

Let us suppose we draw n times from a quantitative population, labeling the result of the first draw X_1 , of the second draw X_2 , and likewise through to the last draw, labeling its result X_n . We say this list X_1, X_2, \dots, X_n is **independent and identically distributed**, or **i.i.d.**, if

- there is no association between any two results X_i and X_j (we say each pair of variables X_i, X_j is **independent**)
- the distribution of each X_i (each draw's result) is the same.

Examples:

1. You roll a fair die 8 times, taking

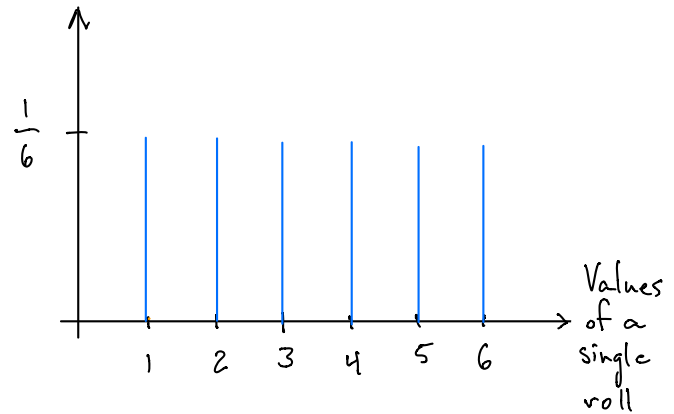
X_1 = result of first roll

X_2 = result of second roll

\vdots

X_8 = result of 8th roll

then X_1, X_2, \dots, X_8 is an i.i.d. random sample of rolls of a fair die.



2. You flip a coin n times, taking

X_1 = 1 if the 1st flip is Heads, 0 if Tails

X_2 = 1 if the 2nd flip is Heads, 0 if Tails

\vdots

X_n = 1 if the n^{th} flip is Heads, 0 if Tails.

Then X_1, X_2, \dots, X_n is an i.i.d. random sample from the two equally-likely values 0 and 1.

3. You are dealt a single card from a shuffled deck (replaced/reshuffled before next card).

X_1 = 1 if the 1st card is a spade, 0 if not.

X_2 = 1 if the 2nd card is a spade, 0 if not.

\vdots

X_n = 1 if the n^{th} card is a spade, 0 if not.

Then X_1, X_2, \dots, X_n is an i.i.d. random sample from the two values 0 and 1, where there is a 3-in-4 chance of 0 and a 1-in-4 chance of 1.

4. If you take

X_1 = height of a randomly-selected female Calvin student

X_2 = height of a second (possibly the same) randomly-selected female Calvin student

\vdots

X_n = height of an n^{th} (possibly repeated) randomly-selected female Calvin student

then X_1, \dots, X_n represents an i.i.d. random sample of female student heights

(at Calvin — probably not representative of female students at other institutions).

A non-example: If, in Example 4, we do not allow any female student to be selected and have her height recorded multiple times, then X_1, \dots, X_n may, indeed be an SRS, but it is not an i.i.d. random sample.