Q1: What type of attribute (categorical, ordinal, quantitative) are the following? If the attribute is ordinal or quantitative, what is the ordering direction (sequential, diverging, cyclic)? What color map (#1~#6) is the best choice to encode each attribute? (20%)

1. Academic letter grade (e.g. A+, A, A-, B+ B …)
   A: **Ordinal, ordered with sequential direction, best using #3.**
2. Media companies (e.g. Netflix, Walt Disney, Fox, CBS, …)
   A: **Categorical, best using #4.**
3. Acceleration (e.g. +2 m/s2 , -3 m/s2 , +22 m/s2)
   A: **Quantitative, ordered with diverging direction, best using #6.**
4. Scores of an exam (e.g. 90 points, 60 points, 30 points)
   A: **Quantitative, ordered with sequential direction, best using #5.**
5. Survey options (e.g., strongly agree, agree, disagree, strongly, disagree)
   A: **Ordinal, ordered with diverging direction, best using #6.**

Q2: Check this website about mental health survey dataset : (20%)
https://www.kaggle.com/osmi/mental-health-in-tech-survey
Answer questions for the following attributes(columns), timestamp, age, gender, country, state, work_interfere, no_employees, benefits, wellness_program, comments.

● Write down the attribute type (categorical, ordinal, quantitative)
● Determine its cardinality (number of levels) for categorical or ordinal, or range for quantitative

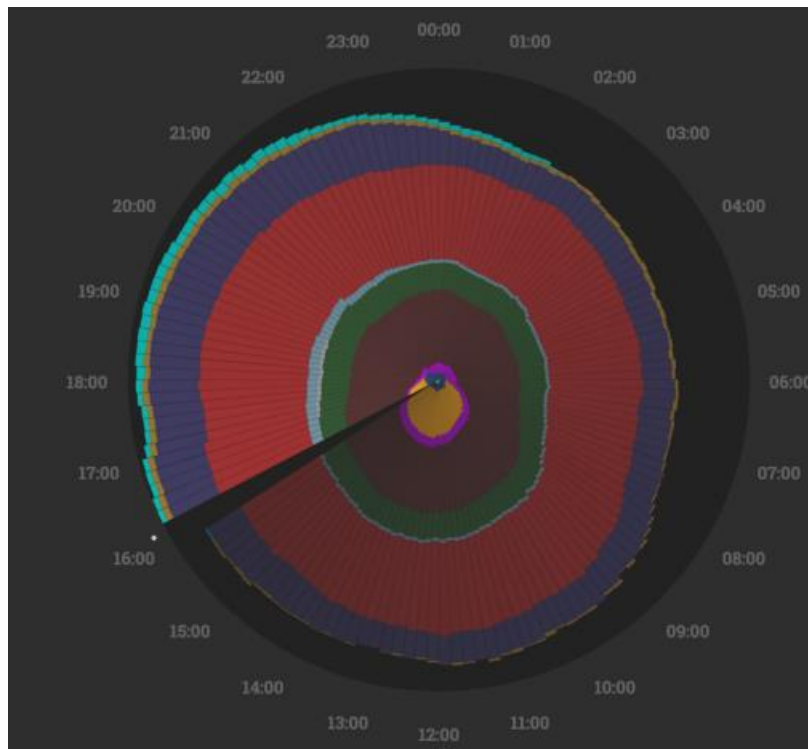| Category	Attribute type	Cardinality
timestamp	quantitative	27Aug14 ~ 2Feb16
age	quantitative	-1726 ~ 99999999999 (we can see that there

		are lots of data that make nonsense here…)
gender	categorical	49 levels (Maybe the author didn't limit the input type, so many different types are actually the same one. e.g. 'M', 'Male', 'male', 'm' are all represent "male")
country	categorical	48 levels
state	categorical	46 levels
work_interfere	ordinal	5 levels (Never, rarely, sometimes, often, NA. Since we got never here, NA means I don't know, I guess)
no_employees	quantitive	6 levels
benefits	ordinal	3 levels (Yes, no, don't know)
wellness_program	ordinal	3 levels
comments	categorical	161 levels

Q3: You will identify data items and the marks used to encode them, and data attributes and the channels used to encode them. (4 questions) (60%)

For each chart, fill in

- Visual channels used?
  - Channel X encodes attribute Y
  - Channel X encodes attribute Y
  - ....
- Marks used?
  - Mark of type X encodes item Y
  - Mark of type X encodes item Y
  - ....

A. https://pm25.lass-net.org/Power/TW/index.html?fbclid=IwAR0cqB6FsjoO8--XGdgEoeYTfpJ4MmoNnMQ8tM6lAqUcRfslEH6EDX1kpfs
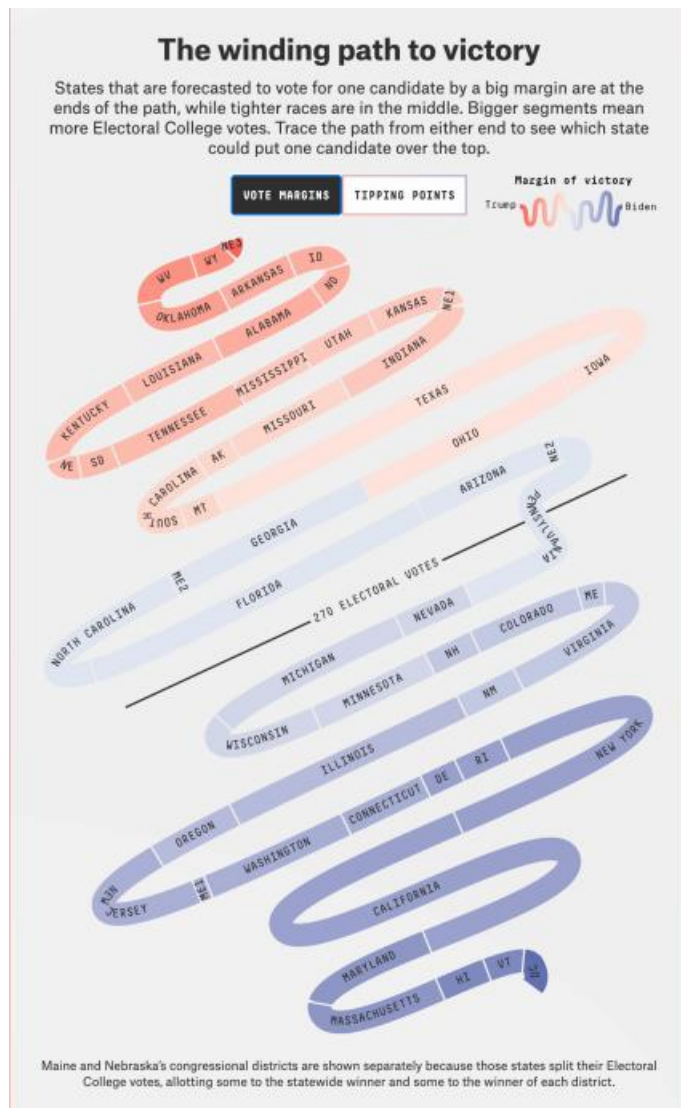

A: Channels:

- **Direction (angle to the top) encodes the daytime**
- **Color encodes the types of electric generation in Taiwan**
- **Bar height (length) encodes million watts of electric generated from the type**

Marks:

- **Bars encodes million watts the electric generated from that time**

The winding path to victory

States that are forecasted to vote for one candidate by a big margin are at the ends of the path, while tighter races are in the middle. Bigger segments mean more Electoral College votes. Trace the path from either end to see which state could put one candidate over the top.

Maine and Nebraska's congressional districts are shown separately because those states split their Electoral College votes, allotting some to the statewide winner and some to the winner of each district.
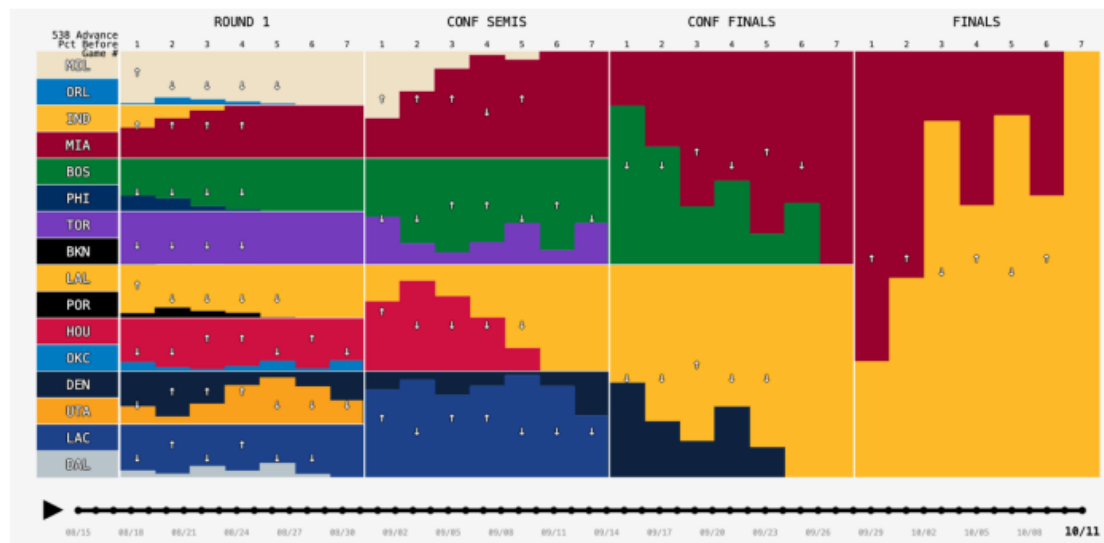
A: Channels:

- Color encodes the percentage of tickets the candidate got.
- Length encodes the ticket number the candidate got.
- Position in line encodes the percentage of tickets the candidate got.

Marks:

- Line segment encodes states of the U.S..

C: https://roadtolarissa.com/playoff-probabilities/ (the image on 10/11)

A: Channels:

- Color encodes teams.
- Row encodes different parts of playoff games.
- Column encodes teams.
- The bar height encodes the winning probability of the team.
- X axis encodes time & games.

Marks:

- Bars encodes a team's winning probability that plays in the certain part of the playoff.
- Arrows encodes the trend of the team's predicted winning probability since the last game.

D: (you need to read this website to answer this question)
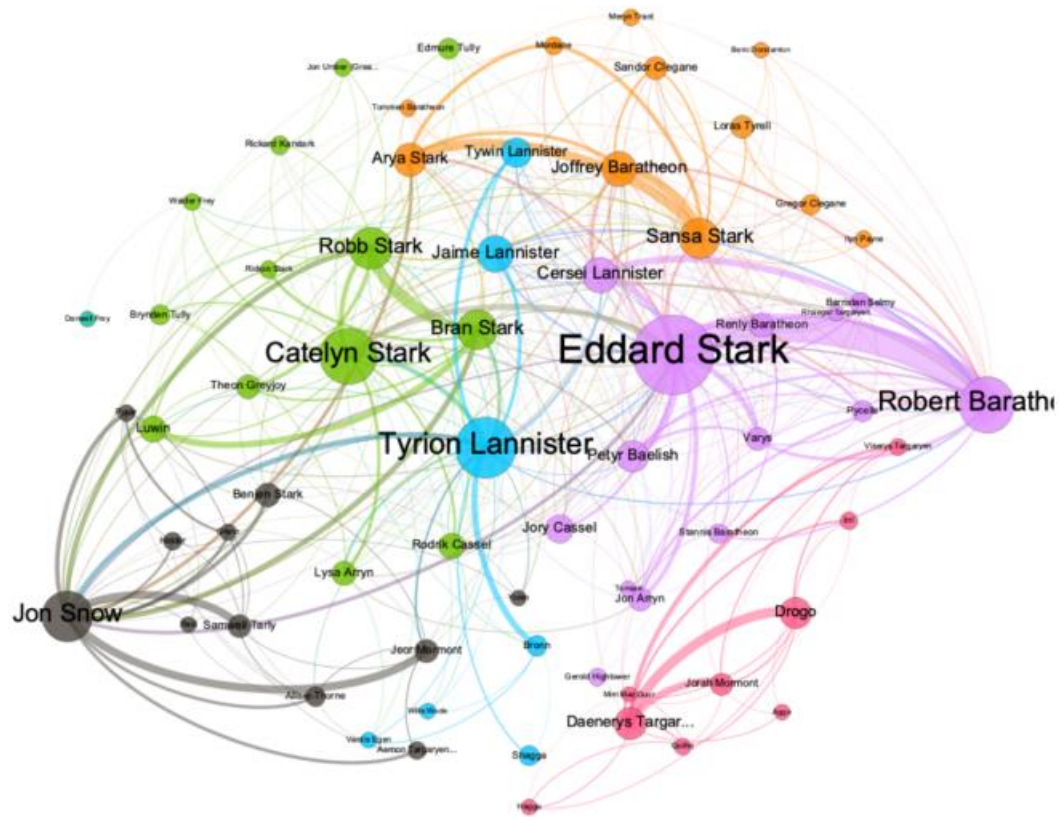
A: Channels:
- **Color encodes seasons of the drama.**
- **Edge weight encodes number of interactions between two characters.**

Marks:
- **Points encodes characters.**