Stat 157 – Section 3.1: Sampling Plans

Simple random sample

given a population of *N* elements, choose *n* elements randomly so that each element is equally likely to be chosen

examples: drawing names from a hat

giving everyone a number, then rolling dice or using a random number generator

Stratified random sample

select a simple random sample from each of a given number of subpopulations (strata)

example: residents of Victoria are divided into different age groups and individuals randomly drawn from each group

benefits: opinions from each group are sampled $\rightarrow$ if have small minorities, they might be missed if random sampling used

Cluster sample

group entire population into clusters, then randomly pick a few clusters and measure all elements in cluster

example: split Victoria up into city blocks, pick a few blocks randomly, poll <u>every</u> resident of the picked blocks

1-in-k systematic random sample

create ordered list, select one of the first *k* elements in the list and every *k*th element thereafter

example: a) list residents of Victoria in alphabetical order

b) for 1-in-50 sampling, pick number from 1 to 50

c) measure that element in the list and then every 50th resident thereafter

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STAT 157: Sampling Plans Exercises

1. What survey design is used in the following situations?

   a) A few electoral districts are chosen at random, and every voter in that district is contacted. _____

   b) The 17th person and then every 100th person thereafter on the list of registered voters in BC is contacted and asked a question. _____

   c) Every registered voter's name is written on paper and put into a really, really big hat. The hat is shaken and 1000 papers are selected. _____

   d) The voters' list is divided up into electoral districts, and 100 names are chosen randomly from each district. _____

2. A manager at the Ford Motor Company wants to do some testing for quality control. In the factory, a number of different assembly lines all produce the same car, the Ford Fiesta. For the following situations, identify the survey method used to pick the samples.

   a) The serial numbers of all cars manufactured on all assembly lines are recorded and twenty of them are randomly selected for testing. _____

   b) For each assembly line, a certain number of cars are chosen at random from the ones manufactured that day. _____

   c) A certain number of assembly lines are chosen at random and then all cars manufactured that day from those lines are tested. _____

Answers

1. a) cluster   b) 1-in-100 systematic   c) simple random   d) stratified random

2. a) simple random b) stratified c) cluster