**A Hotel on the Beach**

The manager of a beach-front hotel wants to survey guests in the hotel to estimate overall customer satisfaction. The hotel has two towers, an older one to the south and a newer one to the north. Each tower has 10 floors of standard rooms (40 rooms per floor) and 2 floors of suites (20 suites per floor). Half of the rooms in each tower face the beach, while the other half of the rooms face the street. This means there are (2 towers)(10 floors)(40 rooms) + (2 towers)(2 floors)(20 suites) = 880 total rooms.

**Problem:**

(a) Explain how to select a simple random sample of 88 rooms.

(b) Explain how to select a stratified random sample of 88 rooms.

(c) Explain why selecting 2 of the 24 different floors would not be a good way to obtain a cluster sample.

**Solution:**

(a) Number each of the rooms from 001 to 880. Using a random number generator, select 88 *unique* random integers from 001 to 880. Use the selected rooms for the sample.

(b) Since customer satisfaction will vary based on room location (e.g. a suite in the north tower facing the ocean is much nicer than a room in the south tower facing the street), we should take a sample from each type of room. We will take an

* SRS of 20 from the 200 south tower rooms facing the beach
* SRS of 20 from the 200 south tower rooms facing the street
* SRS of 20 from the 200 north tower rooms facing the beach
* SRS of 20 from the 200 north tower rooms facing the street
* SRS of 2 from the 20 south tower suites facing the beach
* SRS of 2 from the 20 south tower suites facing the street
* SRS of 2 from the 20 north tower suites facing the beach
* SRS of 2 from the 20 north tower suites facing the street

(c) Although it would be easy to collect the data once the floors were selected (since you only need to visit two floors), each floor is more homogenous than heterogeneous, which is a bad things for clusters. Ideally, each cluster should include all the different types of rooms. If you only selected 2 floors, it is fairly likely that you would get no suites in the sample or only get one of the towers in the sample.