## Section 1.3: Simple Random Sampling

A sample of size $n$ from a population of size $N$ is obtained through **simple random sampling** if every possible sample of size $n$ has an equally likely chance of occurring.

## Section 1.4: Other Effective Sampling Methods

A **stratified sample** is obtained by separating the population into non-overlapping groups called *strata* and then obtaining a proportional simple random sample from each group. The individuals within each group should be similar in some way.

A **systematic sample** is obtained by selecting every $k$th individual from the population. The first individual selected corresponds to a random number between 1 and $k$.

A **cluster sample** is obtained by selecting all individuals within a randomly selected collection or group of individuals.

### Multistage Sampling

Often one technique isn't possible, so many professional polling agencies use a technique called **multistage sampling**. The strategy is relatively self-explanatory - two or more sampling techniques are used.

For example, consider the light-bulb example we looked at earlier with cluster sampling. Let's suppose that the bulbs come off the assembly line in boxes that each contain 20 packages of four bulbs each. One strategy would be to do the sample in two stages:

**Stage 1:** A quality control engineer removes every 200th box coming off the line. (The plant produces 5,000 boxes daily. (This is *systematic* sampling.)

**Stage 2:** From each box, the engineer then samples three packages to inspect. (This is an example of **cluster** sampling.)

The US Census also uses multistage sampling. If you haven't already (you should have!), read Section 1.4 in your text for more details.

## Section 1.5: Sources of Errors in Sampling

In general, there are two types of errors that can result during sampling.

**Nonsampling errors** are errors that result from the survey process.

Examples of nonsampling errors might be nonresponses of individuals selected to be in the survey, inaccurate responses, poorly worded questions, poor interviewing technique, etc.

**Sampling error** is the error that results from using a sample to estimate information regarding a population.

There's really nothing we can do about this second type. Unless we sample every single individual in the sample, there will be some error in our results. Much later in the course, we'll talk about how we can actually get an estimate for how close we are to the true population information we're trying to get at.

Since we can't control the sampling error, we'll focus in this section on the different types of nonsampling errors. There aren't a lot of graphical ways to represent this material, and I don't want to just repeat what's already in your text (pages 14-16), so I'll just summarize each source of error here.