Quiz Week 13

1. What is the main purpose of causal inference in data visualization?
   A) Identifying correlations between variables
   B) Determining cause-and-effect relationships between variables
   C) Analyzing data biases in visualization
   D) Predicting future outcomes

   Answer: B) Determining cause-and-effect relationships between variables

2. What is the key difference between correlation and causation?
   A) Correlation involves variables, while causation involves constants.
   B) Correlation implies a cause-and-effect relationship, while causation involves a statistical association.
   C) Correlation identifies relationships, while causation involves a direct influence of one variable on another.
    D) Correlation requires controlled experiments, while causation relies on observational data.

   Answer: C) Correlation identifies relationships, while causation involves a direct influence of one variable on another.

3. In the context of causal inference, what does "confounding" refer to?
   A) A technique to manipulate variables in controlled experiments
   B) A type of statistical model for establishing causation
   C) The presence of hidden variables that affect both the cause-and-effect variables
   D) The process of identifying spurious correlations

   Answer: C) The presence of hidden variables that affect both the cause-and-effect variables

4. Which of the following statements is true regarding controlled experiments for causal inference?
   A) Controlled experiments are not suitable for establishing cause-and-effect relationships.
   B) Controlled experiments involve manipulating variables to determine correlations.
   C) Controlled experiments are ideal for causal inference as they allow the manipulation of variables.
   D) Controlled experiments only work for observational data.

   Answer: C) Controlled experiments are ideal for causal inference as they allow the manipulation of variables.

5. What is a potential consequence of reverse causality in causal inference?
   A) It leads to the overfitting of statistical models.
   B) It creates a spurious correlation between variables.
   C) It masks the true causal effect.
   D) It mistakes the effect for the cause.

Answer: D) It mistakes the effect for the cause.

6. What is a "spurious correlation" in the context of causal inference?
  A) A correlation that occurs due to chance and has no underlying relationship.
  B) A correlation that involves two variables with a direct cause-and-effect relationship.
  C) A correlation that is difficult to visualize using data visualizations.
  D) A correlation that only occurs when using machine learning techniques.

  Answer A) A correlation that occurs due to chance and has no underlying relationship.

7. What type of relationship is described when an increase in the value of one variable leads to a decrease in the value of another?
  A) Positive Causation
  B) Negative Causation
  C) Spurious Correlation
  D) Inverse Correlation

  Answer B) Negative Causation

8. How can visual techniques aid in understanding complex causal relationships?
  A) By creating random patterns in data visualization
  B) By providing entertainment value to viewers
  C) By facilitating natural and effortless comprehension
  D) By emphasizing correlations over causations

  Answer C) By facilitating natural and effortless comprehension

9. Which of the following is NOT a potential pitfall in causal inference?
  A) Sampling Bias
  B) Confounding Variables
  C) Reverse Causality
  D) Overfitting

  Answer D) Overfitting

10. What type of visualization represents the relationship between two variables, such as the number of cups of coffee consumed and productivity?
  A) Line chart
  B) Bar chart
  C) Scatterplot
  D) Pie chart

  Answer C) Scatterplot