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1. (a) Sampling Methodology for Customer Satisfaction Survey: In this scenario, the software company wants to conduct a customer satisfaction survey among their current customers to gauge market penetration. They cater to various sectors, including industry, government, academia, and private individuals, with most sales going to the industry. To generate 500 responses, here's the sampling methodology:

   Stratified Sampling: Divide the customer base into strata based on industry, government, academia, and private individuals since the bulk of sales are to the industry sector. Then, randomly select a proportionate number of customers from each stratum. This ensures representation from all major customer categories.

   Random Sampling within Strata: Within each stratum, use simple random sampling to select customers. We can use random number generators or customer lists to ensure randomness.

   Weighted Sampling: Since industry customers form the majority, consider assigning higher weights to responses from industry customers to account for their larger share in the customer base.

   Non-Response Adjustment: Be prepared to handle non-responses by having a backup list of customers in case some decline to participate. we can also use statistical techniques to adjust for non-response bias.

   (b) Sampling Methodology for Network Switch Traffic Profile: In this case, the network provider wants to analyze the traffic statistics by selecting 20 switches out of 457. The following issues could affect the sampling method:

   Random Sampling: Ensure that the 20 switches are selected randomly from the entire network to minimize bias. Use a random number generator or lottery method to pick switches.

   Stratified Sampling by Region or Type: Depending on the network's geographical distribution or types of switches, consider dividing them into strata and selecting a proportional number from each stratum. This helps ensure representation from different areas or switch types.

   Sampling Frame: Ensure the list of switches is up-to-date and accurate. If the list is outdated, you might miss some switches or select switches that no longer exist.

   Sampling Period: Consider the time period over which you collect data. Different times of the day or week may show varying traffic patterns, so choose a representative time frame.

Replacement or Non-Replacement: Decide whether to allow switches to be selected more than once (with replacement) or only once (without replacement) in your sampling method, based on your analysis goals.

2. DATA TYPES:

(a) Signal strength as recorded on a 5 bar display:

- Data Type: Categorical Ordinal Explanation: The signal strength displayed as bars represents ordered categories but doesn't have a specific measurement scale. It's ordinal because the categories have a meaningful order (e.g., more bars indicate stronger signals), but the differences between categories are not standardized.

(b) Signal strength measured in dBm (decibel-milliwatts):

- Data Type: Measurement Continuous Explanation: Signal strength in dBm is a continuous numerical measurement. It can take any real value within a defined range, making it a continuous variable.

(c) Error in a GPS measurement:

- Data Type: Measurement Continuous Explanation: GPS measurement errors are typically expressed as continuous numerical values (e.g., meters or feet). They represent the magnitude of inaccuracies and can vary continuously.

(d) Number of frequency channels occupied in one cell in a mobile cellular network:

- Data Type: Measurement Discrete Explanation: The number of frequency channels occupied is a discrete numerical variable. It can only take on specific whole number values, making it a discrete measurement.