Sampling, Weighting and Estimation
Exercise 2

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Exercise 2: Stratification and Allocati

1. Load the `survey` package and the `api` datasets in it.
2. 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 `svydesign` object that enables your to make unbiased point and variance estimates. Estimate the mean of `api00`.
3. Now you should try different allocations. Using `stype` again as a stratification variable calculate the allocation of a sample of 60 schools from `apipop`, using equal, proportional to the number of schools, and optimal with regard to `api99` allocation.
4. Select a StrSRS from `apipop` for each of your allocations.
5. Estimate again the mean of `api00` from your three different samples.

A Function for Stratified Sampling

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```
############################## Input ################################
#strind: the stratification varaible; a population length vector.
#nh:     allocation; a vector with elements named after the strata.
#replace: logical; sampling with or without replacement.
############################## Output ###############################
#A numeric vector containing the sampled
#rows of the population dataset.

strSR.sample <- 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)

}
```