Sampling and Estimation - Exercise 2

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Exercise 2.A

Estimation under a stratified design

- Download the ESS for Sweden and Denmark (round 5)
- Import data to R and combine the two datasets
- Define a `survey` object (stratified design)
- Estimate the empirical distribution of tv consumption (`tvtot`) in Sweden and Denmark
- Estimate the joined empirical distribution of tv consumption in Sweden and Denmark

Codebook ESS round 5

Exercise 2.B

- Load the `survey` package and the `api` datasets.

```
library(survey)
data(api)
```

- The dataset `apistrat` is a sample of schools from `apipop` stratified by `stype`. Assuming the selection within the strata was done by SRS, define a survey object (`svydesign`) and calculate a point and variance estimate for the mean of `api00`.

Exercise 2.B

- Using `stype` again as a stratification variable try different allocations for stratified sample. Calculate the allocation of a sample of 60 schools from `apipop` using equal, proportional and optimal allocation. The proportional allocation should be proportional to the number of schools within the strata and the optimal alloaction should be optimal with regard to `api99`.

Exercise 2.B

- Select a StrSRS from `apipop` for each allocation.
- Estimate again the mean of `api00` from all three samples and compare the results.

Function for stratified samples

```
strSRsample <- function(strind, nh, replace=FALSE){
  Nh <- table(strind)[names(nh)]
  h.id <- split(1:sum(Nh), strind)[names(nh)]


  sam <- mapply( function(x,y) sample(x, y, replace=replace)
                , Nh, nh, SIMPLIFY = F)
  unlist(mapply(function(x,y) x[y]
                , h.id
                , sam, SIMPLIFY = F)
          ,use.names = FALSE)
}
```

Getting the function

```
library(devtools)
install_github("BernStZi/SamplingAndEstimation/r/sampaest",
               ref="short")
```

```
url <- "https://raw.githubusercontent.com/BernStZi/
SamplingAndEstimation/short/r/sampaest/R/strSRsample.R"
source(url)
```