

IDEAS

① Top Active IMO Participating Countries



②

IMO Participation Rate per Country

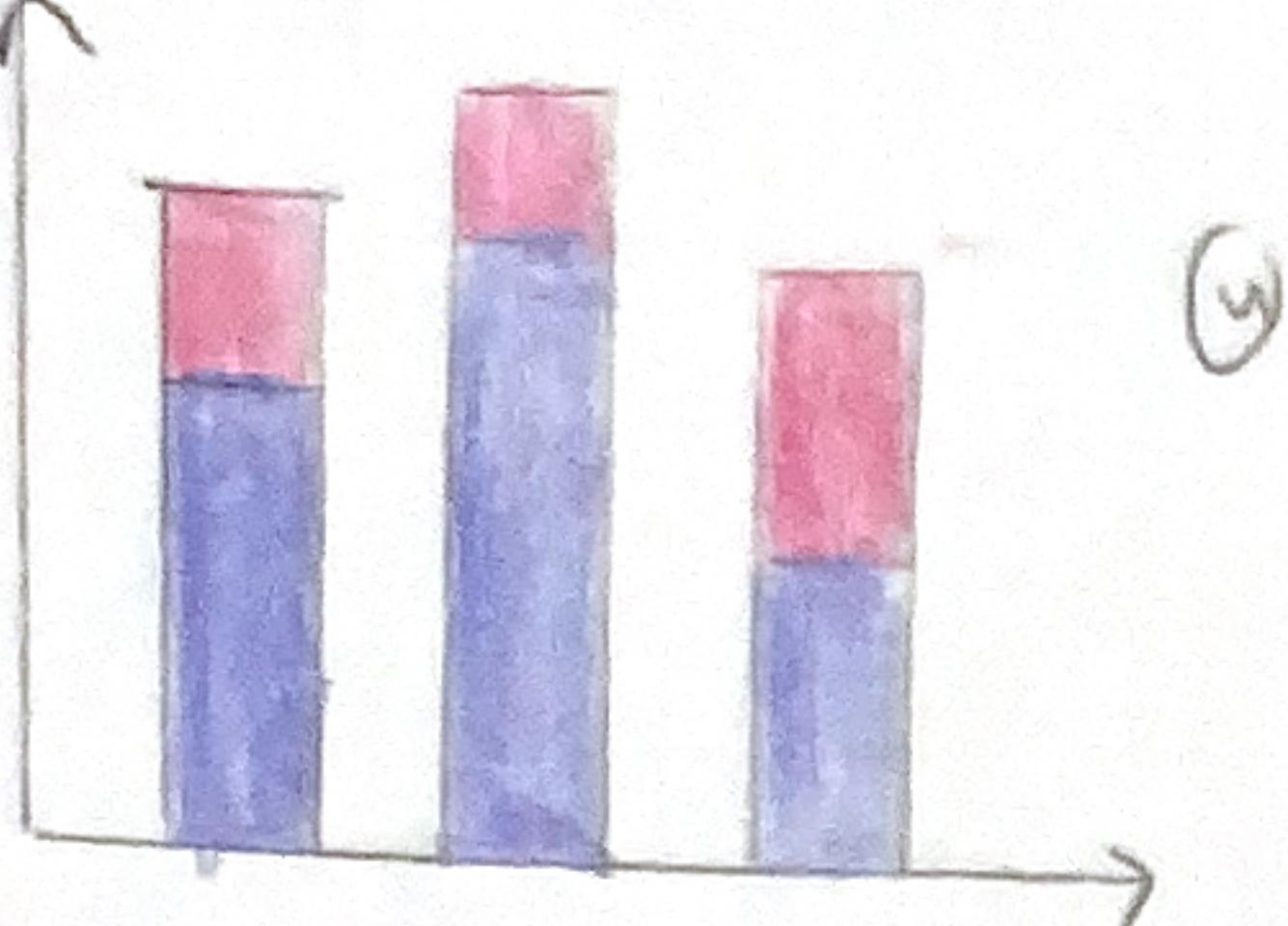


Author: Ngu Khang Wei

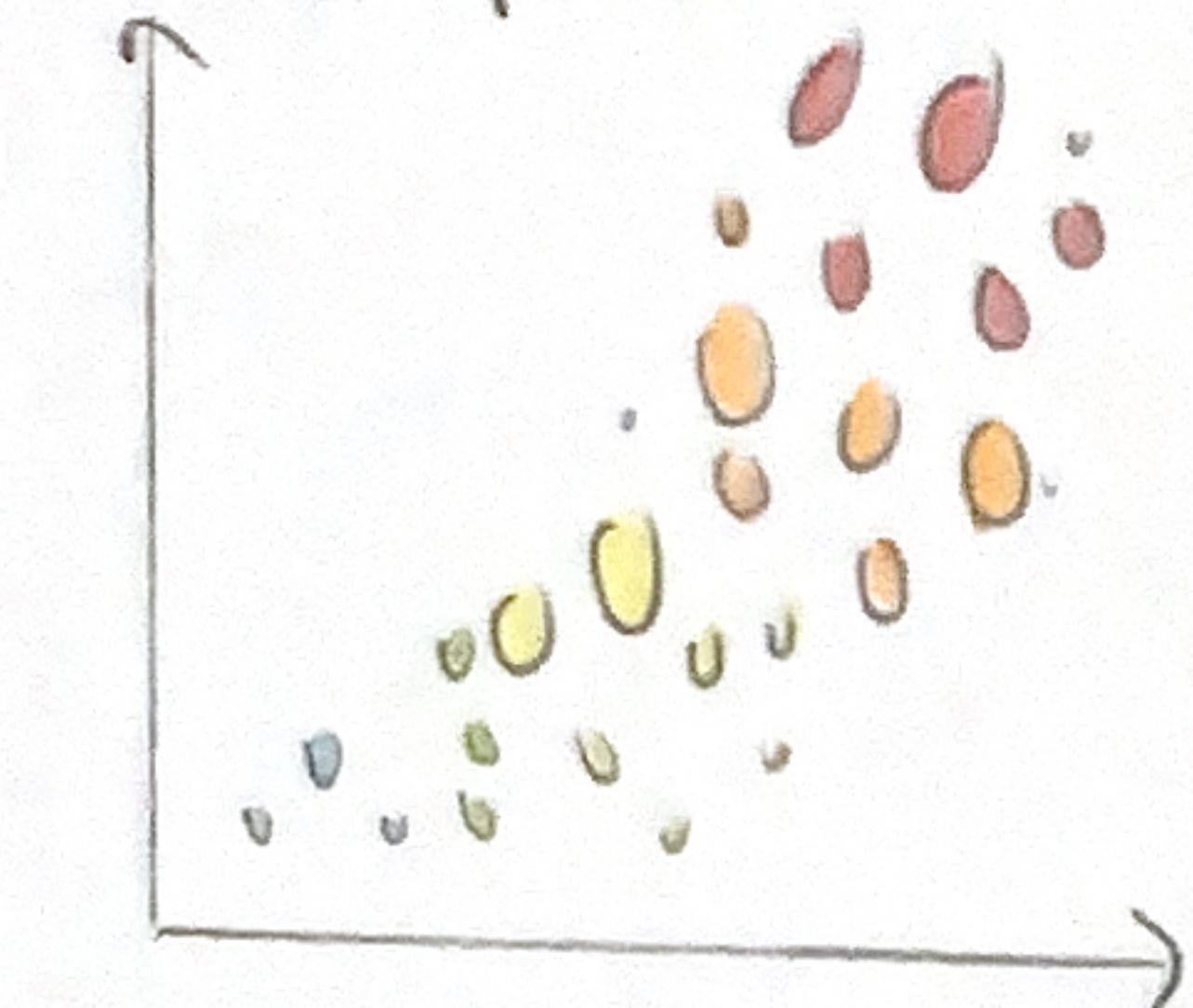
Date: 10/10/2025

Task: Planning the visualisation

③ Males vs Female IMO Participants

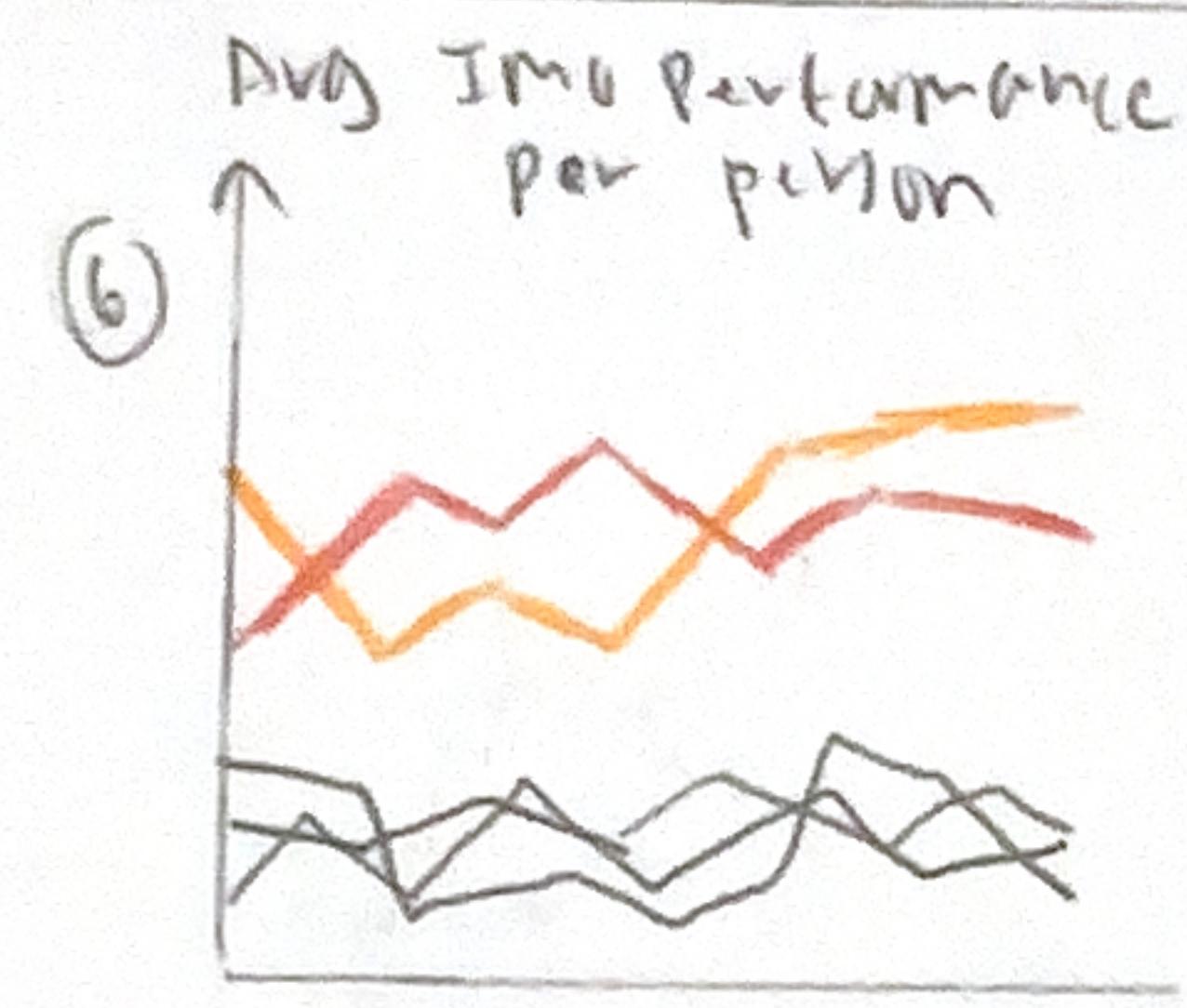


④ Avg vs performance rates vs participation rate

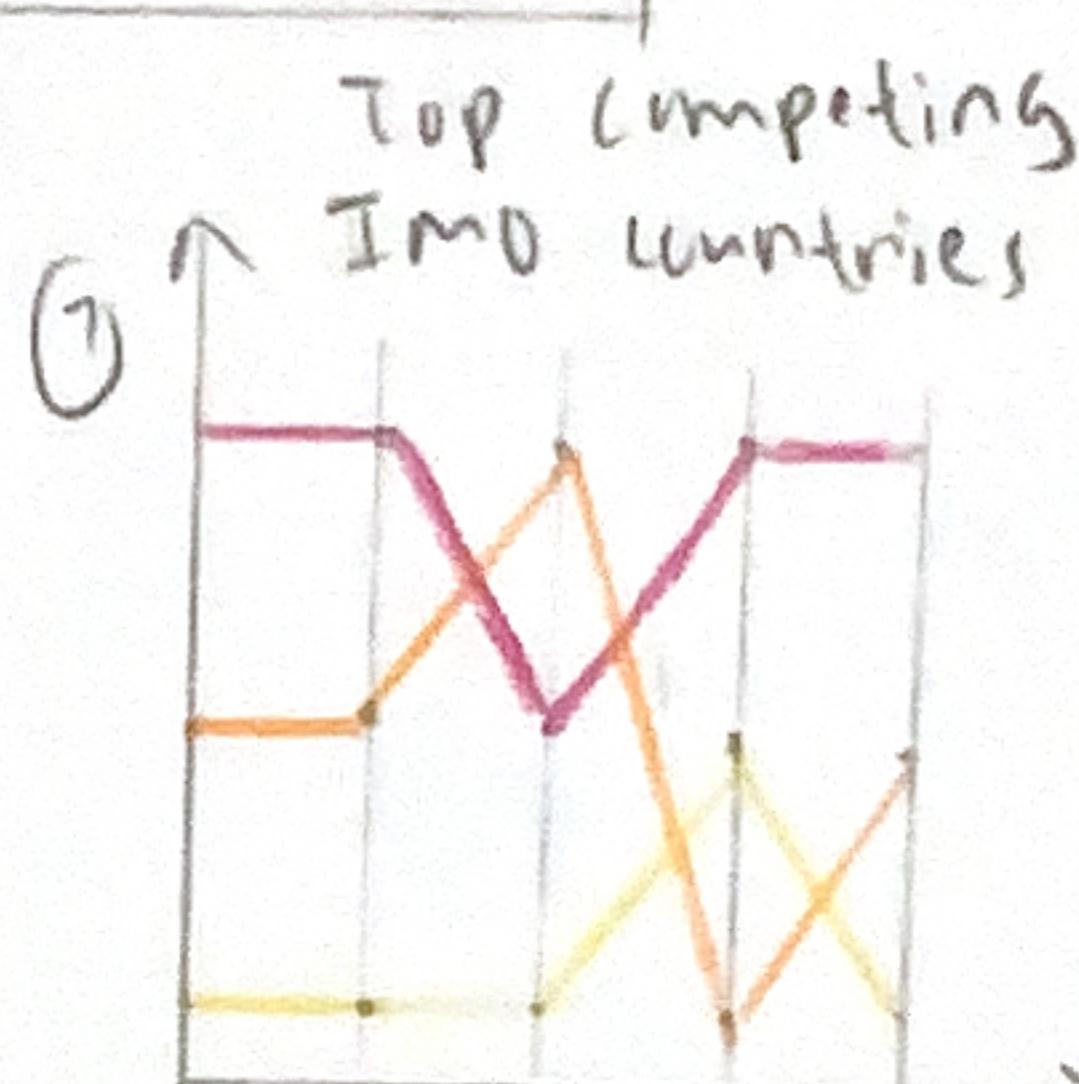


⑤ = KDA^4 ratio of top countries in IMO

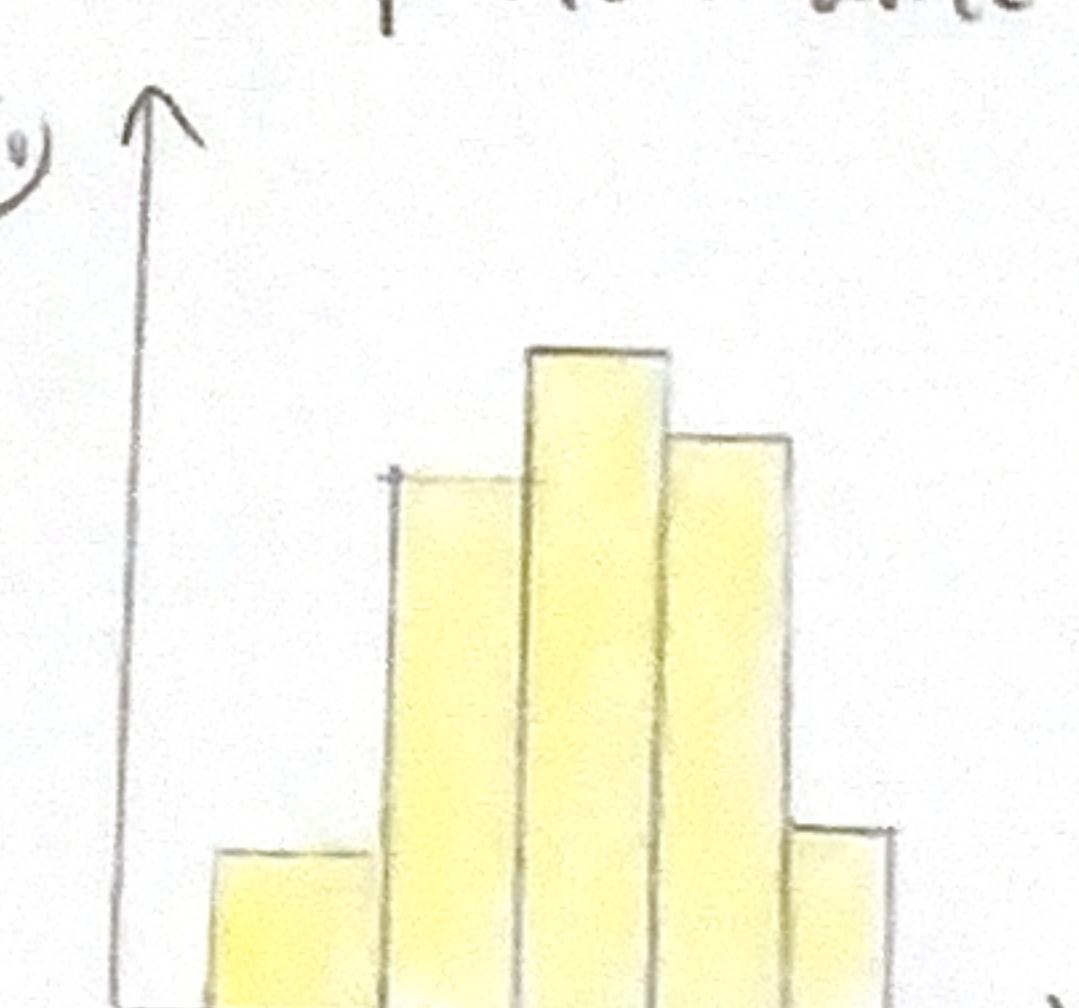
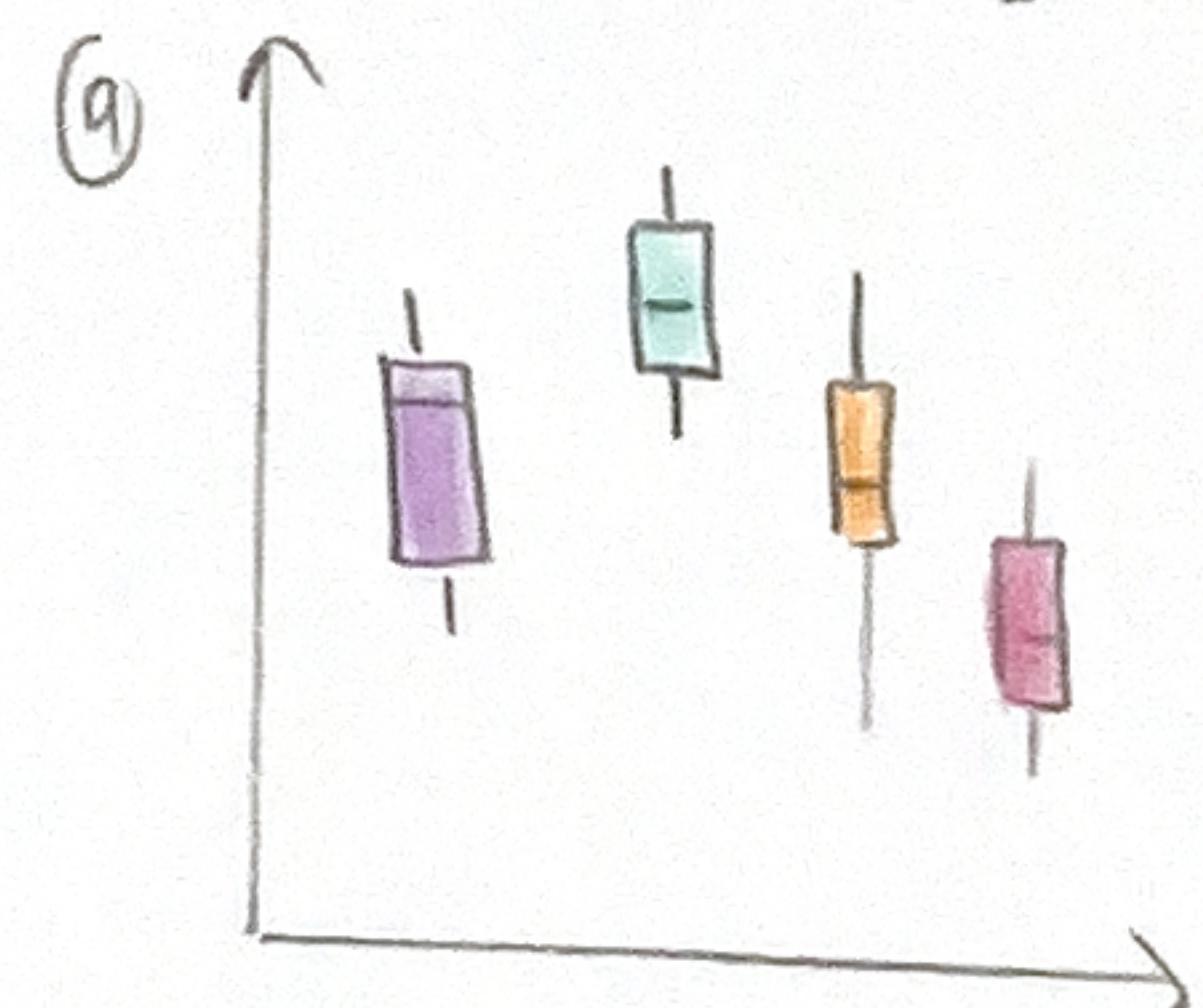
⑥ Total IMO Participants per country



IMO performance consistency



Overall IMO performance

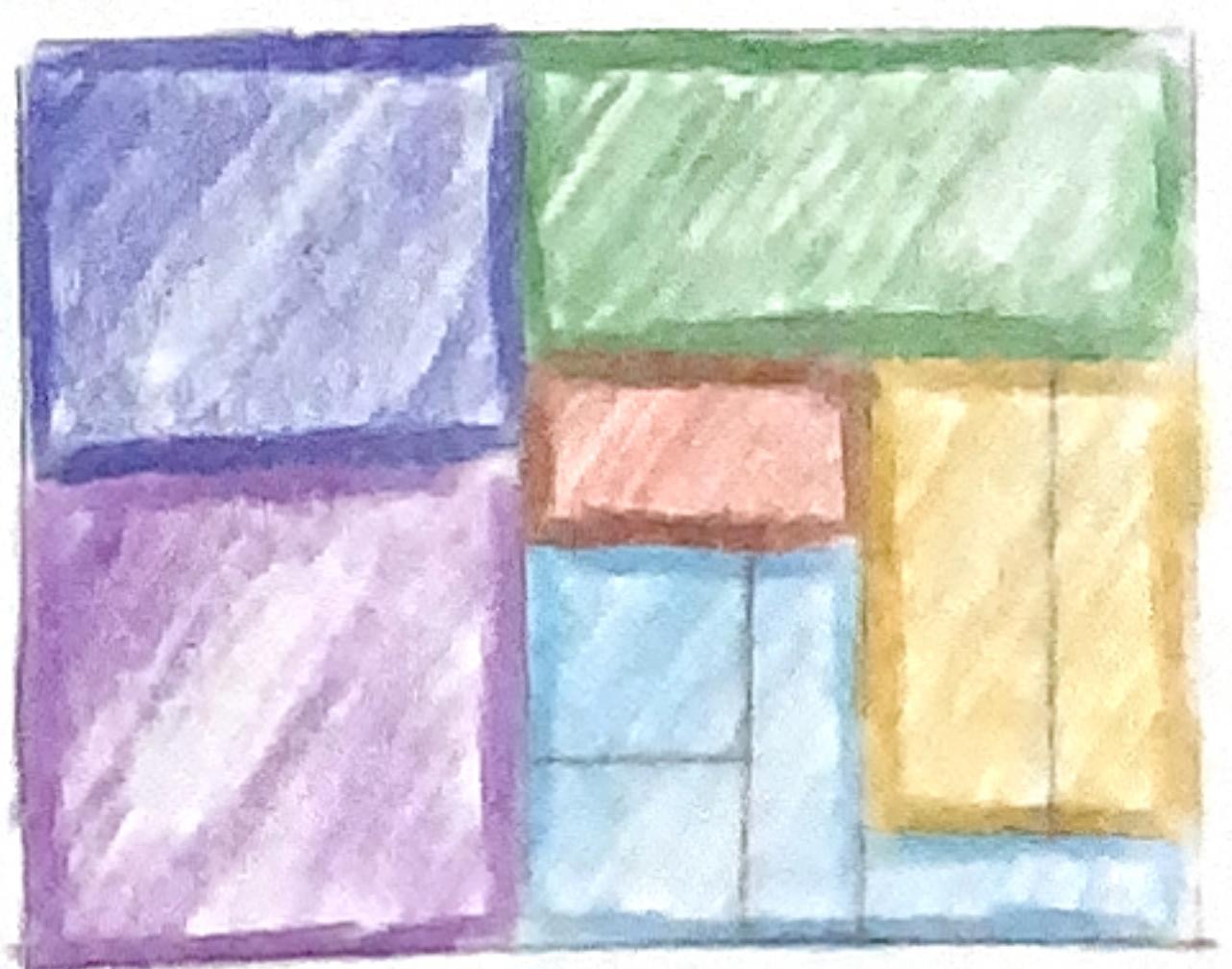


⑦ Select []

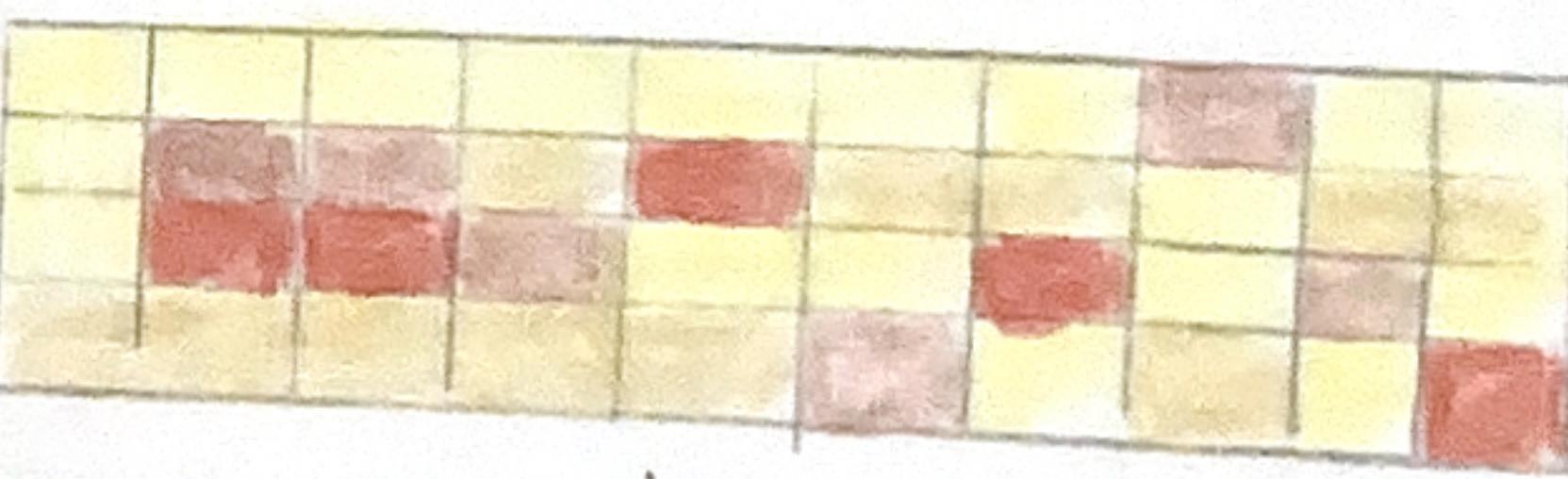
⑧ Each IMO question performance over time



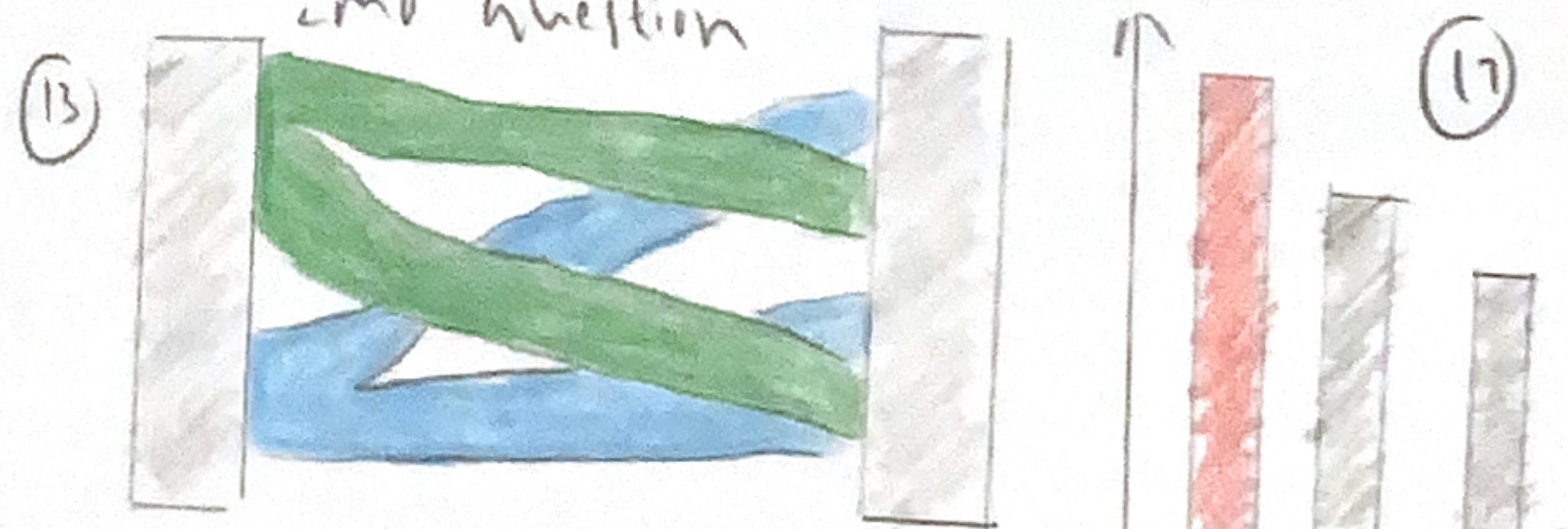
⑨ Top IMO countries as a hierarchy



⑩



Flows from country to IMO question



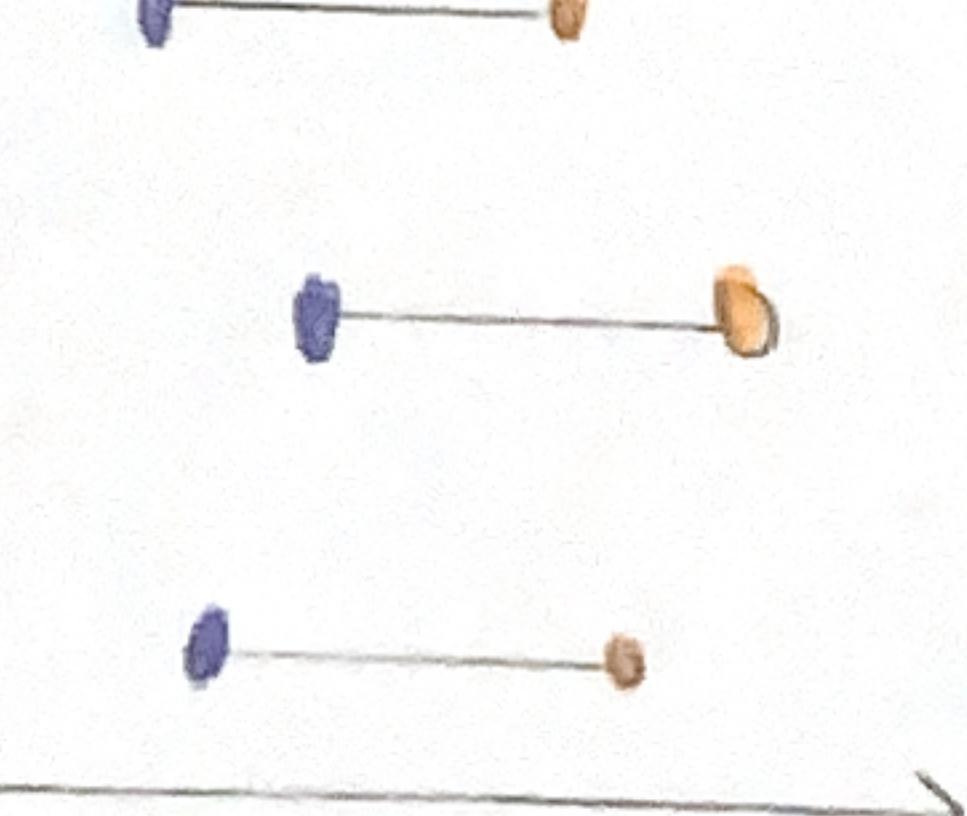
⑪

Part-to-whole visualization of dominating IMO countries



⑫

Males vs Female IMO Participants



FILTER

⑬ \Rightarrow ① If the data has more dimensions and numerical attributes

⑭ \Rightarrow ② If the data is normalized (use choropleth map)

⑮ \Rightarrow ⑥ Can observe central tendencies for groups of data as opposed to everything as a whole

CATEGORISE

IMO trends

⑥, ⑦, ⑫, ⑯

categorical

⑮, ⑯, ⑰

Quantitative

⑩, ⑪, ⑫, ⑯

COMBINE & REFINER

⑯ + 1 more attribute \Rightarrow ⑤ (only when needed)

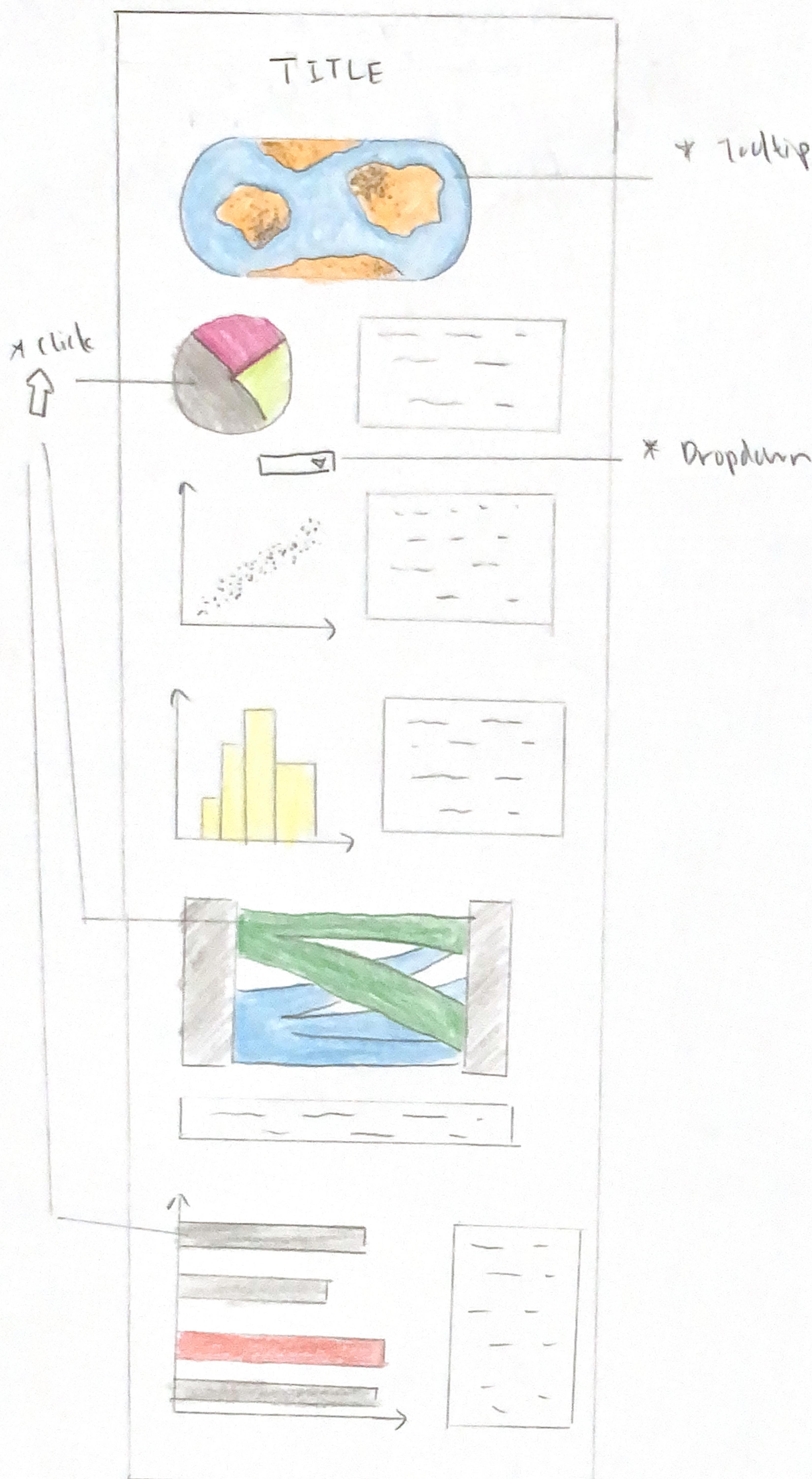
⑯ + date & year \Rightarrow Filter

⑯ + size (quantitative) \Rightarrow ⑯ = encode size of bubbles for another numerical attribute

QUESTION

- Are appropriate idioms used to visualize the data?
- How much data wrangling is needed to achieve these idioms?
- Is the visualization double in Vega or vega-lite?
- Are the idioms complex enough to be interesting?

LAYOUT



Title: IMO trends and Active ness across countries

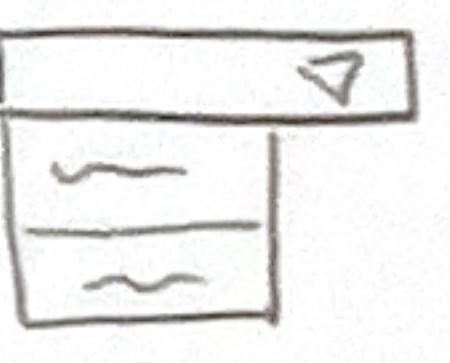
Author: Ng Khang Wei

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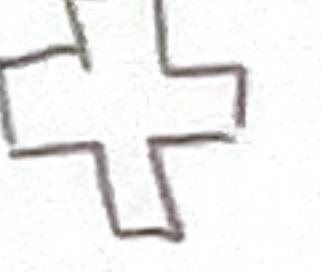
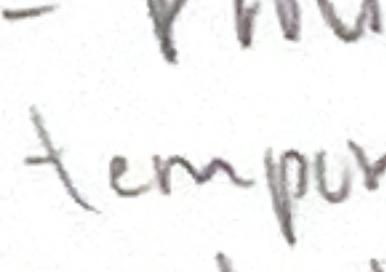
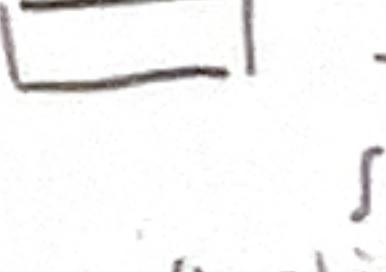
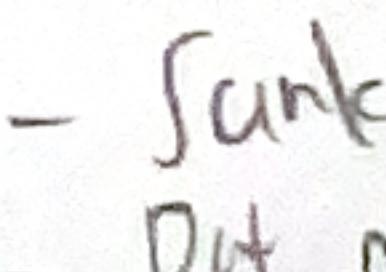
Sheet: 2

Task: Design a well structured visualisation for IMO performance Patterns across countries

OPERATION

- * Click
 - clicking on portions of the pie chart will zoom in on the map to provide emphasis
- 
 - Dropdown for highlighting specific countries and also possibly the IMO questions to filter out the data accordingly
- 
 - Tooltip for further emphasis on the map data or additional information to support the dot map (this alone might be complicated for some)

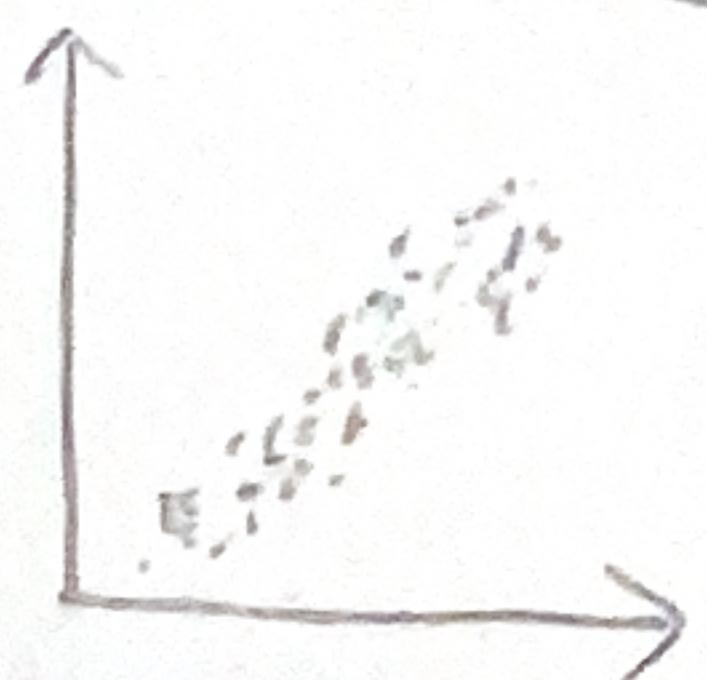
DISCUSSION

- 
 - Idioms are fairly easy to understand and implement (except sunkey)
- 
 - Provide both quantitative and temporal data insights for analytical and trend analysis
- 
 - Less correlation to use sunkey chart for this visualisation
 - No temporal data
 - Too little complexity for the overall visualisation (e.g. surface level observations)
- 
 - Sunkey is difficult to implement
 - Dot map may be harder to interpret compared to other types like chloropleth.

FOCUS

- The main focus is simple visualisation to provide a "fun fact" and trivia-like reading experience without too deep of an exploration into the data.

Correlation



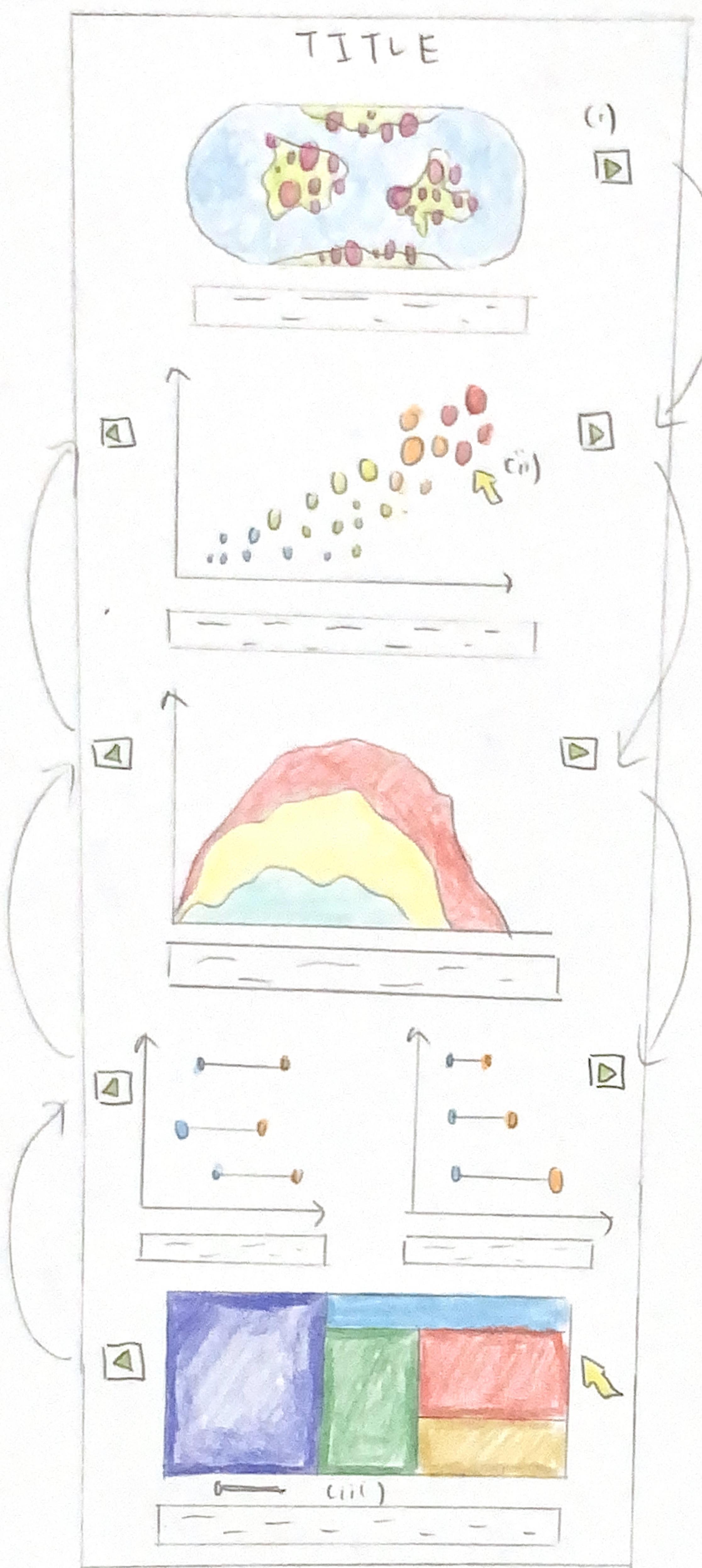
Classification



Overall summary

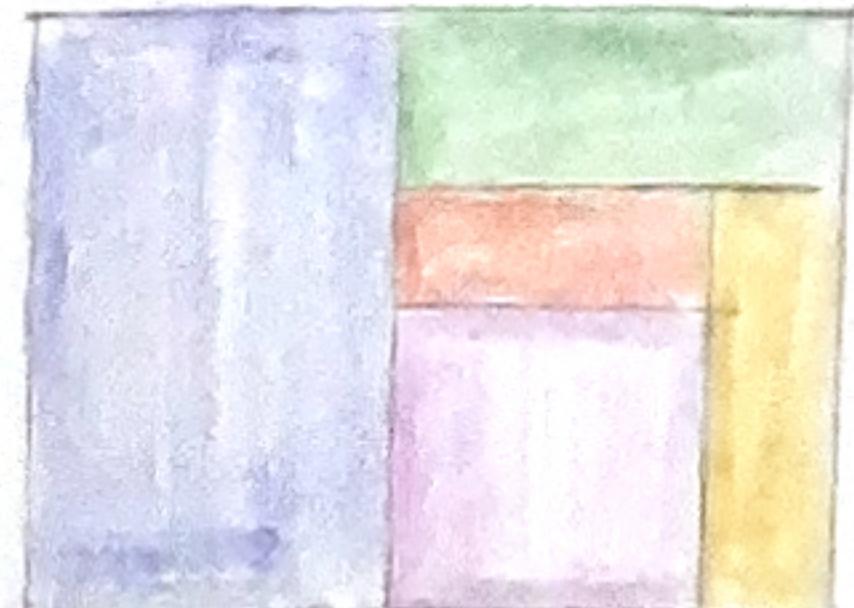


LAYOUT

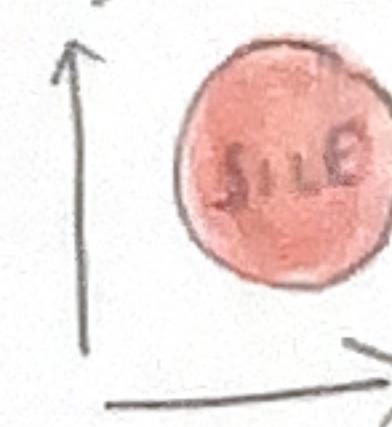


FOCUS

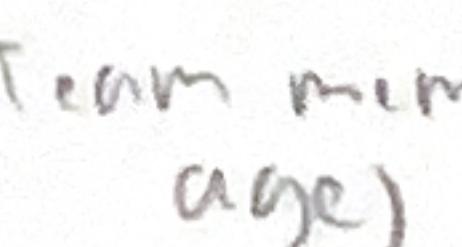
- Part to whole relationship



- Correlation
 - y (IMO performance)

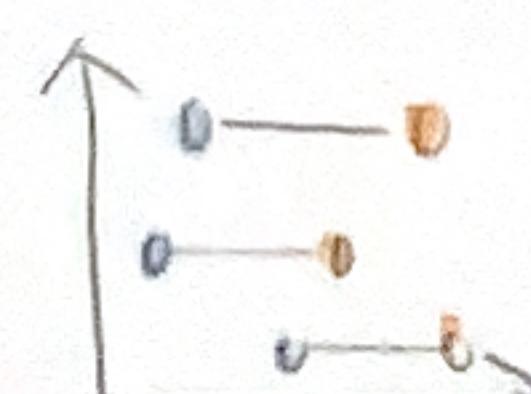


- (Area: participation rate)



A Identity possible hidden patterns in the chart for both easier comparison and deeper insights for future usage.

- Compare and contrast



- (Contrast years where disparity between male and female members is the largest for e.g.)

Title: IMO Performance Record

Author: Nam Khang Wei

Date: 10/10/2025

Sheet: 3

Task: Design an IMO Performance "catalogue" visualisation

OPERATION

(i)

- - Navigate easily through different visualisations without having to scroll

(ii)

- - Clicking on a specific bubble corresponds to a specific country / state which highlights it and can potentially affect other charts as well.

(iii)

- 2000
 - Slider which changes the hierarchical treemap layout throughout the years, showing how IMO participation rate has developed over the years among different countries / continent

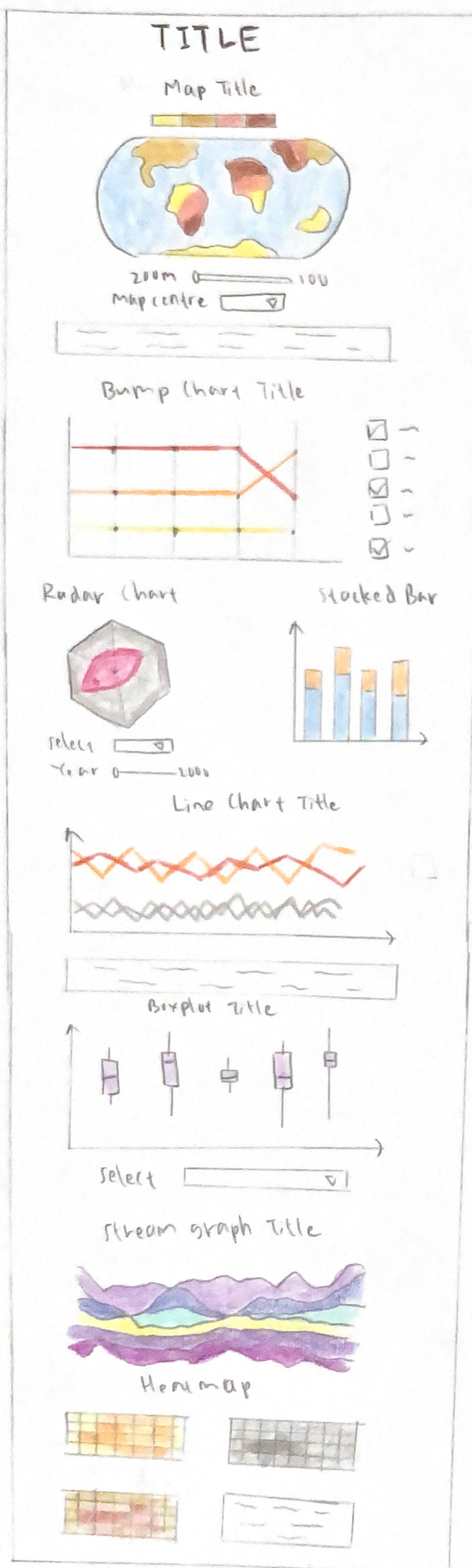
DISCUSSION

- Make use of idioms that take up space (fill area with color). Makes visualisation less boring and more dynamic
- Navigation tool is unique



- Incompatible data between dataset and the suggested idiom (E.g. Age of team members is not provided, and scraping is difficult).
- Navigation tool, while unique, is difficult to implement. And also, scrolling does not take too much time.
- More surface level in that the area chart and treemap shows part to whole relationship.

LAYOUT



- Clear structure and layout which eases reading. The eye guidance is natural
- Idioms used are appropriate, pertaining to the visual and analytical side of visualisation

Title: INNO Insights Narrative

Author: Ngan Khang Wei

Date: 10/10/2025

Sheet: 4

Task: Design a narrative for visualising INNO performance data across countries

OPERATION



Dropdown

- Filter by countries / continents / male and female types



slider

- View changes or developing patterns across the years



Tooltip

- Show additional



- Select the countries that should be highlighted to emphasize the figure ground

FOCUS

Visual aspect:

- Easier reading and comprehension
- Don't need to analyze deeper to pick up on patterns.
- Emphasized through text and line annotations. E.g. map, radar, stream graph

Analytical aspect:

- For deeper observation to derive meaning for other potential wks. E.g. Radar for recognizing the consistency of each country in choosing equally skilled participants

DISCUSSION



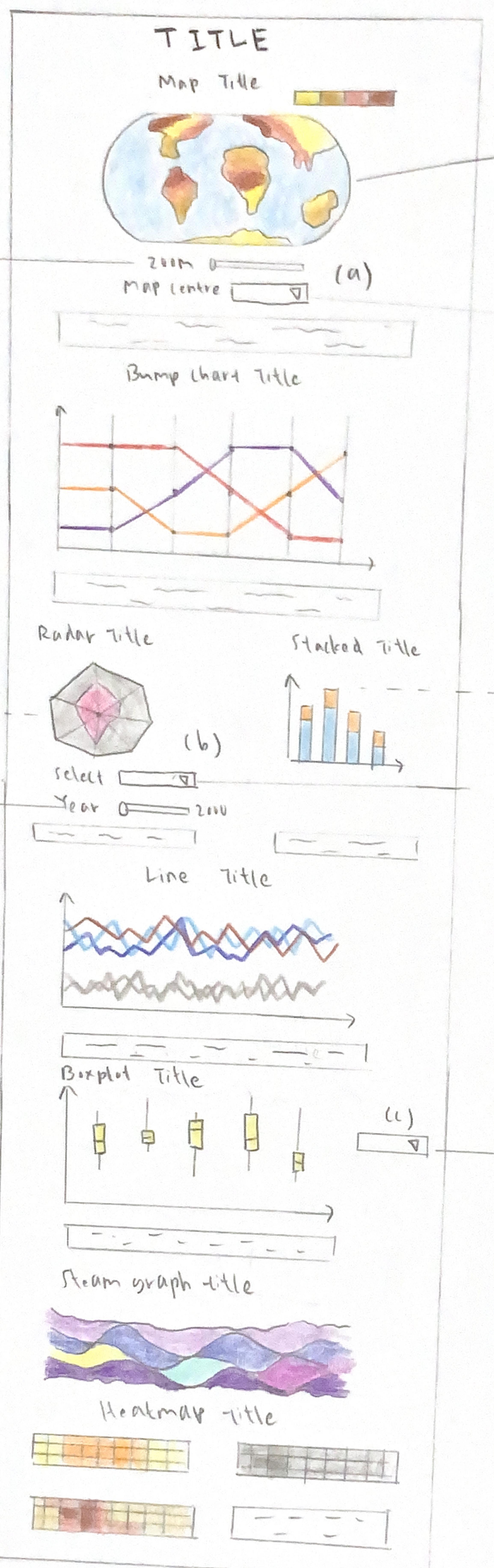
- Some idioms are difficult to implement. Like the radar chart, which involves more low-level implementation

- Data might not be distinct enough to be visualised using some idioms like radar and heatmap

- Most idioms use temporal data but presented with a different perspective which is suitable for these datasets to zero in on possibly hidden patterns as opposed to surface level observations

LAYOUT

* Not 100% finalized



DETAILS

Dependencies:

- vega
- vega-lite
- R
- vega editor
- HTML & CSS & JavaScript

① Gather and find datasets

② Wrangle dataset to fit the idioms and visualisation

③ Attempt homework activities to make first draft of charts

④ Plot the charts using Vega & Vega-Lite

⑤ Create the layout using HTML & CSS and JavaScript to combine layout

• Approximate time and effort layout
 - 1 day for data wrangling
 - 4 days for plotting charts & 2 days for

Title: Final design sheet

Author: Ngan Khang Wei

Date: 10/10/2025

Sheet: 5

Task: Final layout design and explanations

OPERATION

(a) Zoom



- Observe countries clearer



- Filter out the regions to zoom into. (Map cannot be dragged)

(b)

- Filter by country to simulate specific radar info

— 2000 - filter the year in which IMO takes place

(c)

- Filter by top countries to show performance consistency

FOCUS

Visual



Analytical

- Bump
- Line
- Boxplot



NARRATIVE

- Visual for easier pattern recognition E.g. Steam graph is easy to analyze without the need to explore deeper.

- Analytics: For deeper insights E.g. Boxplot used for measuring IMO performance consistency across countries.