League of Legends Region and Rank Champion Analysis

Nicholas Grovich

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What is League of Legends?

League of Legends is a multiplayer online battle areana (MOBA) made by Riot Games in 2009. It is a team-based strategy game where two teams of five champions face off to destroy the other's base. Each player gets to choose from over 150 champions to battle their way to victory. Due to League of Legends being one of the most popular and competitive games worldwide, there is a lot of data and information to analyze.

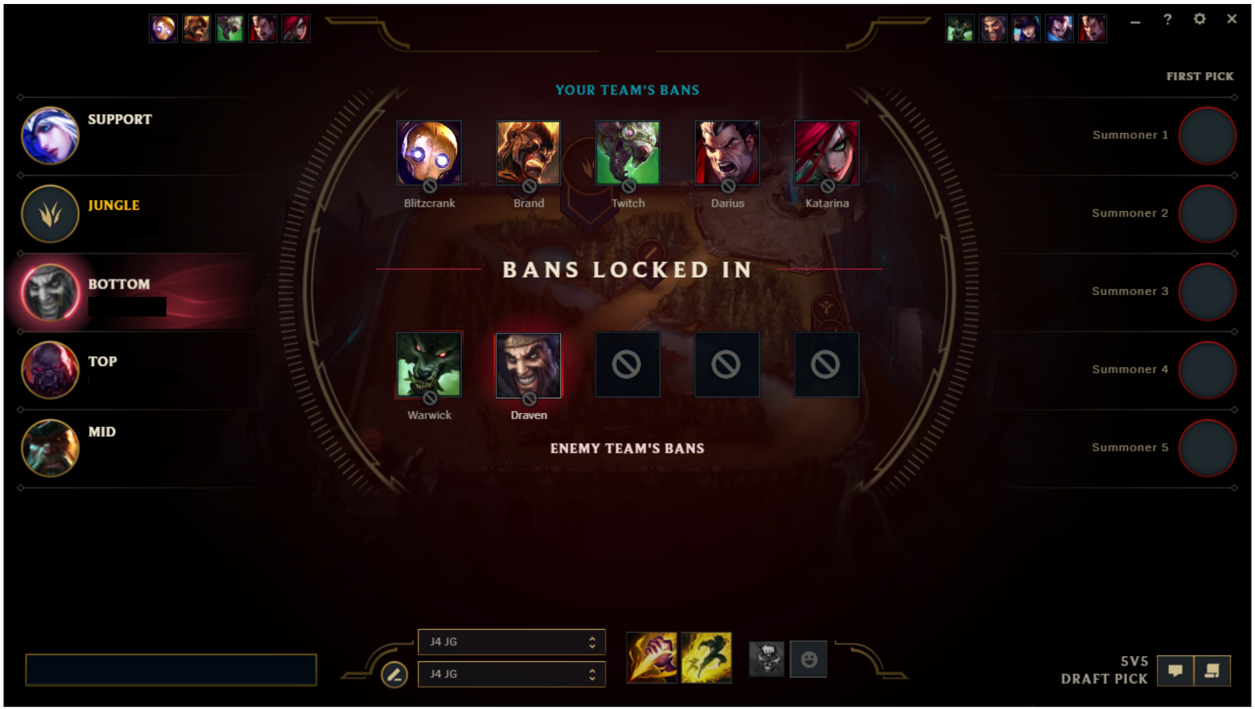
Why Look Into League Data?

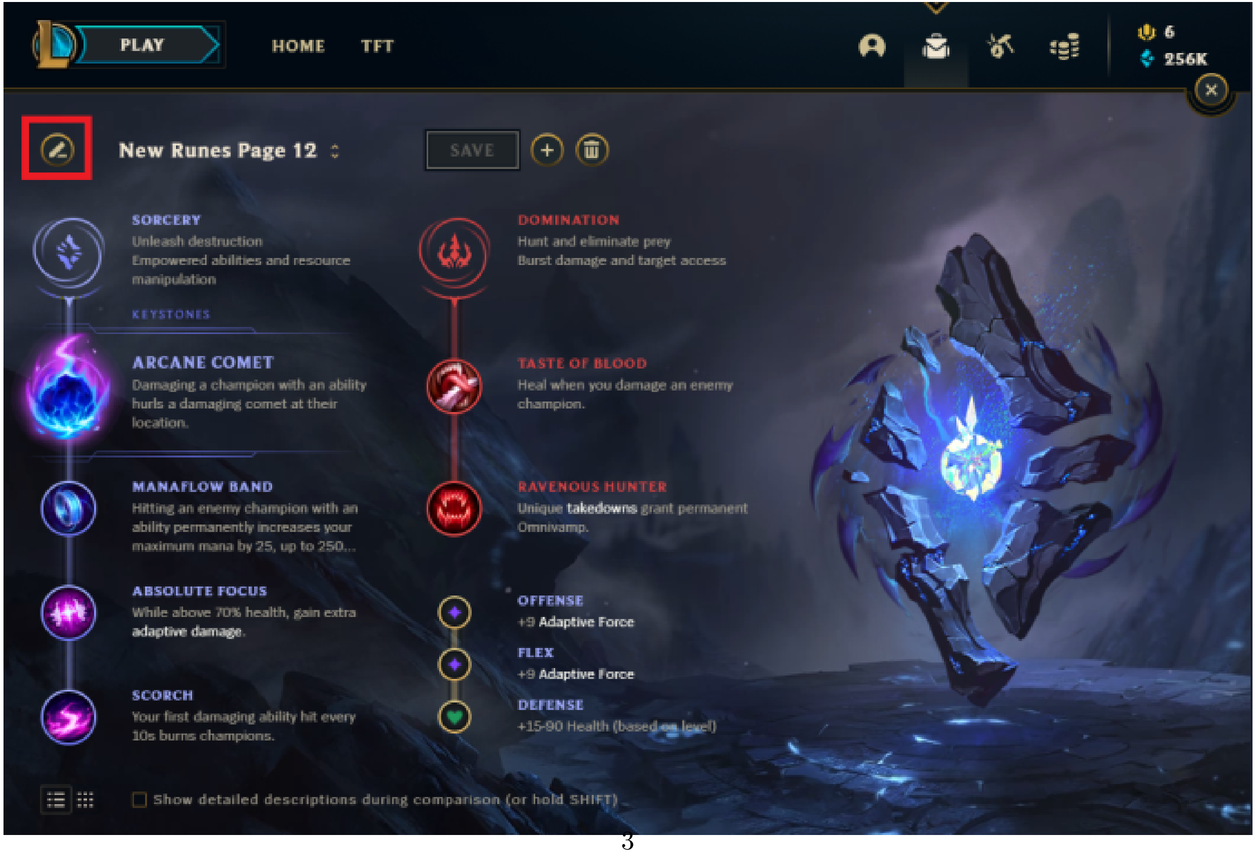
League of Legends matches are never going to follow a strict pattern due to the nature of the game. The game allows the players to make many decisions that can effect the outcome of the game. Because of this, one game will never be the same as another. By analysing data from the ranked players in League of Legends, we can delve into what makes certain champions strong in a solo queue environment. We can view how different regions play the game, what champions thrive in each region, and draw a conclusion on the overall playstyle of a region based on their picks.

Background Information

To first understand on how to read the data, one has to understand the ranking system in League of Legends. League of Legends lets players play ranked games once they have hit level 30 on their account. This allows them to have ample time to understand the game and then they can play in the competitve game mode. Each account starts off unranked and after 10 games the account is placed into a rank based on their performance. The ranks are as following: Iron, Bronze, Silver, Gold, Platinum, Diamond, Master, Grandmaster, and Challenger. The highest a new ranked account can place after 10 games is Platinum 4 and then if they wish to get higher ranked they must play more and continue winning. The top 3 highest ranks have a 24 hours refresh timer that constantly adds and kicks people out based on their performance. This allows for players to remain competitive and see how close others are from taking their spot on the ladder.

Now since the ranks have been discussed, one must understand how League of Legends games work. League of Legends games put five players against another five players. In ranked games, each player on your and the enemy team is allowed to ban one champion. This allows for each person to ban certain matchups that they do not want to face. In this loading screen, the player is allowed to pick 2 summoner spells and runes that will have a large impact on how they play the game. After a short delay, the game then will start. Below is an example of the picking and banning phase of the game and an example of a rune page.





New Runes Page 12

SORCERY
Unleash destruction
Empowered abilities and resource manipulation

KEYSTONES

ARCANE COMET
Damaging a champion with an ability hurls a damaging comet at their location.

MANAFLOW BAND
Hitting an enemy champion with an ability permanently increases your maximum mana by 25, up to 250...

ABSOLUTE FOCUS
While above 70% health, gain extra adaptive damage.

SCORCH
Your first damaging ability hit every 10s burns champions.

DOMINATION
Hunt and eliminate prey
Burst damage and target access

TASTE OF BLOOD
Heal when you damage an enemy champion.

RAVENOUS HUNTER
Unique takedowns grant permanent Omnivamp.

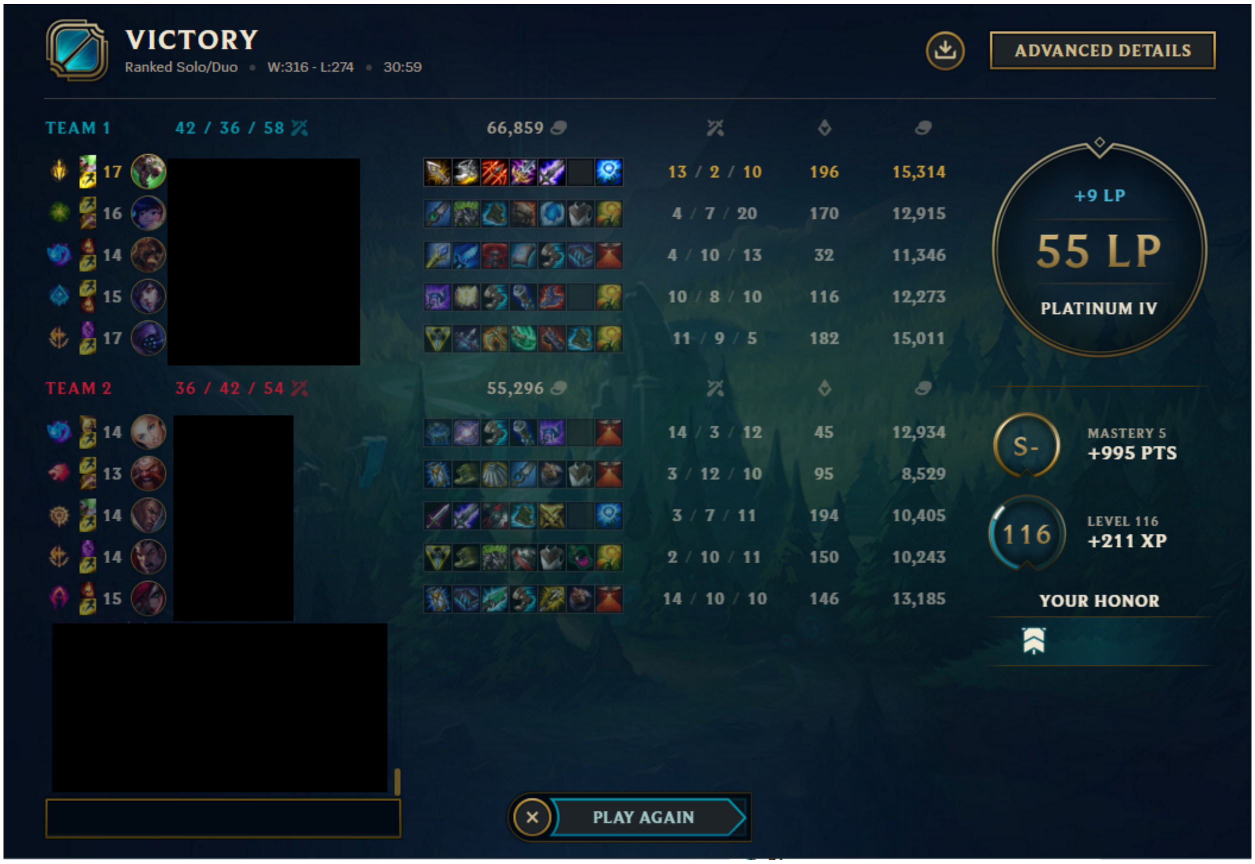
OFFENSE
+9 Adaptive Force

FLEX
+9 Adaptive Force

DEFENSE
+15-90 Health (based on level)

□ Show detailed descriptions during comparison (or hold SHIFT)

After the game is over, the winning team gains LP (League Points) which when they reach 100 points they move on to the next rank. When a player qualifies to reach the next divison they must play a best of 5 games. If they win three of these games, they promote and move onto the next division. If they fail, they stay the same divison and lose LP. Below is an example that shows the gain of LP based on a win.



VICTORY
Ranked Solo/Duo • W:316 - L:274 • 30:59

TEAM 1		42 / 36 / 58	66,859	
17	[redacted]	13 / 2 / 10	196	15,314
16	[redacted]	4 / 7 / 20	170	12,915
14	[redacted]	4 / 10 / 13	32	11,346
15	[redacted]	10 / 8 / 10	116	12,273
17	[redacted]	11 / 9 / 5	182	15,011
TEAM 2		36 / 42 / 54	55,296	
14	[redacted]	14 / 3 / 12	45	12,934
13	[redacted]	3 / 12 / 10	95	8,529
14	[redacted]	3 / 7 / 11	194	10,405
14	[redacted]	2 / 10 / 11	150	10,243
15	[redacted]	14 / 10 / 10	146	13,185

[redacted]

+9 LP
55 LP
PLATINUM IV

S-
MASTERY 5
+995 PTS

116
LEVEL 116
+211 XP

YOUR HONOR

Gathering the Data

We gather the data from webscraping a few websites. The first website is called OP.GG and Riot Games has given them an API to use to easily gather this data. As the information is stored in a JSON, we can use the library jsonlite to get the information. Once we have successfully obtained this information in a list of lists, we can access the list and turn in into a tibble to start tidying the data. The second website we scrap is leagueofgraphs to get the overall ranked distribution of the regions we are looking at, and the average game length time.

```
#1. Download & Load Libraries
knitr::opts_chunk$set(echo = TRUE)
pacman::p_load(
  "tidyverse",
  "dplyr",
  "rvest",
```

```r
  "robotstxt",
  "jsonlite",
  "gridExtra",
  "cowplot",
  "ggpubr",
  "stringr",
  "RSelenium",
  "lubridate"
)
```

```r
##2. Get all the data from all regions.
#Define vector of all the regions we want to obtain data from.
allRegions <- c("na", "kr", "euw", "eune")

#Define vector for all ranks. The combined total of all ranks is a blank string.
allranks <-
  c(
    "",
    "iron",
    "bronze",
    "silver",
    "gold",
    "platinum",
    "diamond",
    "master",
    "grandmaster",
    "challenger"
  )

#Make a empty variable that will be used to hold the final results.
full_stats <- c()

#Read champion roles from csv file.
champ_roles <-
  read_csv("data/Champion_roles_id.csv", show_col_types = FALSE)

#Get all champion data from json (riotwatch api down so we resort to this).
#Region doesn't matter, all champions are the same across all regions.
champion_id_json <-
  fromJSON("https://na.op.gg/api/meta/champions?hl=en_US") %>%
  map_if(is.data.frame, list) %>%
  as_tibble()

#Only take what we need from the json. For example,
#not every single spell and description of each champion is needed.
champ_info_tibble <- as_tibble(champion_id_json[[1]][[1]]) %>%
  select(1, 3)

#For loop to get all the data from each region from vector created earlier.
for (region in allRegions) {
  for (rank in allranks) {
    stats_json <-
      fromJSON(
        paste0(
          'https://',
          region,
          '.op.gg/api/statistics/',
          region,
          '/champions/ranked?period=month&tier=',
          rank
        )
      ) %>%
      map_if(is.data.frame, list) %>%
      as_tibble()

    #tidy up the stats tibble by opening up the list
    #that contains all the data we need.
    stats_tibble <- as_tibble(stats_json[[1]][[1]])

    # Remove NAs from the data (mostly challenger data)
    stats_tibble <- na.omit(stats_tibble)

    stats_tibble <- stats_tibble %>%
      rename(id = champion_id,
             total_games = play,
             jungle_cs = neutral_cs) %>%
      mutate(
        kills_per_game = kill / total_games,
        deaths_per_game = death / total_games,
        assists_per_game = assist / total_games,
        deaths_per_game = death / total_games,
        wards_per_game = ward / total_games,
        gold_per_game = gold / total_games,
        cs_per_game = cs / total_games,
        jg_cs_per_game = jungle_cs / total_games,
        win_rate = (win / total_games) * 100,
        region = region,
        rank = rank,
        sumofallgames = sum(total_games)
      )
    #join the names of champions to the data
    temp_full_stats <-
      merge(x = stats_tibble, y = champ_info_tibble, by = "id")

    # Join the champion roles to the data
    temp_full_stats <- temp_full_stats %>%
      right_join(champ_roles, by = c("id", "name"))

    #bind the full temp results to the current full_stats
    full_stats <- rbind(full_stats, temp_full_stats)
  }
}

#For clarity sake, rename the all rank to be called all not
#just a blank string as it is originally.
full_stats$rank[full_stats$rank == ""] <- "all"
```

```
#Save and write the data just in case we cannot retrieve the
#data in the future. The data is updated every month.
fdate = Sys.Date()
write_csv(full_stats, file = (paste0("data/", fdate, ".csv")))
```

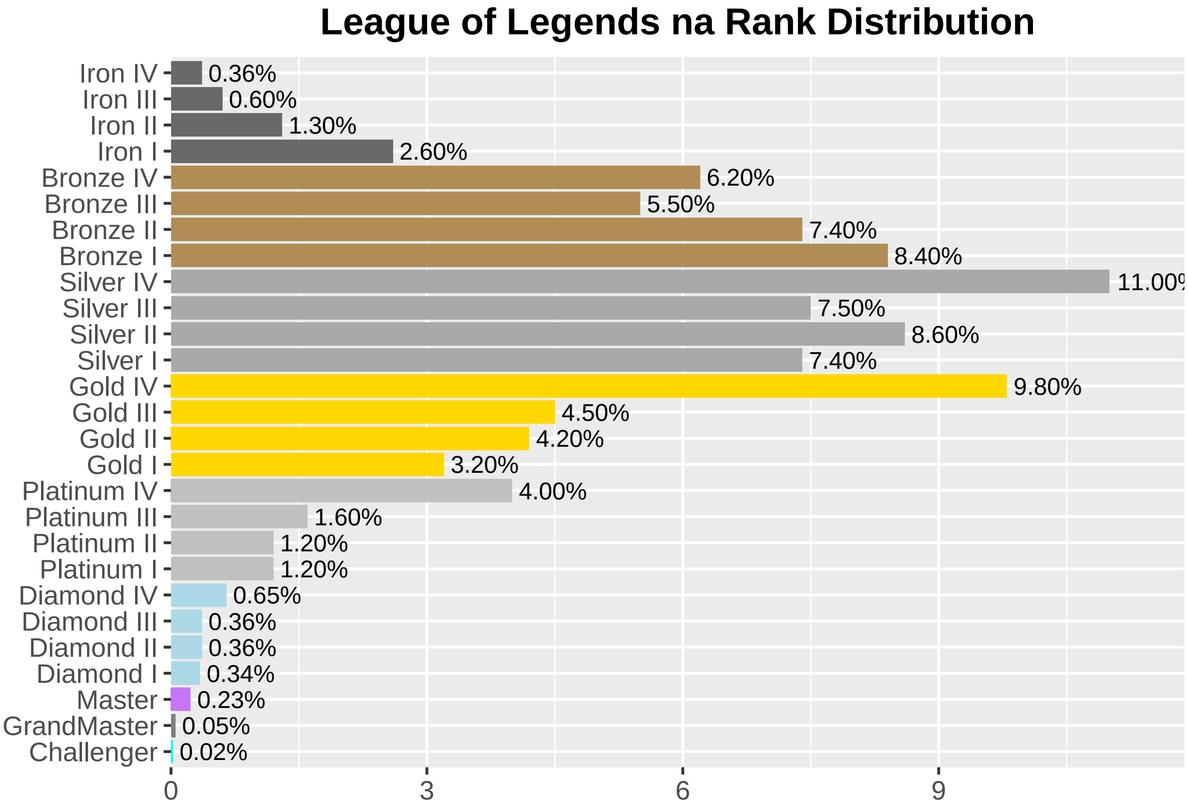
Visualizing the Data

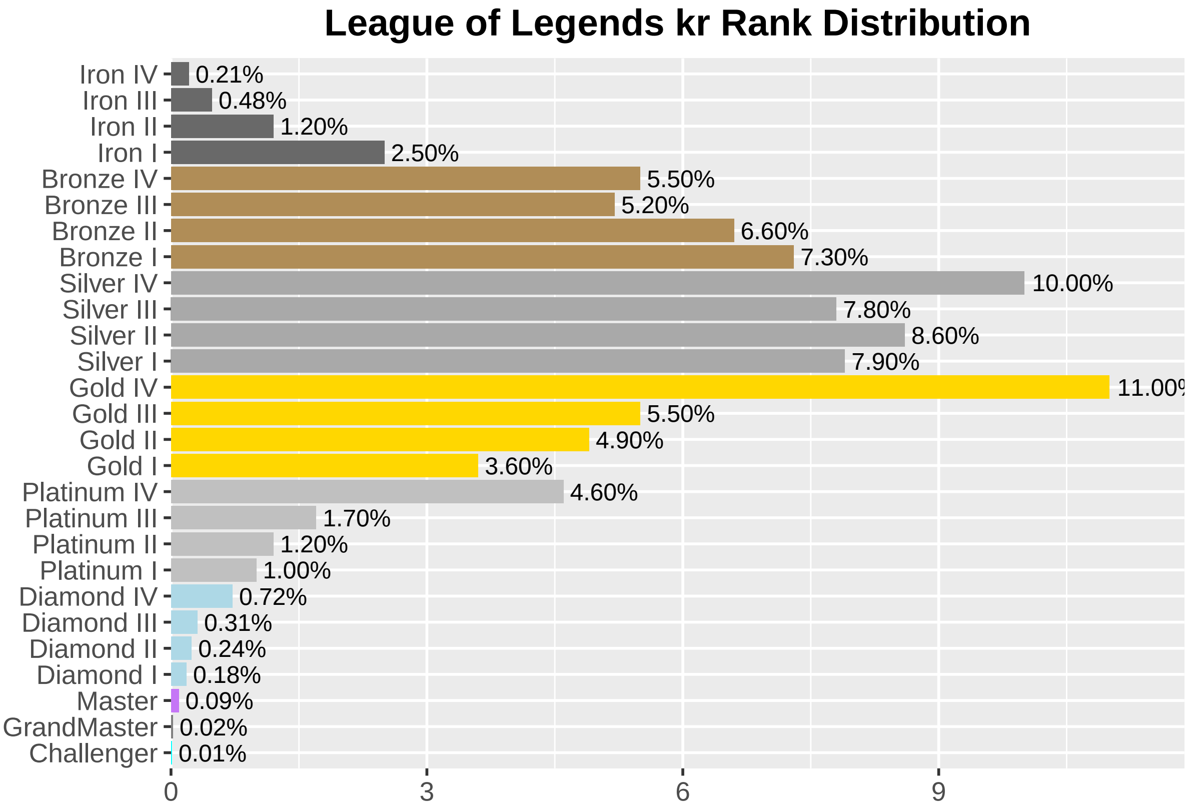
Rank Distrubution

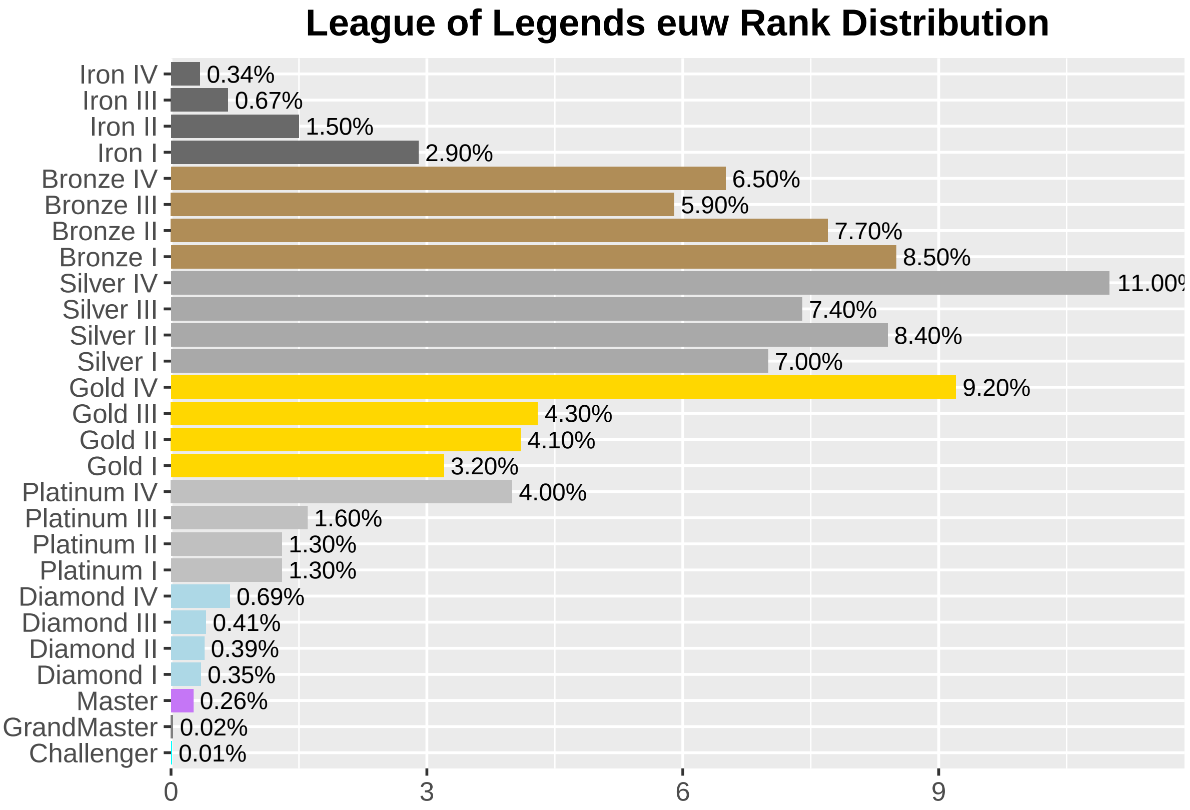
After all the data has been put into a main tibble, we can then filter the data based to visualize it. First we will look into the rank distrubutions between the 4 regions and take a look into all the games played in those servers. We can look to see if certain regions are more dedicated to their ranks compared to others and also identify why this is.

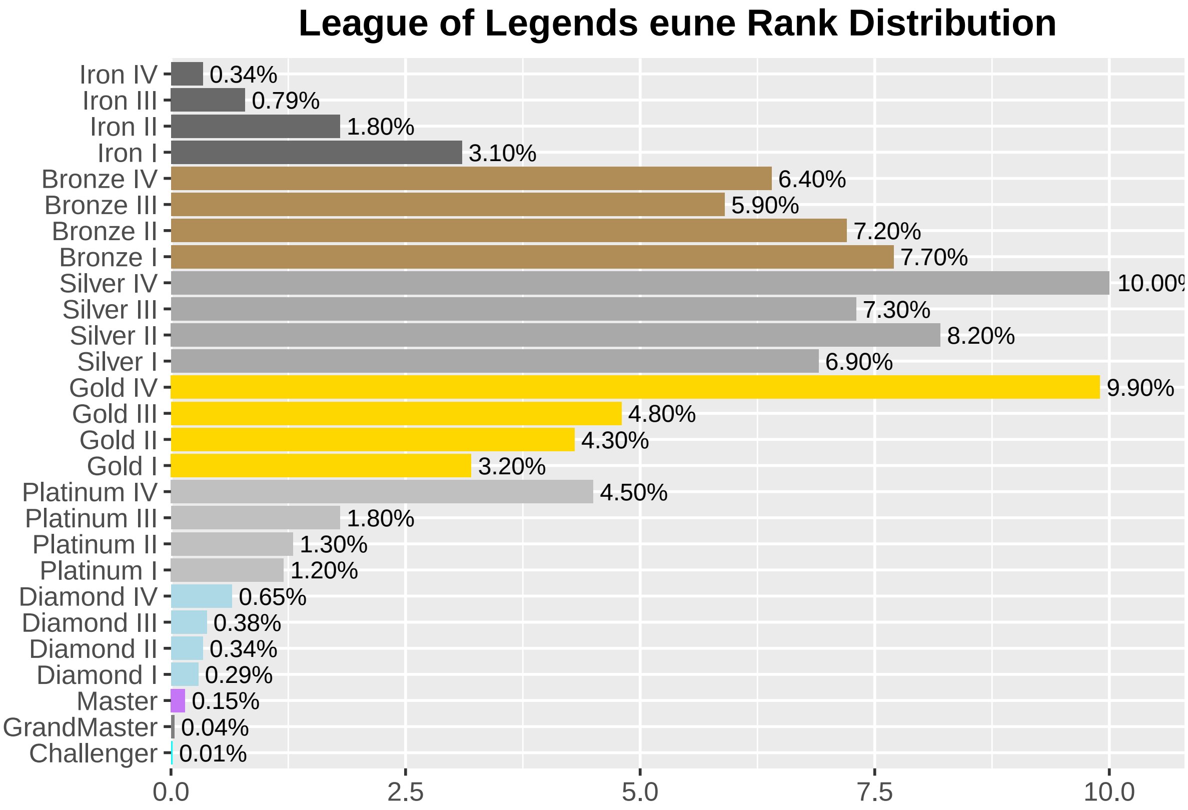
```
#INSITATE vectors that will be used in for loop
RD_SC <-
  c(
    "Challenger",
    "GrandMaster",
    "Master",
    "Diamond",
    "Diamond",
    "Diamond",
    "Diamond",
    "Platinum",
    "Platinum",
    "Platinum",
    "Platinum",
    "Gold",
    "Gold",
    "Gold",
    "Gold",
    "Silver",
    "Silver",
    "Silver",
    "Silver",
    "Bronze",
    "Bronze",
    "Bronze",
    "Bronze",
    "Iron",
    "Iron",
    "Iron",
    "Iron"
  )

ts_cl = c(
  "Iron" =  "#696969",
```

```r
  "Bronze" = "#B08D57",
  "Silver" = "#A9A9A9",
  "Gold" = "#FFD700",
  "Platinum" = "#C0C0C0",
  "Diamond" = '#ADD8E6',
  "Master" = '#C576F6',
  "GrandmMaster" = '#FF7F50',
  "Challenger" = '#00FFFF'
  )

RD_O <- c(1, 2, 3, 4, 4, 4, 4, 5, 5, 5, 5, 6, 6, 6, 6, 7, 7, 7, 7, 8, 8, 8, 8, 9, 9, 9, 9)
All_RD <- c()

#Web scrape to obtain distribution of ranks
for (regs in allRegions) {
  #web-scrape with url
  Page <-
    read_html(paste0(
      "https://www.leagueofgraphs.com/rankings/rank-distribution/",
      regs
    ))

  RD_Percent <- Page %>%
    html_nodes(".box-padding-10:nth-child(1) i") %>%
    html_text() %>%
    str_remove_all("%") %>%
    as.double()

  RD_Rank <- Page %>%
    html_nodes(".box-padding-10:nth-child(1) .nowrap") %>%
    html_text() %>%
    str_remove_all("\n") %>%
    str_trim()

  RDT <- tibble(regs, RD_Rank, RD_Percent, RD_SC, RD_O)
  All_RD <- rbind(All_RD, RDT)
}

#Graph the data
for (regions in allRegions) {
  Rank_Distribution <- All_RD %>%
    filter(regs == regions) %>%
    ggplot(aes(
      x = reorder(RD_Rank, RD_O),
      y = RD_Percent,
      fill = RD_SC,
      label = scales::percent(RD_Percent/100, accuracy = 0.01)
    )) +
    geom_bar(stat = "identity") + #prevent overlapping
    geom_text(hjust = -0.1, size = 3) +
    xlab("") + #remove the x-axis title
    ylab("") + #remove the y-axis title
    ggtitle(paste0("League of Legends ", regions, " Rank Distribution")) +
    #Build title using the index of loop
    theme(
      plot.title = element_text(hjust = 0.5, face = 2),
      #Center title of graph
      text = element_text(size = 12),
      legend.position = "none"
    ) + #Make Font size smaller
    labs(fill = "Rank") +
    coord_flip() +
    scale_y_continuous(expand=expansion(mult=c(0,0.08)))+ #Expand so no clipping
        scale_fill_manual(values = ts_cl, drop = FALSE) #same fill for all

  print(Rank_Distribution)

}
```




League of Legends kr Rank Distribution
Iron IV 0.21%
Iron III 0.48%
Iron II 1.20%
Iron I 2.50%
Bronze IV 5.50%
Bronze III 5.20%
Bronze II 6.60%
Bronze I 7.30%
Silver IV 10.00%
Silver III 7.80%
Silver II 8.60%
Silver I 7.90%
Gold IV 11.00%
Gold III 5.50%
Gold II 4.90%
Gold I 3.60%
Platinum IV 4.60%
Platinum III 1.70%
Platinum II 1.20%
Platinum I 1.00%
Diamond IV 0.72%
Diamond III 0.31%
Diamond II 0.24%
Diamond I 0.18%
Master 0.09%
GrandMaster 0.02%
Challenger 0.01%
0
3
6
9


League of Legends euw Rank Distribution
Iron IV
Iron III
Iron II
Iron I
Bronze IV
Bronze III
Bronze II
Bronze I
Silver IV
Silver III
Silver II
Silver I
Gold IV
Gold III
Gold II
Gold I
Platinum IV
Platinum III
Platinum II
Platinum I
Diamond IV
Diamond III
Diamond II
Diamond I
Master
GrandMaster
Challenger
0.34%
0.67%
1.50%
2.90%
6.50%
5.90%
7.70%
8.50%
11.00%
7.40%
8.40%
7.00%
9.20%
4.30%
4.10%
3.20%
4.00%
1.60%
1.30%
1.30%
0.69%
0.41%
0.39%
0.35%
0.26%
0.02%
0.01%
0
3
6
9

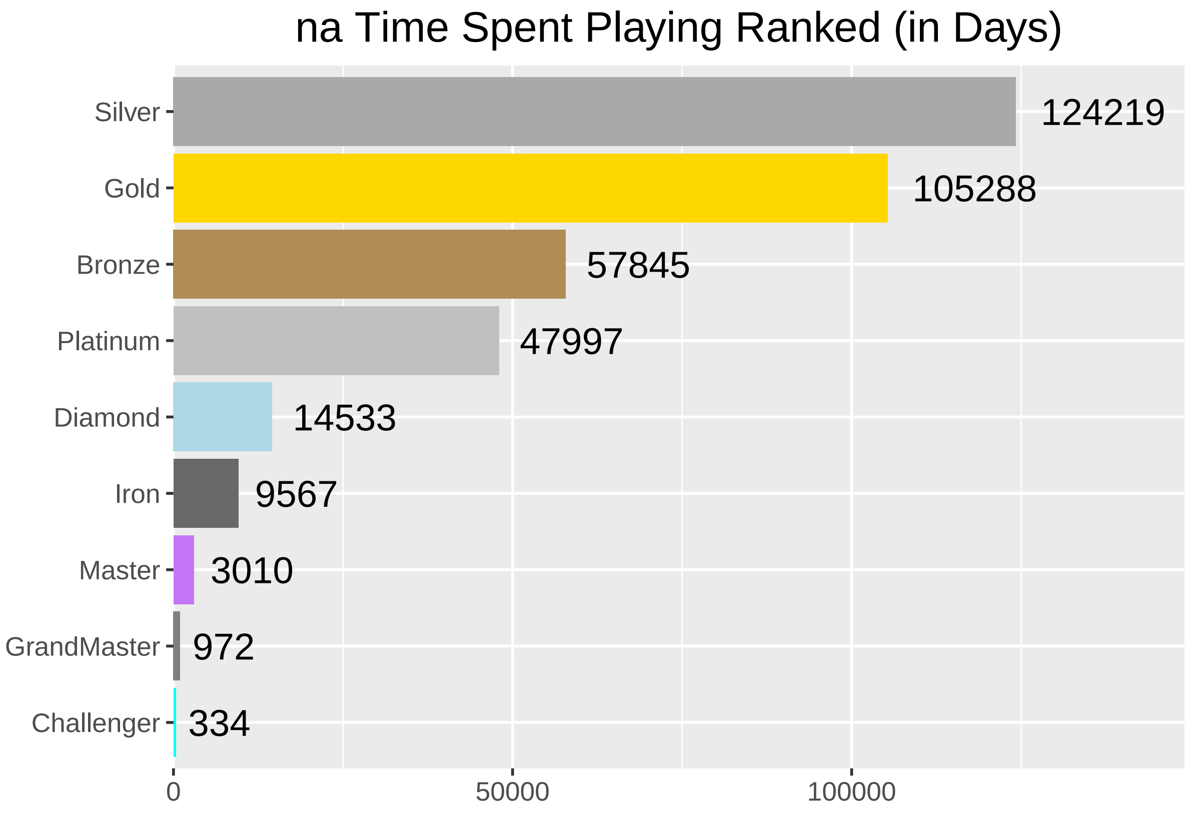


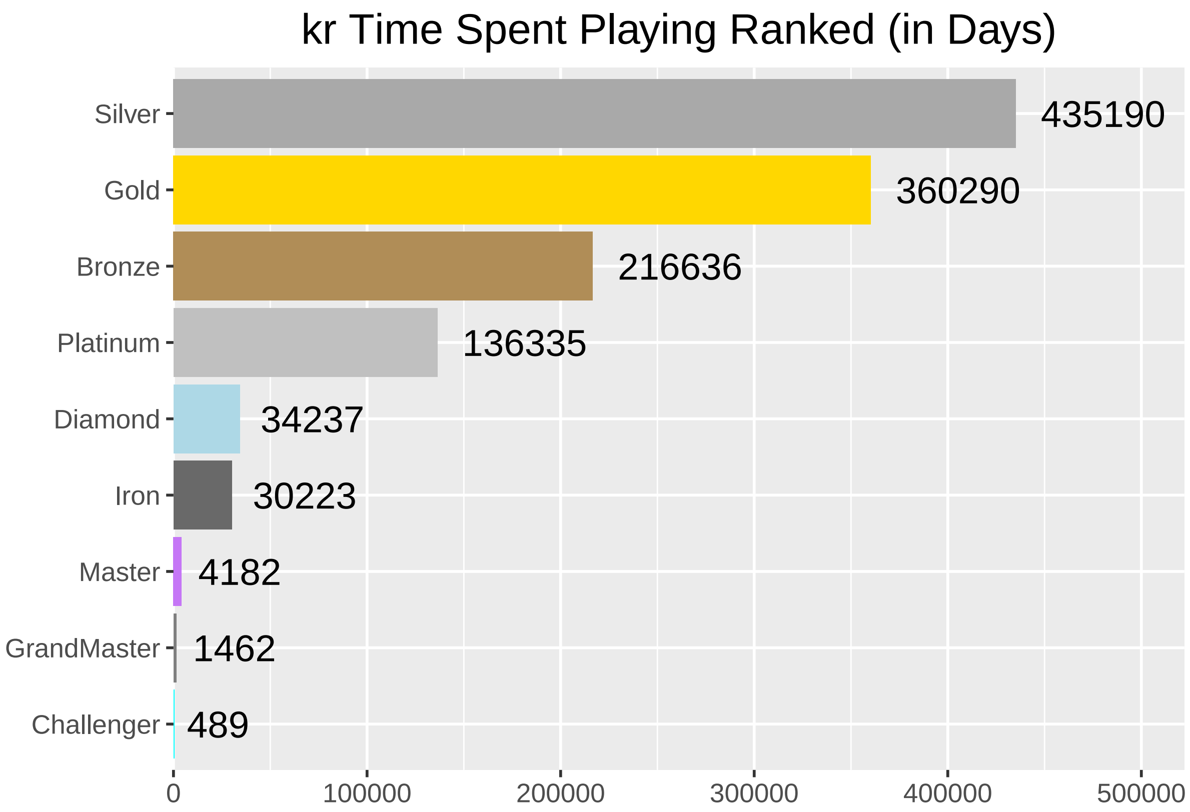
Conclusion: North America (NA) has a greater distribution of ranks around the lower ranks which include iron through gold. Korea (kr) has a much larger distribution near the higher ranks which include gold-diamond but the top ranks (Master-Challenger) are extremely low compared to other regions. Europe West has a very similiar distrubution to North America but has a higher distribution in the lower ranks and a higher distribution in Diamond through Master. Europe North-East has the most distinct distribution as the region has the distribution bottom divisions of each rank (Iron IV, Bronze IV, Gold IV, etc).

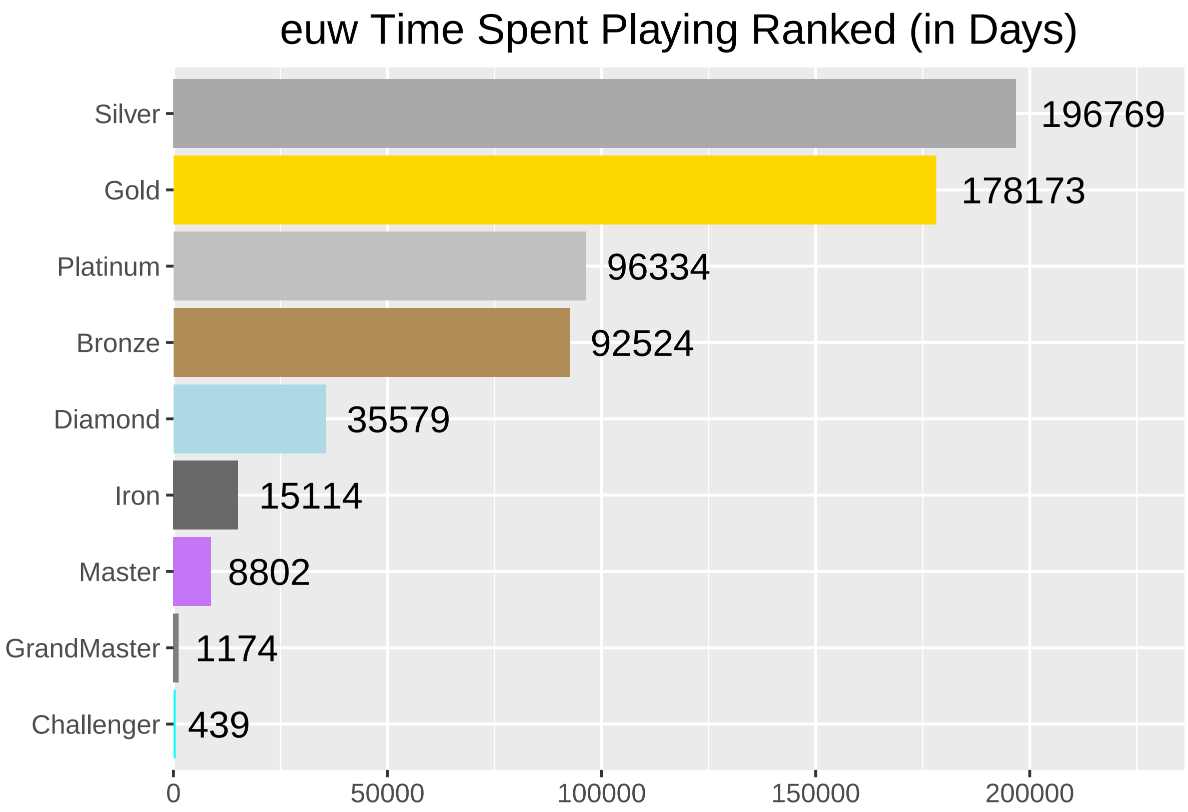
Time Spent Playing Per Region

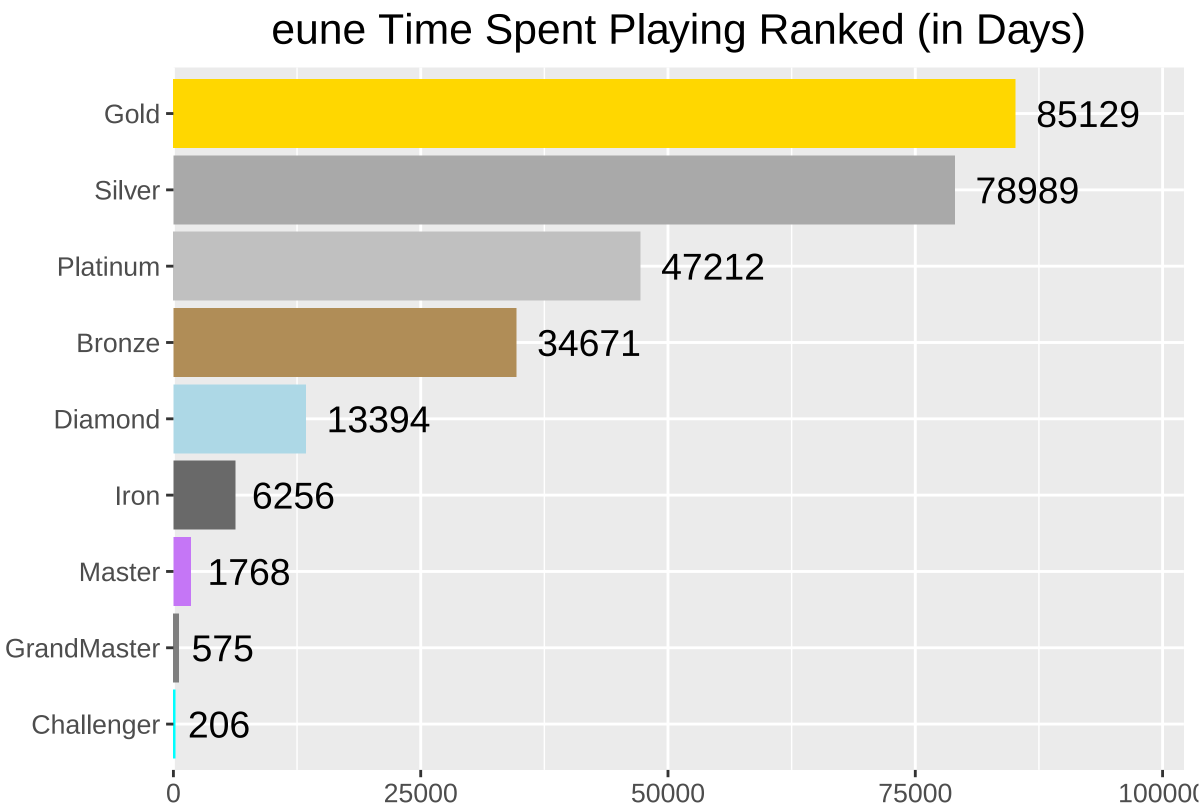
To see how much time has been spent on League of Legends in the last month we can create a sum of the "all" ranks in order to get the total number of ranked games played in a single month for a region. Then we will use Selenium to webscrap from another website to get the average game-lenght for each region and rank. From here we can see how long each region has spent playing the game.

```
options(scipen=10)

for(regs3 in allRegions){
  GLT_Graph <- all_GLT %>%
    filter(regs2 == regs3) %>%
    ggplot(aes(
      x = reorder(rank, GLS_Time),
      y = GLS_Time/1440,
      fill = rank,
      label = round(GLS_Time/1440, digits = 0),
    )) +
    geom_bar(stat = "identity") +
    xlab("") + #remove the x-axis title
    ylab("") + #remove the y-axis title
    ggtitle(paste0(regs3," Time Spent Playing Ranked (in Days)")) +
    geom_text(hjust =-0.2, size = 5) +
    #Build title using the index of loop
    theme(
      plot.title = element_text(hjust = 0.5),
      #Center title of graph
      text = element_text(size = 13),
      # axis.text.x = element_text(angle=90, hjust=1),
      legend.position = "none"
    )  +
    coord_flip() +
    scale_y_continuous(expand=expansion(mult=c(0,0.20))) + #EXpand so no clipping
    scale_fill_manual(values = ts_cl, drop = FALSE) # same fill for all


  print(GLT_Graph)
}
```




kr Time Spent Playing Ranked (in Days)
Silver
Gold
Bronze
Platinum
Diamond
Iron
Master
GrandMaster
Challenger
435190
360290
216636
136335
34237
30223
4182
1462
489
0
100000
200000
300000
400000
500000


euw Time Spent Playing Ranked (in Days)
Silver
196769
Gold
178173
Platinum
96334
Bronze
92524
Diamond
35579
Iron
15114
Master
8802
GrandMaster
1174
Challenger
439
0
50000
100000
150000
200000



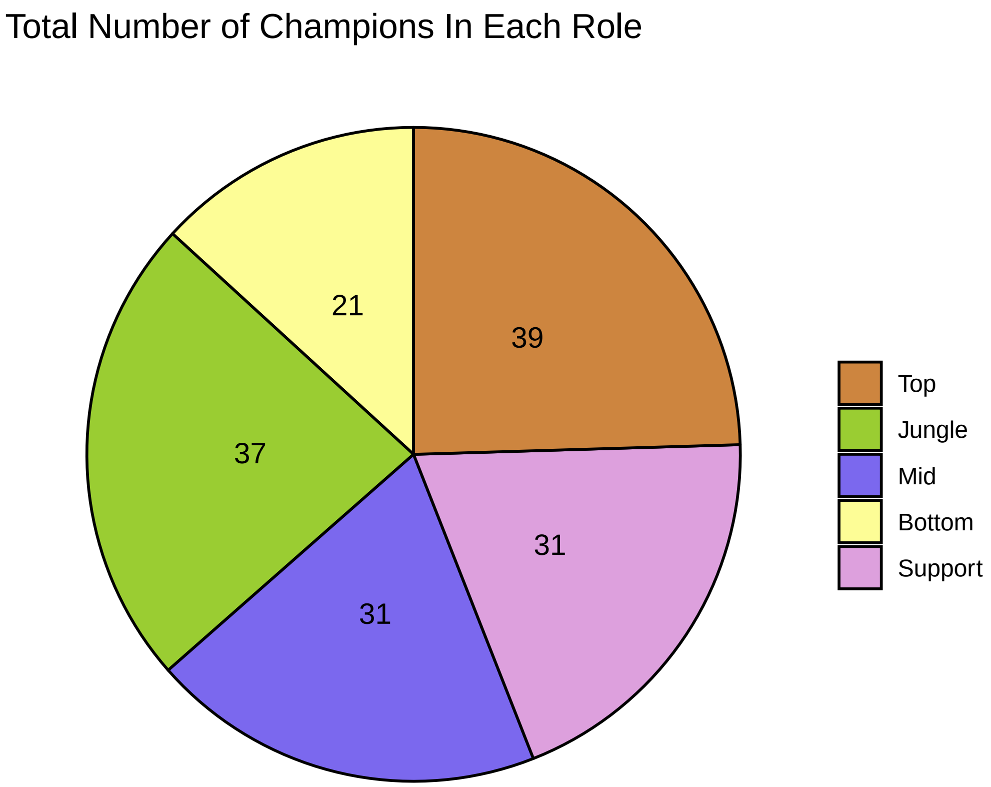
Conclusion: We see that Korea and Europe West both have the most play time. This is not a surprise as they take esports more seriously so they pratice more in general. The viewer ship of people that watch the tournaments for League of Legends also are higher in those regions. North America and Europe North-East both lack in the time played compared to the other two regions, probably due to them not having a strong competitve scene associated with the game in those regions.

Champion Numbers Chart

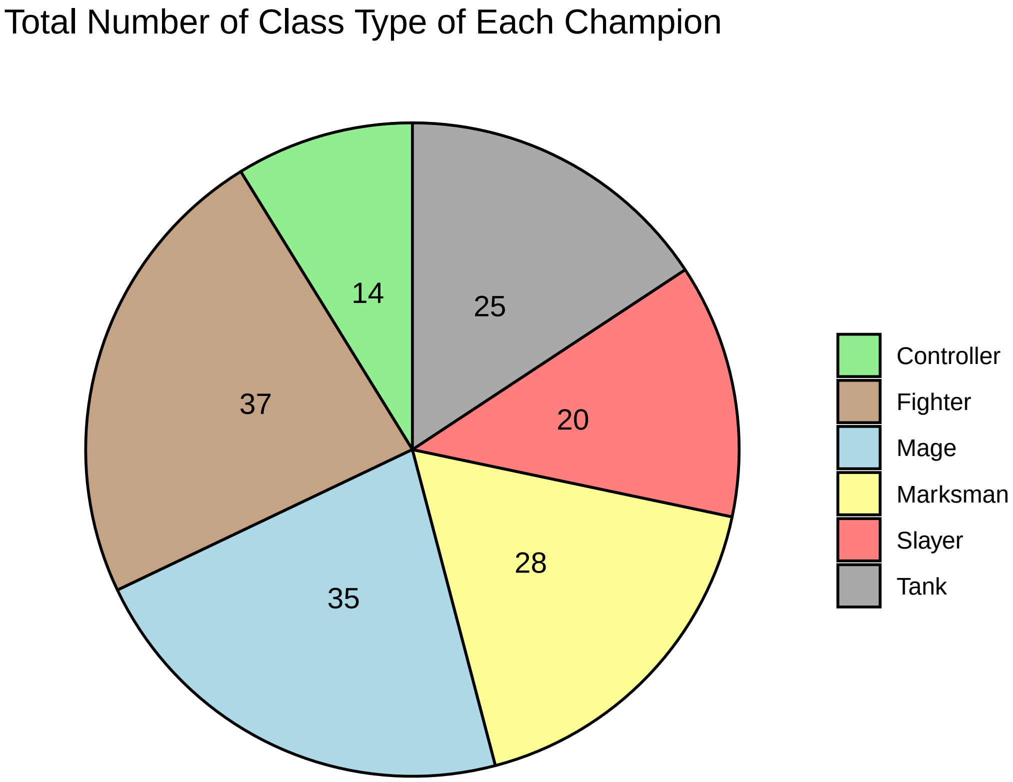
Graph the total number of champions and their main role and class archetype. This will be used later to delve into why certain champions are top pickrate, banrate, and winrate percentages for each region.

```
# Common legend with colors since if we just graphed it
# they would not be the same because not each graph contains
# all the classes.

colours_legend = c(
  "Controller" =  "#90EE90",
  "Fighter" = "#C4A484",
  "Mage" = "#ADD8E6",
  "Marksman" = "#FDFD96",
  "Slayer" = "#FF7F7F",
  "Tank" = '#A9A9A9')
```

```
role_legend = c(
  "Top" =  "#CD853F",
  "Jungle" = "#9ACD32",
  "Mid" = "#7B68EE",
  "Bottom" = "#FDFD96",
  "Support" = "#DDA0DD")

#Graph on the total number of roles of all champions
count_of_roles_PC <- full_stats %>%
  group_by(role1) %>%
  filter(region == "na", rank == "all") %>%
  count(role1) %>%
  ggplot(aes(x="", y = n, fill = role1)) +
  geom_bar(stat='identity', width = 1, color = "black") +
  xlab("Champion Roles") +
  ylab("") +
  ggtitle("Total Number of Champions In Each Role") +
  geom_text(aes(label = n),
            position = position_stack(vjust = 0.5)) +
  coord_polar("y", start = 0) +
  guides(fill = guide_legend(title = "")) +
  theme_void() +
    scale_fill_manual(values = role_legend, drop = FALSE) # same fill for all


#Graph on the total number of class_type of all champions
count_of_class_PC <- full_stats %>%
  group_by(class_type) %>%
  filter(region == "na", rank == "all") %>%
  count(class_type) %>%
  ggplot(aes(x="", y = n, fill = class_type)) +
  geom_bar(stat='identity', width = 1, color = "black") +
  xlab("Champion Class Type") +
  ylab("") +
  ggtitle("Total Number of Class Type of Each Champion") +
  geom_text(aes(label = n),
            position = position_stack(vjust = 0.5,)) +
  coord_polar("y", start = 0) +
  guides(fill = guide_legend(title = "")) +
  theme_void() +
  scale_fill_manual(values = colours_legend, drop = FALSE) # same fill for all


#Display the graphs
count_of_roles_PC
```



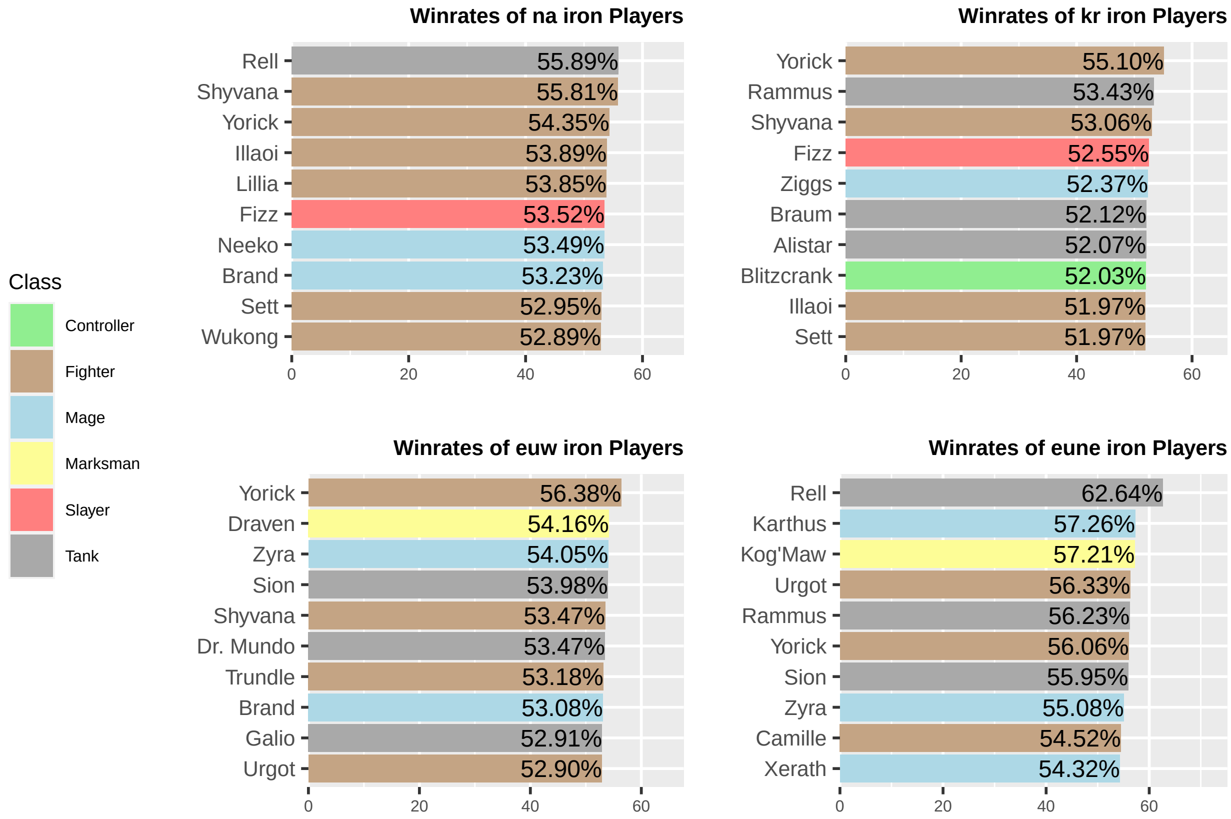
```
count_of_class_PC
```



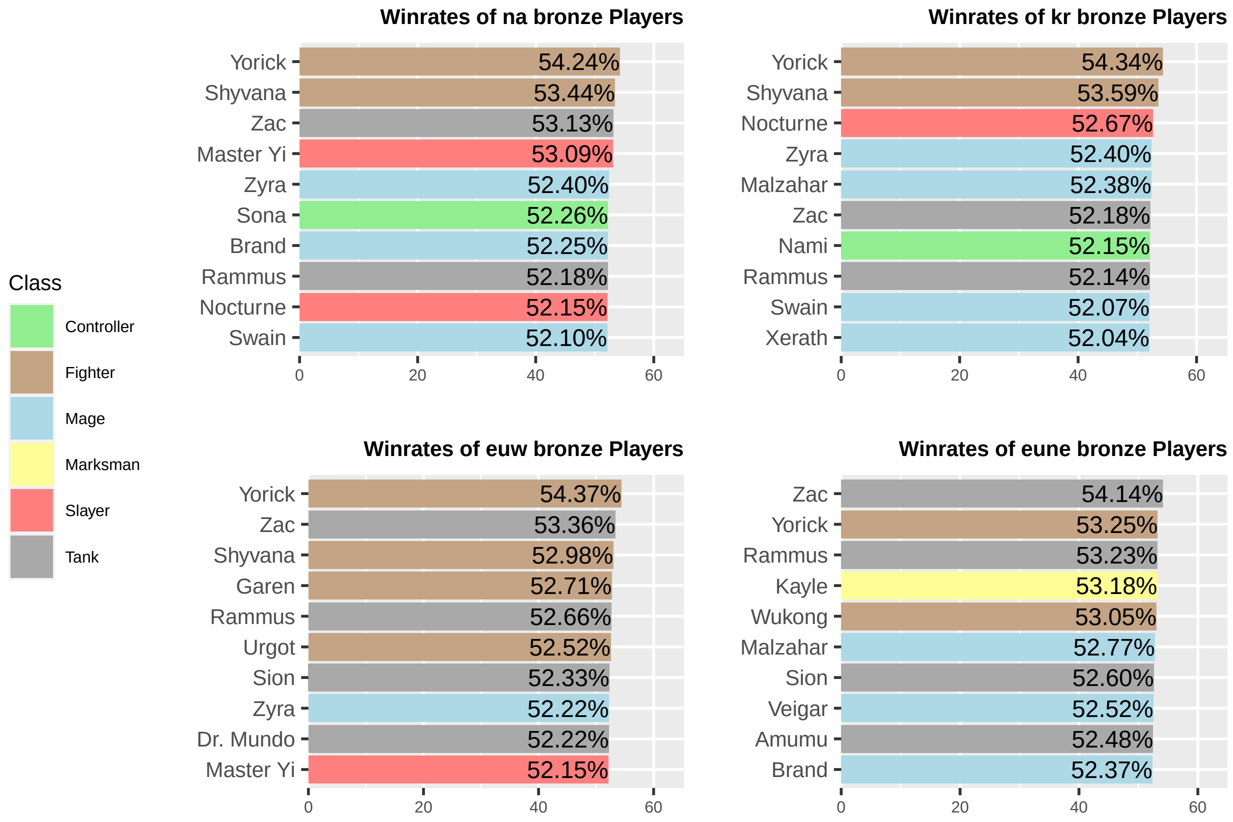
Winrate Percentage Per Region

We will look at the winrate percentage across the 4 regions menioned earlier. By analyzing the winrate percentage for the top 10 champions, we can see what is currently strong in the current state of the game and delve into why this is.

```
#Make another list because we can't use the one above due to the combined all being blank.
allranked_list <-
  c(
    "iron",
    "bronze",
    "silver",
    "gold",
    "platinum",
    "diamond",
    "master",
    "grandmaster",
    "challenger",
    "all"
  )
winrateList <- c()

#Double for loop that retrieves the stats for all ranks in each region
for (reg in allRegions) {
  for (ranks in allranked_list) {
    regional_stats <- full_stats %>%
      group_by(id, region, name, rank, class_type) %>%
      # Have to filter for more than 25 games bevause in the higher
      # ranks there are people who have played a champion 1 time
      # and won causing the winrate to be 100%.
      filter(region == reg, rank == ranks, total_games > 24) %>%
      arrange(desc(win_rate)) %>%
      head(10) %>%
      ggplot(aes(
        x = reorder(name, win_rate),
        y = win_rate,
        fill = class_type,
        label = scales::percent(win_rate / 100, accuracy = 0.01)
      )) +
      #Have to divide by 100 because i need it as a decimal for the function
      geom_bar(stat = "identity") +
      #prevent overlapping
      geom_text(hjust = 1, size = 3, face = 2) +
      #adjust the text horizontally on the graph
      xlab("") +
      #remove the x-axis title
      ylab("") +
      #remove the y-axis title
      ggtitle(paste("Winrates of", reg, ranks, "Players")) +
      #Build title using the index of both loops
      theme(
        plot.title = element_text(hjust = 1, face = 2, size = 8),
        #Center title of graph
        text = element_text(size = 8),
        axis.text.y = element_text(size = 8),
        legend.position = "none"
      ) +
      #Make Font size smaller
      labs(fill = "Class") +
      #Change legend title
      coord_flip() +
      scale_y_continuous(expand=expansion(mult=c(0,0.20)))+ # EXpand so no clipping
      scale_fill_manual(values = colours_legend, drop = FALSE) # same fill for all


    winrateList <- rbind(winrateList, list(regional_stats))
    #Put everything into a list
  }
}

# Select the regions and the same ranks to view all at once by
# Pulling it using the index of where the graph is in the list.
ggarrange(
  winrateList[[1]],
  winrateList[[11]],
  winrateList[[21]],
  winrateList[[31]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



```
ggarrange(
  winrateList[[2]],
  winrateList[[12]],
  winrateList[[22]],
  winrateList[[32]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



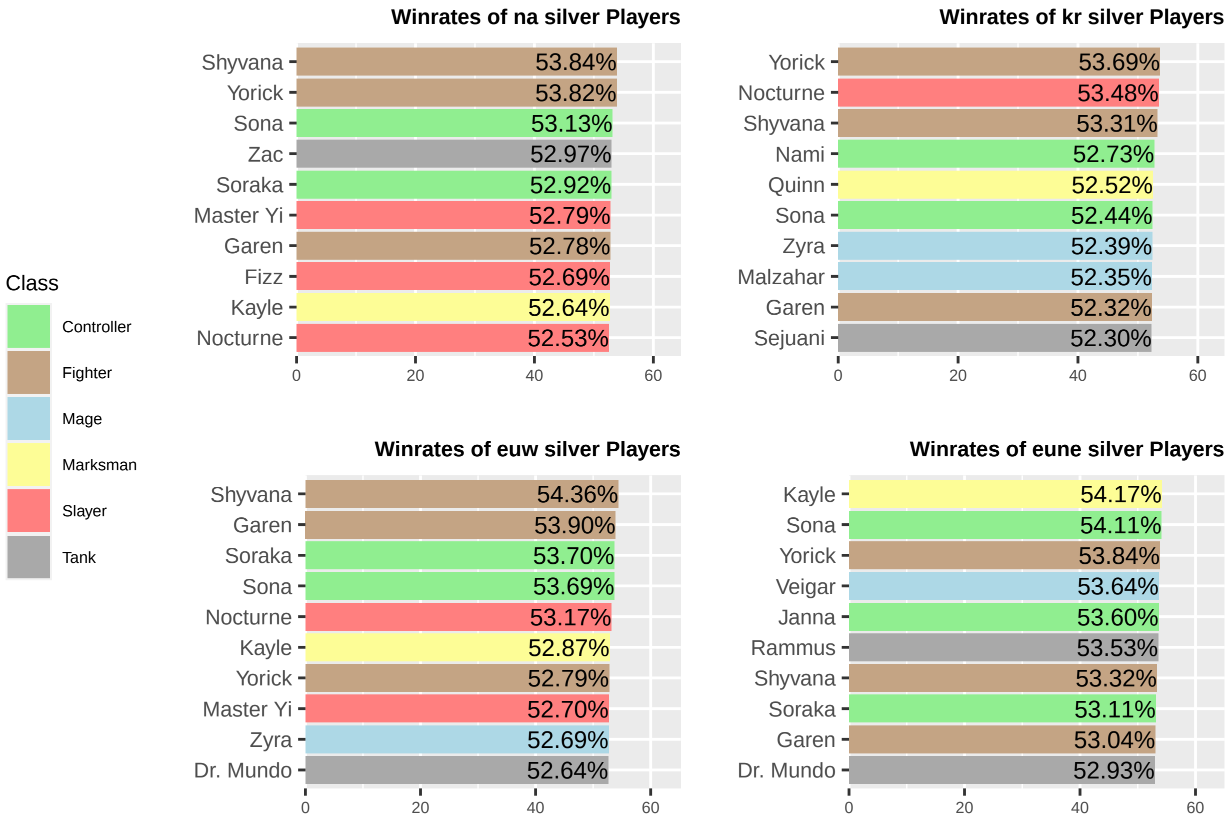
Winrates of na bronze Players

Winrates of kr bronze Players

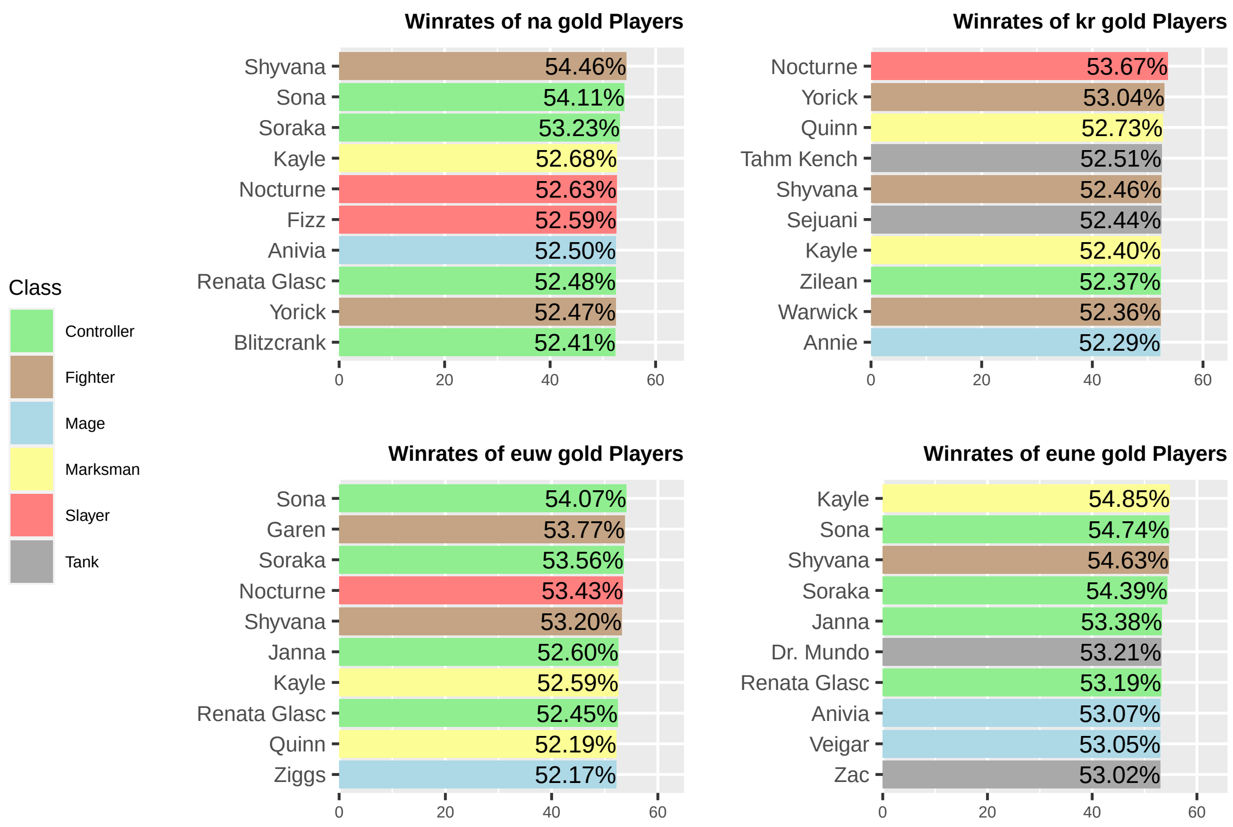
Winrates of euw bronze Players

Winrates of eune bronze Players

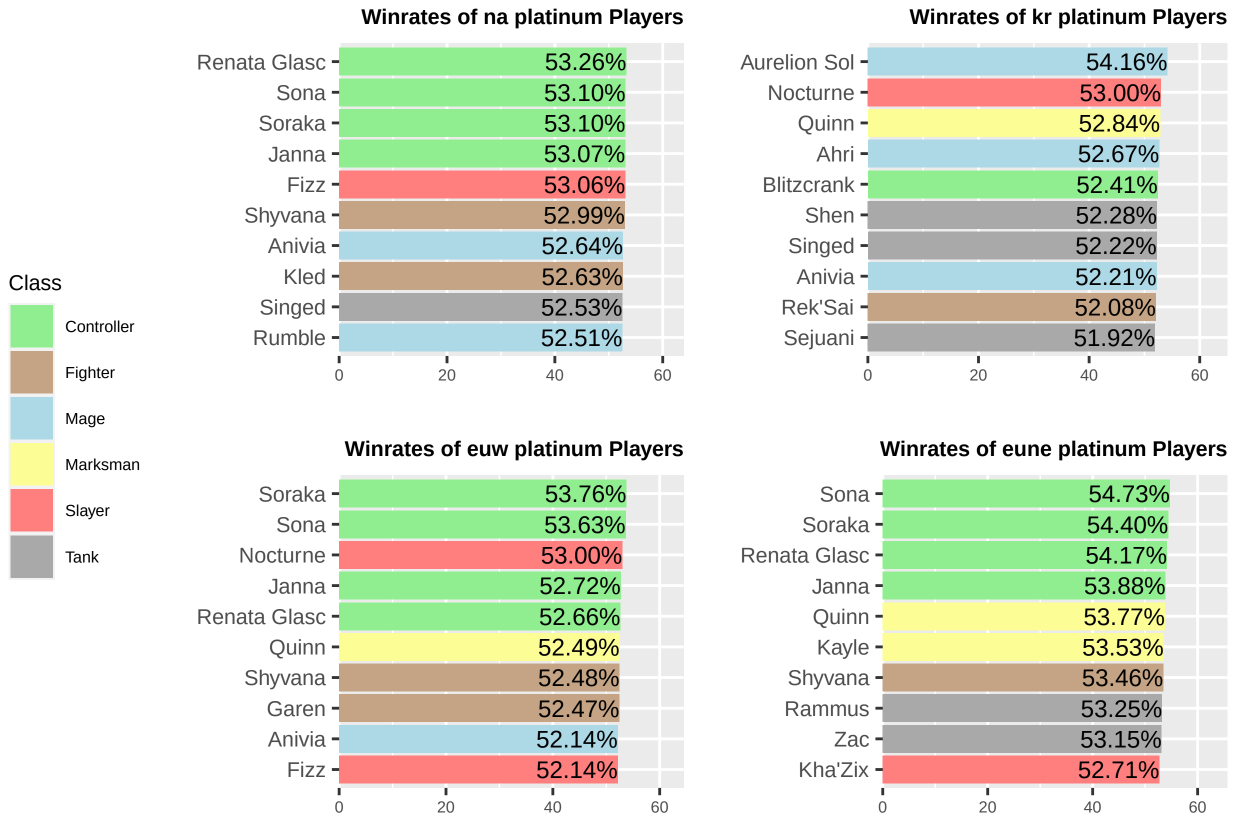
```
ggarrange(
  winrateList[[3]],
  winrateList[[13]],
  winrateList[[23]],
  winrateList[[33]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



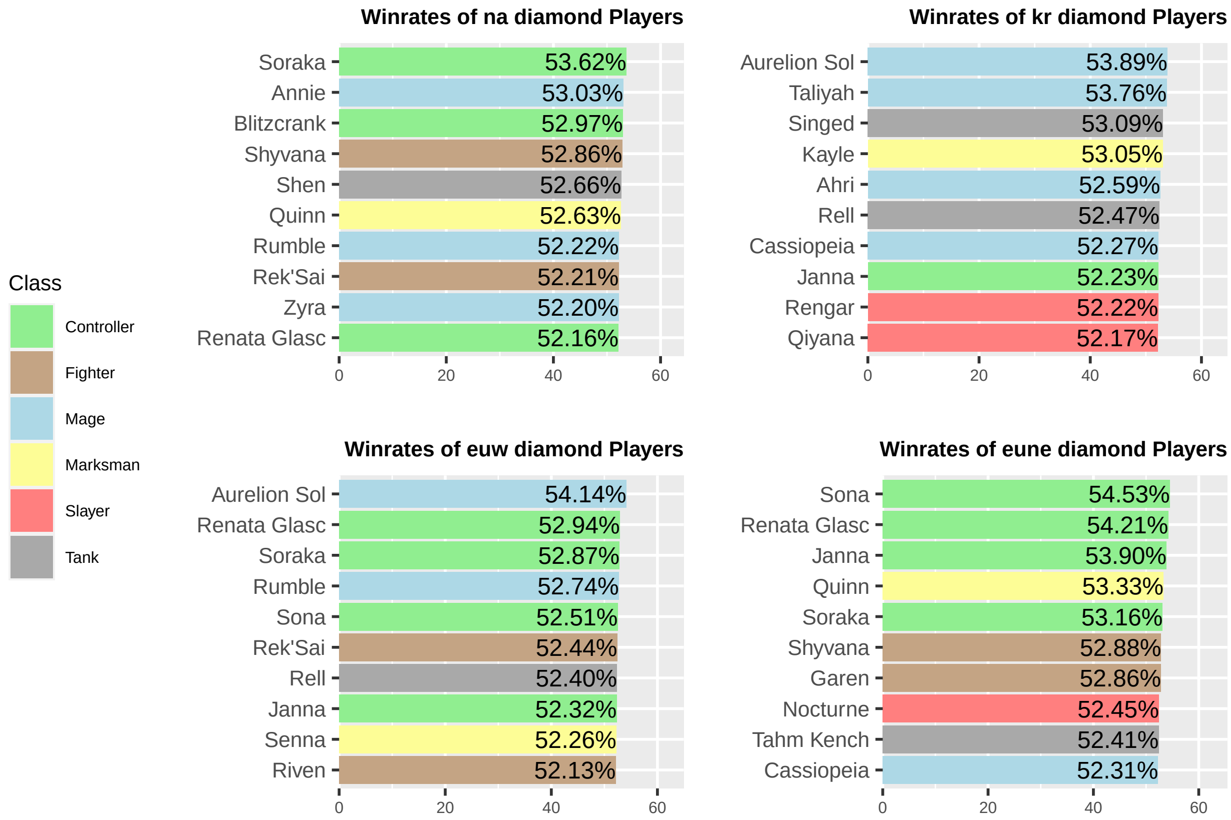
```
ggarrange(
  winrateList[[4]],
  winrateList[[14]],
  winrateList[[24]],
  winrateList[[34]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



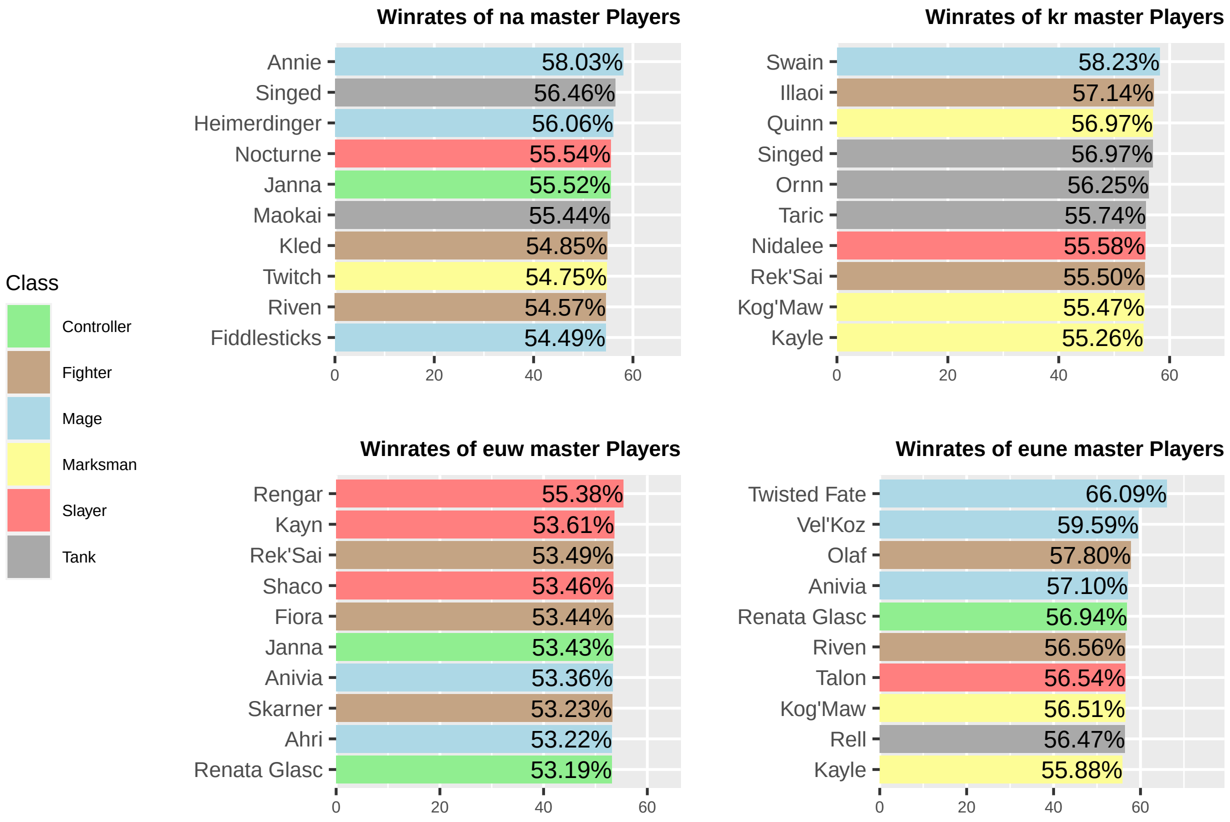
```
ggarrange(
  winrateList[[5]],
  winrateList[[15]],
  winrateList[[25]],
  winrateList[[35]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



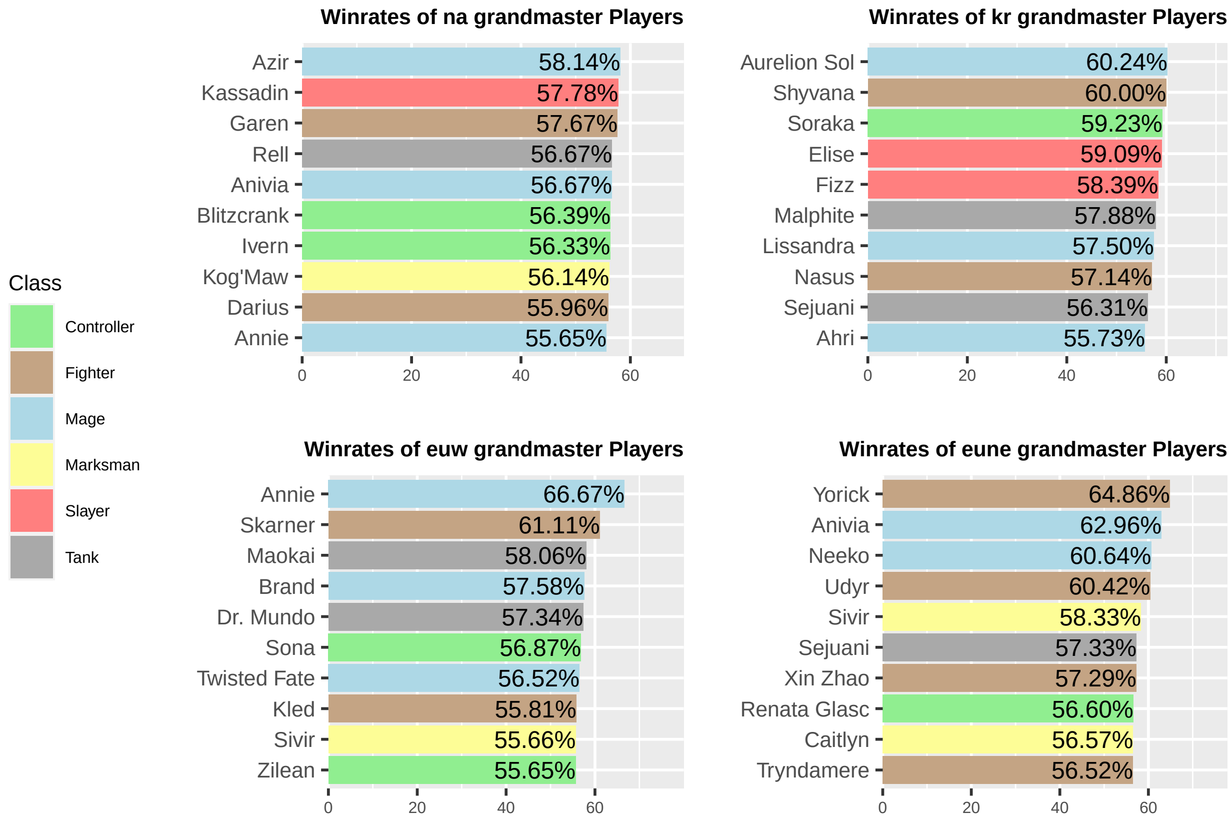
```r
ggarrange(
  winrateList[[6]],
  winrateList[[16]],
  winrateList[[26]],
  winrateList[[36]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



```
ggarrange(
  winrateList[[7]],
  winrateList[[17]],
  winrateList[[27]],
  winrateList[[37]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



```r
ggarrange(
  winrateList[[8]],
  winrateList[[18]],
  winrateList[[28]],
  winrateList[[38]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```

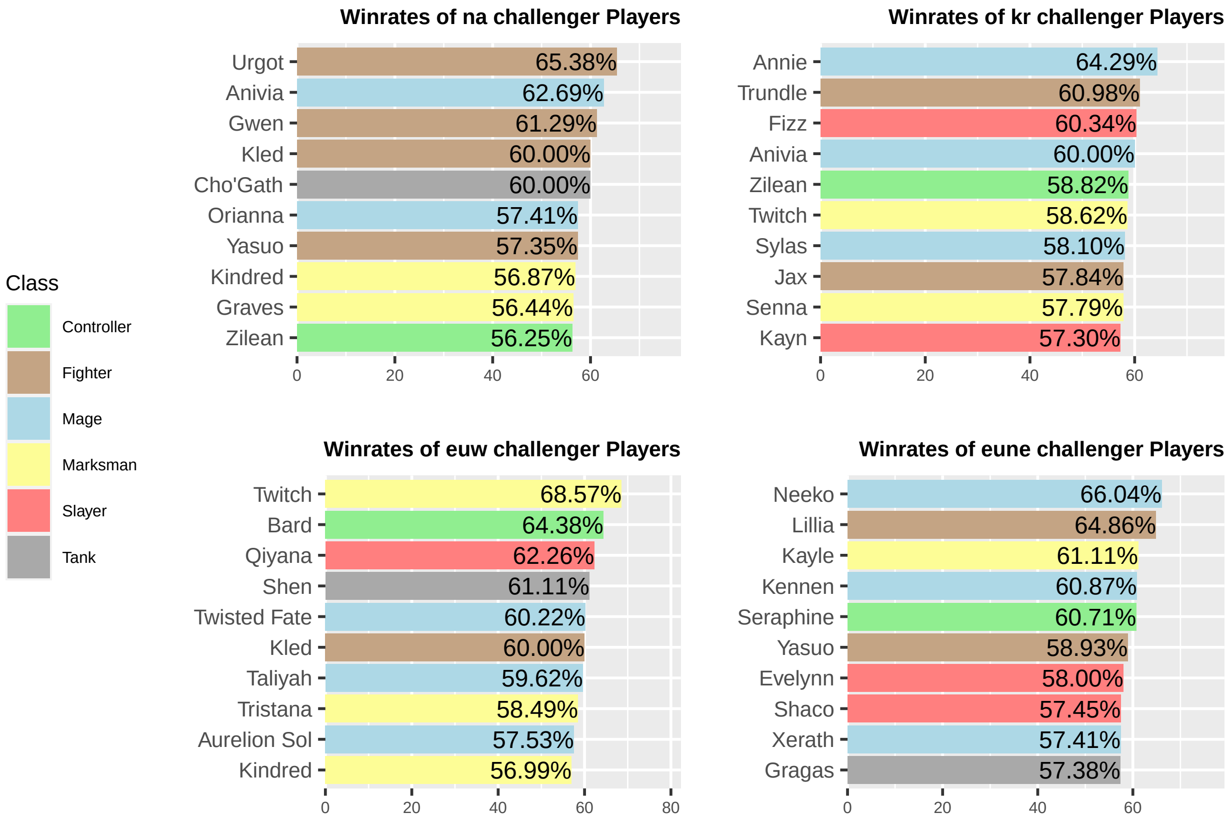

Winrates of na grandmaster Players

Winrates of kr grandmaster Players

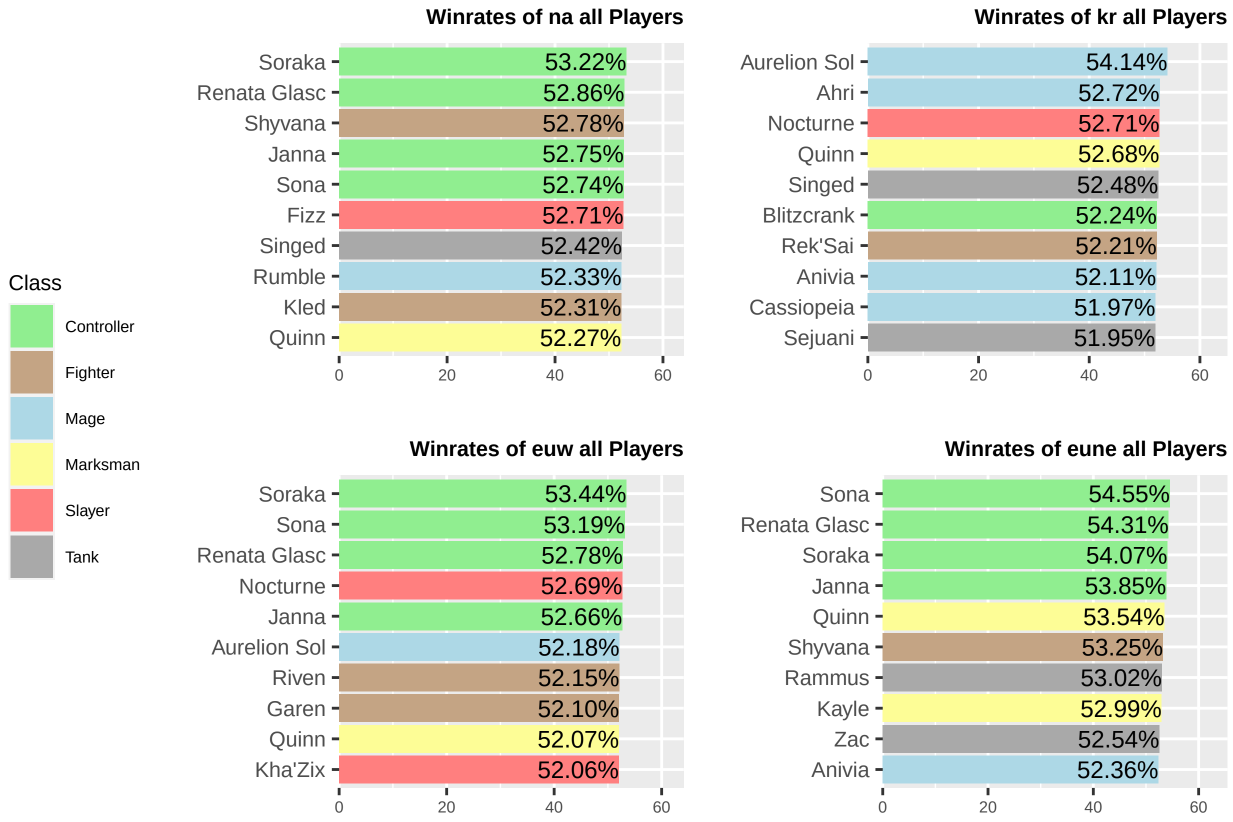
Winrates of euw grandmaster Players

Winrates of eune grandmaster Players

```
ggarrange(
  winrateList[[9]],
  winrateList[[19]],
  winrateList[[29]],
  winrateList[[39]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



```r
ggarrange(
  winrateList[[10]],
  winrateList[[20]],
  winrateList[[30]],
  winrateList[[40]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```

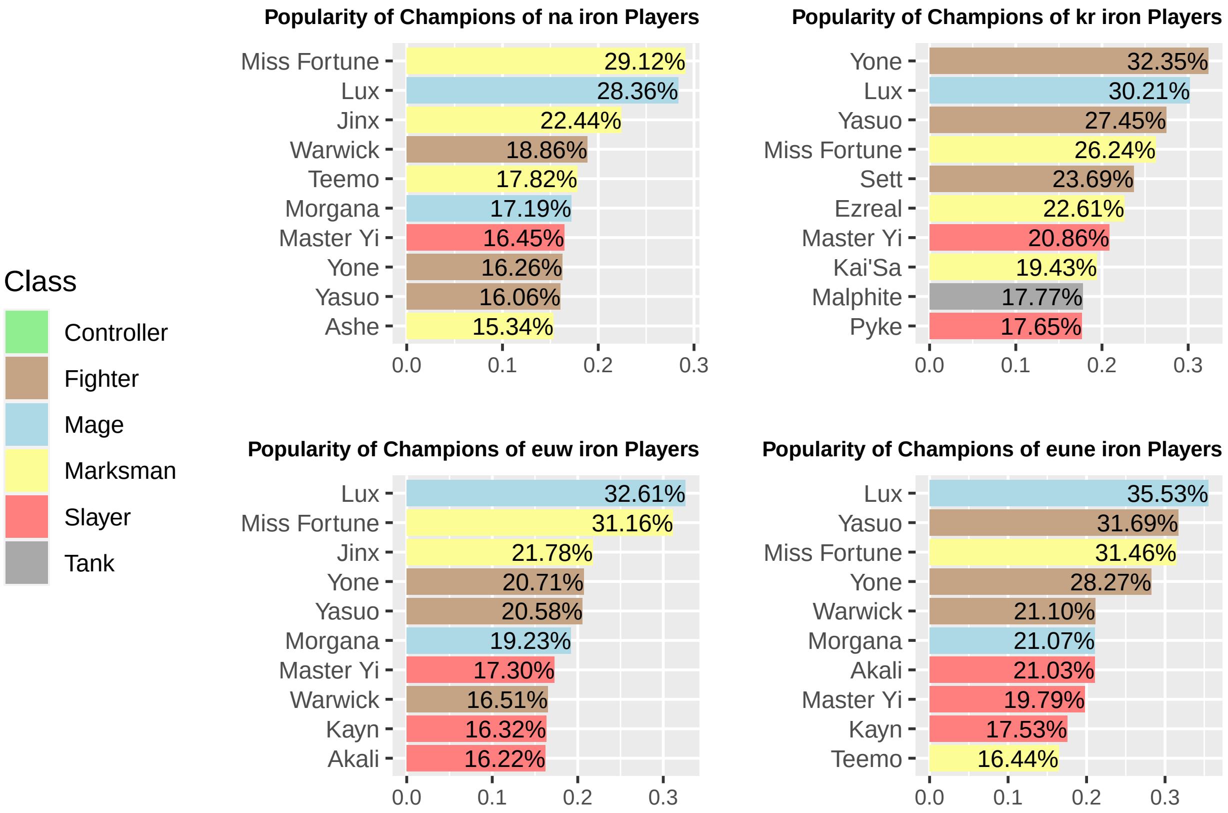


Conclusion: In the iron games, we see that the fighter and Tank champion archetypes exceed for all regions. We do still see some easy to play mages and slayers that excel as well. This is mainly due to their kit being easy to play. In the bronze games, we still see this same trend however we see more fighters and Tanks in EUW, while the others still follow a similar trend to bronze. Once the rank is gold, we see controllers take the lead and fighters trail behind. This is more due to controllers being extremely gold efficient for the stats they give to other champions. The controllers sona, soraka, and janna all are very easy to play and even if they fall behind, provide utility to a team unlike a fighter or slayer. In platinum to diamond, we continue see that controllers take the lead for all regions instead of Korea. This is because Korea plays the game in such an aggressive playstyle that controllers can not stay alive long enough to be effective. In the highest ranks of the game, we see each play region have completlely different champion picks that succeed.

Pickrate Percentage of Champions per Region

We will look at the pickrate percentage across the 4 regions defined earlier. By analyzing the pickrate percentage for the top 10 champions, we can see what playstyle follows each region. This will also tell us more about how players from these regions like to play the game compared to one another.

```r
pickrateList <- c()

for (reg in allRegions) {
  for (ranks in allranked_list) {
    regional_stats_2 <- full_stats %>%
      group_by(id, region, name, rank, class_type) %>%
      filter(region == reg, rank == ranks) %>%
      arrange(desc(pick_rate)) %>%
      head(10) %>%
      ggplot(aes(
        x = reorder(name, pick_rate),
        y = pick_rate,
        fill = class_type,
        label = scales::percent(pick_rate, accuracy = 0.01)
      )) + #Already a decimal unlike before
      geom_bar(stat = "identity") + #prevent overlapping
      geom_text(hjust = 1, size = 3, face = 2) + #adjust the text horizontally on the graph
      xlab("") + #remove the x-axis title
      ylab("") + #remove the y-axis title
      ggtitle(paste("Popularity of Champions of", reg, ranks, "Players")) +
      #Build title using the index of both loops
      theme(
        plot.title = element_text(hjust = 1, face = 2, size = 8),
        #Center title of graph
        axis.text.x = element_text(size = 8),
        legend.position = "none"
      ) + #Make Font size smaller
      labs(fill = "Class") + #Change legend title
      coord_flip() +
      scale_fill_manual(values = colours_legend, drop = FALSE) # same fill for all


    pickrateList <-
      rbind(pickrateList, list(regional_stats_2)) #Put everything into a list
  }
}

ggarrange(
  pickrateList[[1]],
  pickrateList[[11]],
  pickrateList[[21]],
  pickrateList[[31]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



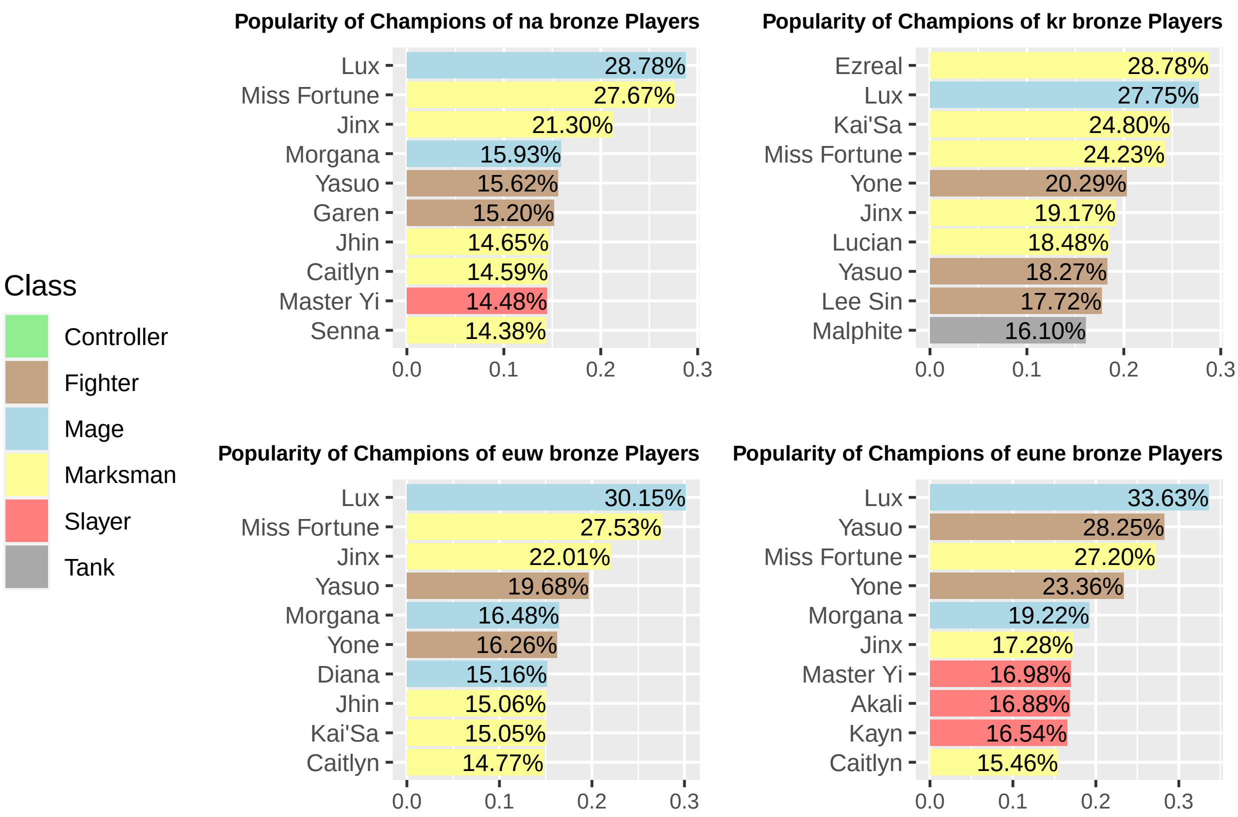
Popularity of Champions of na iron Players

Popularity of Champions of kr iron Players

Popularity of Champions of euw iron Players

Popularity of Champions of eune iron Players

```
ggarrange(
  pickrateList[[2]],
  pickrateList[[12]],
  pickrateList[[22]],
  pickrateList[[32]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



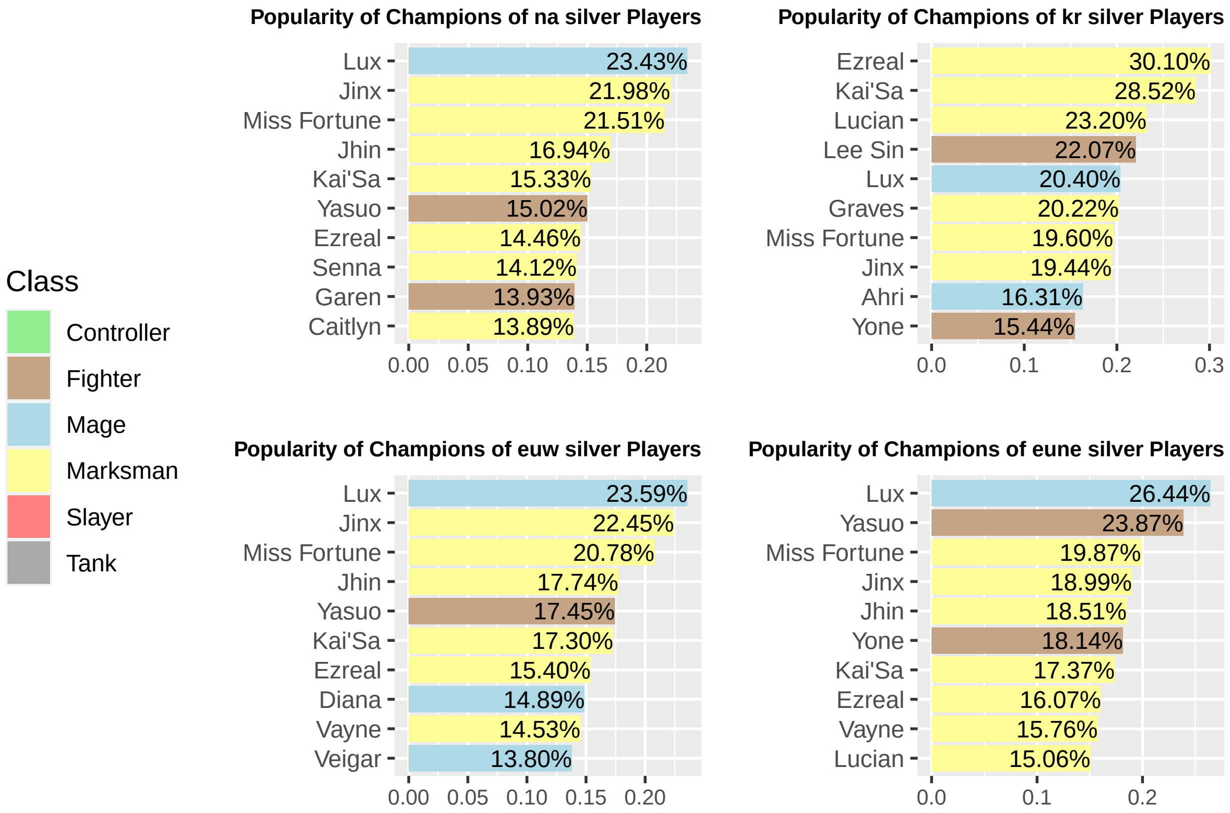
Popularity of Champions of na bronze Players

Popularity of Champions of kr bronze Players

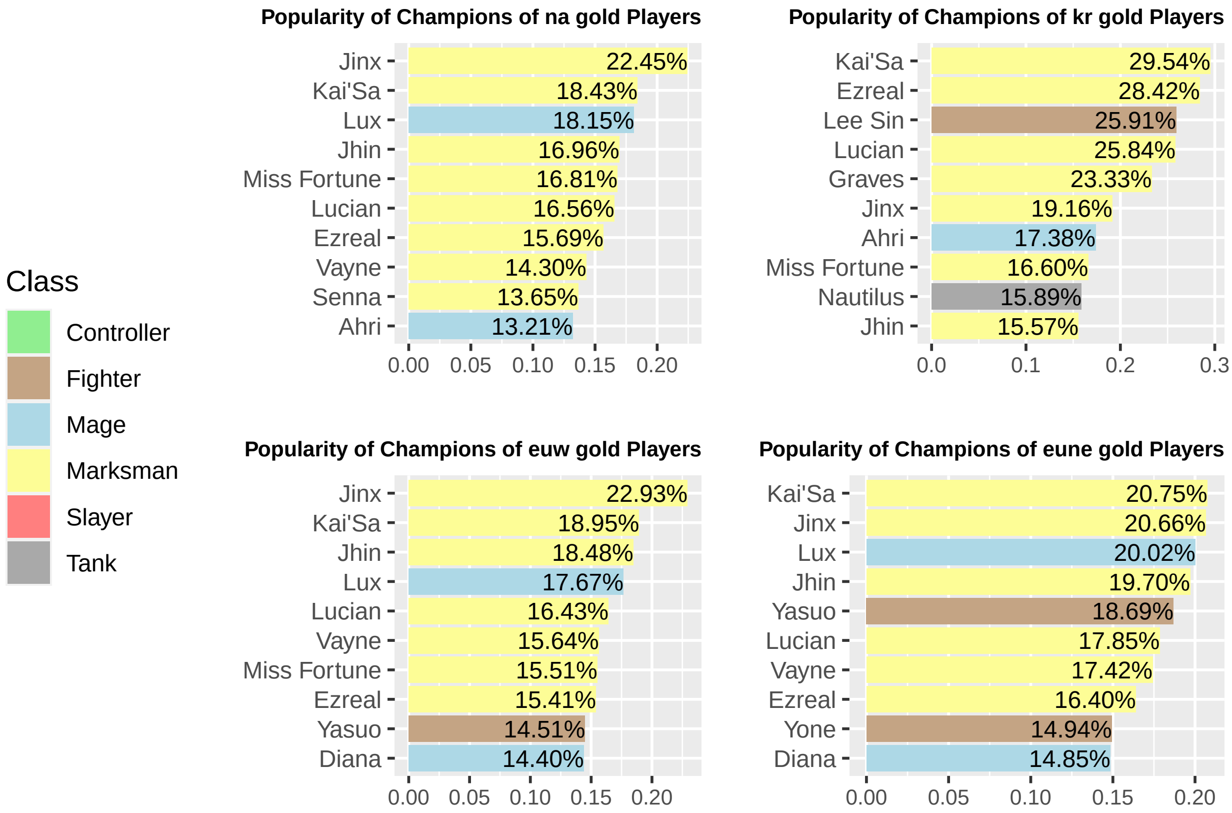
Popularity of Champions of euw bronze Players

Popularity of Champions of eune bronze Players

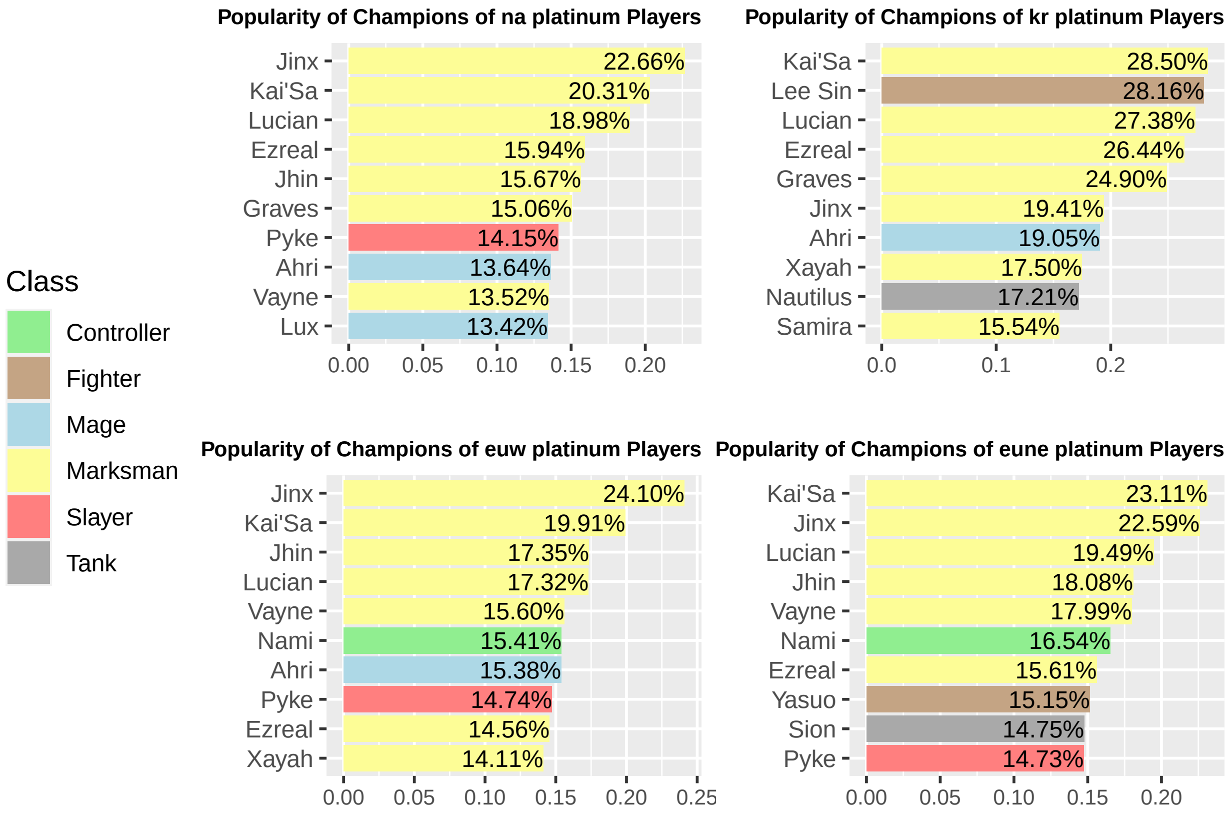
```
ggarrange(
  pickrateList[[3]],
  pickrateList[[13]],
  pickrateList[[23]],
  pickrateList[[33]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



```r
ggarrange(
  pickrateList[[4]],
  pickrateList[[14]],
  pickrateList[[24]],
  pickrateList[[34]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



```r
ggarrange(
  pickrateList[[5]],
  pickrateList[[15]],
  pickrateList[[25]],
  pickrateList[[35]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



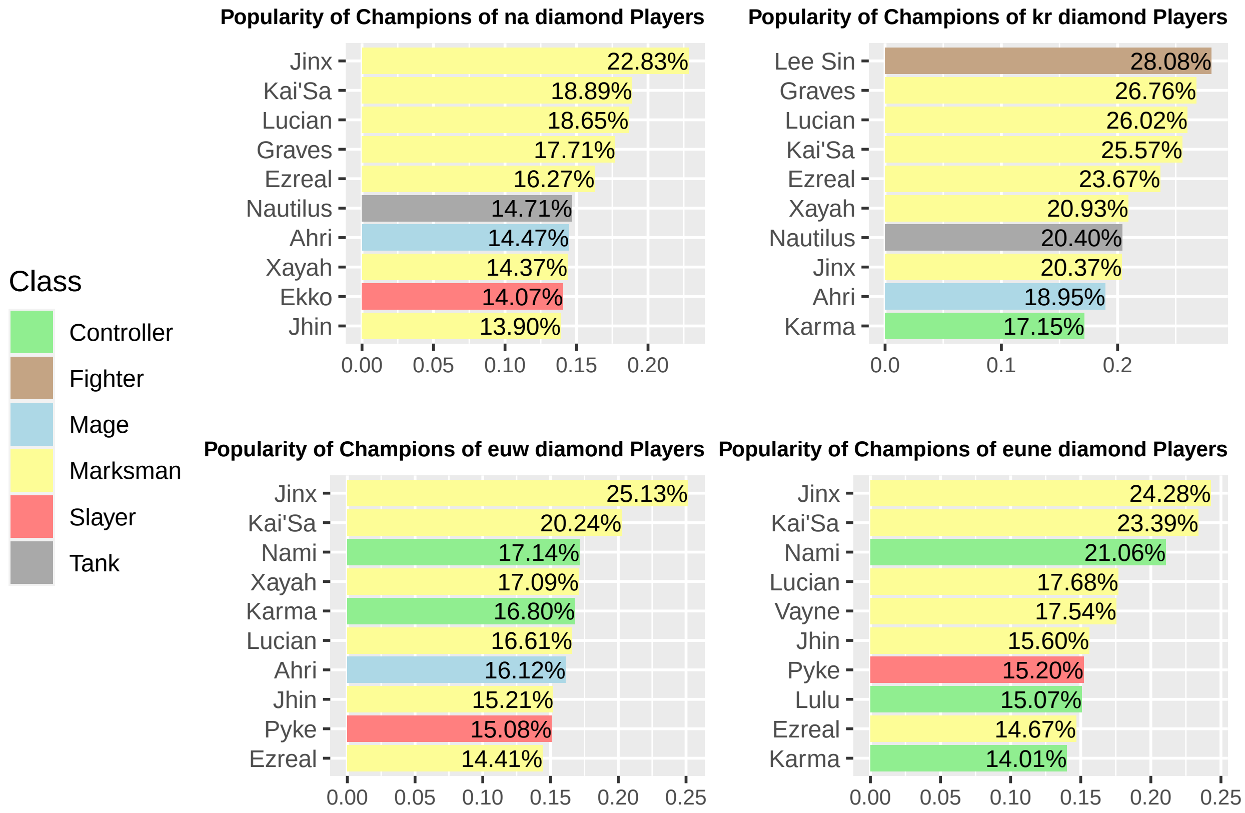
Popularity of Champions of na platinum Players

Popularity of Champions of kr platinum Players

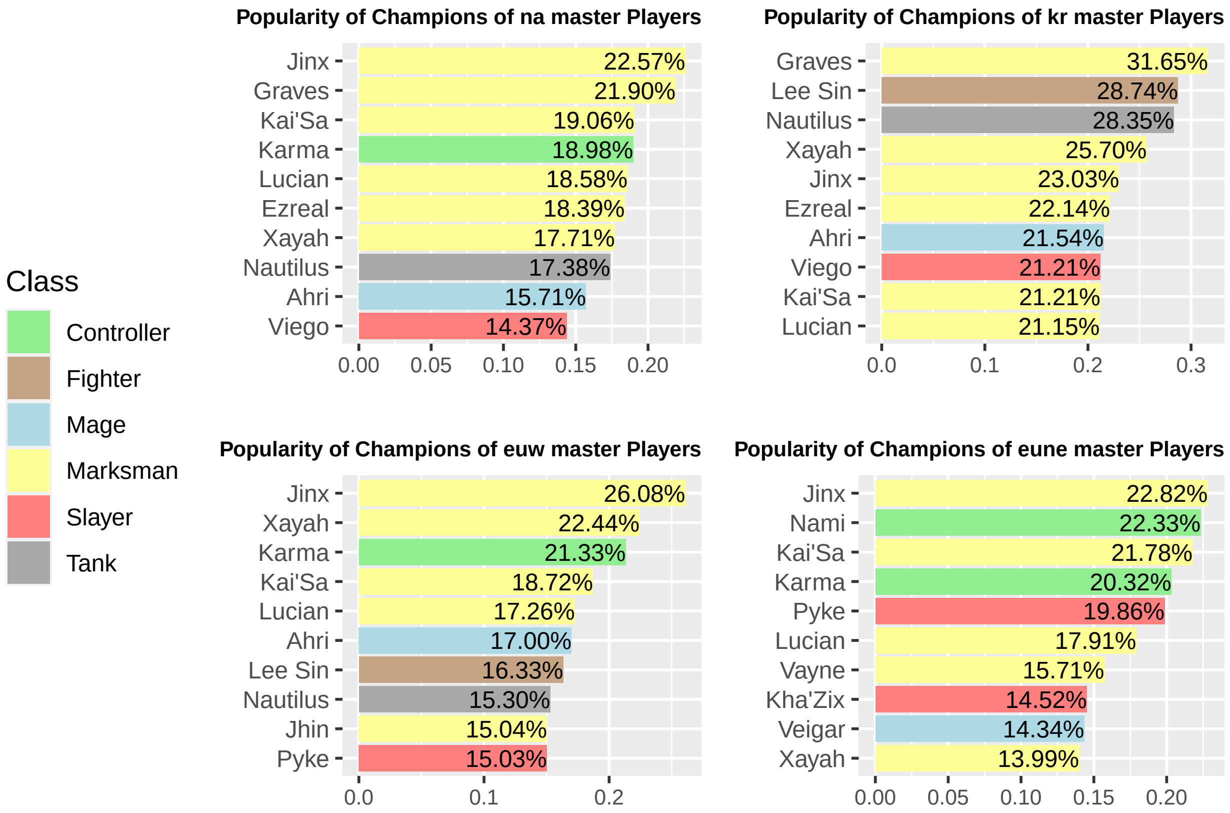
Popularity of Champions of euw platinum Players

Popularity of Champions of eune platinum Players

```
ggarrange(
  pickrateList[[6]],
  pickrateList[[16]],
  pickrateList[[26]],
  pickrateList[[36]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



```
ggarrange(
  pickrateList[[7]],
  pickrateList[[17]],
  pickrateList[[27]],
  pickrateList[[37]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



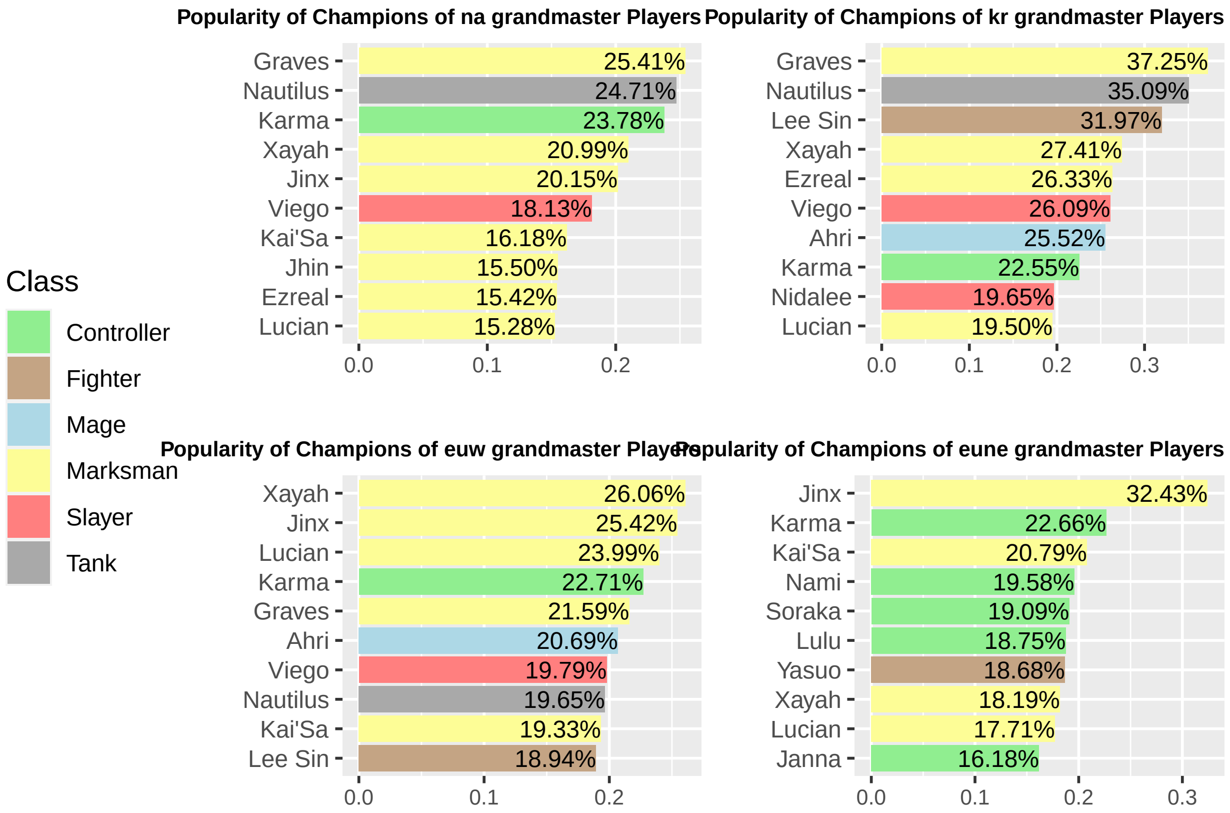
Popularity of Champions of na master Players

Popularity of Champions of kr master Players

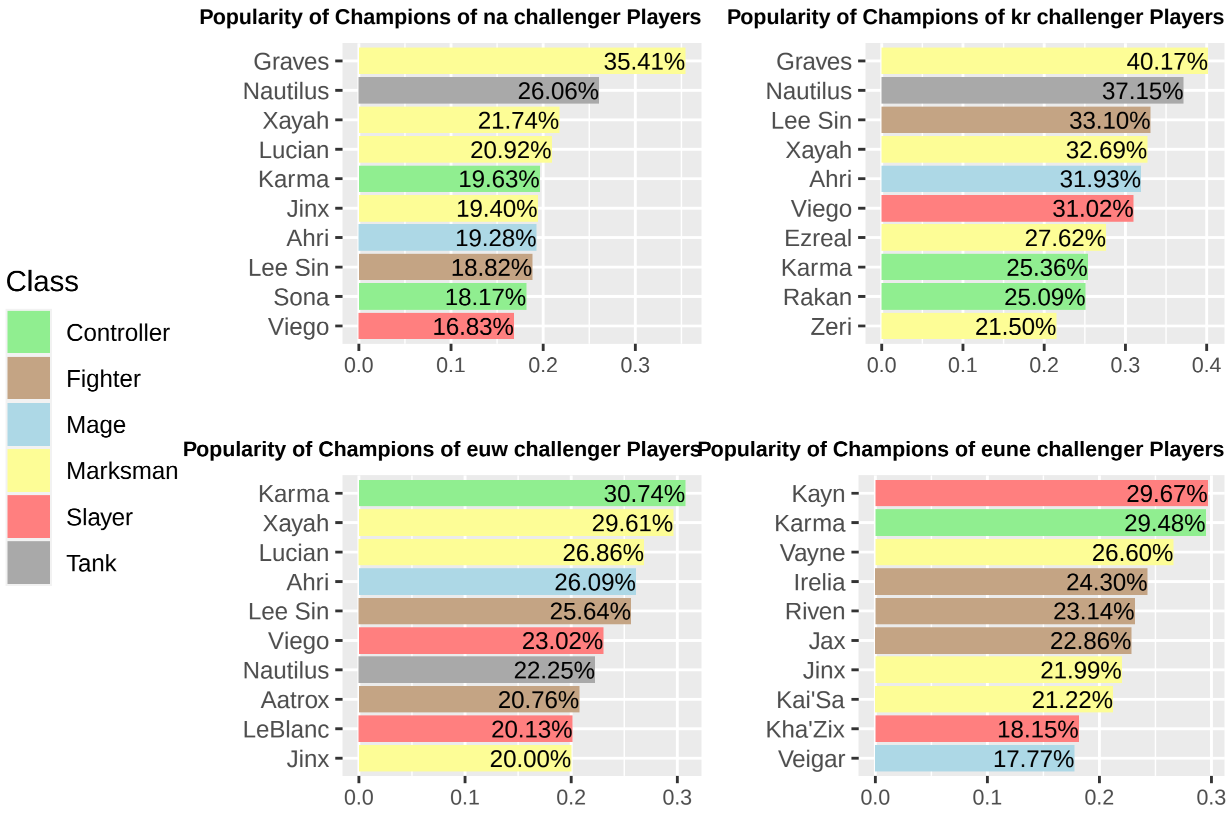
Popularity of Champions of euw master Players

Popularity of Champions of eune master Players

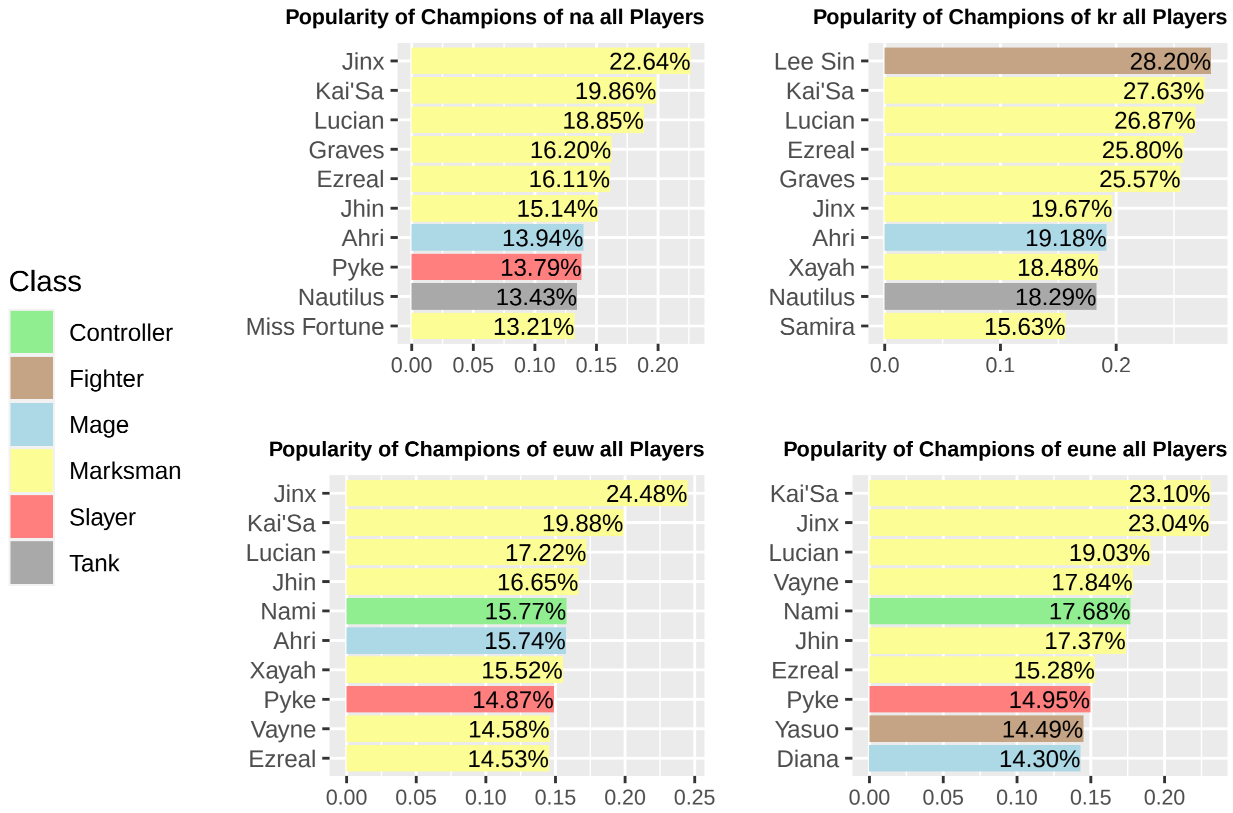
```
ggarrange(
  pickrateList[[8]],
  pickrateList[[18]],
  pickrateList[[28]],
  pickrateList[[38]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



```r
ggarrange(
  pickrateList[[9]],
  pickrateList[[19]],
  pickrateList[[29]],
  pickrateList[[39]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



```
ggarrange(
  pickrateList[[10]],
  pickrateList[[20]],
  pickrateList[[30]],
  pickrateList[[40]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```

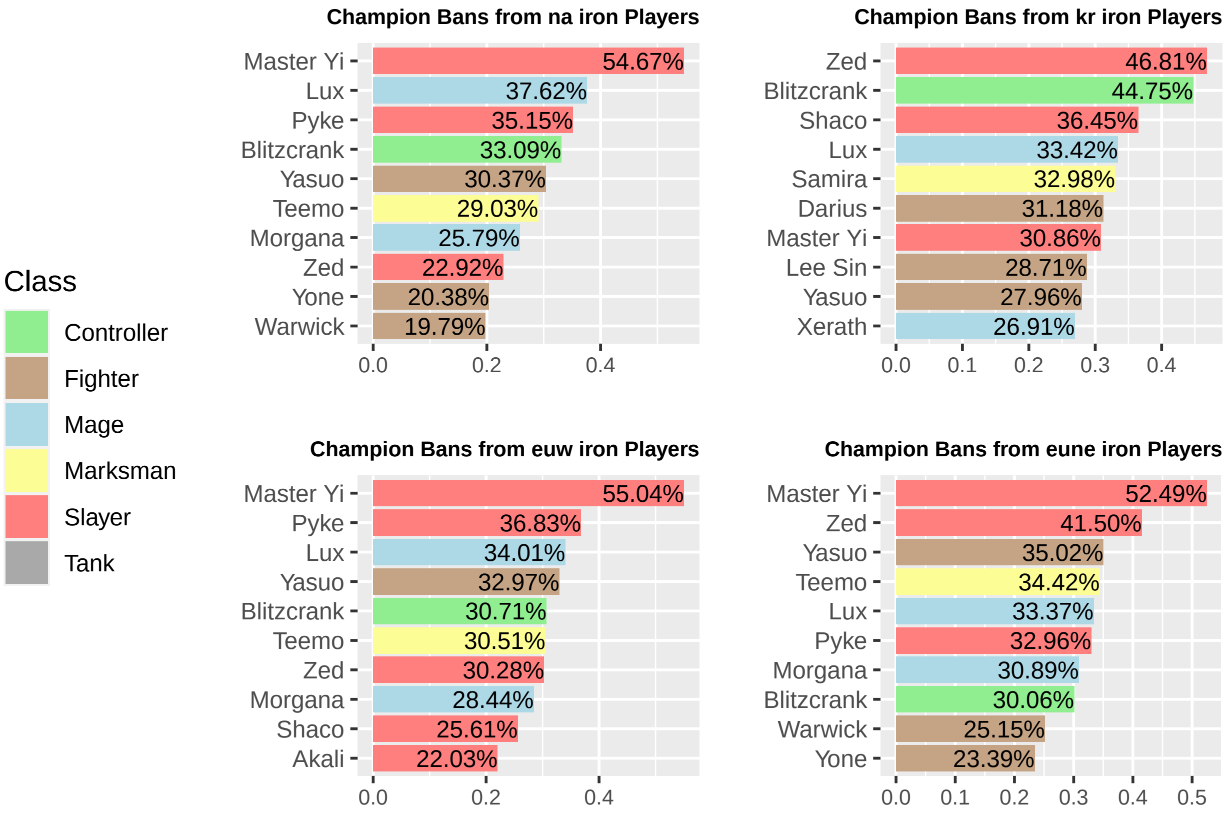


Conclusion: Interstingly, We see that all regions and ranks enjoy playing the marksman class-type. At lower elo, this does not hold and this makes sense as these lower level players do not know the basic mechanics of the game to correctly play a marksman. As if someone were to make a mistake on a marksman, they are normally dead. So, for lower ranks, we see that the artillery mage has the highest pickrate.

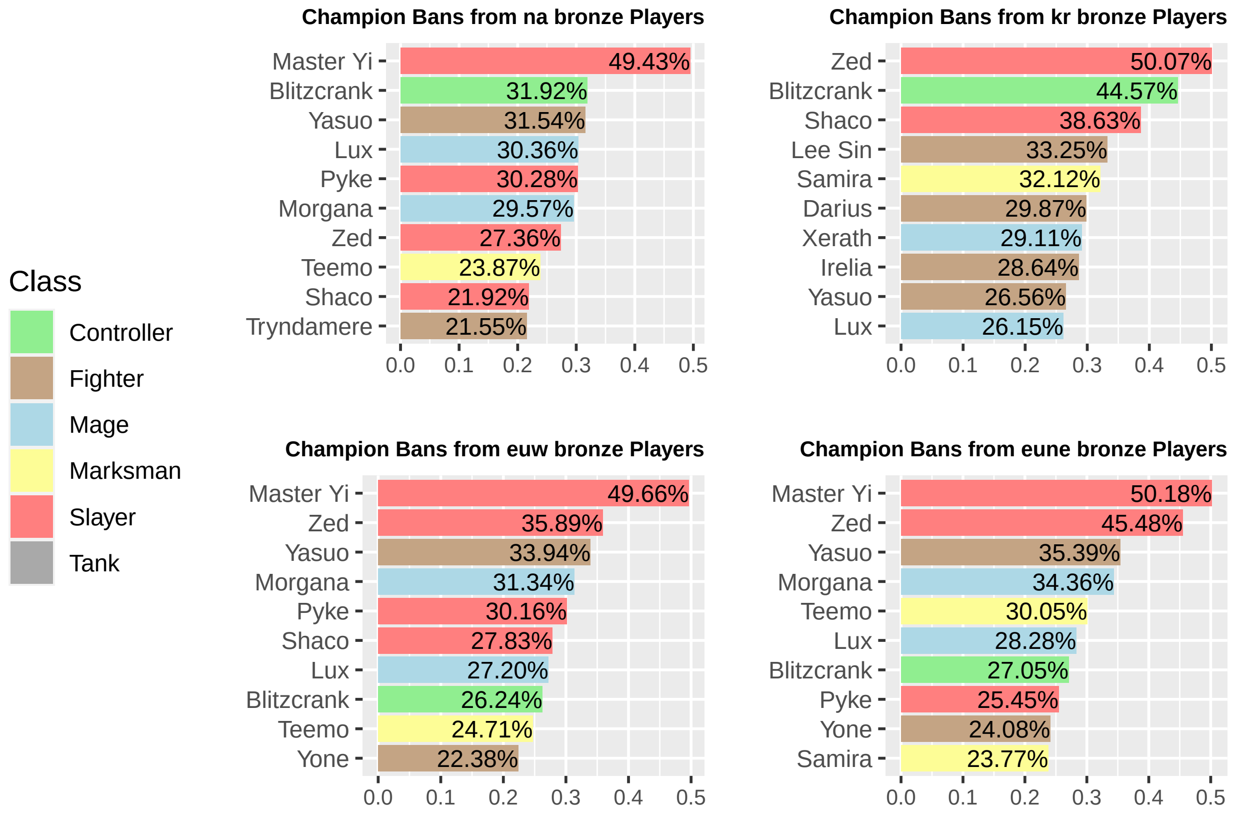
Banrate Percentage per Region

We will look at the Banrate percentage across the 4 regions defined earlier. By analyzing the banrate percentage for the top 10 champions, we can draw conclusions in what each region does NOT like to play against. The banrates can also tell us why certain picks are stronger is some regions compared to others.

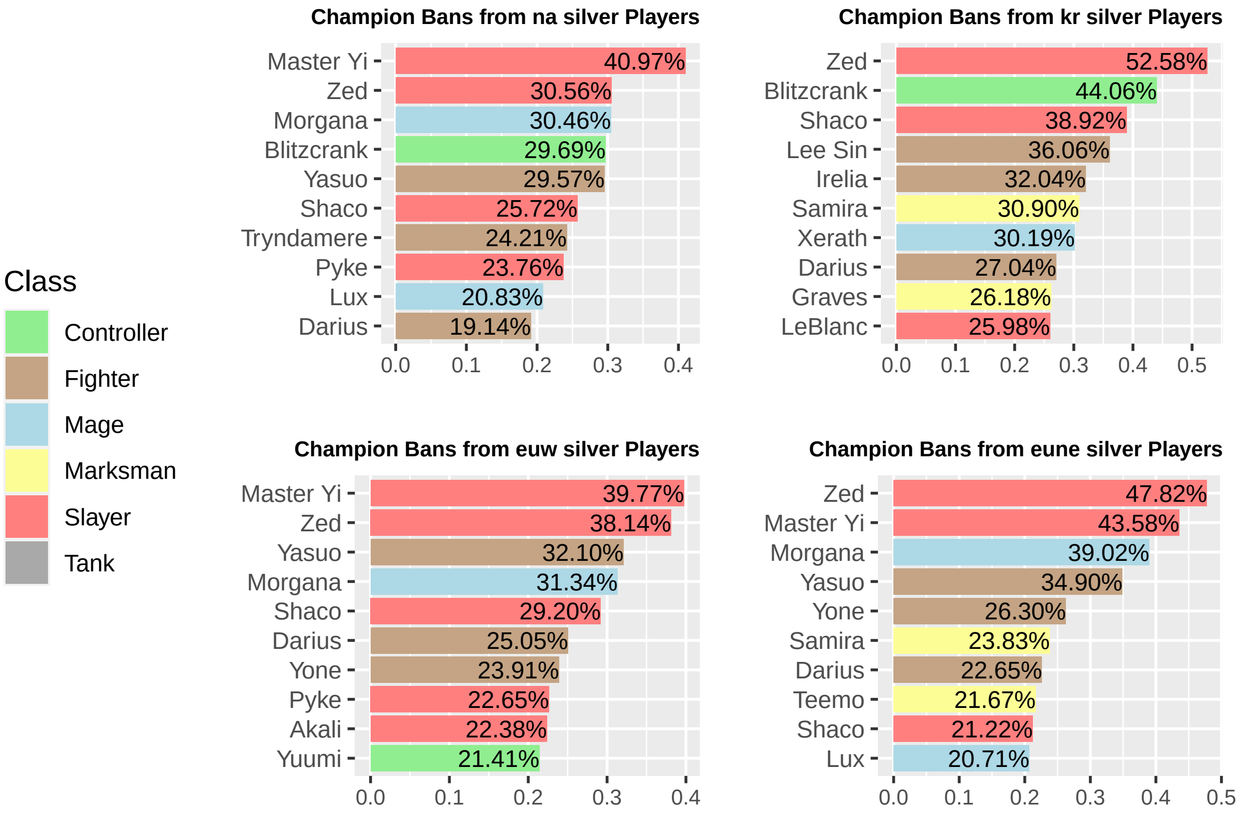
```
banrateList <- c()

for (reg in allRegions) {
  for (ranks in allranked_list) {
    regional_stats_3 <- full_stats %>%
      group_by(id, region, name, rank, archetype_type) %>%
      filter(region == reg, rank == ranks) %>%
      arrange(desc(ban_rate)) %>%
      head(10) %>%
      ggplot(aes(
        x = reorder(name, ban_rate),
        y = ban_rate,
        fill = class_type,
        label = scales::percent(ban_rate, accuracy = 0.01)
      )) + #Already a decimal unlike before
      geom_bar(stat = "identity") + #prevent overlapping
      geom_text(hjust = 1, size = 3, face = 2) + #adjust the text horizontally on the graph
      xlab("") + #remove the x-axis title
      ylab("") + #remove the y-axis title
      ggtitle(paste("Champion Bans from", reg, ranks, "Players")) +
      #Build title using the index of both loops
      theme(
        plot.title = element_text(hjust = 1, face = 2, size = 8),
        #Center title of graph
        axis.text.x = element_text(size = 8),
        legend.position = "none"
      ) + #Make Font size smaller
      labs(fill = "Class") + #Change legend title
      coord_flip() +
      scale_fill_manual(values = colours_legend, drop = FALSE) # same fill for all


    banrateList <-
      rbind(banrateList, list(regional_stats_3)) #Put everything into a list
  }
}

ggarrange(
  banrateList[[1]],
  banrateList[[11]],
  banrateList[[21]],
  banrateList[[31]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



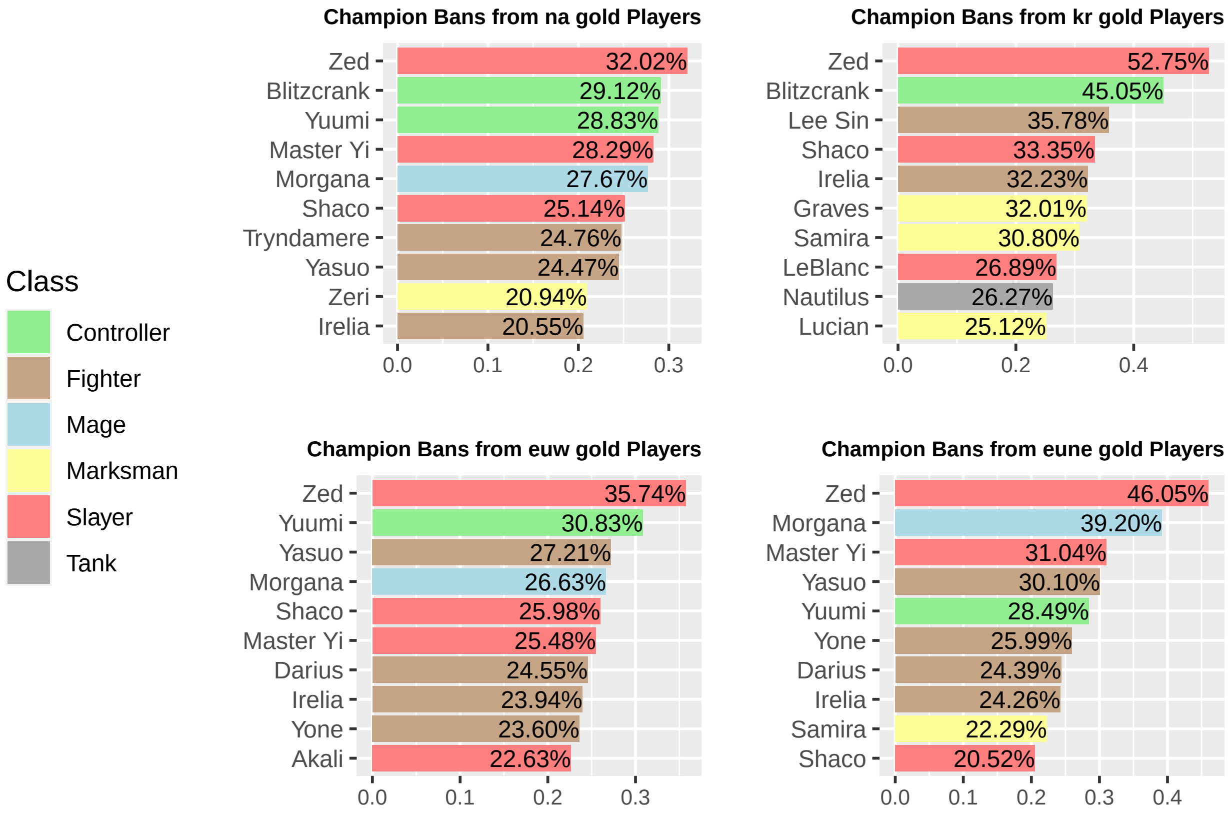
```
ggarrange(
  banrateList[[2]],
  banrateList[[12]],
  banrateList[[22]],
  banrateList[[32]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



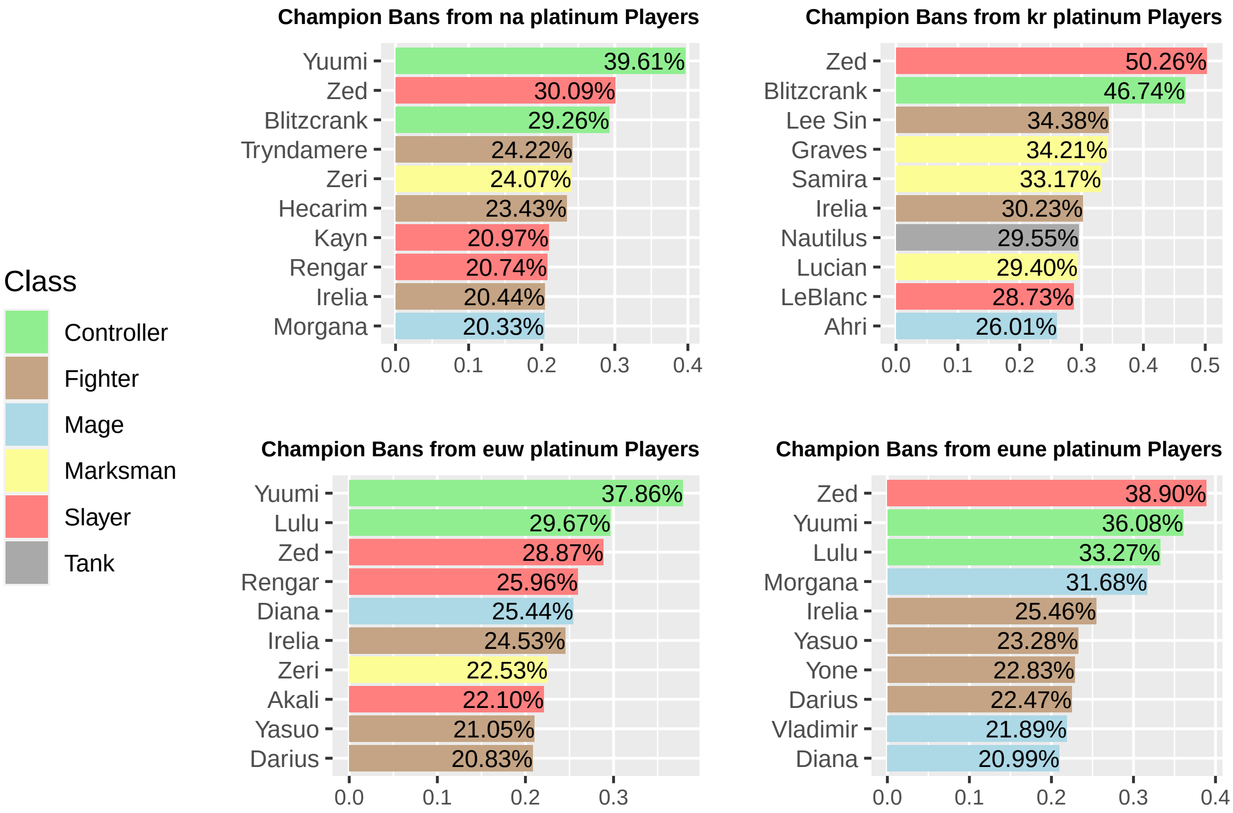
```r
ggarrange(
  banrateList[[3]],
  banrateList[[13]],
  banrateList[[23]],
  banrateList[[33]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



```
ggarrange(
  banrateList[[4]],
  banrateList[[14]],
  banrateList[[24]],
  banrateList[[34]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



```
ggarrange(
  banrateList[[5]],
  banrateList[[15]],
  banrateList[[25]],
  banrateList[[35]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```

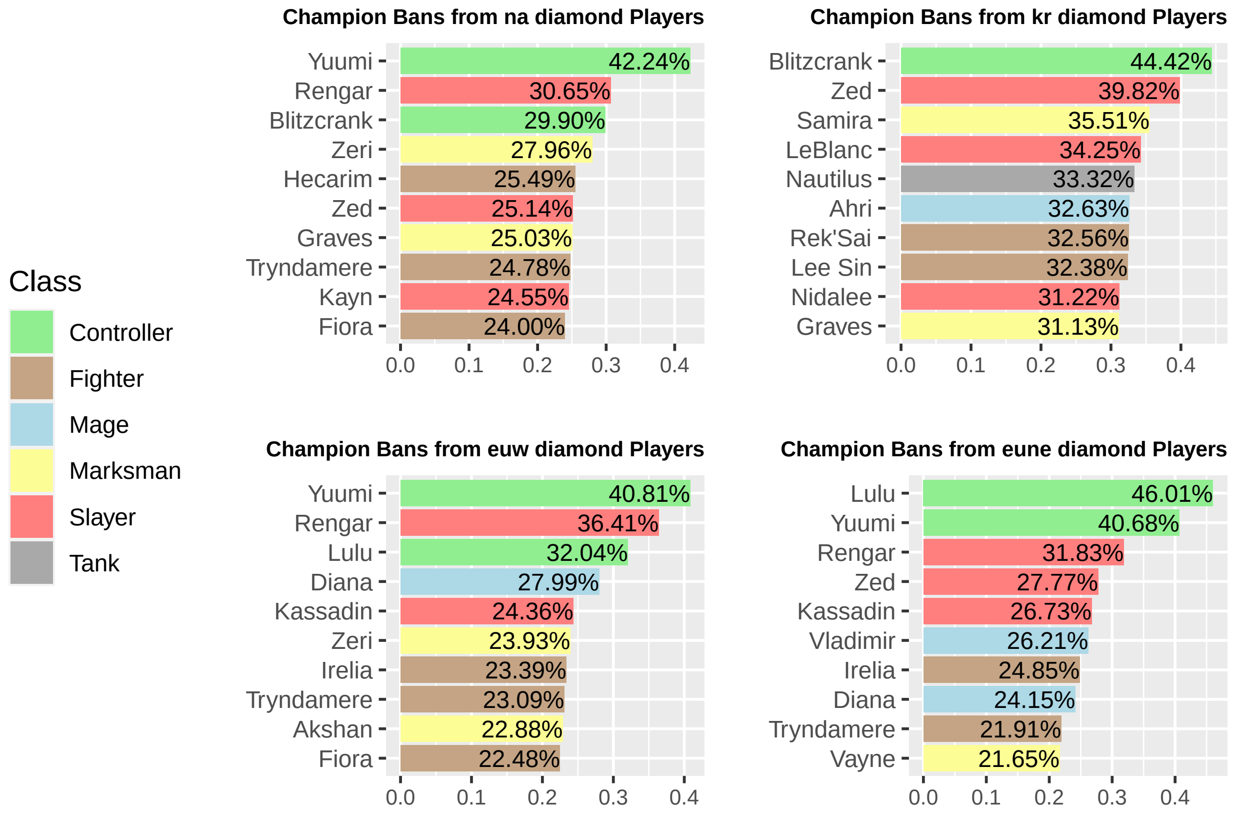

Champion Bans from na platinum Players

Champion Bans from kr platinum Players

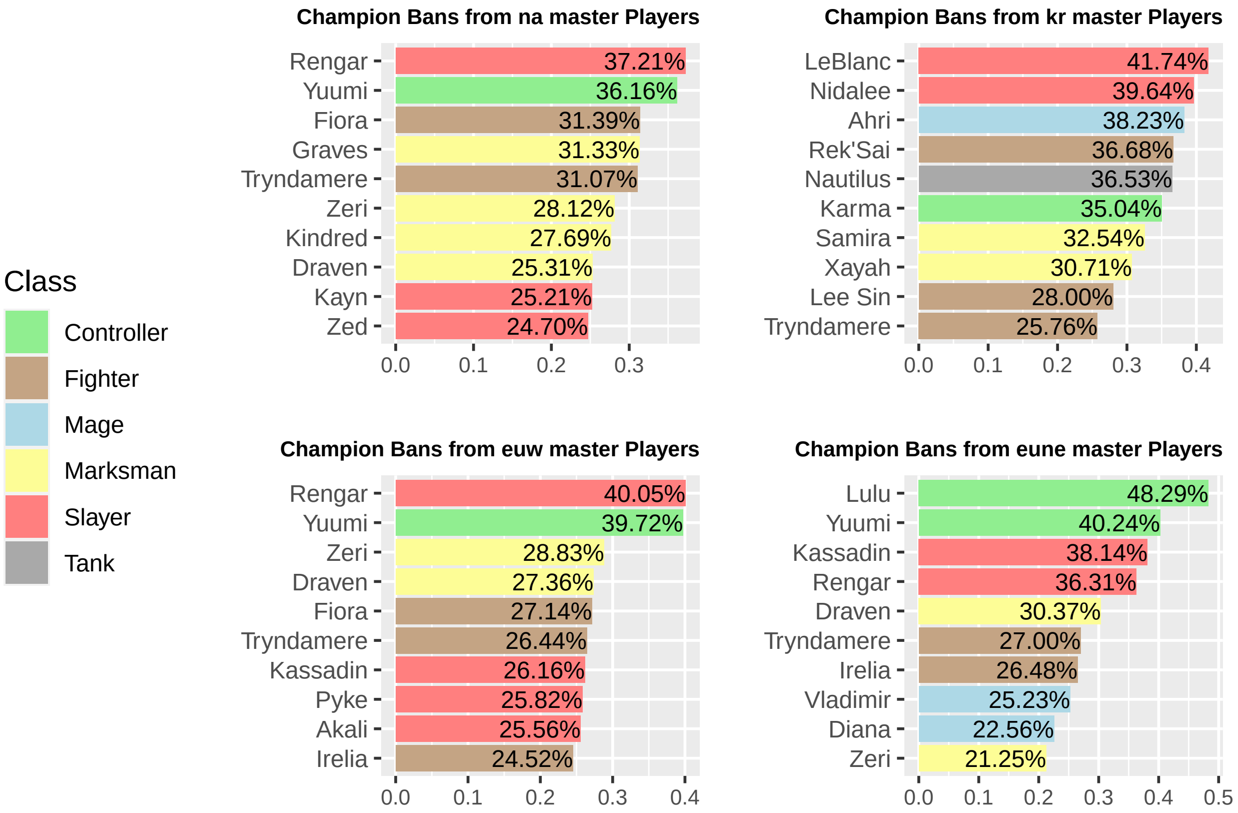
Champion Bans from euw platinum Players

Champion Bans from eune platinum Players

```r
ggarrange(
  banrateList[[6]],
  banrateList[[16]],
  banrateList[[26]],
  banrateList[[36]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



```
ggarrange(
  banrateList[[7]],
  banrateList[[17]],
  banrateList[[27]],
  banrateList[[37]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



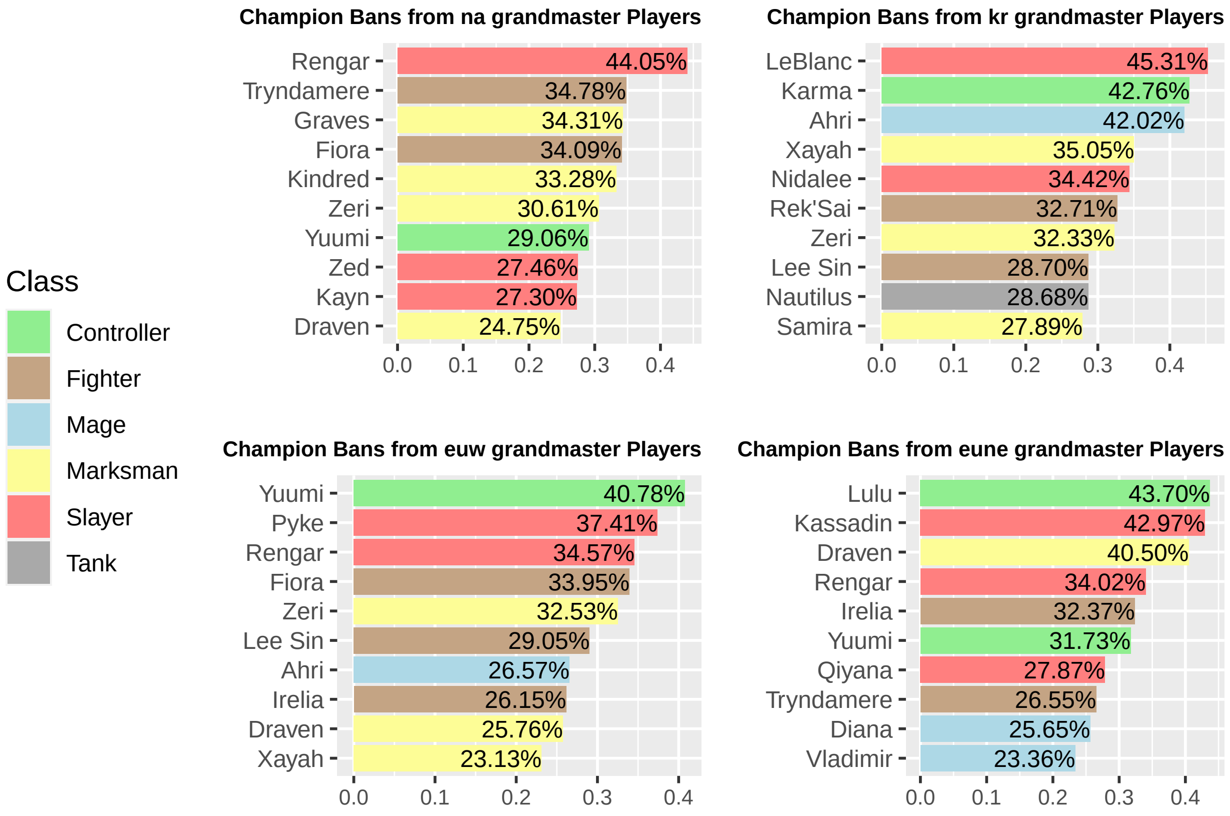
Champion Bans from na master Players

Champion Bans from kr master Players

Champion Bans from euw master Players

Champion Bans from eune master Players

```
ggarrange(
  banrateList[[8]],
  banrateList[[18]],
  banrateList[[28]],
  banrateList[[38]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



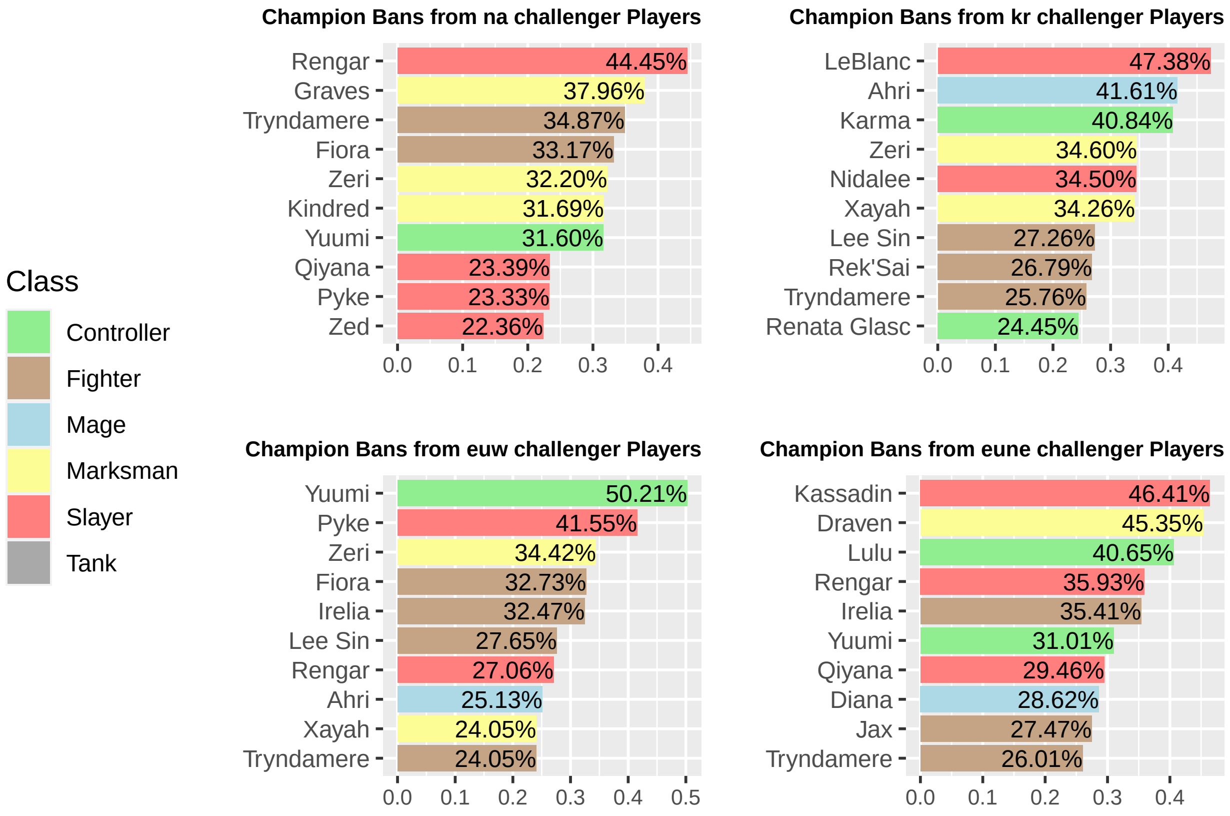
Champion Bans from na grandmaster Players

Champion Bans from kr grandmaster Players

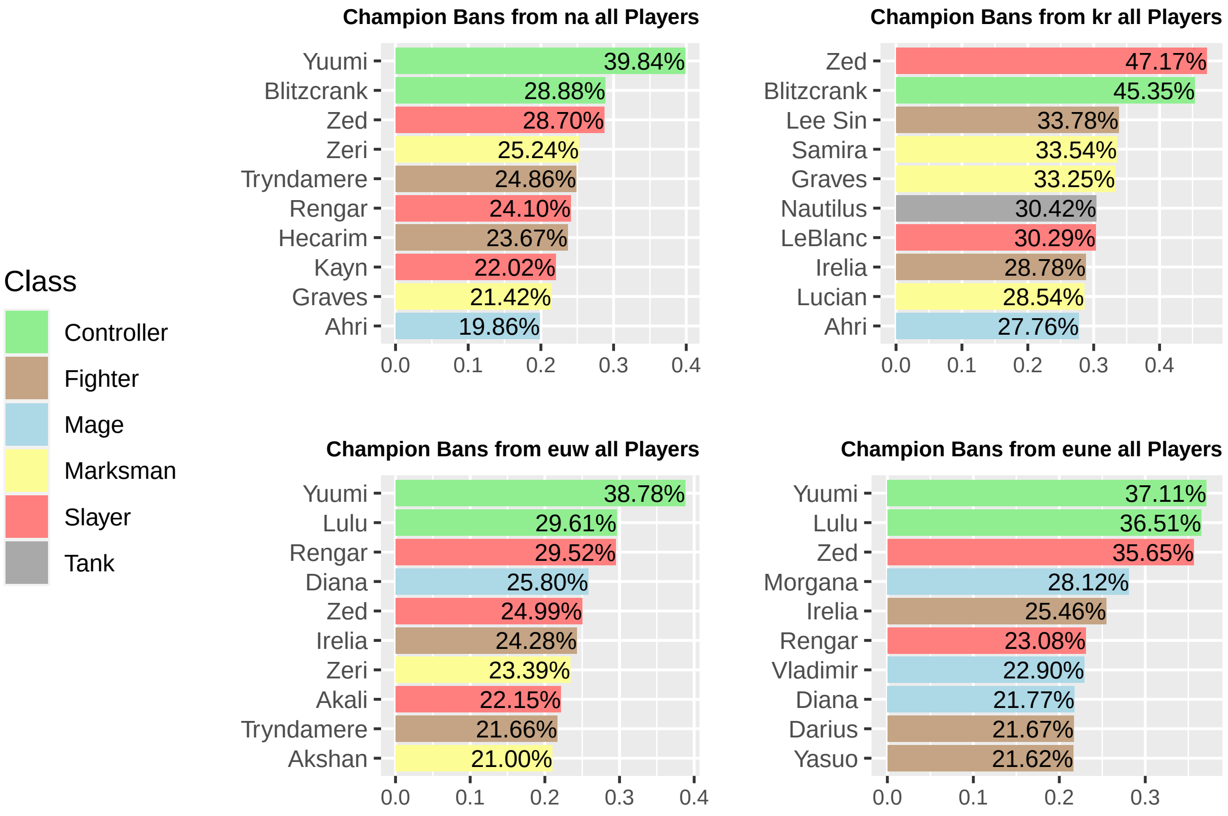
Champion Bans from euw grandmaster Players

Champion Bans from eune grandmaster Players

```r
ggarrange(
  banrateList[[9]],
  banrateList[[19]],
  banrateList[[29]],
  banrateList[[39]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```



```r
ggarrange(
  banrateList[[10]],
  banrateList[[20]],
  banrateList[[30]],
  banrateList[[40]],
  ncol = 2,
  nrow = 2,
  common.legend = TRUE,
  legend = "left"
)
```


Champion Bans from na all Players

Champion Bans from kr all Players

Champion Bans from euw all Players

Champion Bans from eune all Players

Conclusion: We see that in the lower ranks (Bronze-Gold) in North America. Europe West, and Europe North East that Master-Yi is the top or near the top of the bans. This is because he is a simple champion that scales extremely wel and is countered easily when a team can crowd-control him. This rarely happens in ranks as team-fights are very chaotic with little to no communication. In platinum, we see the main 2 bans of Zed and Yuumi in all of the regions. In korea they ban more aggressive picks that are hard to shutdown when they get ahead.