

**STATISTICS APPLIED TO BUSINESS  
ADMINISTRATION. ACADEMIC YEAR 2012-2013  
SEMINAR 6 (40 MINUTES)**

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**EXERCISE 1 (2 POINTS)**

We wish to estimate the proportion of employees that, out of a total of 20000 employees working for a large firm, spend their holidays in a foreign country. Compute the minimum sample size that is required to estimate this proportion of employees with a 95 % confidence and an error that is no larger than 5 % if simple random sampling without replacement is used.

**EXERCISE 2 (6 POINTS)**

In order to estimate the mean alcoholic beverages consumption during the weekends, a stratified three-strata population is considered. That is, the population is divided in three different strata. It is known that the first stratum includes 600 individuals and that its population quasi standard deviation is  $\sigma_1^* = 20$ , that the second stratum includes 300 and that its population quasi standard deviation is  $\sigma_2^* = 30$ , and that the third stratum includes 100 individuals and that its population quasi standard deviation is  $\sigma_3^* = 10$ . We wish to take a sample of 300 individuals.

1. **(1 Point)** If uniform allocation is used, what would the sample size for each stratum in the population under study be?
2. **(1 Point)** If proportional allocation is used, what would the sample size for each stratum in the population under study be?
3. **(2 Points)** If n-optimal allocation is used, what would the sample size for each stratum in the population under study be?
4. **(2 Points)** Compute the estimator's variance for the mean alcoholic beverages consumption for the aforementioned proportional allocation sample size computation.

### EXERCISE 3 (2 POINTS)

1. **(1 Point)** Write down the conditions that strata should verify so that the sampling error is smaller when using stratified sampling instead of simple random sampling without replacement.
2. **(1 Point)** Explain what are the different types of allocation we have considered in stratified sampling. In addition, provide the conditions that should be taken into account to select any specific type of the aforementioned allocation strategies.

**Remark:** This piece of paper should be handed in together with your solutions to the aforementioned exercises. You should also write, both on this piece of paper and in the solutions you provide, the names of the students in your group that have actively participated in this seminar activity.