Generating random identities with a python program

# Abstract

Generating random identities can be useful in lots of situations, especially when you need them to test a database or something similar. Therefore we wrote this program to generate some identites with their name and address.

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# 1. The statistics

There are lots of statistics about the distribution of names. Some were given by the sheet, some are self-made. Here are the ones that we used for our program.

1. The distribution between males and females is about equal.
2. 10% of all persons have a double first-name (like „Franz-Josef“) which is always separated by a „-“.
3. 15% of all persons have a double last-name (like „Meier-Müller“) which is always separated by a „-“.
4. Double names can‘t consist of two similar names (like „Meier-Meier“). This goes for both first and last names.
5. 1% of all persons have a PhD.
6. Of those who have a PhD, 45% are women and 55% are men. (Source: See exercise sheet).
7. Of all house numbers, 1% have 4 digits, 10% have 3 digits and the remaining 89% have 1 or 2 digits. This rule is self-made and based on the assumption that in Germany the higher the number is the more uncommon it gets.
8. The distribution of the prefix and suffix of the streetname is:  
   Haupt- 10% ...Straße 78%  
   Schul- 8% ...Weg 18%  
   Garten- 7% ...Allee 2%  
   Dorf- 7% ...Ring 1%  
   Bahnhof- 7% ...Platz 1%  
   Wiesen- 7%  
   Berg- 6%  
   Kirch- 4%  
   Wald- 4%  
   Ring- 4%   
   Other\* 36%  
     
   \* Other prefixes include names of flowers, trees, cities and celebrities.

And that‘s all. That‘s every statistic that we use.

One last thing: We were given a list with male and female first names as well as some last names. We changed the type of them from sets to lists, but content-wise we didn‘t change anything within those lists. We renamed it from „EPR\_04.py“ to „names.py“ since that fits the purpose better.

# 2. The given tasks

We were given a number of tasks to complete. They each base upon the previous tasks and are designed to get a full and functional program at the end while always having an idea on what to do next.

## 2.1 Simple name generation

The first task was to simply generate single first and last names (no double names yet). Here is an example:

|  |  |  |
| --- | --- | --- |
| Male first names:  Ringo  Hans  Hugo  Fabius  Antonius  Johann  Tristan  Silvester  Siegfried  Aldhelm  Harro  Silvio  Elias  Jürgen  Bert  Adam  Philemon  Joah  Micha  Hubert  Harro  Thorbjörn  Vivien  Ewald  Paul  Burckhardt  Vivien  Leonhard  Wieland  Nikolai  Olaf  Patrick  Yannick  Béla  Marvin  Artur  Tristan  Conan  Bertram  Thorsten  Mohammed  Modestus  Bartholom  Philipp  Sebastian  Bonifatius  Chlothar  Andrea  Hermann  Chlothar | Female first names:  Hella  Augusta  Cemile  Adina  Heidi  Sascha  Therese  Xanthippe  Emma  Leyla  Diethild  Bettina  Delia  Georgia  Waltraud  Jo  Marietta  Antoinette  Merrit  Mandy  Magdalena  Nefertari  Judith  Synke  Fabia  Sabrina  Solveig  Samantha  Antje  Antoinette  Else  Anka  Alwine  Lea  Vera  Esther  Claudia  Augustine  Waltraud  Jelena  Rike  Anneliese  Jeannette  Helene  Winifred  Genoveva  Helgard  Jana  Gundela  Angelina | Last names:  Schillung  Schinder  Schillung  Herzog  Siemens  Andres  Landzettel  Abraham  Herrmann  Neumann  Schmid  Wieland  Schulze  Hering  Calvin  Schulz  Noack  Zacharias  Winkler  Träger  Preuß  Reich  Mach  Landzettel  Sauerbruch  Schulze  Götz  Huber  Thomas  Schnorr  Richter  Kästner  Schröder  Oswald  Ineichen  Thoma  Wittgenstein  Kaiser  Frenzel  Franz  Rohlfs  Thode  Frenzel  Krämer  Fröhlich  Schleich  Sommerfeld  Siemens  Dürrschnabel  Hoffmann |

In the console they are all written beneath each other. We‘ve put them in a table here to increase readability and reduce the length of this document.

These are done by repeatedly calling the function male\_name(), female\_name() and last\_name() respectively.

## **2.2 Generating full names**

The next step is to generate full names (this includes the PhD title). We have to make sure that requirements I to VI are met. This is done by the function full\_name(). But how?

1. An equal distribution of both male and female names is reached by generating a random integer between 1 and 100. If the value is within the range of 1 to 50, the generated person will be male, if the value is within 51 to 100, the person will be female. Therefore the distribution should be about 50/50.
2. Another random number between 1 and 100. If the value is below or equal to 10, the person will have a double first name, else it will be a single first name. So there is a 10% chance of having a double first name which is the requirement.
3. Another random number between 1 and 100. If the value is between 40 and 54 (which are 15 possible values) the person will have a double last name. Why 40 and 54? Why not. It doesn‘t really matter, it‘s just to have some other numbers.
4. This is quite easy. When generating a double name, the function double\_name(gender) is called, where the „gender“ variable tells the function if the double name has to be a last, a male first or a female first name. Then it calls either the function double\_name\_last(), double\_name\_male() or double\_name\_female(), where each function generates random names until the names are different. When they are different, they are connected by a „-“ and then returned to double\_name(gender), which returns the double name to full\_name().
5. Simply another random number. This can only be done together with VI, therefore it will be explained there.
6. We got this by using Bayes‘ theorem. We generate a random number between 1 and 1,000. If the number is less or equal to 11 and the person is male, it will get a PhD. If the number is less or equal to 9 and the person is female, it will get a PhD as well. Why this works? Let‘s take a look at the values. I won‘t proof Bayes‘ theorem here, however I will show that the results we got give us the correct result.

50% or 0.5 out of 1 are male and 50% or 0.5 out of 1 are female. When we generate a random number between 1 and 1000, it has a 11/1000 chance to be less or equal to 11, which is equal to 0.011 or 1.1%. The chance of the number being less or equal to 9 is therefore 0.009 or 0.9%. Now we calculate: 0.5 (for being male) \* 0.011 (for having a PhD as male) + 0.5 (for being female) \* 0.009 (for having a PhD as a female) = 0.0055 + 0.0045 = 0.01 = 1%. Therefore the chance of having a PhD is 1% overall, whereas 55% of the graduates are male and 45% are female.

Now that we have the math out of the way, we can look at some example values. Here we have 100 full names.

|  |  |  |
| --- | --- | --- |
| Irene Haller  Herr Sascha-Igor Albert  Cornelia Hoffmann  Susanne-Asta Krause  Melanie Widera  Maike Friedemann  Arved Schneider  Leyla Körner  Oliver-Simon Weber  William Amalie  Birger Schulthess  Sean Hünlein  Bernhard Grubner-Oswald  Jürgen Friedemann  Margarete Calvin  Aaron Becherer  Brigitte-Hannelore Krause  Irma Rohlfs  Berit Friedemann-Kosba  Wolfhard Resch  Klemens Knebel  Balduin Huber-Landzettel  Samantha-Heilgard Ineichen  Aloisia Sauerbruch-Schmidt  Fennedine Träger  Frau Nikola-Solvej Tannhäuser  Lydia Ines-Haller  Janna-Meral Peter  Ruprecht Zacharias  Hartwin Oswald-Schröder  Robert Jakobi  Anja-Anabel Winkler  Sebastian Sander-Schnurre  Waldemar Jauch | Daniela Albrecht  Lisanne Sygnetzki  Cosima Forge  Baldur Schröder  Samuel Haller  Béla Nordmann  Gundo Hoffmann-Freud  Melanie Henne  Lilli Löchte  Charles Götz  Georgia Schinder  Alwin Lai  Gundela Kosba  Hauke Honecker  Louis Resch  Christiane Leber  Silas Sam  Sophia Hünlein  Sönke Körner  Beatrix Micus  Nico Hintz  Edeltraud Franz  Manuela Götz  Crispian Schulz  Arndt Kaiser  Roald Franz-Querfurt  Dr. Zenon Freund  Aribert Amalie  Denise Zacharias  Janine Meier  Ingo Reich  Simon-Peppone Wenzel-Meier  Bert-Nico Sygnetzki | Antonius Amalie-Resch  Meike Schubert  Gertrud Schnur  Malwine Abt-Albrecht  Elton Lehner  Veronika Frank  Melanie Richter  Brigitte Anders  Radomir Sonntag  Aldhelm-Andrea Thode  Beate-Holde Plagemann  Justus Falk-Schnur  Rainer Ingo  Jördis Schmitt  Lilli Kurz  Eudokia-Kira Zahn  Oswald Haller-Thoma  Paul Christiansen-Abt  Rudolf-Joah Jauch  Hilde Frenzel  Volker Zacharias-Schmid  Edeltraud Micus  Adele Voigtländer  Peppone Landzettel-Gärtner  Johannes Kolmar-Semper  Michaela Ines-Ruoff  Timon Eschenburg  Lukas Vogt  Heilgard-Anke Ludwig  Christine Frenzel  Luca Ingo  Geoffrey Noack  Corinna Nietzsche-Kosba |

As you can see, there is 1 PhD out of 100 people. There are some double first names and double last names as well.

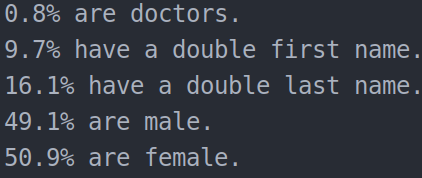
Note: We added the prefix „Herr“ or „Frau“ for male and female names respectively in case that the first name can be used for both genders. It‘s simply to identify the gender of a person.

Sascha-Igor Albert is a great example. If you have a person named „Sascha“ it could be both male and female. The second part of the double name is useless. Why? Do you know Christoph-Maria Herbst, also known as Stromberg? Maria is a female name but can be used as second part of a double name by male persons as well. Therefore we simply add „Herr“ or „Frau“ to make it easier.

## 2.3 Statistical test 1

Just implementing the requirements is not enough, we need to test our implementation. Therefore the function statistical\_test\_name(sample\_size) creates random names (in this case 1,000) and tests them on the statistics. 1% doctors, 10% with double first name, 15% with double last name, 50% male and 50% female.

An example result:

So why are the numbers slightly off? Because of the law of large numbers which essentially says: „The larger the sample size, the better the statistical result.“ 1,000 is simply not a large enough sample to get accurate values. But since all of them are near of what they should be, it is fine.

Note: Theoretically you should have printed the 1,000 used names as well, but I won‘t include them here for the sake of keeping the document below 50 pages.

## 2.4 Full identity generation

The next task is to implement the address generation (done by address()) and combining them with the names to get full identites (done by identity()).   
The percentage values are implemented exactly like before, by generating a random number between 1 and 100 and then setting the range for each option according to the value. This is used for the prefix (if „other“ is the result, the function will take a random element of the set in names.py), the suffix and the house number (here it will adjust the range in which the house number will be randomly generated.

|  |  |
| --- | --- |
| Muriel Herold, Kiefernstraße 14  Dennis Nietzsche, Ringstraße 979  Fridolin-Klemens Kühn, Waldstraße 19  Tina-Vera Kühn, Bahnhofstraße 84  Geofreda Löchte, Bergstraße 53  Ilona Reich, Kirchstraße 38  Quintus Schulz, Fichtenstraße 33  Frauke Sauerbruch, Hauptstraße 45  Eudokia Falk, Dorfweg 10  Keiko Sam, Hauptstraße 24  Hilde Türk, Hauptweg 85  Patrick Steiner, Edelweißstraße 9  Gunther Köhler, Ulmenstraße 17  Jörn Semper, Hauptstraße 23  Kurt Ines, Gartenstraße 557  Dr. Eduard Oswald, Lilienallee 56  Jesus Reich-Eschenburg, Gartenweg 49  Josef-Julier Siemens, Buchenstraße 142  Delia-Helgard Schultz, Rosenstraße 760  Pascal Jörg, Gartenstraße 25  Olga Zahn, Hauptstraße 8  Ingmar Winkler, Eichenstraße 24  Malwine Plagemann, Wiesenring 82  Archibald Widera, Waldstraße 70  Carolin Amalie, Hauptstraße 91  Florin Schulthess-Gruber, Hauptstraße 61  Andrzej Böhm, Rotdornallee 35  Josephine Wieland, Blauregenstraße 17  Hilde Pohl, Waldstraße 81  Eudokia Sonntag, Pilsener Straße 86  Adrian Wurm-Semper, Wiesenstraße 15  Corinna-Veronika Krause-Siemens, Tulpenstraße 318  Agnes-Olga Gerster, Hauptstraße 52  Armin Rumpf, Schwarzeichenstraße 85  Calvin Schulze-Eschenburg, Schulstraße 60  Calvin Türk, Hyazinthenstraße 12  Torben-Benno Lücking, Wiesenstraße 47  Irmgard Schmidt, Ringstraße 372  Weselius-Edgar Kästner, Kirchstraße 4234  Annegret Türck, Schulstraße 73  Karoline Böll, Eichenstraße 92  Dominik-Inga Tenberge, Wiesenweg 8  Adelgunde Rumpf-Kühn, Dorfstraße 62  Clementine Abendroth, Frankfurter Straße 419  Genoveva Thyssen, Waldstraße 8698  Salomo Böll, Wiesenstraße 197  Frau Kari Ossege-Jauch, Ulmenstraße 55  Grant Nordmann, Hauptstraße 372  Elias Böll, Gartenstraße 120  Nikolai Overbeck, Dorfstraße 64 | Thorbjörn Thomas, Hauptstraße 61  Frau Ira Nordmann, Stechpalmenstraße 67  Silas Herrmann, Hauptstraße 72  Tim Neumann, Hauptstraße 644  Veronika Wittgenstein, Tulpenstraße 95  Aribert Krause, Bergstraße 68  Othmar Krüger, Schulstraße 24  Rupert Thoma, Quackenbrücker Straße 43  Kriemhild Krupp, Hauptstraße 63  Petrus Abt, Saarbrücker Weg 81  Gerlinde Pügner, Bergstraße 73  Justus Nordmann, Berglingstraße 50  Harro Ludwig, Schulstraße 115  Eudokia Tannhäuser, Fichtenstraße 52  Boris Jörg, Schulweg 393  Radomir Mester, Ringweg 45  Dr. Xaver Jung, Hauptweg 39  Almut Becherer, Schulstraße 62  Otto Weck-Herzog, Leninweg 77  Veronika Winkler-Schulze, Medicistraße 48  Adelinde Howaldt, Dorfstraße 38  Götz Wieland, Rosenstraße 63  Dr. Toni Franz, Bergstraße 320  Lilith Schillung, Bahnhofstraße 24  Viola Baumann-Schinder, Bahnhofstraße 80  Fabius Weck, Dorfstraße 11  Andre Behm, Hauptstraße 52  Crispian Selbmann, Bahnhofweg 14  Anastasia Schnurrer, Dorfstraße 49  Sabine Sonntag, Schulstraße 69  Leo Mach, Guevaraweg 11  Veronika-Charlotte Luhmann, Gartenstraße 29  Mike Becker, Schneeglöckchenstraße 17  Friedemann Frank, Wiesenweg 49  Wieland-Boleslaw Amalie, Rotbuchenstraße 24  Reinhard Schnurrer, Hegelstraße 77  Fred Abraham, Hauptstraße 16  Philipp Braun, Dorfstraße 16  Julier Winkler, Wiesenallee 24  Hubert Frenzel, Clematisstraße 406  Christopher-Eckbert Lehmann, Dorfstraße 70  Emma Nordmann, Ringweg 93  Arnold Grubner, Dorfweg 45  Maike Krause, Zedernstraße 31  Heinrich Steiner, Leipziger Weg 11  Wladyslaw Krause, Bergweg 89  Sarine Wittgenstein, Schneerosenweg 61  Arno Schneider, Waldstraße 2  Asmus Körner, Dorfstraße 83  Hartmut Quant, Hauptstraße 85 |

Again, In the program all names are printed in a single list and the columns here are just to shorten the text a bit.

## 2.5 Full statistical test and sorted list

We need to generate a sorted list of persons and do a full statistical analysis.

### 2.5.1 Sorted list

The solution for the sorted list is inspired by this stackoverflow post: <https://stackoverflow.com/questions/20459982/how-to-sort-a-list-alphabetically-by-the-second-word-in-a-string>

Essentially we use two things: The function sorted() and a lambda expression.

Sorted simply returns a sorted list. We use the lambda expression as key. The key simply defines by what to sort, e.g. you could sort by the length of the words etc.

lambda simply creates small functions that are restricted to a single expression. This allows us to create our small and simple function where it is required instead of writing a whole new function with docstring and return statement and so on. In this case our lambda is used to sort the sample list first by their first names, then by their last names. More on lambda here: [https://docs.python.org/2/tutorial/controlflow.html#lambda-expressions](https://docs.python.org/2/tutorial/controlflow.html" \l "lambda-expressions)

And that‘s all. Since Pythons sorting is stable (repeated elements are sorted as they appear in the list), we can simply sort the sample by the first name of the persons and then by the last name, therefore keeping the sorting by the first name where it is necessary (people with the same last name).

### 2.5.2 Statistical test

Not much to say here, it is essentially like the first statistical test (2.3) just with some more variables. The testing of the name is the same, it even used the already written function. The testing of the address is done by test\_address(residence) where the function returns you a list with 19 elements, each representing one part (0-10 are prefixes, 11-15 suffixes, 16-18 house number length). The values that apply to the given address are set to 1, the others remain 0. After that everything is added to the counter for the whole sample. Rinse and repeat until it‘s done for every address in the sample. From there you can simply calculate the percentage.

# 3. User Interaction

To make the program easy to use, we implemented a user interaction. Every possibility will be asked:

* Generating single male names
* Generating single female names
* Generating single last names
* Generating double male names
* Generating double female names
* Generating double last names
* Generating full names
* Statistically test names
* Generating full identities
* Generating a sorted list of names
* Creating a full statistical test.

The order of these is based on their order in the given tasks and therefore their time of implementation.

# 4. Usage

What you can do are – simply put – two things:

1. You can use the program as it is or
2. you can add more names in names.py – for persons and/or streets.

## 4.1 Using the program

This is really simple. By running the program as main (or alternatively calling the user\_interaction() function) you will get asked a couple of questions (see 3.).

If your answer to a question is yes, don‘t enter „yes“!!! Just enter the number of elements you want to be created (for the statistical tests this will be the sample size, for the others it‘s just the number of elements you get) as an integer.

If you don‘t want to do it, just enter anything else. Can be a „no“, can be a „5234.1234,531426,321,“ or a „f\*ck off“. Just anything that isn‘t an integer.

## 4.2 Adding more names

The names contained in names.py are just an example, feel free to add and remove whatever you like. However, a few notes:

* There is no checking whether the name is already in the list you want to add it to. However, the lists referring to person names are currently alphabetically sorted.
* Street names are generated by putting a prefix and a suffix together. Therefore the prefix should be capitalized.
* If using a flower or a tree (in german), use the plural. Simple check: What sounds better? „Tannenstraße“ or „Tannestraße“.
* Celebrities are normally referred to by their last names.
* Be careful with city names. Normally you won‘t find anything like a „Frankfurtstraße“, more like a „Frankfurter Straße“. If you want to use a city name: Write „{city name}er „ instead of „{city name}“. By adding a „er“ and a blank directly after your city of choice, you will generate the opportunity of creating good sounding names instead of names that suck.

# 5. Thanks for reading

Thank you for reading this documentation. I hope you like our program. Feel free to contact us if you have questions or find errors/mistakes.