Seminar 4

1. Using a calendar, systematically select 5 samples every eighteenth day of the year, beginning with January 6.

2. At the U.S. Mint in Philadelphia, 10 machines stamp out pennies in lots of 50. these lots are arranged sequentially on a single conveyor belt that passes an inspection station. An inspector decides to use systematic sampling in inspecting the pennies and is trying to decide whether to inspect every fifth or every seventh lots of pennies. Which is better? Why?

3. A survey throughout a country has revealed that 40% of non-manual workers travel to work by public transport and one-half of non-manual workers use their own cars. For all workers, 47.5% use public transport and 10% use methods other than their own cars or public transport (e.g. walk).

   A statistician in a large factory ABC (which has 3/4 manual workers and 1/4 non-manual workers) has been asked to sample 200 employees for their views on factory-coach service. He decides to take a sample at factory "main gate" at five ock one evening.

   a) How many manual workers will there be in the sample for factory ABC?
   b) Calculate the no. of employees to be interviewed in each of the six sub-groups defined. (Identify the six sub-groups first)
   c) How many workers who travel to work by public transport will be interviewed?
   d) Point out the limitations/problems of the sampling technique involved and suggests a better way of collecting the data.

4. The state occupational safety board has decided to do a study of work-related accidents within the state, to examine some of the variables involved in the accidents; e.g., the type of job, the cause of the accident, the extent of the injury, the time of day, and whether the employer was negligent. It has been decided that 250 of the 2,500 work-related accidents reported last year in the state will be sampled. The accident reports are filed by date in a filing cabinet. A department employee has proposed that the study should use a systematic sampling technique and select every tenth report in the file for the sample. Would the proposed plan of systematic sampling be appropriate here? Explain?

5. A population is made up of groups that have wide variation within each group but little variation from group to group. The appropriate type of sampling for this population is
   a) Stratified
   b) Systematic
   c) Cluster
   d) Judgement

Seminar 4 (cont.)

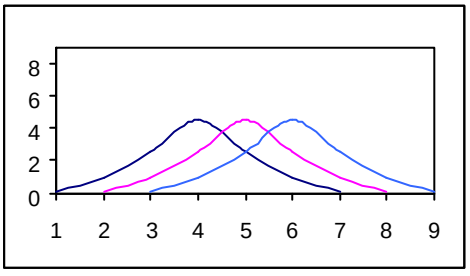
6. Bob Bennett, product manager for Clipper Mowers Company, is interested in looking at the kinds of lawn mowers used throughout the country. Assistant product manager, Mary Wilson has recommended a stratified random sampling process in which the cities and communities studied are separated into sub-strata, depending on the size and nature of the community. Mary Wilson proposes the following classification:

CATEGORY	TYPE OF COMMUNITY
Urban	Inner city (population 100,000 +)
suburban	Outlying area of cities or smaller communities (pop. 20,000 to 100,000)
Rural	Small communities (fewer than 20,000 residents)

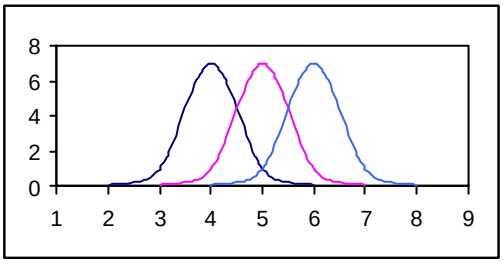
Is stratified random sampling appropriate here?

7. A Senate study on the issue of self-rule for the District of Columbia involved surveying 2,000 people from the population of the city regarding their opinions on a number of issues related to self-rule. Washington, D.C. is a city in which many neighbourhoods are poor and many neighbourhoods are rich, with very few neighbourhoods falling between the extremes. The researches who were administering the survey had reason to believe that the opinions expressed on the various questions would be highly dependent upon income. Which method was more appropriate, stratified sampling or cluster sampling? Explain briefly.

8. For the figures below, probability distribution for 3 natural subgroups of a larger population are shown. For which situation you recommend stratified sampling?



(a)



(b)

9. What is the major drawback of judgement sampling?

10. What are some of the disadvantages of probability sampling verses judgement sampling?

11. The principal of an academic institute wants to investigate the views of students on the issues of a new policy concerning computers. In particular, he is interested in comparing the opinions of students majoring in computer science with the rest of the student population. He can only take a fairly small sample because of limited resources. Explain briefly whether a simple random sample or a stratified random sample is more suitable in this situation.