Gift exchange application

Instructions

You have one day to implement an application fulfilling the following specifications. Your implementation should be in python and you should deliver the source code along with a readme.txt file explaining how to run the application and run your tests. Half a day of work should be sufficient to build a good application.

Specifications

Once a year, Mr. Raccoon organizes a gift exchange dinner with the rest of his family. Each member of the family comes to the dinner with a present and puts their name in a hat, where all the names are then shuffled. At the end of the dinner, each member, in turn (random order and random initial person), draws a name from the hat and immediately offers their present to the person for whom they picked the name.

The rules are well known by the family:

- You can't draw your own name
- You can't draw the name of your partner if you have one

If one of those two events happen, then:

- the on-going process stops,
- gifts are given back to their original owners,
- names are put back in the hat and shuffled again,
- and a new whole process is restarted.

Over the years, the family has grown, there are more and more partners and the dinners tend to become longer and longer. Mr. Raccoon would like to speed up the process by automating it with a piece of software.

Mr. Raccoon would like a command-line application with the following use cases (both Mr. Raccoon and the rest of the family members will interact with the application):

- As a member of the family, I want to be able to register to the gift exchange in order to receive a gift.
- If I have a partner, I don't want to receive the gift brought by my partner
- As the organizer of the gift exchange (Mr. Raccoon), I want to be able to just launch the whole process automatically and get back the results.

Technical details:

- We assume that all participants have unique names
- You don't have to use a database
- **You don't have to simulate the above gift procedure exactly, as long as your solution gives the same result in probability (we care about the efficiency of the algorithm)**

Evaluation criteria

You will be evaluated on the following criteria:

- If your application meets the requirements of Mr. Raccoon
- If your application is well-written and fast
- If the tests for your application are well written
- If your code is easily understandable
- If your code is easily maintainable
- If your application is easily usable

Good luck!

Math bonus question (no implementation required, you won't be disqualified for not doing it!)

If the family is composed of n couples, on average how many times does the gift exchange process have to be restarted until it finishes?