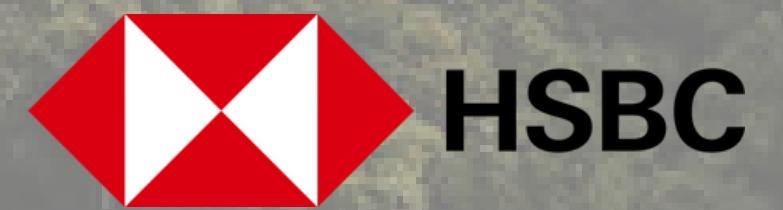
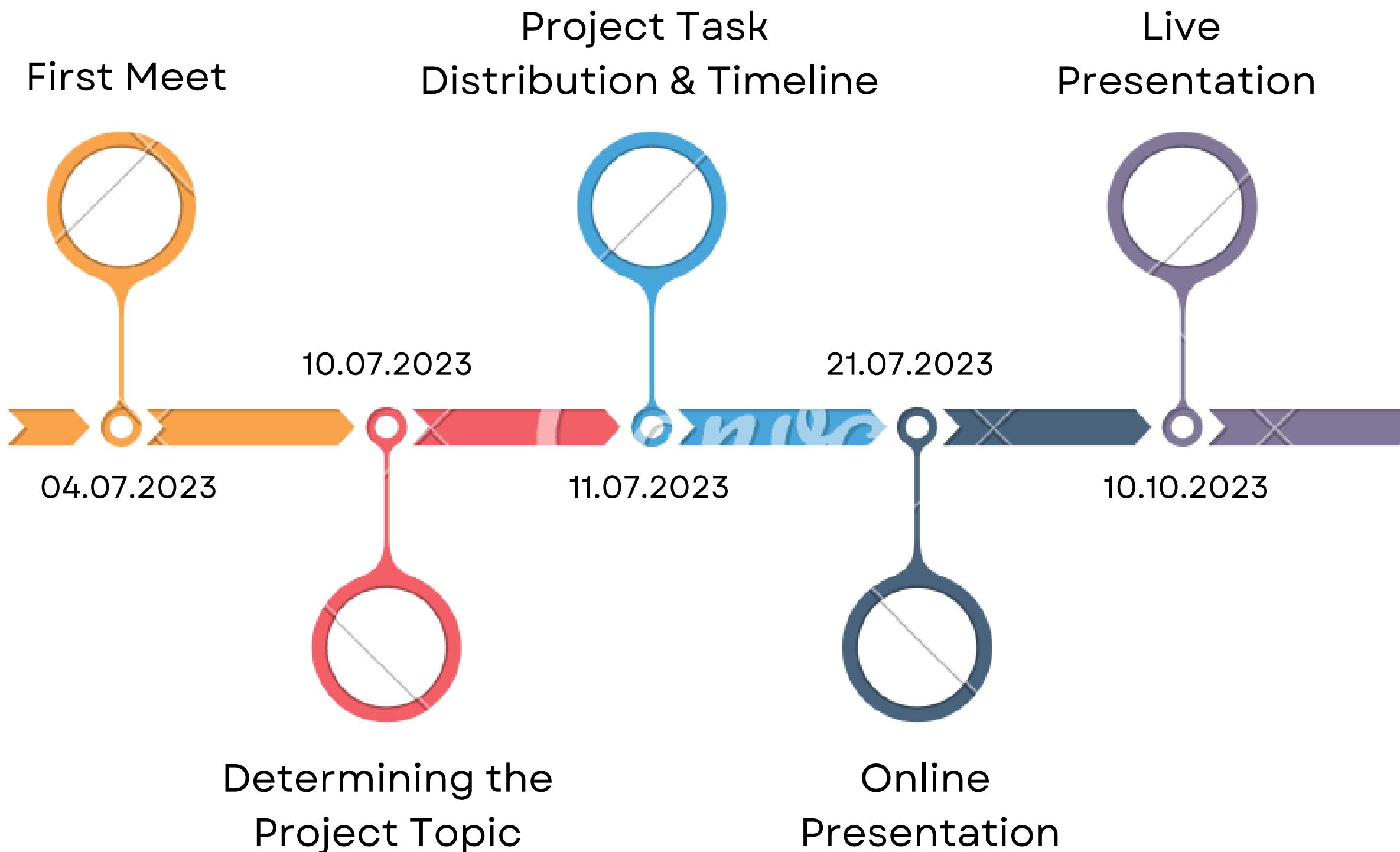




# Smart Sustainability with Data Visualizations



# Virtualent Timeline



# Smart Sustainability Team

## Bülent Coşkun

Middle East Technical University  
Statistics 2nd grade



## Emirhan Büyükkurt

Bilkent University  
Graduated Economics



## İsmail Aksu

Marmara University  
Economics 3rd grade



## Ahmet Alım

Istanbul Technical University  
Management Engineering 3rd grade



## Samet Ganal

Cyber Security  
Technologies Manager



# What is Data Visualization ?

Data visualization, which has entered our lives with data that has increased in popularity in recent years, makes it easier to read by visualizing data consisting only of numbers instead of reading groups of number.

# Principles of Visualization and Gestalt Principles

# Gestalt Principles

- Gestalt Principles is a theory which is developed by Fritz Perls in early 1920's.
- Gestalt theory is based on the idea that the human brain will attempt to simplify and organize complex images or designs that consist of many elements, by subconsciously arranging the parts into an organized system that creates a whole, rather than just a series of disparate elements.
- Our brains are built to see structure and patterns in order for us to better understand the environment that we're living in.



# Gestalt Principles

8 out of 10 people see the photo below as a human face. Instead of focusing on the parts, our brain works to make the photo look like something that makes sense as a whole.



# Gestalt Principles

If we look at five commonly used principles that we see in daily life:

- Principle of Closure
- Principle of Proximity
- Principle of Similarity
- Principle of Continuity
- Principle of Figure/Ground

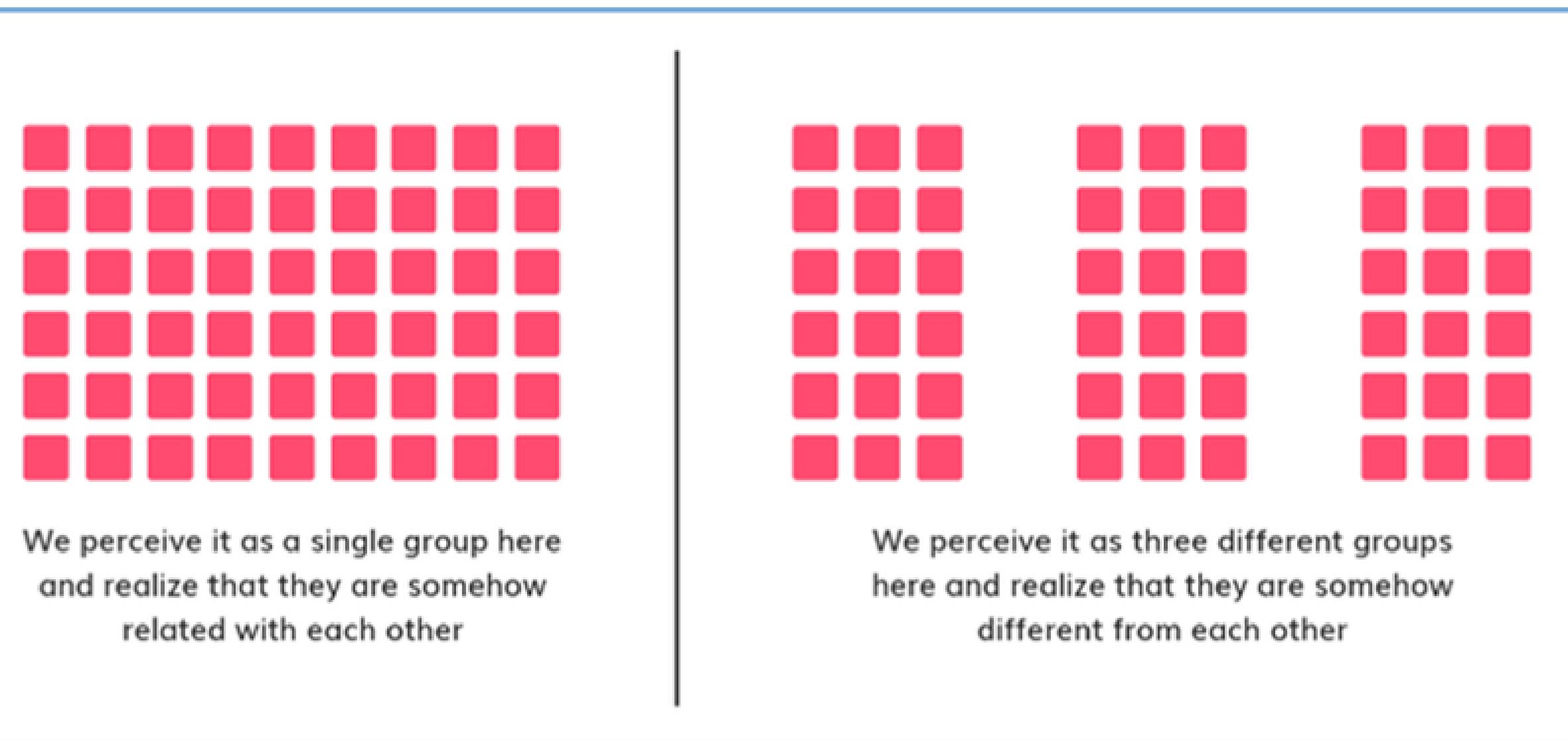
# Principle of Closure

- When we see any complex structure of visual elements, our brain looks for a single recognizable pattern.
- Our brain looks for this pattern from our previous experiences. If there is any match, we see the structure as this matching pattern.



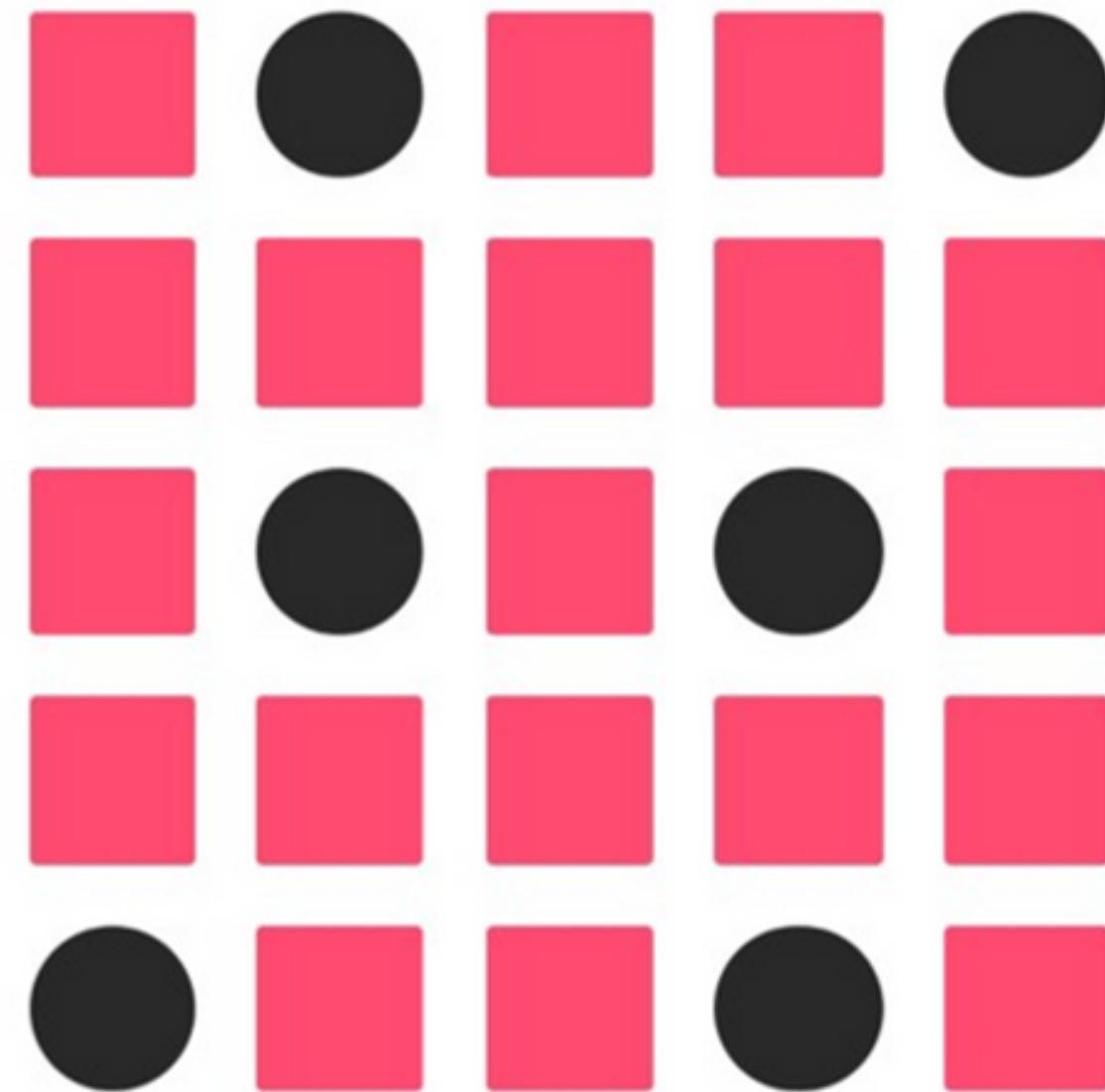
# Principle of Proximity

- Our brain perceives objects as a group based on their relative distance.
- Things that are close together seem more related than things that are far apart.



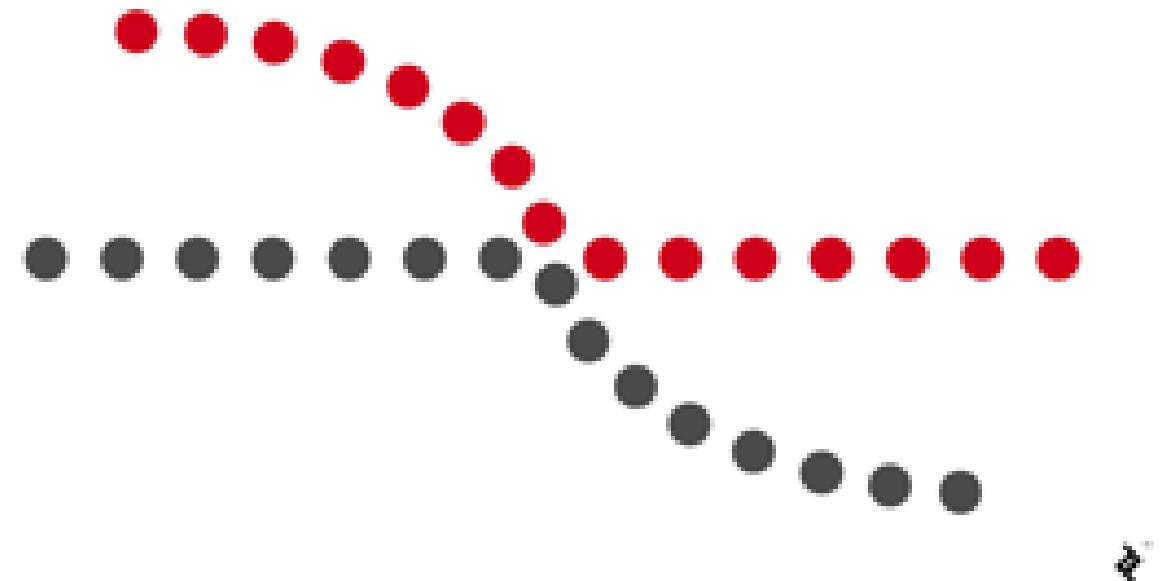
# Principle of Similarity

- Objects that share visual characteristics (size, color, texture, dimension, shape, or orientation) appear similar.
- The human brain creates groups of objects based on similarity.



# Principle of Continuity

- Our eyes tend to follow a straight line from one end of this shape to the other and a curved line from top to bottom, even if the lines change color halfway through.
- We tend to perceive objects with sharp and clear directional changes as groups and less as a single object.



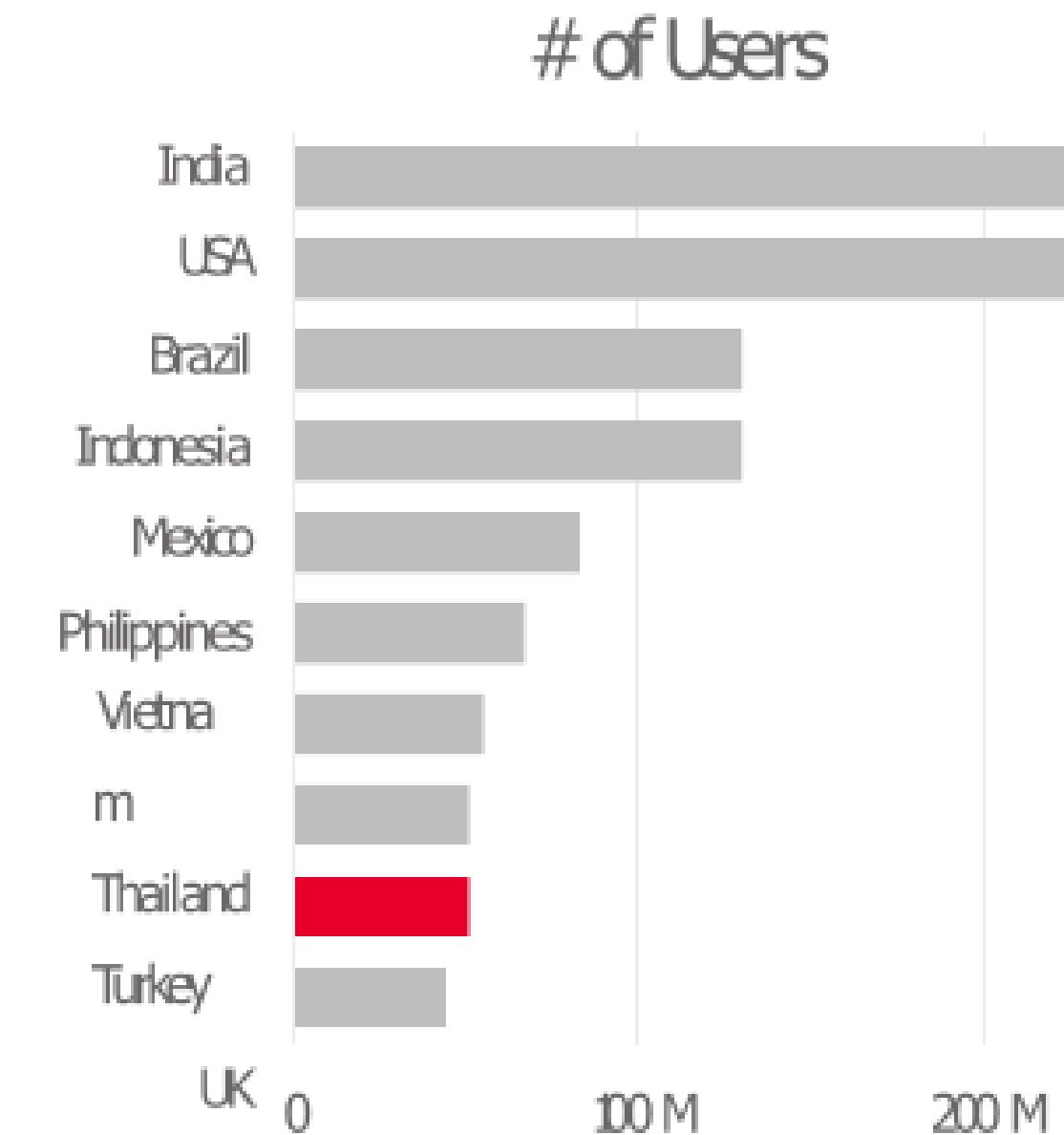
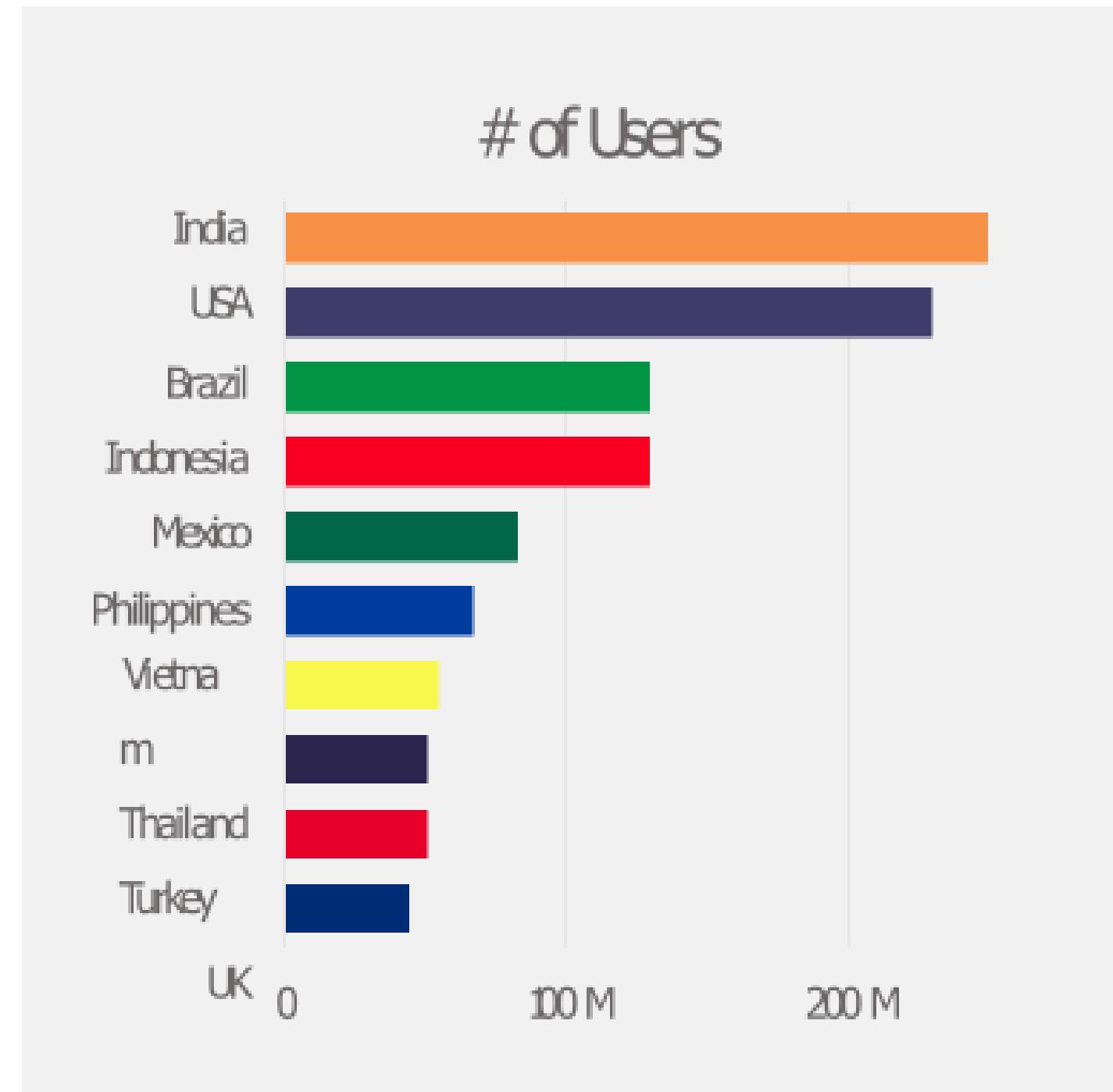
# Principle of Figure/Ground

- This principle shows how our eyes can simplify complex shapes into simple shapes, which we are familiar with it.
- We humans like to make sense of disorganized things quickly. We do not like flow and we have to find a meaning quickly.

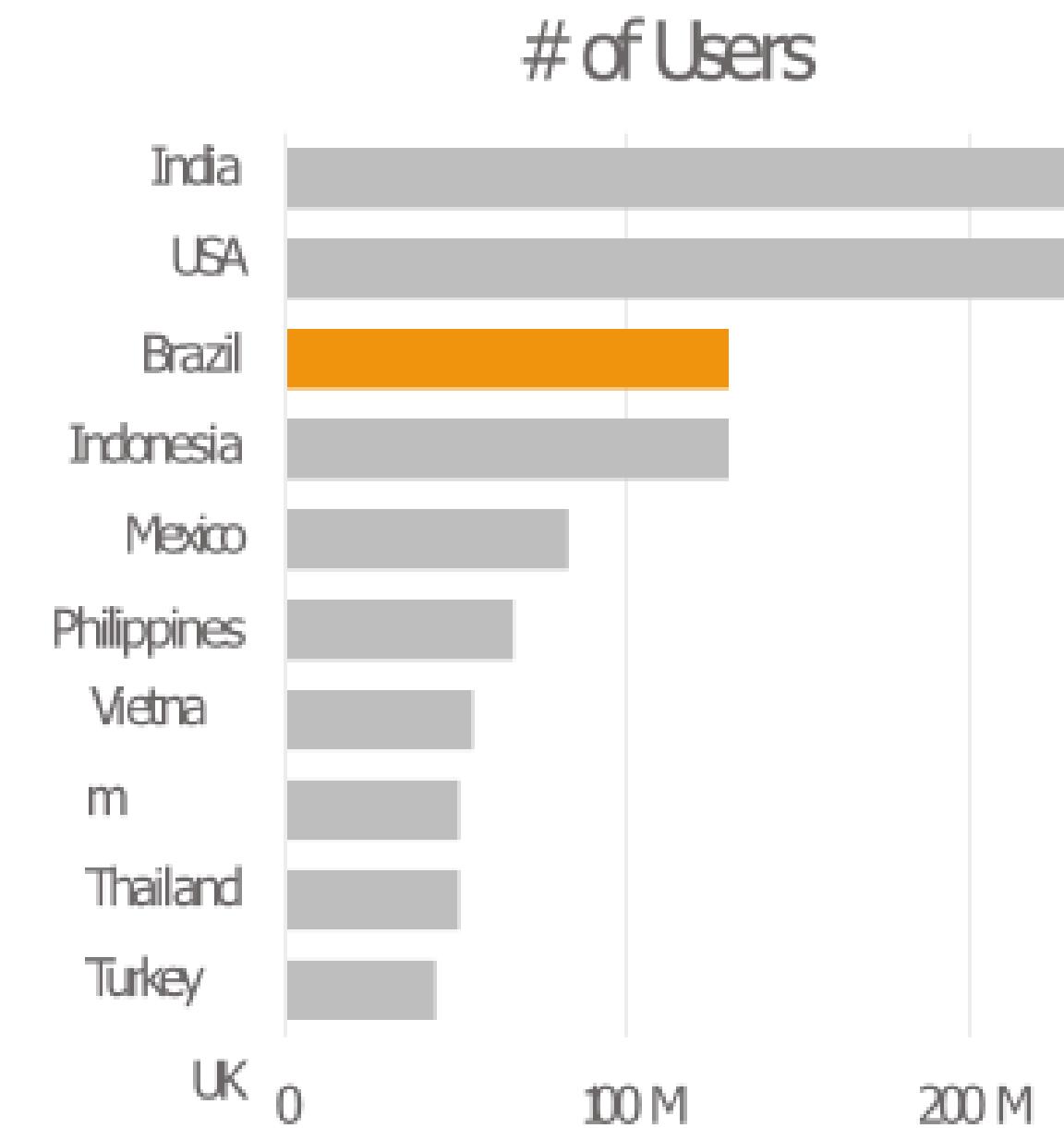
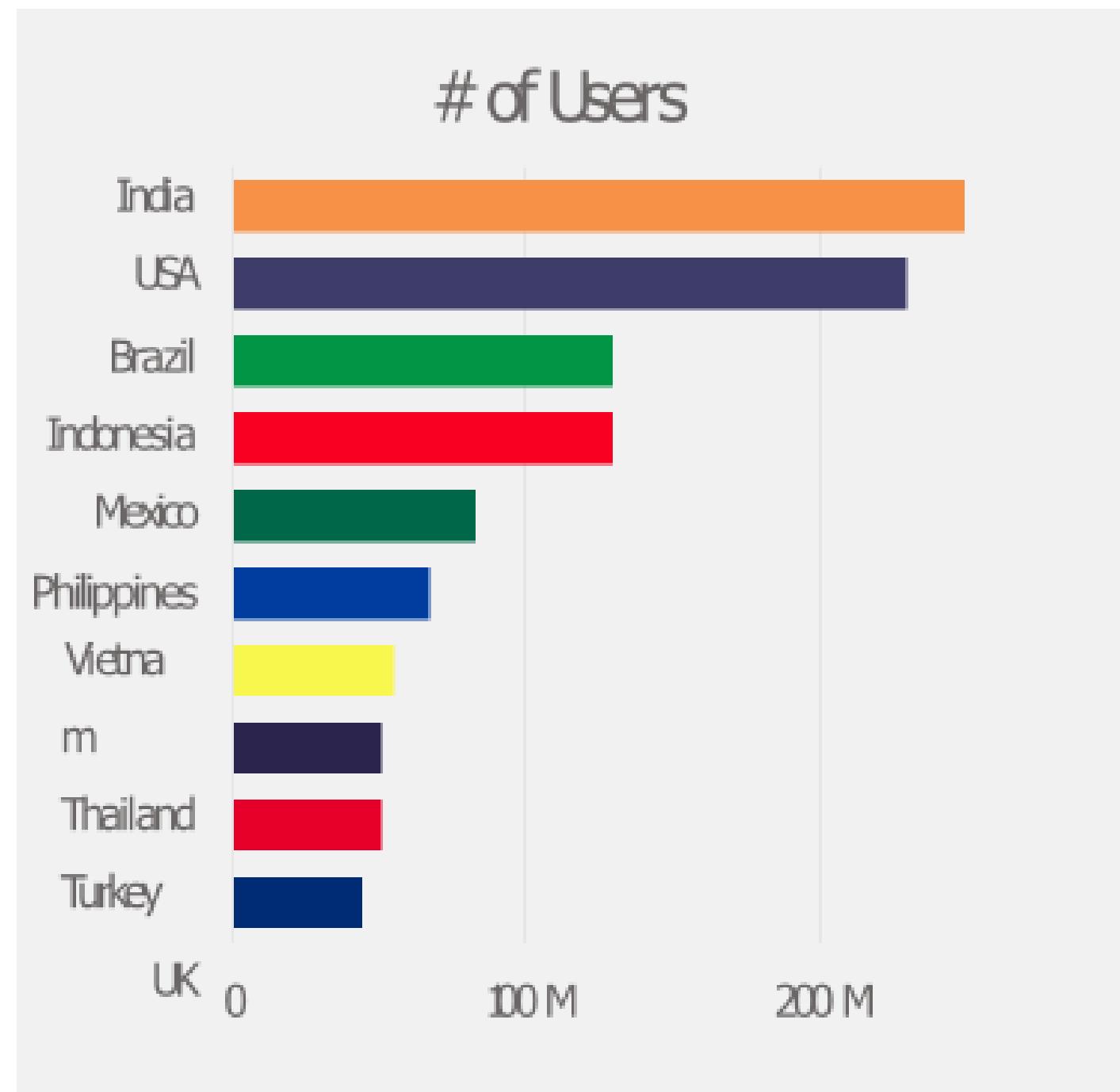


**Illustration  
Based on  
Visualization  
Principles**

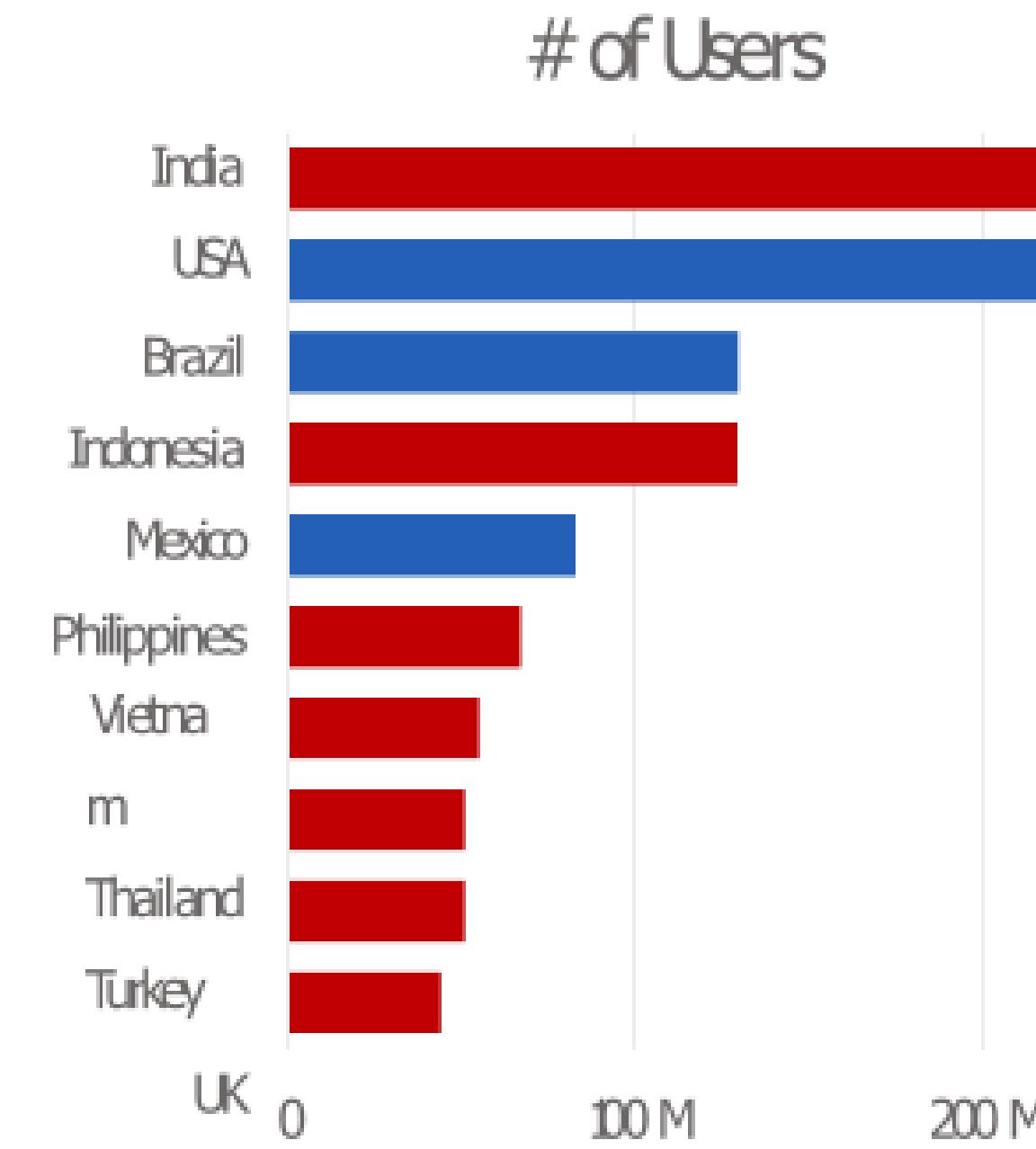
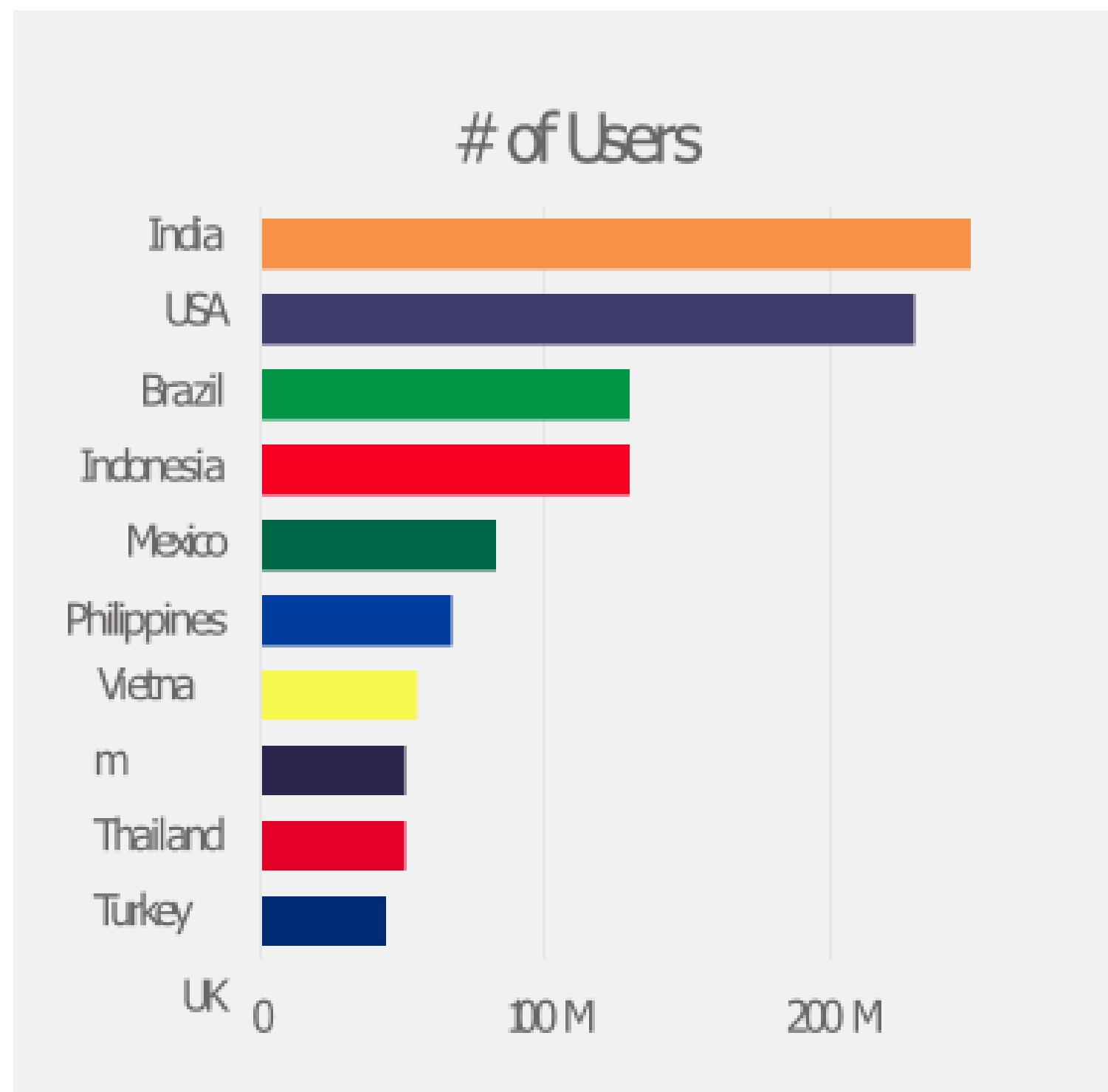
We prefer to highlight the country which we want to talk about it.



Here there is another example of highlighting.



In this page countries are colored by geographic locations of countries.



# There are rules to be followed in data visualization.

1



## SINGULAR DIFFERENTIATION

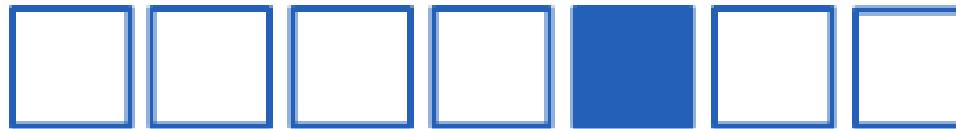
Different colors for comparison

2



## BRANDING

The color of the brand in the comparison of companies



## HIGHLIGHTING

Color that highlights an item in the group based on its meaning

3



## WARNING

Single strong color for warning or alarm



## SEQUENTIAL

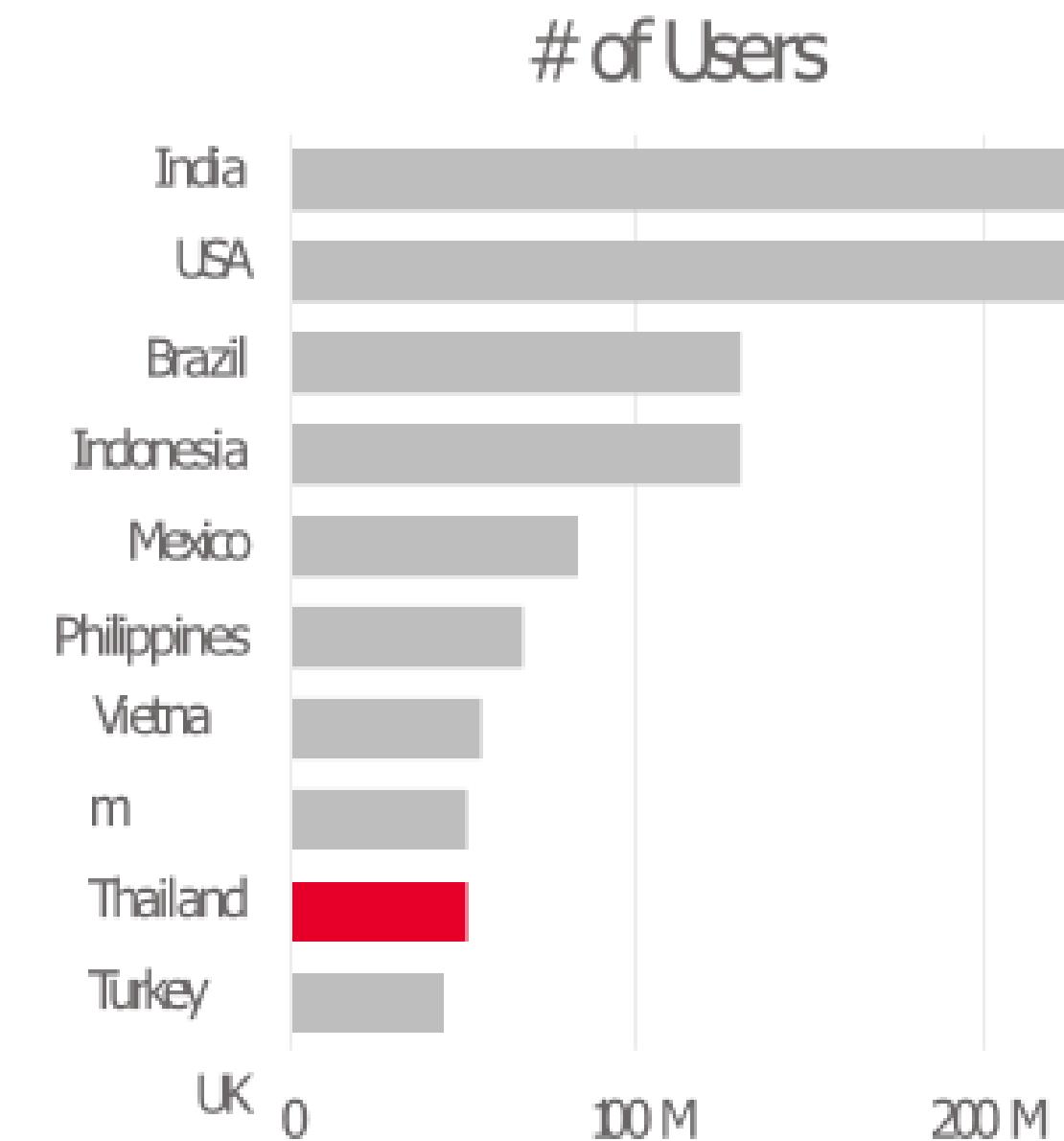
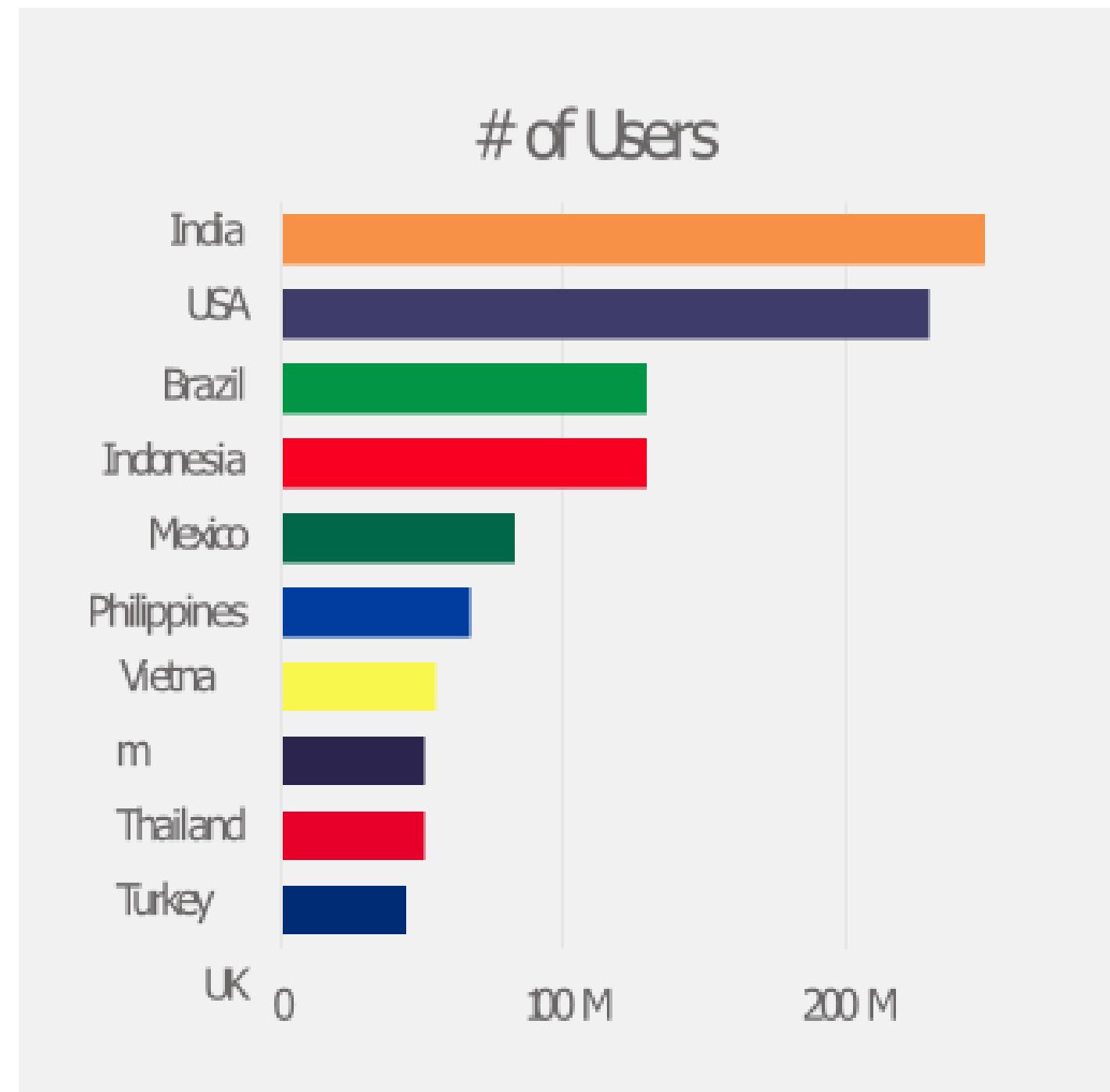
Lumination of selected color ranked low to high



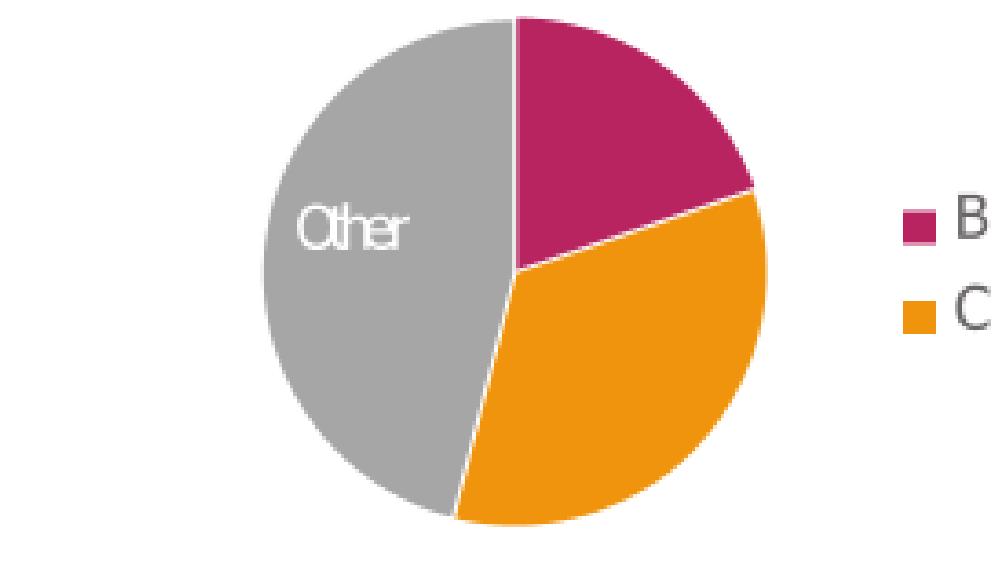
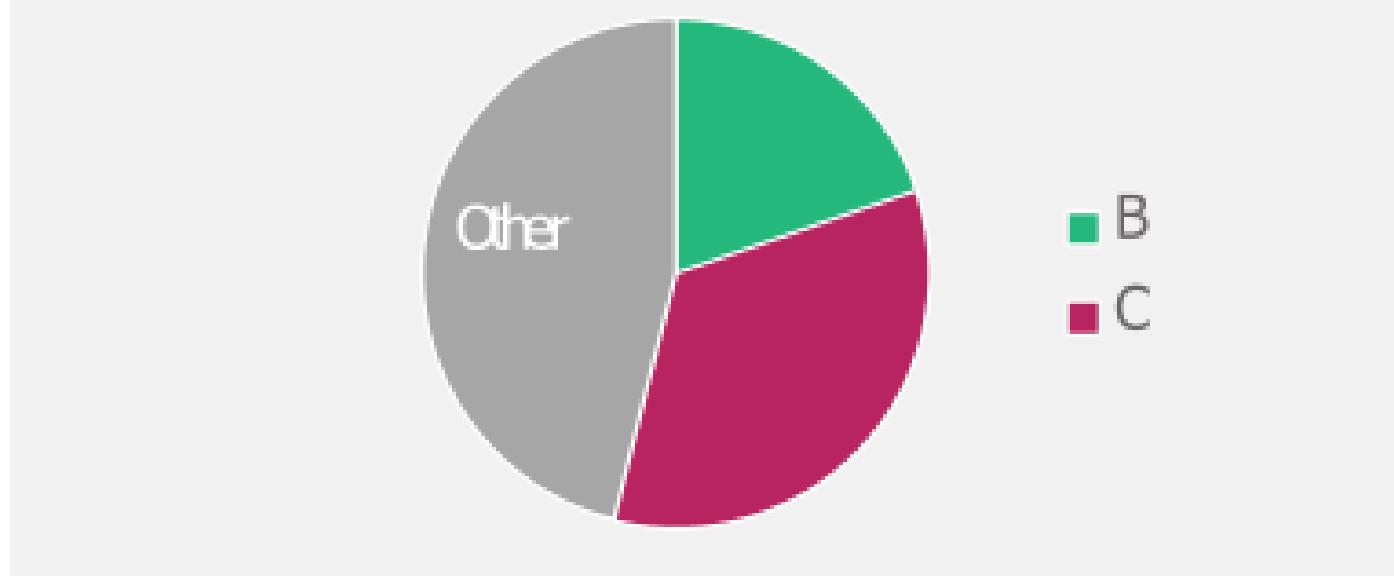
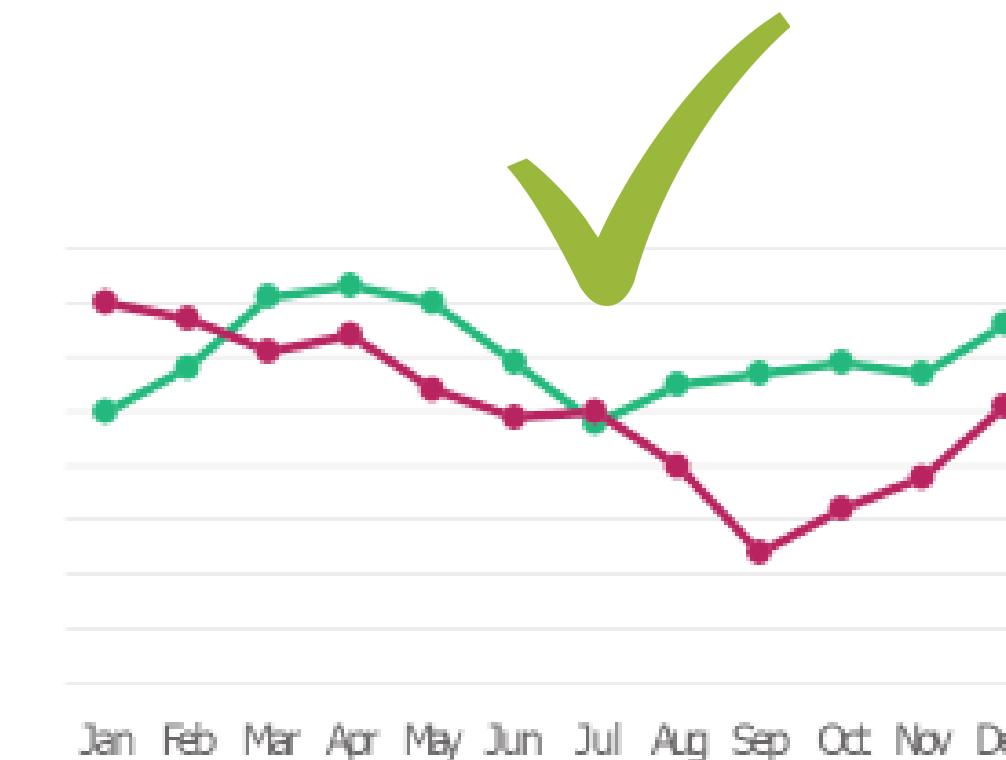
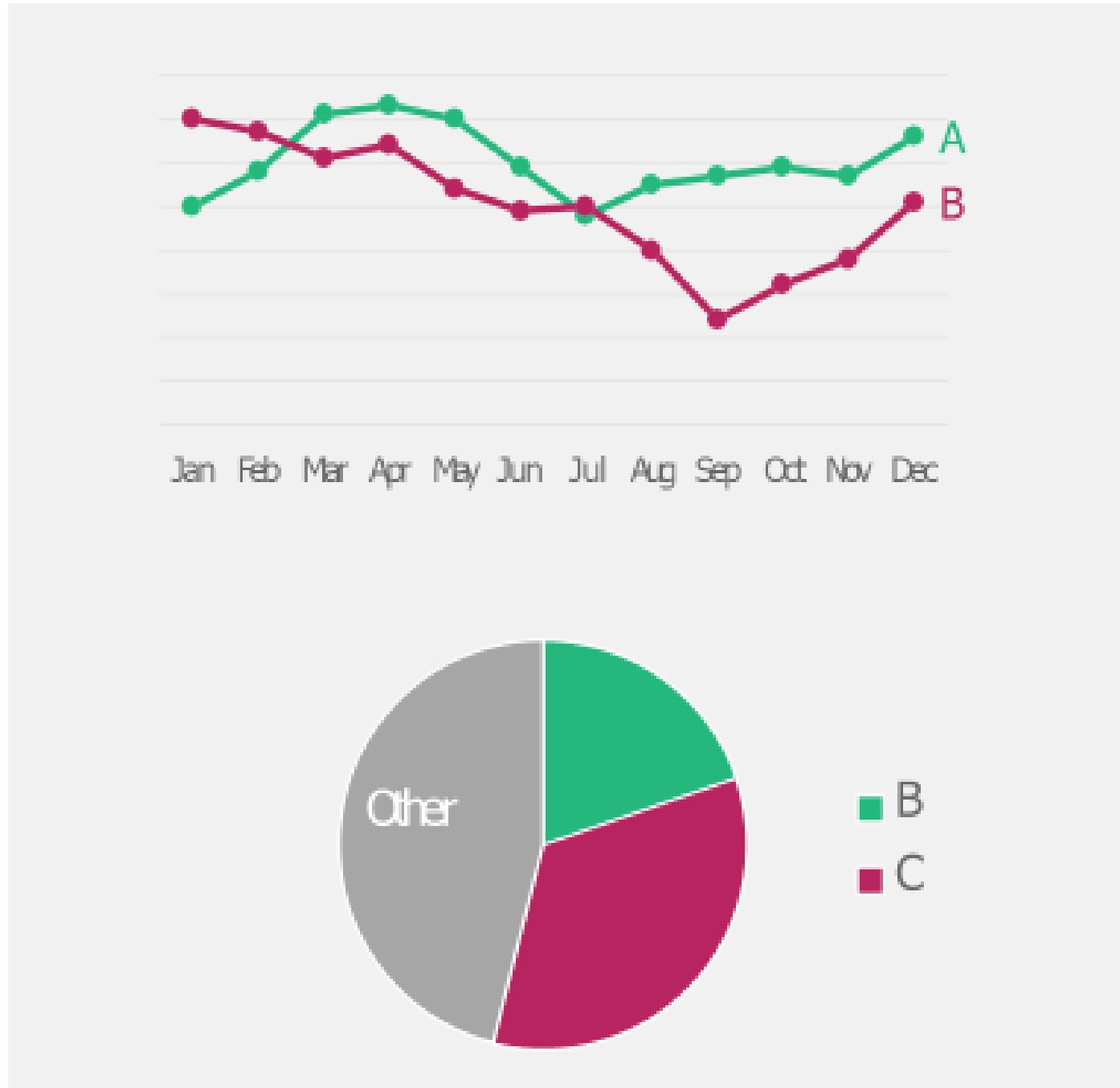
## DIVIDING

Two contrasting colors lined up next to a neutral color

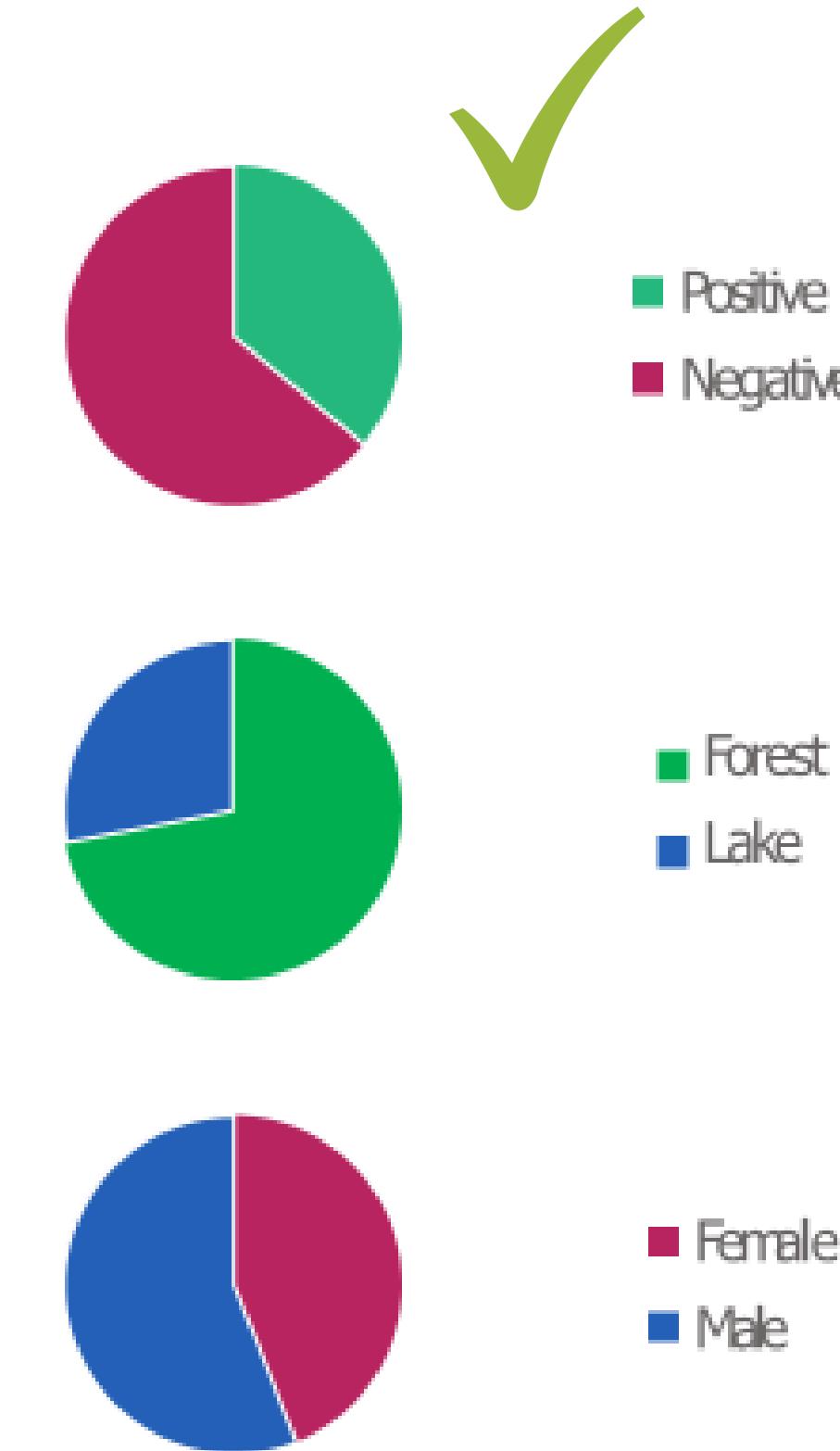
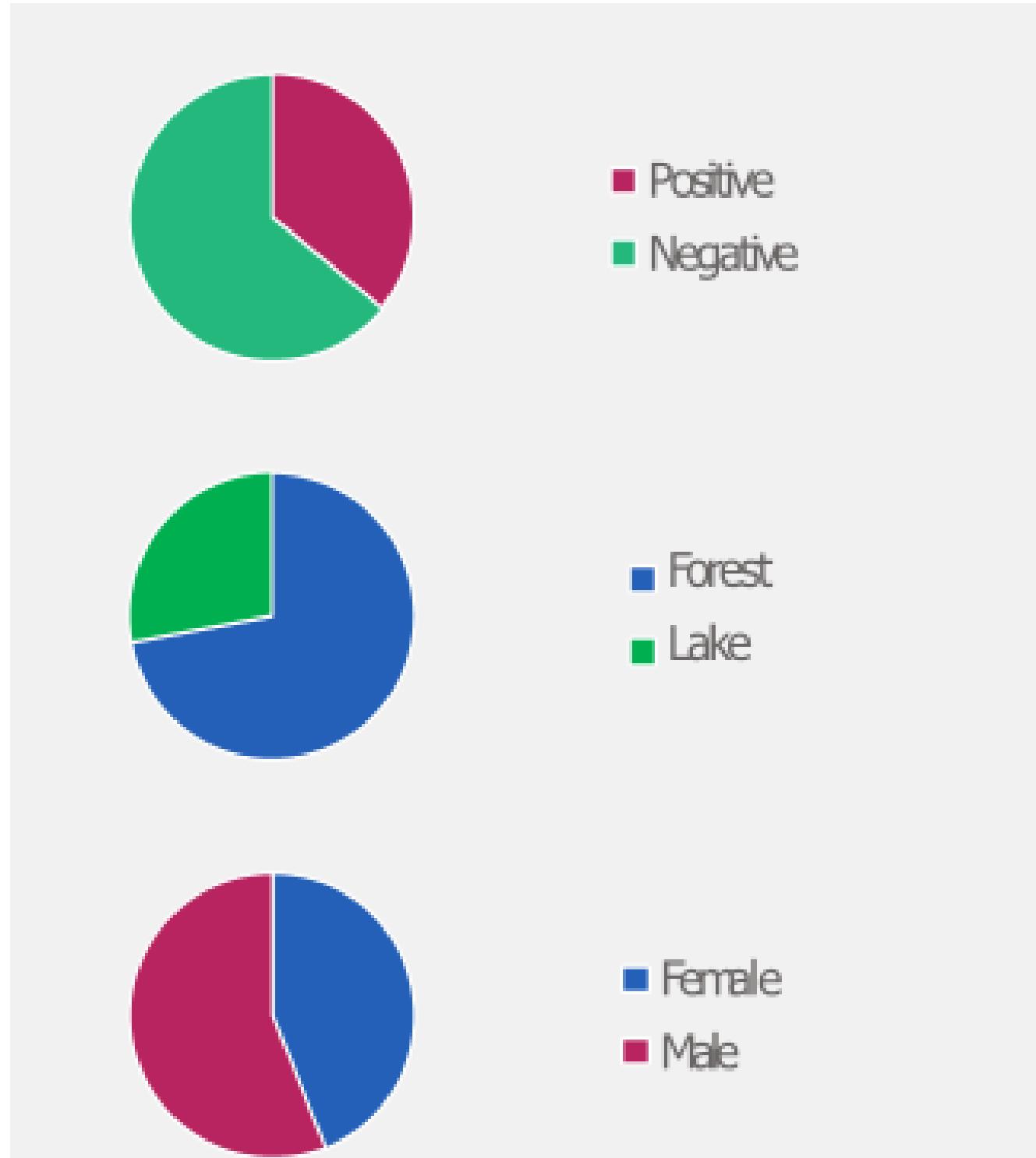
In the below which method of data visualization is used ?



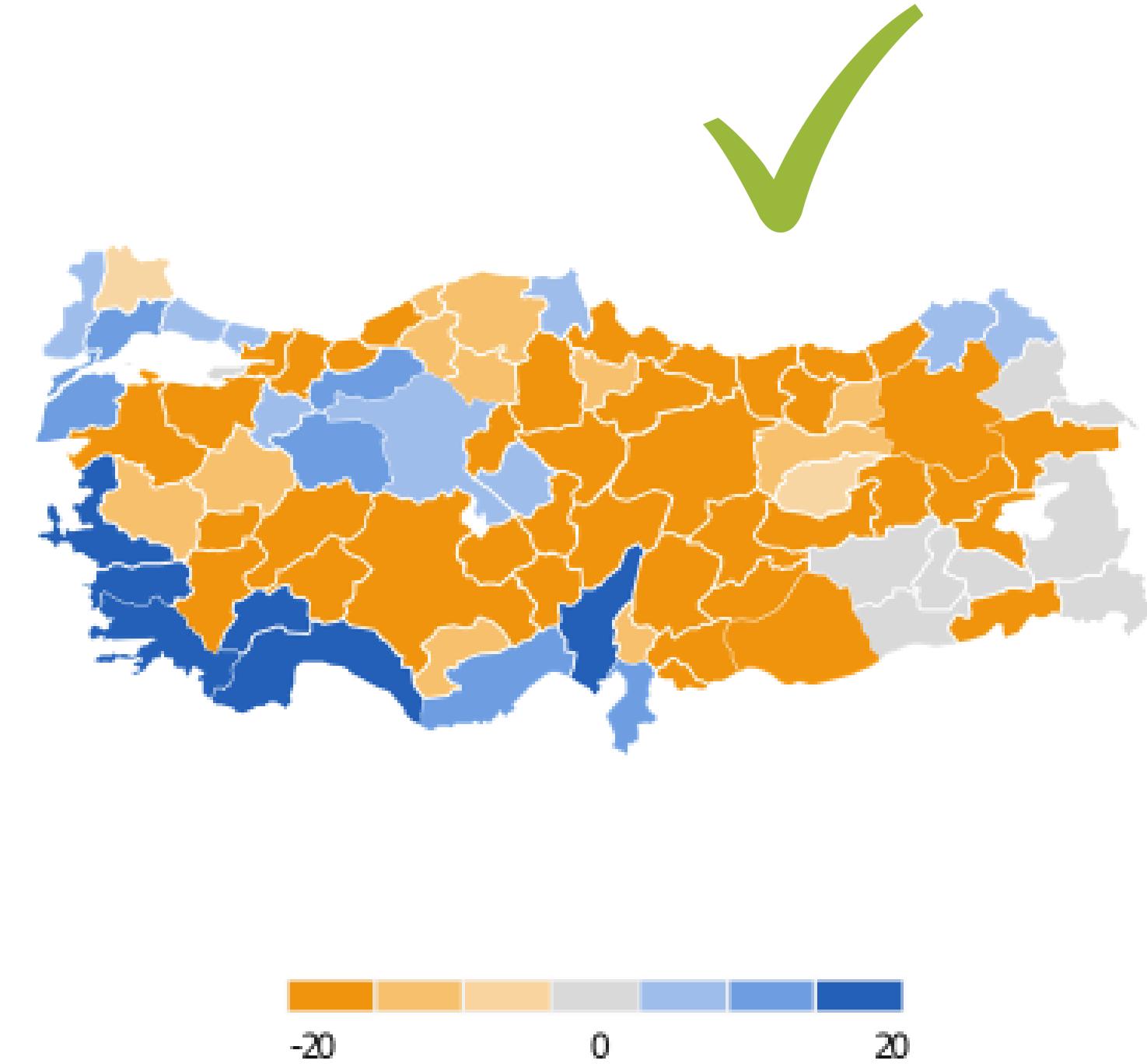
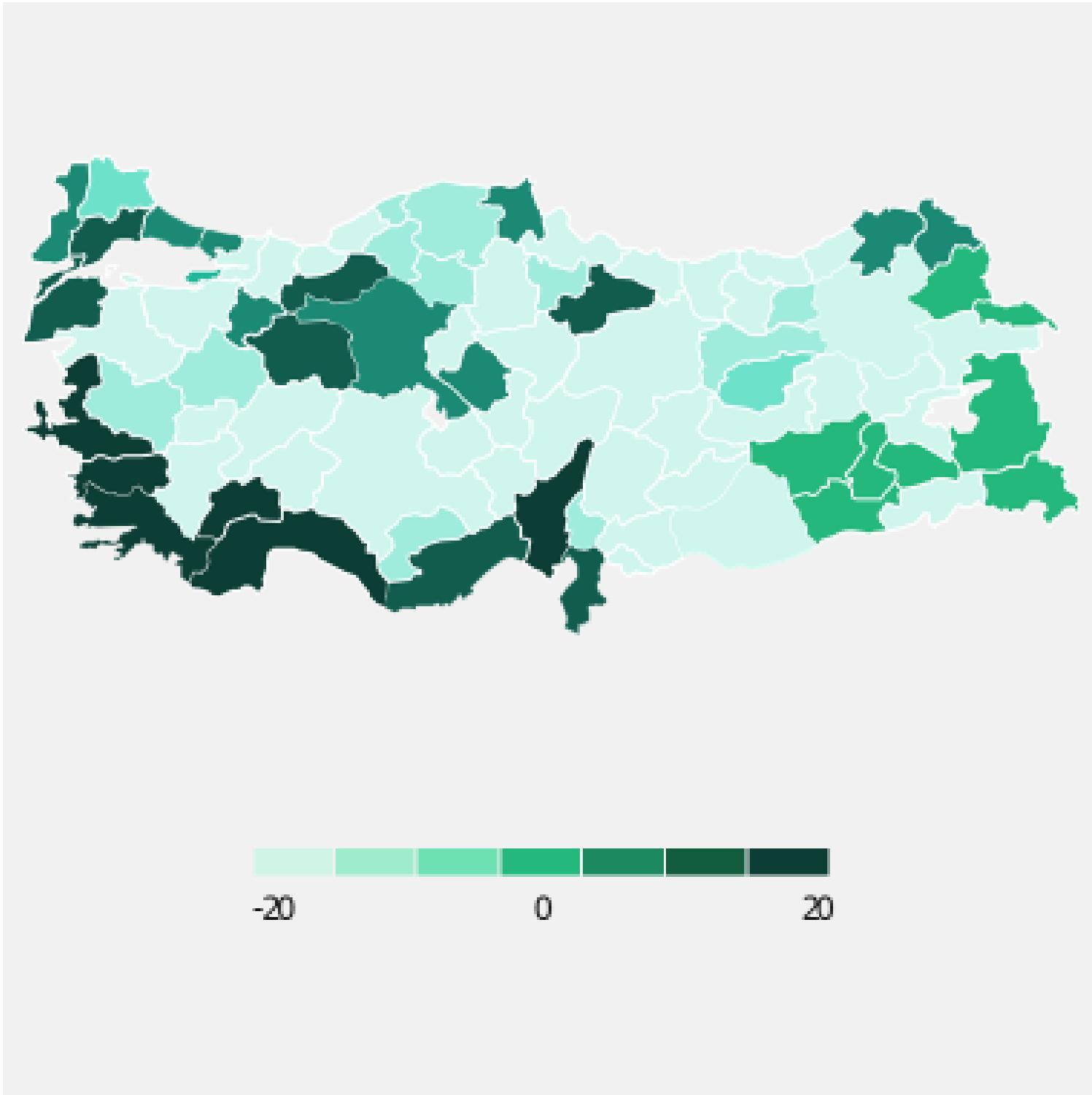
It would be better if we use the right one since b is already colored to purple.



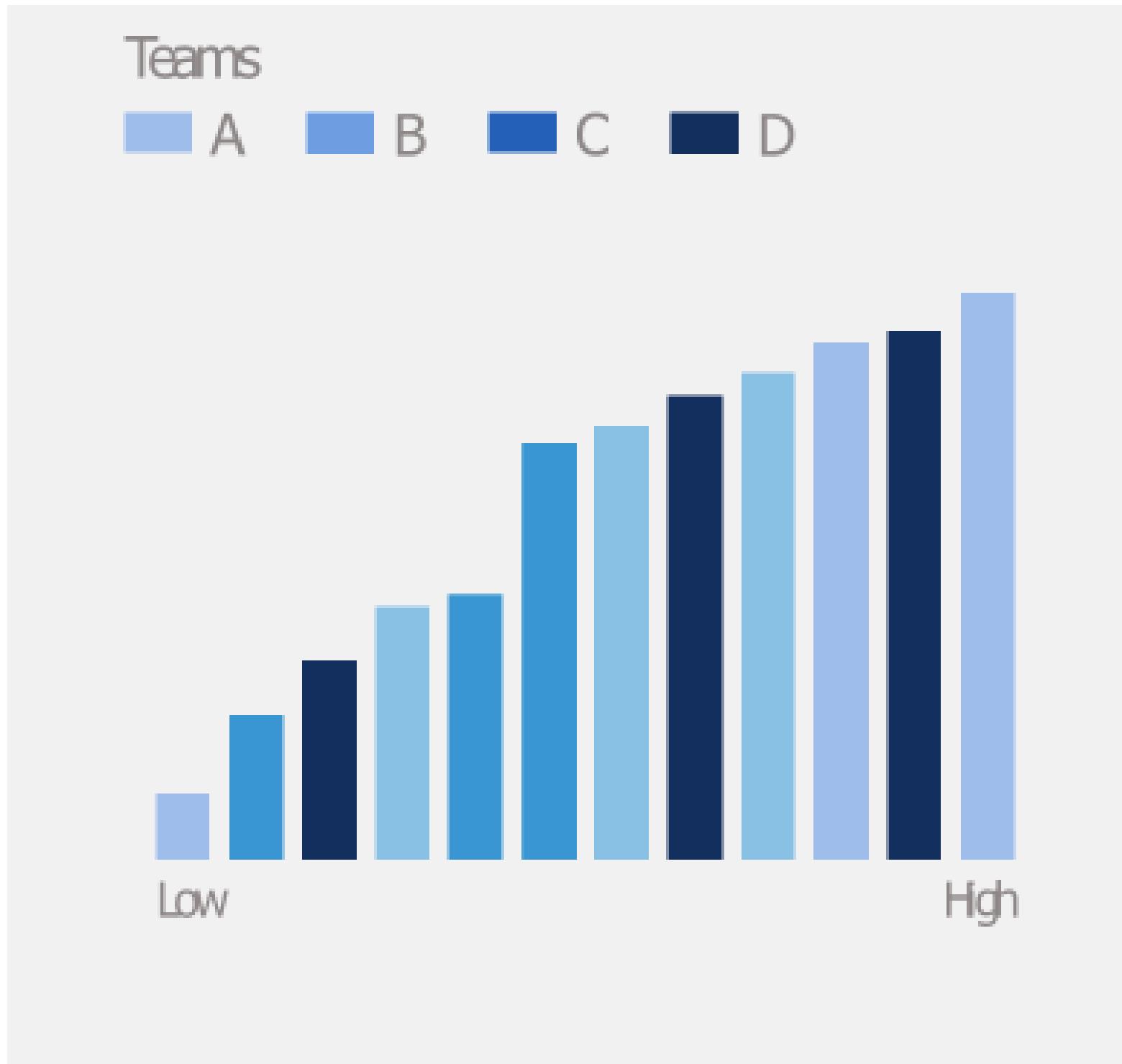
it is right one because we human imagine that lake is blue and forest is green.  
So, its all about perception.



Some parts of the map is impossible to see so we have to choose another color diverging.



if there are more than two class we have to choose the right one since its less complexed.





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# Benefits of Smart Sustainability Map to People

# Benefits of Solar Energy System to People

- There is no invoice problem.
- It is environmentally friendly.
- It is a Safe Investment.
- No Fear of Raise.

## Güneşlenme Süresi(saat/yıl)



# Benefits of Wind Energy System to People

- It provides profits to companies.
- It saves money.
- It offers new professions and new business areas.
- It allows the development of rural areas.

## Ortalama Güç Yoğunluğu (W/m<sup>2</sup>)



\*According to the US Bureau of Labor and Statistics, one of the fastest growing occupations wind turbine technician.

## Ortalama Rüzgar Hızı (m/s)



\*Wind power plants built in rural areas in the USA and Europe develop the local people and economy.

## Ortalama Kapasite Faktörü(%)



# Benefits of Wave Energy System to People

- It is an environmentally friendly resource.
- It is widespread and abundant.
- It reduces dependency on external resources.
- It is a reliable source.

## Yıllık Ortalama Dalga Enerjisi(KWh/m<sup>2</sup>)

### Avg. Yıllık ortalama..

3 | Page 1630



# Ortalama Arsa Fiyatı (m<sup>2</sup>)

Ortalama Arsa Fiyatı (m<sup>2</sup>)

626 5.077



# Benefits of Smart Sustainability Map for Financial Institutions



# ESG: Environment, Social and Governance



# ESG Considerations in Financial Institutions

ESG criteria now play an important role in investment decisions as well as financial performance.



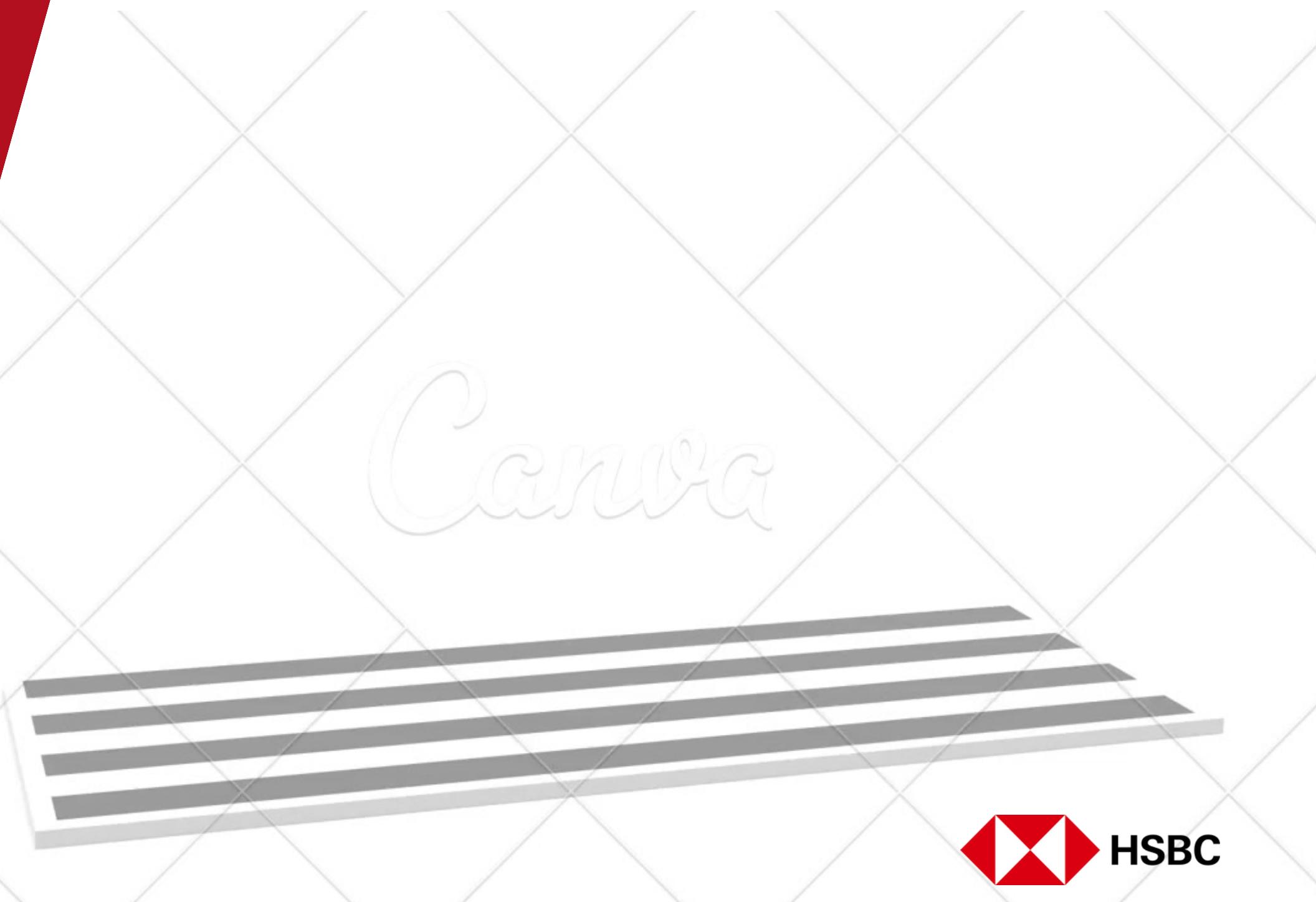
# Renewable Energy Investments

- Renewable resources such as solar, wind and wave energy stand out as the energy sources of the future.
- Our sustainability map visualizes solar, wind and wave energy potential on a map.
- It offers new energy transformation investment opportunities to financial institutions.



# Risk Management and Cost Reduction

Assessing environmental risks minimizes costs in the long run. Sustainability mapping helps financial institutions identify environmental risks and take appropriate action.



## Future Plans

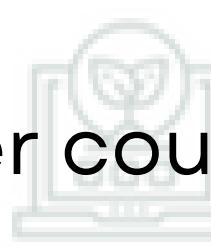
- The site will also be translated into different languages.
- We will research and examine legal regulations regarding investing in Turkey from a foreign perspective will be added to the site.
- Using machine learning, the most suitable cities for investment will be ranked using energy type, price and other economic factors.
- As a result of these steps, the same system will be developed for other countries.



Gelecek nesillere yaşanabilir bir dünya bırakabilmek için, sürdürülebilirlik çabalarını artırmamız ve doğal kaynakları akıllıca kullanmamız gerekiyor.



Sürdürülebilirlik, ekonomik büyümeyi desteklerken çevreye zarar vermeden doğal kaynakları koruma ve geri dönüşümü teşvik etme amacını taşır.



Sürdürülebilir bir gelecek için, toplum olarak enerji verimliliğini artırmak, yenilenebilir enerji kaynaklarını kullanmak ve çevre dostu uygulamaları benimsemeliyiz.

A photograph of a woman and a young child walking away from the camera, holding hands. They are in a field of tall, golden grass. In the background, several white wind turbines stand against a bright blue sky with scattered white clouds. The woman has long brown hair tied back and is wearing a light blue long-sleeved shirt and tan pants. The child has blonde hair and is wearing a red t-shirt and tan shorts.

Take Steps for a Sustainable Future

Thanks!