,]

safe_players_info <- subset(safe_players_info, match_id != 127703 & match_id !=127715 &
 match_id != 127721)

safe_players_info <- inner_join(safe_players_info, safe_matches)
```

```
## Joining, by = "match_id"
```

```
safe_players_info <- inner_join(safe_players_info, champs)
```

```
## Joining, by = "champion_id"
```

```
test <- safe_players_info %>%
  group_by(match_id, win) %>%
  mutate(first_blood_team = sum(firstblood)) %>%
  ungroup(match_id, win)

test <- select(test, -champion_id)

names(teamstats) <- c("match_id", "team_id", "first_blood_team", "firsttower", "firstinh
ib", "firstbaron", "firstdragon", "firstharry")

test <- test %>%
  mutate(teamid = ifelse(player_number <= 5, 100, 200))
```

Turn champions to bag of words like attributes

```
copyof <- test
copyof["hasAhri"] <- 0
copyof["hasAkali"] <- 0
copyof["hasAlistar"] <- 0
copyof["hasAmumu"] <- 0
copyof["hasAnivia"] <- 0
copyof["hasAnnie"] <- 0
copyof["hasAshe"] <- 0
copyof["hasAurelionSol"] <- 0
copyof["hasAzir"] <- 0
copyof["hasBard"] <- 0
copyof["hasBlitzcrank"] <- 0
copyof["hasBrand"] <- 0
copyof["hasBraum"] <- 0
copyof["hasCaitlyn"] <- 0
copyof["hasCamille"] <- 0
copyof["hasCassiopeia"] <- 0
copyof["hasChoGath"] <- 0
copyof["hasCorki"] <- 0
copyof["hasDarius"] <- 0
copyof["hasDiana"] <- 0
copyof["hasDraven"] <- 0
copyof["hasDrMundo"] <- 0
copyof["hasEkko"] <- 0
copyof["hasElise"] <- 0
copyof["hasEvelynn"] <- 0
copyof["hasEzreal"] <- 0
copyof["hasFiddlesticks"] <- 0
copyof["hasFiora"] <- 0
copyof["hasFizz"] <- 0
copyof["hasGalio"] <- 0
copyof["hasGangplank"] <- 0
copyof["hasGaren"] <- 0
copyof["hasGnar"] <- 0
copyof["hasGragas"] <- 0
copyof["hasGraves"] <- 0
copyof["hasHecarim"] <- 0
copyof["hasHeimerdinger"] <- 0
copyof["hasIllaoi"] <- 0
copyof["hasIrelia"] <- 0
copyof["hasIvern"] <- 0
copyof["hasJanna"] <- 0
copyof["hasJarvanIV"] <- 0
copyof["hasJax"] <- 0
copyof["hasJayce"] <- 0
copyof["hasJhin"] <- 0
copyof["hasJinx"] <- 0
copyof["hasKalista"] <- 0
copyof["hasKarma"] <- 0
copyof["hasKarthus"] <- 0
copyof["hasKassadin"] <- 0
copyof["hasKatarina"] <- 0
copyof["hasKayle"] <- 0
```

```
copyof["hasKennen"] <- 0
copyof["hasKhaZix"] <- 0
copyof["hasKindred"] <- 0
copyof["hasKled"] <- 0
copyof["hasKogMaw"] <- 0
copyof["hasLeBlanc"] <- 0
copyof["hasLeeSin"] <- 0
copyof["hasLeona"] <- 0
copyof["hasLissandra"] <- 0
copyof["hasLucian"] <- 0
copyof["hasLulu"] <- 0
copyof["hasLux"] <- 0
copyof["hasMalphite"] <- 0
copyof["hasMalzahar"] <- 0
copyof["hasMaokai"] <- 0
copyof["hasMasterYi"] <- 0
copyof["hasMissFortune"] <- 0
copyof["hasMordekaiser"] <- 0
copyof["hasMorgana"] <- 0
copyof["hasNami"] <- 0
copyof["hasNasus"] <- 0
copyof["hasNautilus"] <- 0
copyof["hasNidalee"] <- 0
copyof["hasNocturne"] <- 0
copyof["hasNunu"] <- 0
copyof["hasOlaf"] <- 0
copyof["hasOrianna"] <- 0
copyof["hasPantheon"] <- 0
copyof["hasPoppy"] <- 0
copyof["hasQuinn"] <- 0
copyof["hasRakan"] <- 0
copyof["hasRammus"] <- 0
copyof["hasRekSai"] <- 0
copyof["hasRenekton"] <- 0
copyof["hasRengar"] <- 0
copyof["hasRiven"] <- 0
copyof["hasRumble"] <- 0
copyof["hasRyze"] <- 0
copyof["hasSejuani"] <- 0
copyof["hasShaco"] <- 0
copyof["hasShen"] <- 0
copyof["hasShyvana"] <- 0
copyof["hasSinged"] <- 0
copyof["hasSion"] <- 0
copyof["hasSivir"] <- 0
copyof["hasSkarner"] <- 0
copyof["hasSona"] <- 0
copyof["hasSoraka"] <- 0
copyof["hasSwain"] <- 0
copyof["hasSyndra"] <- 0
copyof["hasTahmKench"] <- 0
copyof["hasTaliyah"] <- 0
copyof["hasTalon"] <- 0
copyof["hasTaric"] <- 0
```

```
copyof["hasTeemo"] <- 0
copyof["hasThresh"] <- 0
copyof["hasTristana"] <- 0
copyof["hasTrundle"] <- 0
copyof["hasTryndamere"] <- 0
copyof["hasTwistedFate"] <- 0
copyof["hasTwitch"] <- 0
copyof["hasUdyr"] <- 0
copyof["hasUrgot"] <- 0
copyof["hasVarus"] <- 0
copyof["hasVayne"] <- 0
copyof["hasVeigar"] <- 0
copyof["hasVelKoz"] <- 0
copyof["hasVi"] <- 0
copyof["hasViktor"] <- 0
copyof["hasVladimir"] <- 0
copyof["hasVolibear"] <- 0
copyof["hasWarwick"] <- 0
copyof["hasWukong"] <- 0
copyof["hasXayah"] <- 0
copyof["hasXerath"] <- 0
copyof["hasXinZhao"] <- 0
copyof["hasYasuo"] <- 0
copyof["hasYorick"] <- 0
copyof["hasZac"] <- 0
copyof["hasZed"] <- 0
copyof["hasZiggs"] <- 0
copyof["hasZilean"] <- 0
copyof["hasZyra"] <- 0

copyof$hasAhri <- ifelse(copyof$champion_name == "Ahri", 1, 0)
copyof$hasAkali <- ifelse(copyof$champion_name == "Akali", 1, 0)
copyof$hasAlistar <- ifelse(copyof$champion_name == "Alistar", 1, 0)
copyof$hasAmumu <- ifelse(copyof$champion_name == "Amumu", 1, 0)
copyof$hasAnivia <- ifelse(copyof$champion_name == "Anivia", 1, 0)
copyof$hasAnnie <- ifelse(copyof$champion_name == "Annie", 1, 0)
copyof$hasAshe <- ifelse(copyof$champion_name == "Ashe", 1, 0)
copyof$hasAurelionSol <- ifelse(copyof$champion_name == "AurelionSol", 1, 0)
copyof$hasAzir <- ifelse(copyof$champion_name == "Azir", 1, 0)
copyof$hasBard <- ifelse(copyof$champion_name == "Bard", 1, 0)
copyof$hasBlitzcrank <- ifelse(copyof$champion_name == "Blitzcrank", 1, 0)
copyof$hasBrand <- ifelse(copyof$champion_name == "Brand", 1, 0)
copyof$hasBraum <- ifelse(copyof$champion_name == "Braum", 1, 0)
copyof$hasCaitlyn <- ifelse(copyof$champion_name == "Caitlyn", 1, 0)
copyof$hasCamille <- ifelse(copyof$champion_name == "Camille", 1, 0)
copyof$hasCassiopeia <- ifelse(copyof$champion_name == "Cassiopeia", 1, 0)
copyof$hasChoGath <- ifelse(copyof$champion_name == "ChoGath", 1, 0)
copyof$hasCorki <- ifelse(copyof$champion_name == "Corki", 1, 0)
copyof$hasDarius <- ifelse(copyof$champion_name == "Darius", 1, 0)
copyof$hasDiana <- ifelse(copyof$champion_name == "Diana", 1, 0)
copyof$hasDraven <- ifelse(copyof$champion_name == "Draven", 1, 0)
copyof$hasDrMundo <- ifelse(copyof$champion_name == "DrMundo", 1, 0)
copyof$hasEkko <- ifelse(copyof$champion_name == "Ekko", 1, 0)
copyof$hasElise <- ifelse(copyof$champion_name == "Elise", 1, 0)
```

```
copyof$hasEvelynn <- ifelse(copyof$champion_name == "Evelynn", 1, 0)
copyof$hasEzreal <- ifelse(copyof$champion_name == "Ezreal", 1, 0)
copyof$hasFiddlesticks <- ifelse(copyof$champion_name == "Fiddlesticks", 1, 0)
copyof$hasFiora <- ifelse(copyof$champion_name == "Fiora", 1, 0)
copyof$hasFizz <- ifelse(copyof$champion_name == "Fizz", 1, 0)
copyof$hasGalio <- ifelse(copyof$champion_name == "Galio", 1, 0)
copyof$hasGangplank <- ifelse(copyof$champion_name == "Gangplank", 1, 0)
copyof$hasGaren <- ifelse(copyof$champion_name == "Garen", 1, 0)
copyof$hasGnar <- ifelse(copyof$champion_name == "Gnar", 1, 0)
copyof$hasGragas <- ifelse(copyof$champion_name == "Gragas", 1, 0)
copyof$hasGraves <- ifelse(copyof$champion_name == "Graves", 1, 0)
copyof$hasHecarim <- ifelse(copyof$champion_name == "Hecarim", 1, 0)
copyof$hasHeimerdinger <- ifelse(copyof$champion_name == "Heimerdinger", 1, 0)
copyof$hasIllaoi <- ifelse(copyof$champion_name == "Illaoi", 1, 0)
copyof$hasIrelia <- ifelse(copyof$champion_name == "Irelia", 1, 0)
copyof$hasIvern <- ifelse(copyof$champion_name == "Ivern", 1, 0)
copyof$hasJanna <- ifelse(copyof$champion_name == "Janna", 1, 0)
copyof$hasJarvanIV <- ifelse(copyof$champion_name == "Jarvan IV", 1, 0)
copyof$hasJax <- ifelse(copyof$champion_name == "Jax", 1, 0)
copyof$hasJayce <- ifelse(copyof$champion_name == "Jayce", 1, 0)
copyof$hasJhin <- ifelse(copyof$champion_name == "Jhin", 1, 0)
copyof$hasJinx <- ifelse(copyof$champion_name == "Jinx", 1, 0)
copyof$hasKalista <- ifelse(copyof$champion_name == "Kalista", 1, 0)
copyof$hasKarma <- ifelse(copyof$champion_name == "Karma", 1, 0)
copyof$hasKarthus <- ifelse(copyof$champion_name == "Karthus", 1, 0)
copyof$hasKassadin <- ifelse(copyof$champion_name == "Kassadin", 1, 0)
copyof$hasKatarina <- ifelse(copyof$champion_name == "Katarina", 1, 0)
copyof$hasKayle <- ifelse(copyof$champion_name == "Kayle", 1, 0)
copyof$hasKennen <- ifelse(copyof$champion_name == "Kennen", 1, 0)
copyof$hasKhaZix <- ifelse(copyof$champion_name == "KhaZix", 1, 0)
copyof$hasKindred <- ifelse(copyof$champion_name == "Kindred", 1, 0)
copyof$hasKled <- ifelse(copyof$champion_name == "Kled", 1, 0)
copyof$hasKogMaw <- ifelse(copyof$champion_name == "KogMaw", 1, 0)
copyof$hasLeBlanc <- ifelse(copyof$champion_name == "LeBlanc", 1, 0)
copyof$hasLeeSin <- ifelse(copyof$champion_name == "LeeSin", 1, 0)
copyof$hasLeona <- ifelse(copyof$champion_name == "Leona", 1, 0)
copyof$hasLissandra <- ifelse(copyof$champion_name == "Lissandra", 1, 0)
copyof$hasLucian <- ifelse(copyof$champion_name == "Lucian", 1, 0)
copyof$hasLulu <- ifelse(copyof$champion_name == "Lulu", 1, 0)
copyof$hasLux <- ifelse(copyof$champion_name == "Lux", 1, 0)
copyof$hasMalphite <- ifelse(copyof$champion_name == "Malphite", 1, 0)
copyof$hasMalzahar <- ifelse(copyof$champion_name == "Malzahar", 1, 0)
copyof$hasMaokai <- ifelse(copyof$champion_name == "Maokai", 1, 0)
copyof$hasMasterYi <- ifelse(copyof$champion_name == "Master Yi", 1, 0)
copyof$hasMissFortune <- ifelse(copyof$champion_name == "Miss Fortune", 1, 0)
copyof$hasMordekaiser <- ifelse(copyof$champion_name == "Mordekaiser", 1, 0)
copyof$hasMorgana <- ifelse(copyof$champion_name == "Morgana", 1, 0)
copyof$hasNami <- ifelse(copyof$champion_name == "Nami", 1, 0)
copyof$hasNasus <- ifelse(copyof$champion_name == "Nasus", 1, 0)
copyof$hasNautilus <- ifelse(copyof$champion_name == "Nautilus", 1, 0)
copyof$hasNidalee <- ifelse(copyof$champion_name == "Nidalee", 1, 0)
copyof$hasNocturne <- ifelse(copyof$champion_name == "Nocturne", 1, 0)
copyof$hasNunu <- ifelse(copyof$champion_name == "Nunu", 1, 0)
copyof$hasOlaf <- ifelse(copyof$champion_name == "Olaf", 1, 0)
```

```
copyof$hasOrianna <- ifelse(copyof$champion_name == "Orianna", 1, 0)
copyof$hasPantheon <- ifelse(copyof$champion_name == "Pantheon", 1, 0)
copyof$hasPoppy <- ifelse(copyof$champion_name == "Poppy", 1, 0)
copyof$hasQuinn <- ifelse(copyof$champion_name == "Quinn", 1, 0)
copyof$hasRakan <- ifelse(copyof$champion_name == "Rakan", 1, 0)
copyof$hasRammus <- ifelse(copyof$champion_name == "Rammus", 1, 0)
copyof$hasRekSai <- ifelse(copyof$champion_name == "RekSai", 1, 0)
copyof$hasRenekton <- ifelse(copyof$champion_name == "Renekton", 1, 0)
copyof$hasRengar <- ifelse(copyof$champion_name == "Rengar", 1, 0)
copyof$hasRiven <- ifelse(copyof$champion_name == "Riven", 1, 0)
copyof$hasRumble <- ifelse(copyof$champion_name == "Rumble", 1, 0)
copyof$hasRyze <- ifelse(copyof$champion_name == "Ryze", 1, 0)
copyof$hasSejuani <- ifelse(copyof$champion_name == "Sejuani", 1, 0)
copyof$hasShaco <- ifelse(copyof$champion_name == "Shaco", 1, 0)
copyof$hasShen <- ifelse(copyof$champion_name == "Shen", 1, 0)
copyof$hasShyvana <- ifelse(copyof$champion_name == "Shyvana", 1, 0)
copyof$hasSinged <- ifelse(copyof$champion_name == "Singed", 1, 0)
copyof$hasSion <- ifelse(copyof$champion_name == "Sion", 1, 0)
copyof$hasSivir <- ifelse(copyof$champion_name == "Sivir", 1, 0)
copyof$hasSkarner <- ifelse(copyof$champion_name == "Skarner", 1, 0)
copyof$hasSona <- ifelse(copyof$champion_name == "Sona", 1, 0)
copyof$hasSoraka <- ifelse(copyof$champion_name == "Soraka", 1, 0)
copyof$hasSwain <- ifelse(copyof$champion_name == "Swain", 1, 0)
copyof$hasSyndra <- ifelse(copyof$champion_name == "Syndra", 1, 0)
copyof$hasTahmKench <- ifelse(copyof$champion_name == "Tahm Kench", 1, 0)
copyof$hasTaliyah <- ifelse(copyof$champion_name == "Taliyah", 1, 0)
copyof$hasTalon <- ifelse(copyof$champion_name == "Talon", 1, 0)
copyof$hasTaric <- ifelse(copyof$champion_name == "Taric", 1, 0)
copyof$hasTeemo <- ifelse(copyof$champion_name == "Teemo", 1, 0)
copyof$hasThresh <- ifelse(copyof$champion_name == "Thresh", 1, 0)
copyof$hasTristana <- ifelse(copyof$champion_name == "Tristana", 1, 0)
copyof$hasTrundle <- ifelse(copyof$champion_name == "Trundle", 1, 0)
copyof$hasTryndamere <- ifelse(copyof$champion_name == "Tryndamere", 1, 0)
copyof$hasTwistedFate <- ifelse(copyof$champion_name == "Twisted Fate", 1, 0)
copyof$hasTwitch <- ifelse(copyof$champion_name == "Twitch", 1, 0)
copyof$hasUdyr <- ifelse(copyof$champion_name == "Udyr", 1, 0)
copyof$hasUrgot <- ifelse(copyof$champion_name == "Urgot", 1, 0)
copyof$hasVarus <- ifelse(copyof$champion_name == "Varus", 1, 0)
copyof$hasVayne <- ifelse(copyof$champion_name == "Vayne", 1, 0)
copyof$hasVeigar <- ifelse(copyof$champion_name == "Veigar", 1, 0)
copyof$hasVelKoz <- ifelse(copyof$champion_name == "VelKoz", 1, 0)
copyof$hasVi <- ifelse(copyof$champion_name == "Vi", 1, 0)
copyof$hasViktor <- ifelse(copyof$champion_name == "Viktor", 1, 0)
copyof$hasVladimir <- ifelse(copyof$champion_name == "Vladimir", 1, 0)
copyof$hasVolibear <- ifelse(copyof$champion_name == "Volibear", 1, 0)
copyof$hasWarwick <- ifelse(copyof$champion_name == "Warwick", 1, 0)
copyof$hasWukong <- ifelse(copyof$champion_name == "Wukong", 1, 0)
copyof$hasXayah <- ifelse(copyof$champion_name == "Xayah", 1, 0)
copyof$hasXerath <- ifelse(copyof$champion_name == "Xerath", 1, 0)
copyof$hasXinZhao <- ifelse(copyof$champion_name == "Xin Zhao", 1, 0)
copyof$hasYasuo <- ifelse(copyof$champion_name == "Yasuo", 1, 0)
copyof$hasYorick <- ifelse(copyof$champion_name == "Yorick", 1, 0)
copyof$hasZac <- ifelse(copyof$champion_name == "Zac", 1, 0)
copyof$hasZed <- ifelse(copyof$champion_name == "Zed", 1, 0)
```

```
copyof$hasZiggs <- ifelse(copyof$champion_name == "Ziggs", 1, 0)
copyof$hasZilean <- ifelse(copyof$champion_name == "Zilean", 1, 0)
copyof$hasZyra <- ifelse(copyof$champion_name == "Zyra", 1, 0)

copyof <- copyof %>%
  group_by(match_id, teamid) %>%
  summarise(
    season = mean(season_id),
    win = mean(win),
    totalwards = sum(wardsplaced),
    hasAhri = sum(hasAhri),
    hasAkali = sum(hasAkali),
    hasAlistar = sum(hasAlistar),
    hasAmumu = sum(hasAmumu),
    hasAnivia = sum(hasAnivia),
    hasAnnie = sum(hasAnnie),
    hasAshe = sum(hasAshe),
    hasAurelionSol = sum(hasAurelionSol),
    hasAzir = sum(hasAzir),
    hasBard = sum(hasBard),
    hasBlitzcrank = sum(hasBlitzcrank),
    hasBrand = sum(hasBrand),
    hasBraum = sum(hasBraum),
    hasCaitlyn = sum(hasCaitlyn),
    hasCamille = sum(hasCamille),
    hasCassiopeia = sum(hasCassiopeia),
    hasChoGath = sum(hasChoGath),
    hasCorki = sum(hasCorki),
    hasDarius = sum(hasDarius),
    hasDiana = sum(hasDiana),
    hasDraven = sum(hasDraven),
    hasDrMundo = sum(hasDrMundo),
    hasEkko = sum(hasEkko),
    hasElise = sum(hasElise),
    hasEvelynn = sum(hasEvelynn),
    hasEzreal = sum(hasEzreal),
    hasFiddlesticks = sum(hasFiddlesticks),
    hasFiora = sum(hasFiora),
    hasFizz = sum(hasFizz),
    hasGalio = sum(hasGalio),
    hasGangplank = sum(hasGangplank),
    hasGaren = sum(hasGaren),
    hasGnar = sum(hasGnar),
    hasGragas = sum(hasGragas),
    hasGraves = sum(hasGraves),
    hasHecarim = sum(hasHecarim),
    hasHeimerdinger = sum(hasHeimerdinger),
    hasIllaoi = sum(hasIllaoi),
    hasIrelia = sum(hasIrelia),
    hasIvern = sum(hasIvern),
    hasJanna = sum(hasJanna),
    hasJarvanIV = sum(hasJarvanIV),
    hasJax = sum(hasJax),
    hasJayce = sum(hasJayce),
```

```
    hasJhin = sum(hasJhin),
    hasJinx = sum(hasJinx),
    hasKalista = sum(hasKalista),
    hasKarma = sum(hasKarma),
    hasKarthus = sum(hasKarthus),
    hasKassadin = sum(hasKassadin),
    hasKatarina = sum(hasKatarina),
    hasKayle = sum(hasKayle),
    hasKennen = sum(hasKennen),
    hasKhaZix = sum(hasKhaZix),
    hasKindred = sum(hasKindred),
    hasKled = sum(hasKled),
    hasKogMaw = sum(hasKogMaw),
    hasLeBlanc = sum(hasLeBlanc),
    hasLeeSin = sum(hasLeeSin),
    hasLeona = sum(hasLeona),
    hasLissandra = sum(hasLissandra),
    hasLucian = sum(hasLucian),
    hasLulu = sum(hasLulu),
    hasLux = sum(hasLux),
    hasMalphite = sum(hasMalphite),
    hasMalzahar = sum(hasMalzahar),
    hasMaokai = sum(hasMaokai),
    hasMasterYi = sum(hasMasterYi),
    hasMissFortune = sum(hasMissFortune),
    hasMordekaiser = sum(hasMordekaiser),
    hasMorgana = sum(hasMorgana),
    hasNami = sum(hasNami),
    hasNasus = sum(hasNasus),
    hasNautilus = sum(hasNautilus),
    hasNidalee = sum(hasNidalee),
    hasNocturne = sum(hasNocturne),
    hasNunu = sum(hasNunu),
    hasOlaf = sum(hasOlaf),
    hasOrianna = sum(hasOrianna),
    hasPantheon = sum(hasPantheon),
    hasPoppy = sum(hasPoppy),
    hasQuinn = sum(hasQuinn),
    hasRakan = sum(hasRakan),
    hasRammus = sum(hasRammus),
    hasRekSai = sum(hasRekSai),
    hasRenekton = sum(hasRenekton),
    hasRengar = sum(hasRengar),
    hasRiven = sum(hasRiven),
    hasRumble = sum(hasRumble),
    hasRyze = sum(hasRyze),
    hasSejuani = sum(hasSejuani),
    hasShaco = sum(hasShaco),
    hasShen = sum(hasShen),
    hasShyvana = sum(hasShyvana),
    hasSinged = sum(hasSinged),
    hasSion = sum(hasSion),
    hasSivir = sum(hasSivir),
    hasSkarner = sum(hasSkarner),
```

```
    hasSona = sum(hasSona),
    hasSoraka = sum(hasSoraka),
    hasSwain = sum(hasSwain),
    hasSyndra = sum(hasSyndra),
    hasTahmKench = sum(hasTahmKench),
    hasTaliyah = sum(hasTaliyah),
    hasTalon = sum(hasTalon),
    hasTaric = sum(hasTaric),
    hasTeemo = sum(hasTeemo),
    hasThresh = sum(hasThresh),
    hasTristana = sum(hasTristana),
    hasTrundle = sum(hasTrundle),
    hasTryndamere = sum(hasTryndamere),
    hasTwistedFate = sum(hasTwistedFate),
    hasTwitch = sum(hasTwitch),
    hasUdyr = sum(hasUdyr),
    hasUrgot = sum(hasUrgot),
    hasVarus = sum(hasVarus),
    hasVayne = sum(hasVayne),
    hasVeigar = sum(hasVeigar),
    hasVelKoz = sum(hasVelKoz),
    hasVi = sum(hasVi),
    hasViktor = sum(hasViktor),
    hasVladimir = sum(hasVladimir),
    hasVolibear = sum(hasVolibear),
    hasWarwick = sum(hasWarwick),
    hasWukong = sum(hasWukong),
    hasXayah = sum(hasXayah),
    hasXerath = sum(hasXerath),
    hasXinZhao = sum(hasXinZhao),
    hasYasuo = sum(hasYasuo),
    hasYorick = sum(hasYorick),
    hasZac = sum(hasZac),
    hasZed = sum(hasZed),
    hasZiggs = sum(hasZiggs),
    hasZilean = sum(hasZilean),
    hasZyra = sum(hasZyra))
```

Join team and individual data

```
fulldata <- inner_join(copyof, teamstats, by = c("match_id", "teamid" = "team_id"))

#fulldata1 is a copy of fulldata with win on the leftmost column
fulldata1 <- fulldata[,c(which(colnames(fulldata)=="win"),which(colnames(fulldata)!="wi
n"))]
```

Write csv file

```
write.csv(tellmewhy, file = "season3.csv")
```

Sample of final data before seasons split

```
head(fulldata1, 20)
```

```
## # A tibble: 20 x 146
## # Groups:   match_id [10]
##      win match_id teamid season totalwards hasAhri hasAkali hasAlistar
##    <dbl>    <int>  <dbl>  <dbl>      <int>   <dbl>    <dbl>      <dbl>
##  1     0       10    100      8         53       0        0          0
##  2     1       10    200      8         54       1        0          0
##  3     0       11    100      8         52       0        0          0
##  4     1       11    200      8         50       0        0          0
##  5     0       12    100      8         44       0        0          0
##  6     1       12    200      8         41       1        0          0
##  7     0       13    100      8         43       0        0          0
##  8     1       13    200      8         45       0        0          0
##  9     0       14    100      8         53       0        0          0
## 10     1       14    200      8         69       0        0          0
## 11     1       15    100      8         44       1        0          0
## 12     0       15    200      8         50       0        0          0
## 13     0       16    100      8         36       0        0          0
## 14     1       16    200      8         49       0        0          0
## 15     0       17    100      8         48       0        0          0
## 16     1       17    200      8         50       0        0          0
## 17     0       18    100      8         42       0        0          0
## 18     1       18    200      8         49       0        0          0
## 19     1       19    100      8         42       0        1          0
## 20     0       19    200      8         54       0        0          0
## # ... with 138 more variables: hasAmumu <dbl>, hasAnivia <dbl>,
## #   hasAnnie <dbl>, hasAshe <dbl>, hasAurelionSol <dbl>, hasAzir <dbl>,
## #   hasBard <dbl>, hasBlitzcrank <dbl>, hasBrand <dbl>, hasBraum <dbl>,
## #   hasCaitlyn <dbl>, hasCamille <dbl>, hasCassiopeia <dbl>,
## #   hasChoGath <dbl>, hasCorki <dbl>, hasDarius <dbl>, hasDiana <dbl>,
## #   hasDraven <dbl>, hasDrMundo <dbl>, hasEkko <dbl>, hasElise <dbl>,
## #   hasEvelynn <dbl>, hasEzreal <dbl>, hasFiddlesticks <dbl>,
## #   hasFiora <dbl>, hasFizz <dbl>, hasGalio <dbl>, hasGangplank <dbl>,
## #   hasGaren <dbl>, hasGnar <dbl>, hasGragas <dbl>, hasGraves <dbl>,
## #   hasHecarim <dbl>, hasHeimerdinger <dbl>, hasIllaoi <dbl>,
## #   hasIrelia <dbl>, hasIvern <dbl>, hasJanna <dbl>, hasJarvanIV <dbl>,
## #   hasJax <dbl>, hasJayce <dbl>, hasJhin <dbl>, hasJinx <dbl>,
## #   hasKalista <dbl>, hasKarma <dbl>, hasKarthus <dbl>, hasKassadin <dbl>,
## #   hasKatarina <dbl>, hasKayle <dbl>, hasKennen <dbl>, hasKhaZix <dbl>,
## #   hasKindred <dbl>, hasKled <dbl>, hasKogMaw <dbl>, hasLeBlanc <dbl>,
## #   hasLeeSin <dbl>, hasLeona <dbl>, hasLissandra <dbl>, hasLucian <dbl>,
## #   hasLulu <dbl>, hasLux <dbl>, hasMalphite <dbl>, hasMalzahar <dbl>,
## #   hasMaokai <dbl>, hasMasterYi <dbl>, hasMissFortune <dbl>,
## #   hasMordekaiser <dbl>, hasMorgana <dbl>, hasNami <dbl>, hasNasus <dbl>,
## #   hasNautilus <dbl>, hasNidalee <dbl>, hasNocturne <dbl>, hasNunu <dbl>,
## #   hasOlaf <dbl>, hasOrianna <dbl>, hasPantheon <dbl>, hasPoppy <dbl>,
## #   hasQuinn <dbl>, hasRakan <dbl>, hasRammus <dbl>, hasRekSai <dbl>,
## #   hasRenekton <dbl>, hasRengar <dbl>, hasRiven <dbl>, hasRumble <dbl>,
## #   hasRyze <dbl>, hasSejuani <dbl>, hasShaco <dbl>, hasShen <dbl>,
## #   hasShyvana <dbl>, hasSinged <dbl>, hasSion <dbl>, hasSivir <dbl>,
## #   hasSkarner <dbl>, hasSona <dbl>, hasSoraka <dbl>, hasSwain <dbl>,
## #   hasSyndra <dbl>, hasTahmKench <dbl>, ...
```