

Pick-Ban Relations

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Introduction

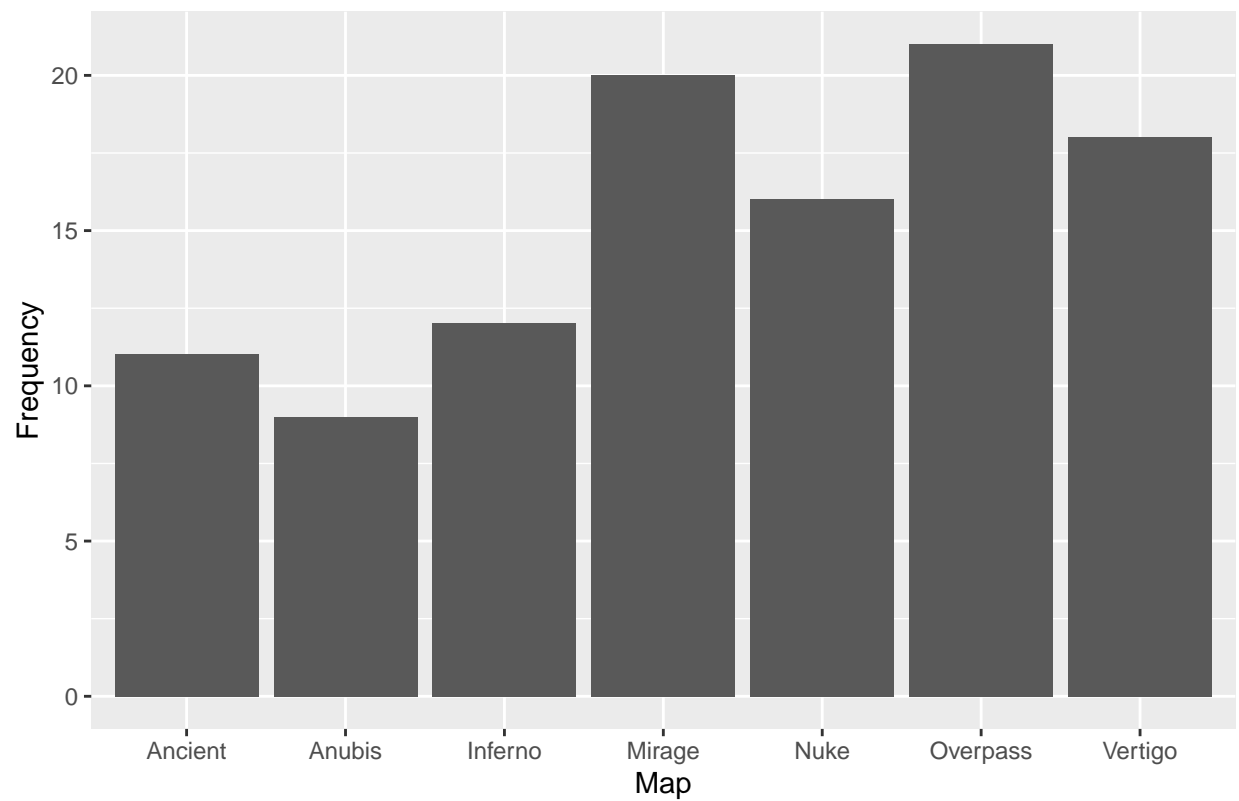
CS2 popularized the Premier gamemode, which includes a Pick-Ban method of selecting maps. Teams take turns banning maps until one is selected. Data was gathered from 109 matches on the order in which maps were banned (and which map was ultimately selected), as well as who had the advantage on the selected map (who had more recent wins). The data will be analyzed in various methods using R.

Ban Rates

First, the rates of banned maps will be analyzed without subdividing into any groups. Bar charts will be created to see the rates. (Datasets were prepared and summarised before-hand). The first chart is what map was played on, the second chart is first ban frequency, the third chart is second ban frequency, and the last chart is third ban frequency.

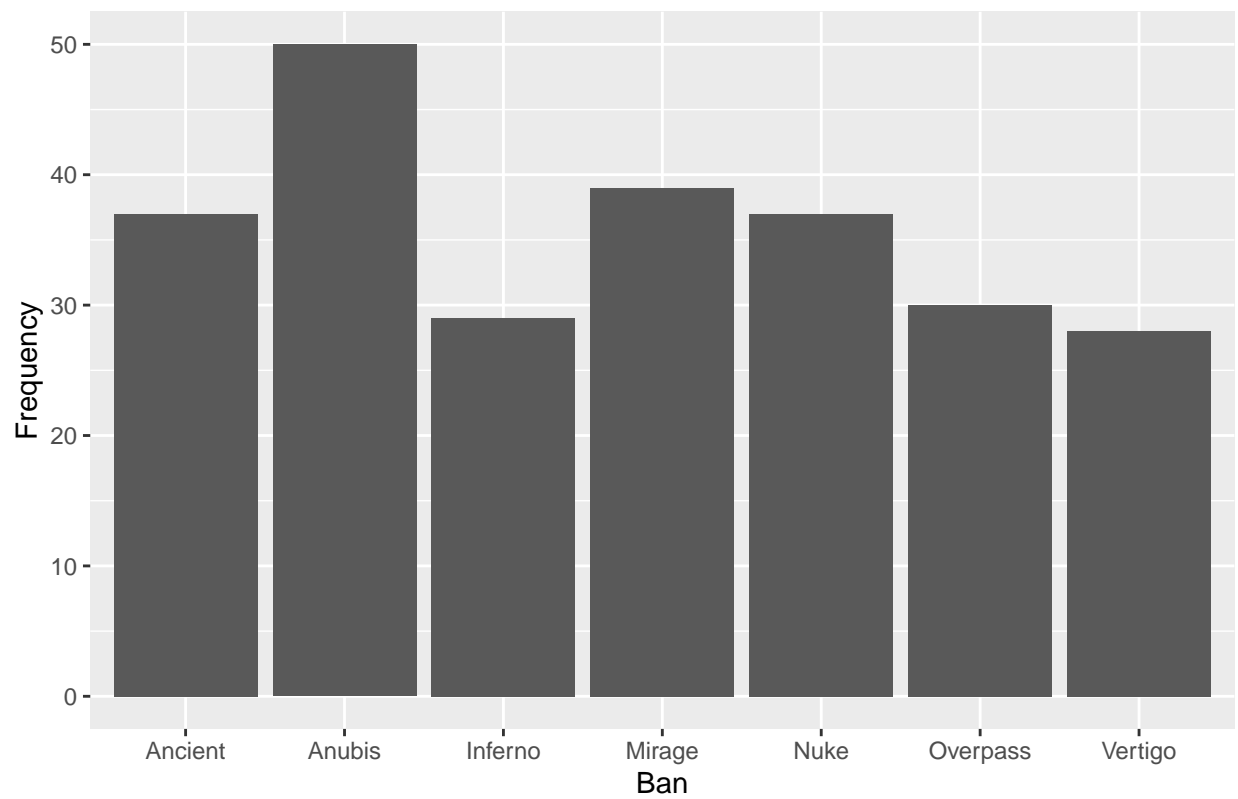
```
ggplot(data = mapsSummary, aes(x = Map, y = countMap)) +  
  geom_col() +  
  labs(title = "Bar Chart of Map Frequency", y = "Frequency")
```

Bar Chart of Map Frequency



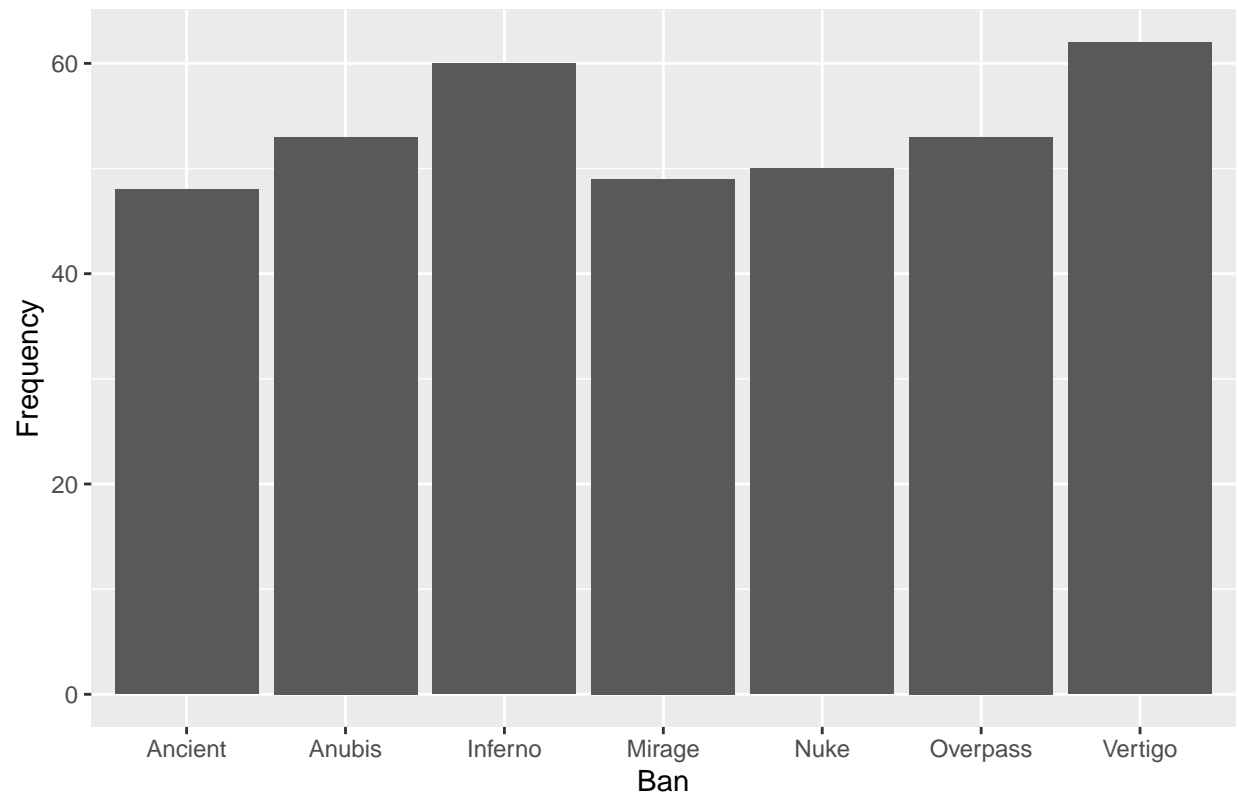
```
ggplot(data = firstSummary, aes(x = Ban, y = countMap)) +  
  geom_col() +  
  labs(title = "Bar Chart of First Ban Frequency", y = "Frequency")
```

Bar Chart of First Ban Frequency



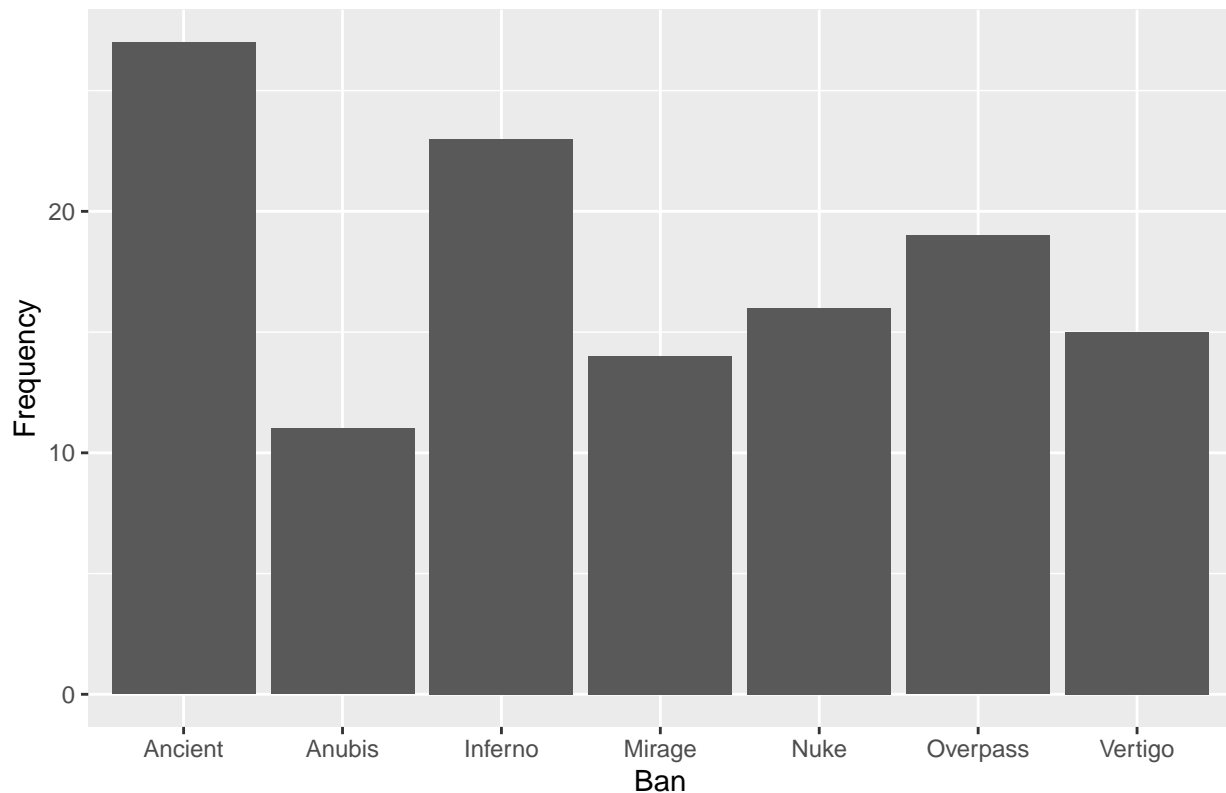
```
ggplot(data = secondSummary, aes(x = Ban, y = countMap)) +  
  geom_col() +  
  labs(title = "Bar Chart of Second Ban Frequency", y = "Frequency")
```

Bar Chart of Second Ban Frequency



```
ggplot(data = thirdSummary, aes(x = Ban, y = countMap)) +  
  geom_col() +  
  labs(title = "Bar Chart of Third Ban Frequency", y = "Frequency")
```

Bar Chart of Third Ban Frequency



Analyzing the first bar chart first, it is apparent that Anubis is infrequently played, with Ancient and Inferno nearby. On the other hand, the last four maps (Mirage, Nuke, Overpass, and Vertigo) are quite frequently played. This could be mostly due to player preference: Mirage and Nuke are quite popular maps within the community, whereas Ancient and Anubis do not appear to be as popular.

The second graph shows the first ban rates, where a team bans two maps to start. Here, it is painfully apparent that Anubis is not popular, which was found with the first graph. Anubis is banned constantly in the first round of pick-bans, with Ancient, Mirage, and Nuke trailing behind. Finally, Inferno, Overpass, and Vertigo are not banned first as frequently. This is a tad interesting since it was established that Mirage and Nuke are popular and get played frequently, but are also banned quite frequently as well. Part of this could be due to which team has the advantage, which will be analyzed in a later section.

The third graph showcases second ban rates, where the opposite team bans three maps. Interestingly, all of the maps are banned at around the same rates; Inferno and Vertigo do stand out a bit, but not enough to be extremely different. It is unsure why the maps are all equal though. Perhaps analyzing this in more depth in a later section will reveal some causes.

Finally, there is the third ban frequency, where the first team chooses the last map to ban (and consequently, which map to play). An interesting note is that Anubis is extremely low. One might be confused by this, before realizing that Anubis was banned so much in previous sections. It makes sense that the ban rates here are low: it rarely survives long enough to make it this far. Instead, Ancient and Inferno are banned most frequently at this stage, which plays in to them being played so rarely. The rest of the maps are banned around the same amount, which was the four most played maps that was found earlier.

Putting it all together, some interesting trends can be noted. Maps like Mirage and Overpass are usually below the “average ban rates” for each section, which plays in to them being played so often. In fact, Mirage, Nuke, Overpass, and Vertigo usually follow the same trends in each section, getting banned at about the same frequency. The first three (Ancient, Anubis, and Inferno) are where extremes are found.

Pick-Ban and Order

The two teams take turns banning the different maps, as noted earlier. It was noted that this order may have a difference in the rates that maps are banned. Now it is time to dive into that section and see if the order teams choose have any outcome on how maps are banned.

First, the datasets for map rates and order are merged and summarised.

```
masterFirstMerge <- master %>%  
  inner_join(firstBan, by = "ID") %>%  
  select(ID, PickBan, Advantage, Map, Ban)  
  
masterSecondMerge <- master %>%  
  inner_join(secondBan, by = "ID") %>%  
  select(ID, PickBan, Advantage, Map, Ban)  
  
masterThirdMerge <- master %>%  
  inner_join(thirdBan, by = "ID") %>%  
  select(ID, PickBan, Advantage, Map, Ban)  
  
mergeFirstSummary <- masterFirstMerge %>%  
  group_by(PickBan, Ban) %>%  
  summarise(count = n())
```

'summarise()' has grouped output by 'PickBan'. You can override using the
'.groups' argument.

```
mergeSecondSummary <- masterSecondMerge %>%  
  group_by(PickBan, Ban) %>%  
  summarise(count = n())
```

'summarise()' has grouped output by 'PickBan'. You can override using the
'.groups' argument.

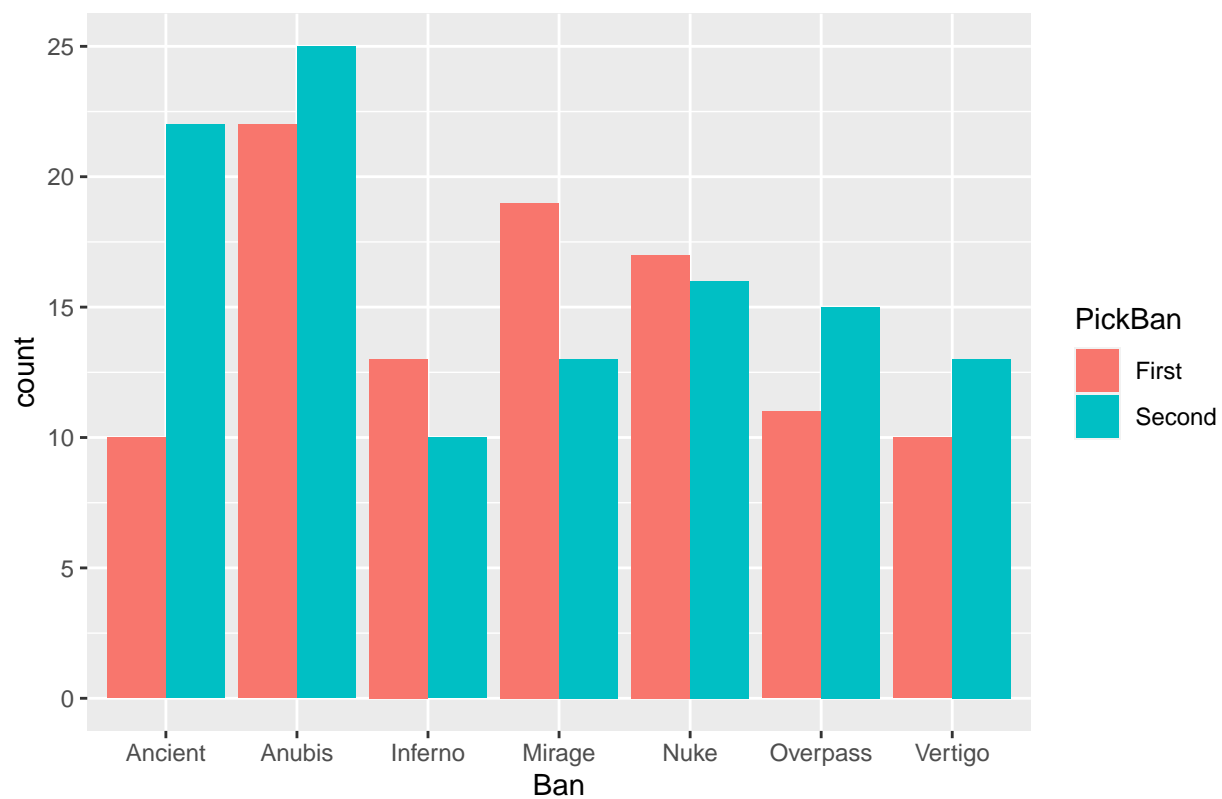
```
mergeThirdSummary <- masterThirdMerge %>%  
  group_by(PickBan, Ban) %>%  
  summarise(count = n())
```

'summarise()' has grouped output by 'PickBan'. You can override using the
'.groups' argument.

Now it is possible to chart the frequency of bans grouped by the order of the teams.

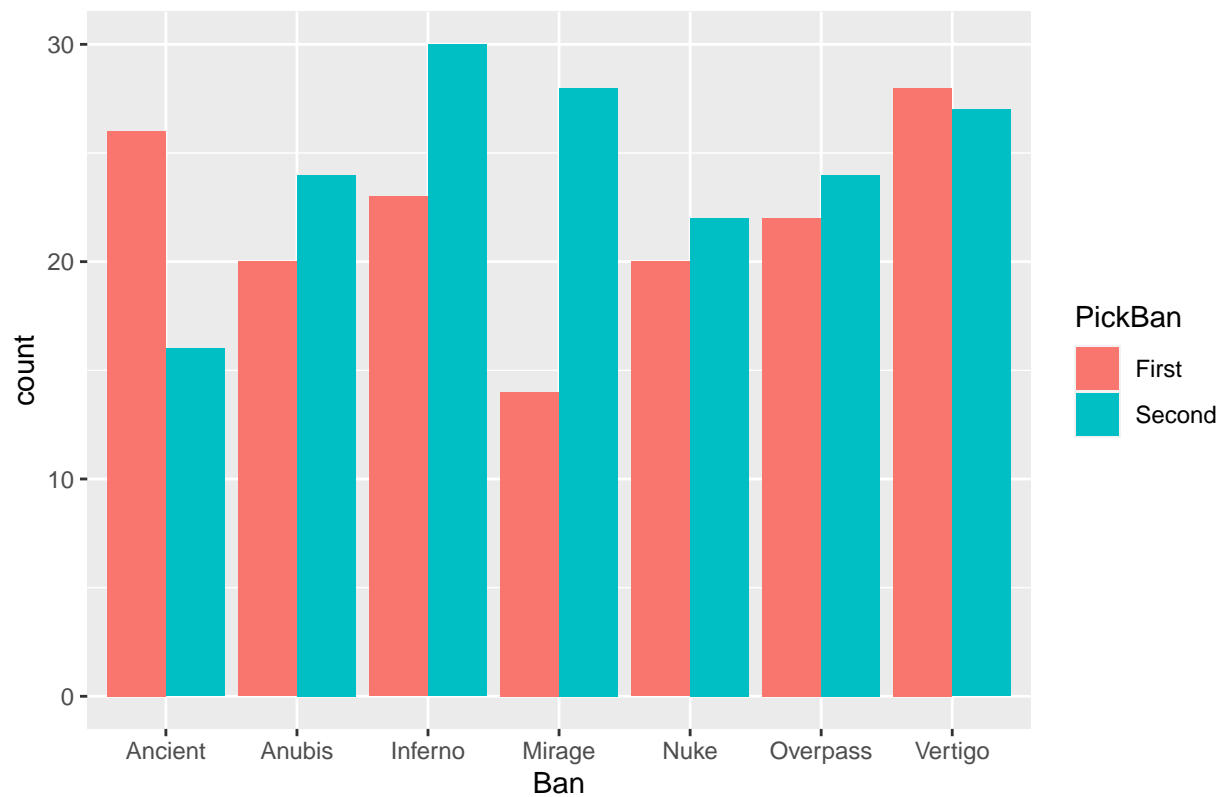
```
ggplot(data = mergeFirstSummary, aes(x = Ban, y = count)) +  
  geom_col(aes(fill=PickBan), position = "Dodge") +  
  labs(title = "Bar Chart of First Ban Counts, Grouped by Pick-Ban Order")
```

Bar Chart of First Ban Counts, Grouped by Pick-Ban Order



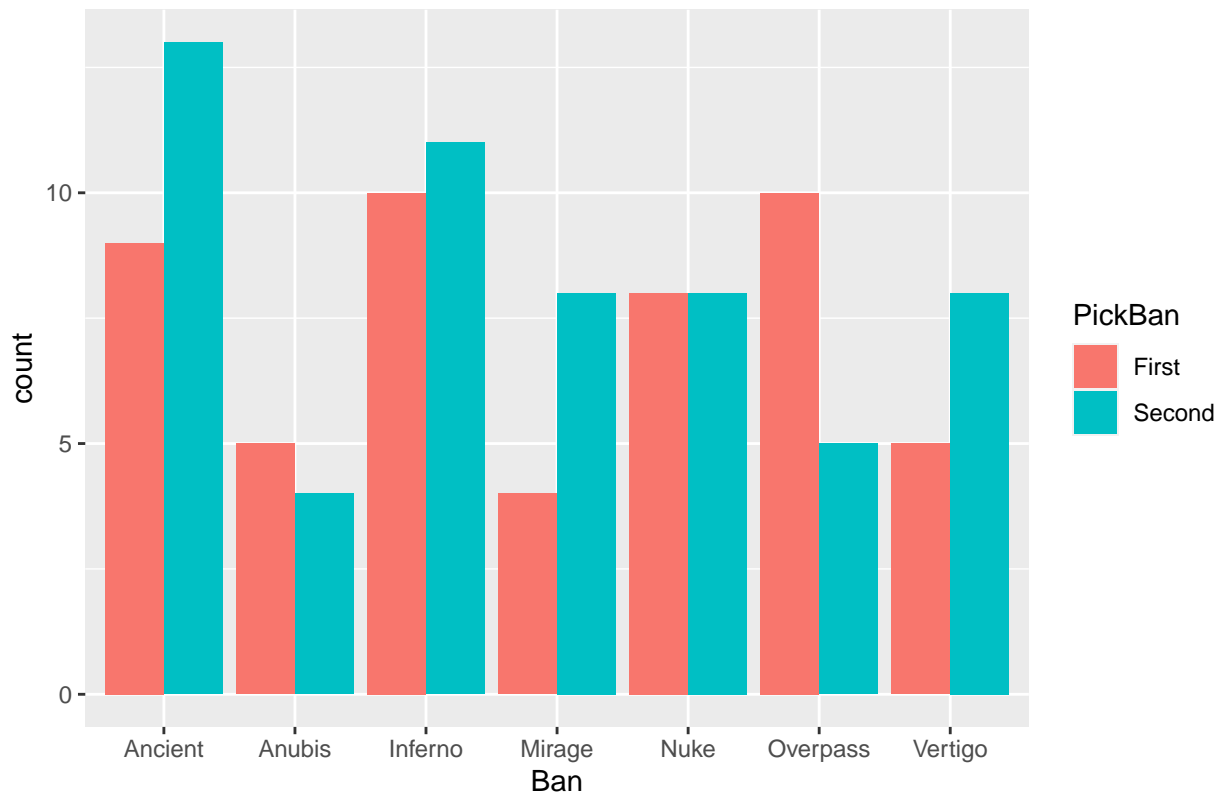
```
ggplot(data = mergeSecondSummary, aes(x = Ban, y = count)) +  
  geom_col(aes(fill=PickBan), position = "Dodge") +  
  labs(title = "Bar Chart of Second Ban Counts, Grouped by Pick-Ban Order")
```

Bar Chart of Second Ban Counts, Grouped by Pick-Ban Order



```
ggplot(data = mergeThirdSummary, aes(x = Ban, y = count)) +  
  geom_col(aes(fill=PickBan), position = "Dodge") +  
  labs(title = "Bar Chart of Third Ban Counts, Grouped by Pick-Ban Order")
```


Bar Chart of Third Ban Counts, Grouped by Pick-Ban Order



The first graph shows first ban counts grouped by pick-ban order, where red bars are where the author (and the team they were grouped with) banned that map, and the blue bars are where the opposing team banned that map. Here, some interesting observations can be noted. Ancient is wildly differing between the two groups: the opposing team will ban it more often than the author's team. This difference can also be seen in Mirage and Overpass, though not as extreme. As for the rest of the maps (Anubis, Inferno, Nuke, Vertigo), there is also a difference, but not as extreme as the first three.

Taking a look at the second graph, the roles are now reversed. Red bars are maps that the opposing team banned, and blue bars are maps the author's team banned. This is due to the order: if the team goes second, then it is their turn to ban a map on the second ban phase, whereas the first group just waits. Here, more extreme discrepancies can be seen: Mirage, Inferno, and Ancient all boast a hefty difference between the two groups. For Inferno and Mirage, the author's team bans them much more frequently. Inferno is likely because the author does not like that map, whereas Mirage is usually due to the opposing team having a massive advantage on that map (there is no statistics to back this up, however. It is simply an observation the author noted throughout the matches, but may be prone to confirmation bias.) As for Ancient, this may be due to opposing teams not liking the map, whereas the author doesn't mind broadening their horizons. As for the rest of the maps (Anubis, Nuke, Overpass, and Vertigo), no major difference can be seen between the two groups.

Finally, third ban rates are back to normal, where the first team gets to ban a final map. Here, another interesting note can be made: Ancient has a major discrepancy like before. When the author is first (and their team gets to ban), it is much lower than when the opposing team gets to choose the map. This may be similar as before: opposing teams may not like Ancient whereas the author doesn't mind it. Also worth noting is Overpass, Vertigo, and Mirage having major differences. For Overpass, the author's team bans it more than opposing teams, likely for the same reason Inferno was banned much more in the second phase. Vertigo and Mirage may be for similar reasons that Mirage was banned so frequently in the second phase. If those two maps made it past the second phase where the author's team gets to ban three maps, then it

likely means they have an advantage on those maps. Since the opposing team doesn't want to go up on a map where they have the disadvantage, they may ban those maps more than the author bans them. There is no statistics to back this up, though; it is purely speculation.

Maps and Advantages

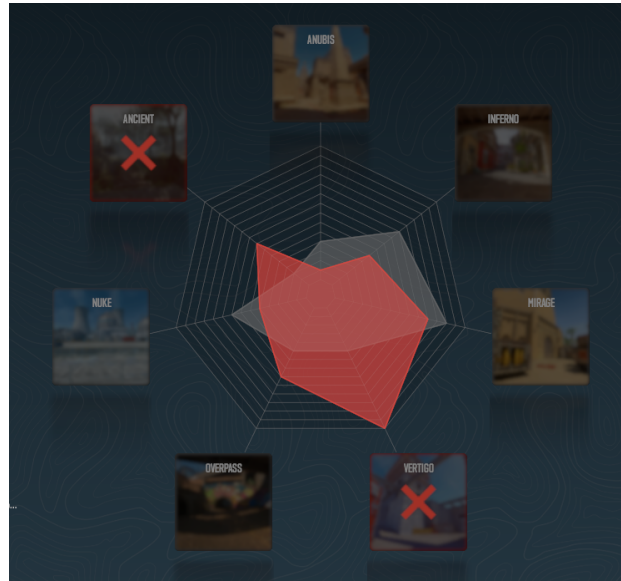


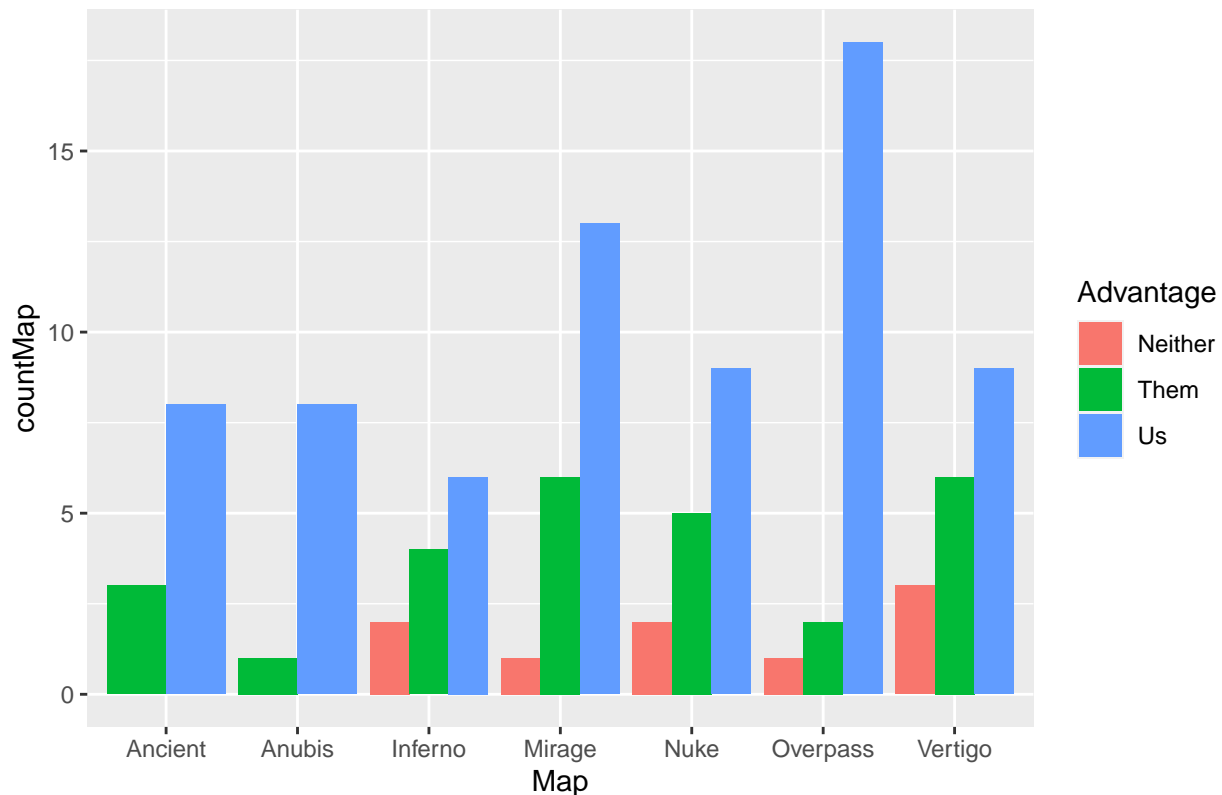
Figure 1: An example of the polygon graph in Premier.

In Premier during the pick-ban phase, players can see the overall team's most recent wins in a polygonal graph in the center. A farther segment means that team has much more wins on that map recently, and vice versa. Ideally, a team will want maps that they have a larger segment in, and ban maps that they have a smaller segment. Under ideal circumstances, this should result in a map that both teams are about evenly skilled in.

The following is a bar graph of the count of each map, paired by which team had the advantage on the map. An interesting note can be made as well about the data: it does not differentiate the "degree" of how much a team had an advantage. The data does not report whether a team had a massive difference in recent wins or a small difference, just that there was a difference. This may hinder some of the conclusions that can be made.

```
ggplot(data = mapsSummary, aes(x = Map, y = countMap)) +  
  geom_col(aes(fill=Advantage), position = "Dodge") +  
  labs(title = "Bar Chart of Map Frequency, Grouped by Advantage")
```

Bar Chart of Map Frequency, Grouped by Advantage



A first note to be made is that the “Neither” category does not appear often, not even occurring in Ancient or Anubis. This is because teams usually don’t “tie” in recent wins—a team will usually have at least one more recent win than the other. Other than not occurring in Ancient and Anubis, the “neither” category seems to be quite equally spread, though quite low.

Also worth noting is that for every map, the author’s team usually seems to have more recent wins than the opposing team (though how much cannot be commented on). Other than Inferno, the difference is quite pronounced as well! Later reports will look in to how the advantage affects different aspects; the purpose of this report is just to comment on the distribution of maps and bans.

Conclusion

After looking at the distribution of maps and bans grouped by various relevant attributes, it was found that some maps tend to be played more than others, specifically Mirage, Nuke, Overpass, and Vertigo. The last three maps, Ancient, Anubis, and Inferno were banned more frequently than chosen. However, the rates that the maps were banned varied quite a bit depending on what team was first to choose what was banned. And when grouped by which team had the advantage, it was found that generally the author’s team had the advantage on all the maps. Further research will be done to see how the advantage affects various attributes.

References

R Core Team (2023). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>.