

# **A GLIMPSE INTO FIGURE SKATING EVENTS**

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# INTRODUCTION

The dataset contains information about 17 major international **events of figure skating**, from October 2016 to December 2017.

Dataset source: <https://github.com/BuzzFeedNews/2018-02-figure-skating-analysis>



# HOW DOES AN EVENT WORK?

In each event, **junior** and **senior** athletes compete. The athletes are divided in 4 **categories**: **Ladies**, **Men**, **Ice dance** and **Pairs**.

The competition has the same structure all over the categories. Each one is composed by 2 **programs**: **short** and **free**.

Athlete(s) final score = short program score + free program score

# HOW TO CALCULATE THE SCORES?

In each performance two types of aspects are judged: **elements** (i.e. jumps and spins) and **components** (i.e. interpretation of the music and skating skills).

Performance score = **elements score** + **components score**

**Element's score** = element's base value + judge's score  
 $\in [-3, +3]$

**Component's score** = factor \* judge's score  
 $\in [0.25, 10]$

# DATASET

Some of the main information considered after preprocessing are:

- ❄ event
- ❄ category
- ❄ program
- ❄ athlete\_name
- ❄ athlete\_nation
- ❄ element\_base\_value
- ❄ total\_element\_score
- ❄ total\_component\_score
- ❄ judge\_nation
- ❄ rank
- ❄ ...

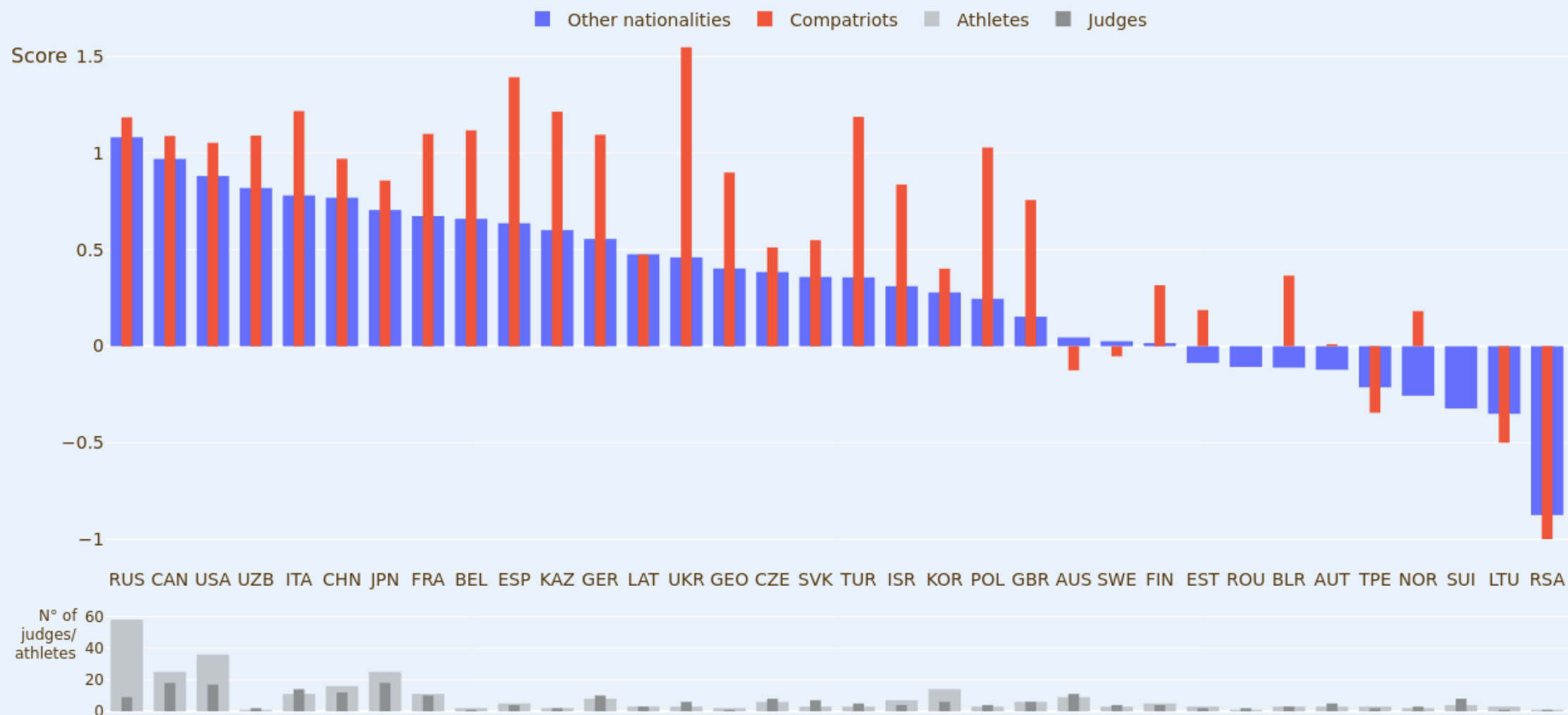
You can find the processed dataset and code [here](#).

# QUESTIONS ADDRESSED

- ❄ Do the judges favor compatriot athletes?
- ❄ How do the athletes rank depending on the difficulty of the elements performed?
- ❄ Are elements more important than components in establishing the final ranking?

## Evident national bias in judges' scoring

Comparison between the average score given to a Nation's athletes by their compatriots and the one given by other judges.



data source: <https://github.com/BuzzFeedNews/2018-02-figure-skating-analysis>  
plot author: Cecilia Zagni

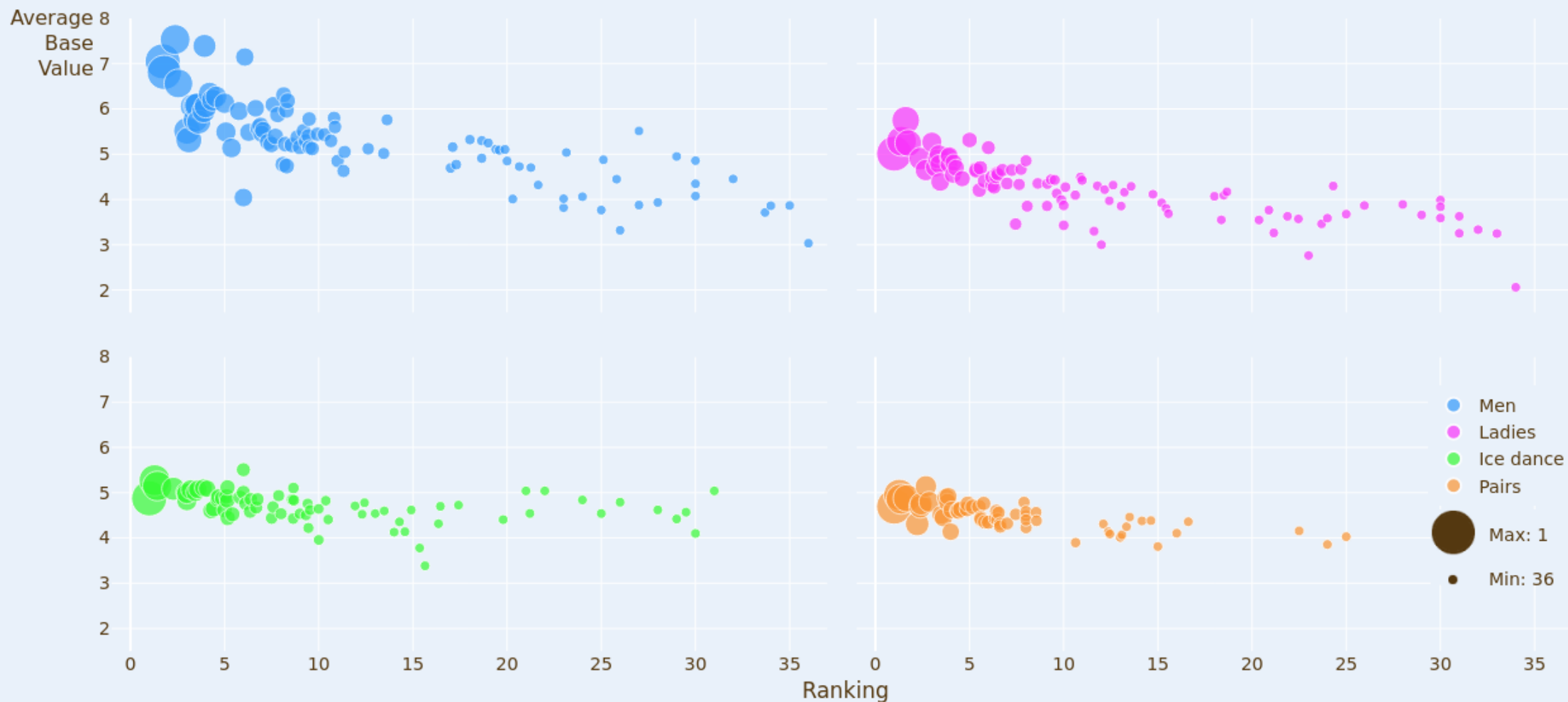
# MAPPING GRAPH 1

- ❄ The results are presented in a bar plot (top).
- ❄ The bottom bar plot is useful to understand the variability in the averages.
- ❄ Only the elements' score is considered. Athletes who were never judged by a compatriot judge are discarded.
- ❄ On the x axis countries are displayed, ordered by other nationalities' score descending. The axis is shared between the two plots.
- ❄ On the y axis of the top plot is displayed the average score given by the judges.
- ❄ On the y axis of the bottom plot is displayed the total number of athletes/judges.
- ❄ In the top plot, colors discriminate the category of the judges (compatriots and not).
- ❄ In the bottom plot, colors differentiate judges from athletes.



## Top ranking Men and Ladies athletes take bigger risks

Athletes in the Men and Ladies top group perform more difficult elements than the others. No significant correlation is noticed for Ice dance and Pairs.



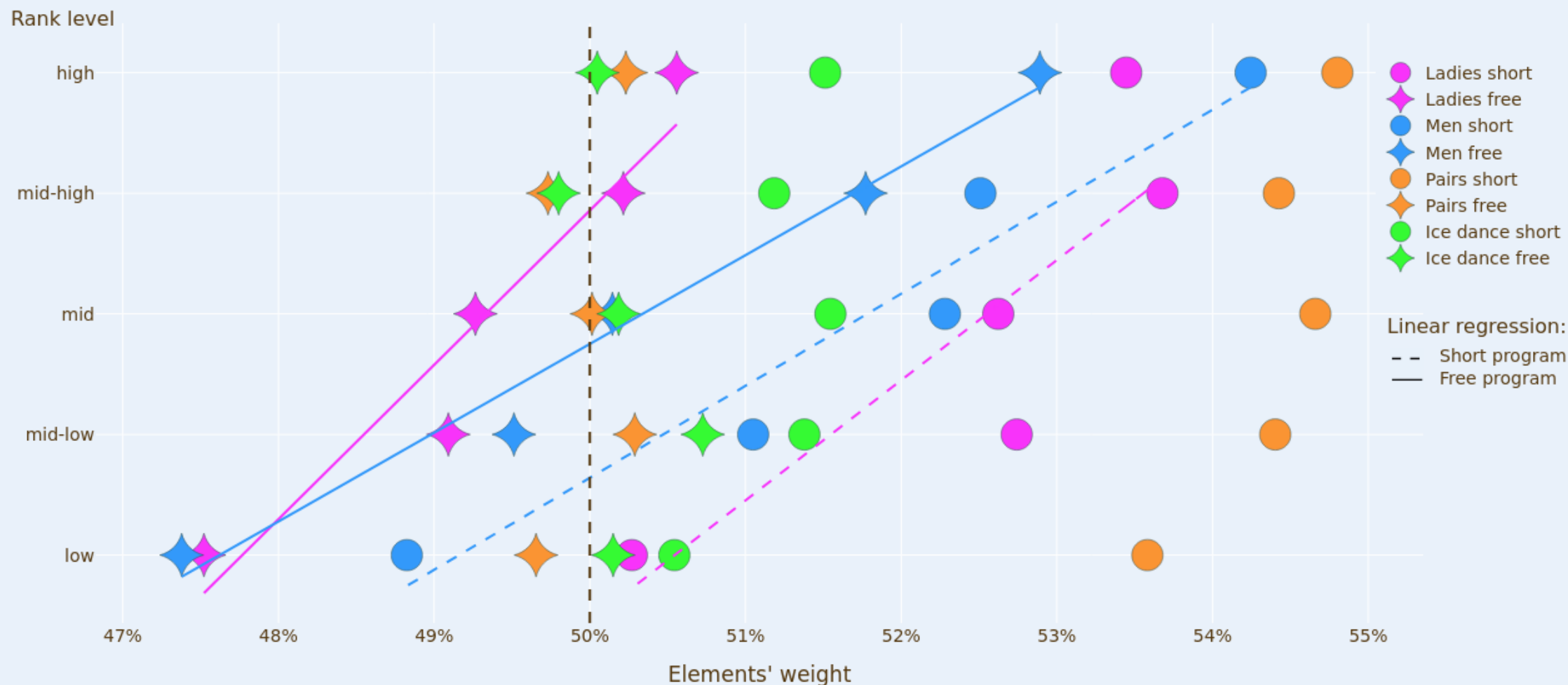
data source: <https://github.com/BuzzFeedNews/2018-02-figure-skating-analysis>  
plot authors: Valeria Insogna, Cecilia Zagni

# MAPPING GRAPH 2

- ❄ The results are presented in a bubble plot (small multiples).
- ❄ On the x axis is displayed average ranking. This “” is also represented by the dimension of the bubble.
- ❄ On the y axis is displayed the average base value of the elements (as a measure of difficulty).
- ❄ All the averages were computed considering all the performances of all the athletes in all the events.
- ❄ Each athlete is represented by a bubble.
- ❄ Colors discriminate the category of the athletes. We chose to group together junior categories with their respective senior's ones, because the general trending didn't differ significantly among them.

## Elements play key role in Men and Ladies competitions

The more the elements' importance in the performance score, the higher the ranking of Men and Ladies athletes. For the other categories, correlation between ranking and elements' weight is less noticeable. Short programs tend to have higher elements' weight than free ones.



data source: <https://github.com/BuzzFeedNews/2018-02-figure-skating-analysis>  
plot author: Valeria Insogna

# MAPPING GRAPH 3

- ✧ The results are presented in scatter plot.
- ✧ On the y axis is displayed the rank level. It was necessary to differentiate the ranking in (5) levels because the number of participants differs among events, categories and programs.
- ✧ On the x axis is displayed the average weight of the elements. It wasn't necessary to plot the components' weights, since the final performance score is the sum of the two.
- ✧ All the averages were computed considering all the performances of all the athletes in all the events.
- ✧ Colors discriminate the category of the athletes. We chose to group together junior categories with their respective senior's ones, because the general trending didn't differ significantly among them.
- ✧ Marker's shape differentiate short program from free program.
- ✧ Lines represent the linear regression of each category/program.
- ✧ The dashed bold line marks the 50% threshold, corresponding to a balanced score between elements and components.
- ✧ In order to stress the correlation between ranking and elements' weight, regression lines for Men and Ladies has been plotted : the line type discriminates the type of the program (short or free).



# INDIVIDUAL CONTRIBUTIONS

- ❄ Dataset preprocessing: Zagni.
- ❄ Question brainstorming: Insogna, Zagni.
- ❄ Question one data analysis and visualitazion: Zagni.
- ❄ Question two data analysis and visualitazion: Insogna.
- ❄ Question three data analysis : Insogna.
- ❄ Question three visualitazion: Zagni.
- ❄ Slides and refinements: Insogna, Zagni.

# REFERENCES

- ❄ <https://github.com/BuzzFeedNews/2018-02-figure-skating-analysis>
- ❄ [https://en.wikipedia.org/wiki/ISU\\_Judging\\_System#:~:text=The%20seven%20elements%20required%20of,spiral%2C%20and%20one%20step%20sequence.](https://en.wikipedia.org/wiki/ISU_Judging_System#:~:text=The%20seven%20elements%20required%20of,spiral%2C%20and%20one%20step%20sequence.)
- ❄ <https://www.usfigureskating.org/about/scoring-system>
- ❄ <https://www.isu.org/figure-skating/rules/fsk-judging-system>

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