Behavioral Research and Experiment Design

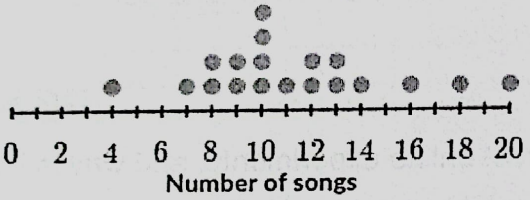
Quiz 2

Time: 45 Minutes

Total Marks: 25

Section A: Multiple Choice (Single Correct) Questions **[1M each]**

1. The following dotplot (and corresponding stat-table) shows the number of songs on each album in conundramatic's discography. Each dot represents a different album.



min	Q_1	median	Q_3	max
4	9	10	13	20

According to the {>1.5 x InterQuartile Range} rule for outliers, how many outliers are there in this data set?

a. 1
b. 2
c. 3
d. 0

2. In which of the following studies would Experience Sampling be the most suitable method for data collection?
   a. Investigating the effect of a new drug on long-term patient outcomes.
   b. Exploring daily stress levels of individuals in a high-pressure work environment.
   c. Analysing historical trends in annual temperature fluctuations.
   d. Examining the impact of different teaching methods on student test scores.
3. Under what circumstances is the removal of an outlier (participant) from a dataset typically not justified in data analysis?
   a. When outlier's data point is found to be significantly different from rest of the dataset.
   b. When the outlier's data point is inconsistent with the research hypothesis.
   c. When there is clear evidence that the outlier's data is a result of measurement errors.
   d. When the outlier's data point is from a small sample, and its removal would leave the dataset with insufficient statistical power.

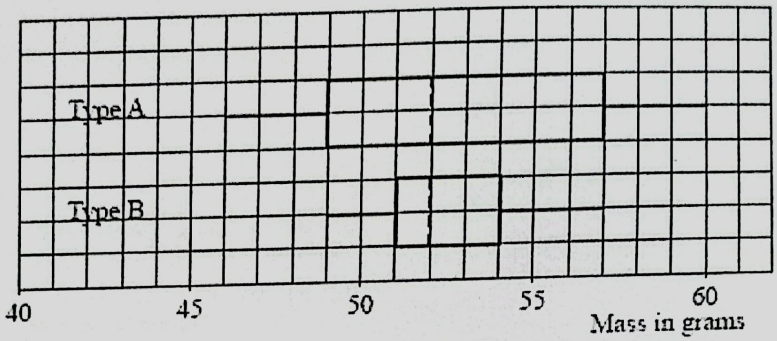
4. Which of the following is an example of naturalistic research?
    a. A laboratory experiment conducted to study the effects of a new drug on patients with a specific medical condition.
    b. A controlled study assessing the impact of a new teaching method on student performance in a controlled classroom setting.
    c. An observational study where researchers observe and document the behavior of wild animals in their natural habitats.
    d. A survey conducted to gather opinions and preferences of individuals regarding their favorite movie genre.
5. In Multi Dimensional Scaling (MDS), what does "proximities" refer to?
    a. The number of dimensions used in the analysis
    b. The size of the dataset
    c. The measures of dissimilarity or similarity between data points
    d. The number of participants in a study

Section B: Short Descriptive Questions **[2M each]**

1. What is timestamp jitter in the context of online experiments, and why is it a concern for researchers?
2. When should you use a pie chart, and when should you use a bar chart in data visualization? Provide clear criteria and examples for each type of chart.
3. As a researcher tasked with conducting a case study on the "Music Sharing Patterns in Times of COVID", explore the advantages and disadvantages of utilizing social media research as a primary data source.
4. In the context of the Facebook Emotional Contagion experiment, what ethical concern was raised regarding the absence of informed consent, and what potential measures could have been taken to address this issue?
5. What kind of visualisation is appropriate for the following situations and why?
    a. You are given data on the number of social media followers for a fashion brand over the past year. Whay plot would you use to measure the growth patterns of the fashion brand's social media following to identify peak engagement periods?
    b. Given survey data on students' preferred learning styles and their academic performance (CGPA), how would you explore if there is any association between students' preferred learning styles and their academic performance?
6. What kind of visualisation is appropriate for describing data comprising three quantitative variables and a categorical grouping at a time? Justify your answer with an example of such a visualization.
7. Describe 4 attributes of good visualizations.

Section C: Visualization Analysis [3M each]

1. A gardener collected data on two types of tomatoes he grows in his garden. The box plot below shows data for the masses in grams of the tomatoes in the two samples. Compare and contrast the two types and advise the gardener which type of tomato he should grow in future.



2. You are presented with a plot made from data collected on 71 six-week-old baby chickens (chicks), which includes observations on their feed type, sex, and weight. Analyze the plot and answer the following:
   a. Identify the type of plot, and why it is useful in this particular context.
   b. Describe the relationship between various feed types and chick weight.
   c. Interpret the shape of distribution for the weights of sunflower-fed chicks.