Ashoka Horizons Proram
Assignment #3 HW
Applied Data Science
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Part 1: Fundamentals of Visualization

1) Question 1
    a) Clarity means that the data is easy to read and interpret and isn't cluttered. Precision is the accuracy of the data itself. Efficiency refers to using the fewest possible graphical elements to effectively represent a large amount of data.
    b) A stacked bar chart showing monthly expenses, with each category represented by a similar shade of blue. The clarity will be an issue here because of the lack of distinction in colour
2) Question 2
    a) These days, data is available almost everywhere and getting it doesn't take much effort. But just having data is not so useful unless we know how to look at it in a way that makes sense. This is where data visualization becomes more important because it lets people see the information clearly. Without this skill, the data might just stay in a form that is not helping anyone much.
    b) When data is shown in a visual form, it becomes easier to find things that are meaningful. For example, patterns or changes over time can be seen quickly. If we only look at tables or long lists, it is harder to know what is happening. Visualization lets people get the main idea from data more easily, which means they can use it in a better way.

Part 2: Visual Encoding and Perception

3) Question 3: Exploratory visualization is the kind where you use visuals to look into data and try to find patterns, unusual values, or relationships that are not obvious. You are still figuring things out. Explanatory visualization is more for when you already found something and now want to show it clearly to someone else so they understand the point you're trying to make.
    a) A dataset contains information about how different age groups use public transport. This can be visualized in different ways to see if there are patterns, like younger people traveling more during weekends. The goal is to notice trends or differences that are not obvious by just reading the raw numbers.
    b) A chart is made that shows how a specific age group, such as people aged 18–25, uses public transport much more on weekends compared to weekdays. This visualization is made for a city planning committee. The goal is to communicate the conclusion clearly so that decisions can be taken based on the insight.

4) Question 4:
    a) As per Tamara Munzner's ranking, position and length are the ones that are most effective for showing quantitative data. This seems to be because people are usually better at seeing how far something is placed or how long it is, instead of trying to guess from other visual things. It helps comparisons to be made more easily and the differences are also clearer when using these channels.
    b) Identity channels are things like color, shape, or texture that help to show what category something is from. These are more suitable when the goal is not to show amounts but to tell one group apart from another. For example, if there is a scatter plot with many different car brands, each brand can have a different shape or color, which makes it easier to see which point belongs to which brand.
5) Question 5: Expressiveness means that the chart or graph shows all the data it's supposed to, without leaving out something or putting in extra stuff that's not needed. Effectiveness means that the way the data is shown helps people understand it easily and quickly. Both are important because if a chart doesn't show everything it should, people might not get the right idea. And even if the data is all there, if it's shown in a hard way, then people still might not understand it. So, to make a good data visualization, the chart needs to have all the right data and also show it in a way that makes sense to people.

Part 3: Narrative, Color, and Design

6) Question 6: Florence Nightingale's "Diagram of the Causes of Mortality"
    a) The visualization is a polar area chart, where different colored wedges show the number of deaths by different causes among soldiers during the Crimean War. The chart is round and shows each month as a slice with areas growing outward.
    b) The main message was that most of the soldiers were dying not because of battle wounds, but from diseases that could have been stopped. It was made to show that better hygiene and health care could save many lives.
    c) The way the chart used big colored sections made it easy to see how many people died from disease compared to other reasons. The circle shape also helped show how things changed over months, and the bright colors helped the important parts stand out.
7) Question 7:
    a) Qualitative palette is for things that are in different groups but don't have order. Like car brands or animals. An example is a bar chart that shows favorite fruit, like apple, banana, orange. Sequential palette is for numbers that go from small to big. It works when data keeps going up or down. Like a heat map showing test scores, where light color is low score and dark color is high.
    Diverging palette is when numbers go in two ways from a middle point. It's good for showing things like better or worse than average. For example, a chart where red shows below average and green shows above average marks.
    b) Some people can't see colors the same, like they mix up red and green. If the chart only uses those colors, it can be hard to read. To fix this, you can use colors

that are easier to tell apart or add lines or words to help show what the colors mean.

8) Question 8: Before making any data visualization, planning is very important. These are three questions to ask:What is the question?
   You need to know what you are trying to find or show. This helps to decide what kind of data and chart you need.

   Who is the audience?
   Think about who will look at the chart. Some people know more about the topic, some less. That changes how you show the data.'

   What data is needed?
   You should know what data you have and what you still need to find. This makes sure the chart shows the right thing in the right way.

   (I cannot see the answer to this question on slide 34 so I have answered it myself)

Part 4: Dynamic Visualization and Creative Coding

9) Question 9:
   a) Dynamic visualizations can let users do more things, like click, move around, or see more details. This is better than static ones because people can explore the data by themselves. They can look at what they care about and find more things without making the chart too full or messy.
   b) One example of interactivity is filtering. This is when a user can choose to see only part of the data, like picking one year or one country. It helps because the person doesn't have to look at everything together, which can be too much. By only seeing what they want, they can understand that part of the data more clearly.
10) Question 10:
   a) Creative coding means using code to make pictures or designs with data, not just normal charts. It is more about making the data look nice or different, sometimes with movement or special shapes. It is not only for showing numbers but also to make people feel something when they see the data.
   b) A real example is Kialo. Kialo is a website where people can make and look at debates. The debate is not just words in a list. It is boxes that show what each person said. These boxes are joined with lines. Some boxes say "yes," and some say "no." The "yes" boxes support the main idea, and the "no" boxes go against it. If someone replies to a box, a smaller box appears under it. It keeps going like a tree.

You can click the boxes to open or close them. So you can look at just the part of the debate you want. The colors are also different to show if the argument is for or against. The lines help to see how ideas are connected.

https://www.kialo.com/

Why it is creative:
It is not just a page with writing. It is more like a map. You move around and follow how the debate grows. You can see big arguments and also small replies. It helps people not get lost. It also makes the debate easier to understand. It is more fun than just reading paragraphs. That is why Kialo is a good example of creative coding.