Scenario: Random sample without replacement

Suppose you have a population of 10 students, and their student IDs are as follows:

Population: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

You want to randomly select a sample of 4 students from this population without replacement (meaning once a student is selected, they cannot be selected again).

Step-by-Step Process:

1. **List the Population:**

Population: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

2. **Randomly Select 4 Students:** We will select 4 students at random from the population. Since it's without replacement, each student can only be selected once.

Let's say you randomly pick the following students:

- First selection: Student 4
- Second selection: Student 8
- Third selection: Student 2
- Fourth selection: Student 7

3. **Final Sample:** The sample of 4 students selected without replacement is:

   Sample: [4, 8, 2, 7]

Scenario: Simple random sample with replacement

Suppose you have a population of 5 items, and their labels are as follows:

Population: [A, B, C, D, E]

You want to randomly select a sample of 3 items from this population with replacement (meaning each item can be selected more than once).

Step-by-Step Process:

1. **List the Population:**

Population: [A, B, C, D, E]

2. **Randomly Select 3 Items:** We will select 3 items at random from the population. Since it's with replacement, each item can be selected more than once.

Let's say you randomly pick the following items:

- First selection: Item B
- Second selection: Item D
- Third selection: Item B (again)

3. **Final Sample:** The sample of 3 items selected with replacement is:

   Sample: [B, D, B]