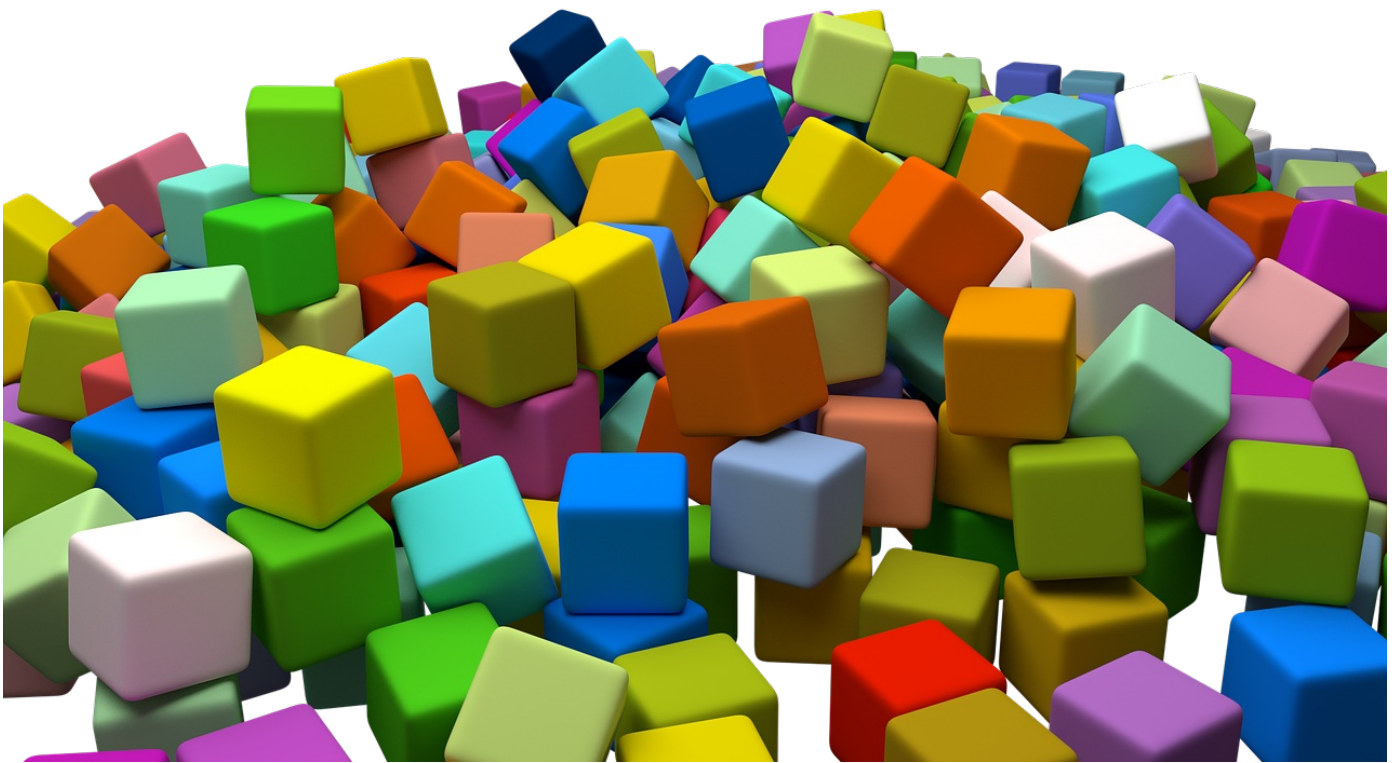# random — Generate pseudo-random numbers

This module implements pseudo-random number generators for various distributions.

For integers, there is uniform selection from a range. For sequences, there is uniform selection of a random element, a function to generate a random permutation of a list in-place, and a function for random sampling without replacement.

On the real line, there are functions to compute uniform, normal (Gaussian), lognormal, negative exponential, gamma, and beta distributions. For generating distributions of angles, the von Mises distribution is available.

Almost all module functions depend on the basic function random(), which generates a random float uniformly in the semi-open range [0.0, 1.0). Python uses the Mersenne Twister as the core generator. It produces 53-bit precision floats and has a period of 2**19937-1. The underlying implementation in C is both fast and threadsafe. The Mersenne Twister is one of the most extensively tested random number generators in existence. However, being completely deterministic, it is not suitable for all purposes, and is completely unsuitable for cryptographic purposes.

The functions supplied by this module are actually bound methods of a hidden instance of the random.Random class. You can instantiate your own instances of Random to get generators that don't share state.

Class Random can also be subclassed if you want to use a different basic generator of your own devising: in that case, override the random(), seed(), getstate(), and setstate() methods. Optionally, a new generator can supply a getrandbits() method — this allows randrange() to produce selections over an arbitrarily large range.

The random module also provides the SystemRandom class which uses the system function os.urandom() to generate random numbers from sources provided by the operating system.

```
import random
```

Syntax

random.seed(a, version)

Parameter Values

Parameter Description

a Optional. The seed value needed to generate a random number. If it is an integer it is used directly, if not it has to be converted into an integer.

Default value is None, and if None, the generator uses the current system time. version An integer specifying how to convert the a parameter into a integer. Default value is 2

```
import random

# the generator creates a random number based on the seed value,
# so if the seed value is 10, you will always get 0.5714025946899135
# as the first random number.

0.5714025946899135
0.9056396761745207
0.5390815646058106
0.4586067093870614
0.4975365687586023


random.seed(10)
print(random.random())


random.seed(20)
print(random.random())


random.seed(30)
print(random.random())


random.seed(40)
print(random.random())


random.seed(50)
print(random.random())


import random
random.seed(2)

print(random.random())
print(random.random())
print(random.random())
```

```
0.5714025946899135
0.9056396761745207
0.5390815646058106
0.4586067093870614
0.4975365687586023
```

```
0.9560342718892494
0.9478274870593494
0.05655136772680869
```

def getstate()

Return internal state; can be passed to setstate() later.

In [ ]:

```python
import random

x = random.getstate()

print(x)
```

In [ ]:

```python
import random

#print a random number:
print(random.random())

#capture the state:
state = random.getstate()

#print another random number:
print(random.random())

#restore the state:
random.setstate(state)

#and the next random number should be the same as when you captured the state:
print(random.random())
```

In [25]:

```python
import random

print(random.getrandbits(8))
```

```
188
```

In [26]:

```python
import random

print(random.randrange(3, 9))
```

```
8
```

In [27]:

```python
import random

print(random.randint(3, 9))
```

```
9
```

In [28]:

```python
import random

mylist = ["apple", "banana", "cherry"]

print(random.choice(mylist))
```

```
banana
```

In [29]:

```python
# import random
import random

# prints a random value from the list
list1 = [1, 2, 3, 4, 5, 6]
print(random.choice(list1))

# prints a random item from the string
string = "striver"
print(random.choice(string))
```

3
v

In [30]:

```python
import random

# using choice() to generate a random number from a
# given list of numbers.
print("A random number from list is : ", end="")
print(random.choice([1, 4, 8, 10, 3]))

# using randrange() to generate in range from 20
# to 50. The last parameter 3 is step size to skip
# three numbers when selecting.
print("A random number from range is : ", end="")
print(random.randrange(20, 50, 3))
```

A random number from list is : 4
A random number from range is : 47

In [31]:

```python
import random

# using random() to generate a random number
# between 0 and 1
print("A random number between 0 and 1 is : ", end="")
print(random.random())

# using seed() to seed a random number
random.seed(5)

# printing mapped random number
print("The mapped random number with 5 is : ", end="")
print(random.random())

# using seed() to seed different random number
random.seed(7)

# printing mapped random number
print("The mapped random number with 7 is : ", end="")
print(random.random())

# using seed() to seed to 5 again
random.seed(5)

# printing mapped random number
print("The mapped random number with 5 is : ", end="")
print(random.random())

# using seed() to seed to 7 again
random.seed(7)

# printing mapped random number
print("The mapped random number with 7 is : ", end="")
```

```
print(random.random())
```

```
A random number between 0 and 1 is : 0.035734441736370415
The mapped random number with 5 is : 0.6229016948897019
The mapped random number with 7 is : 0.32383276483316237
The mapped random number with 5 is : 0.6229016948897019
The mapped random number with 7 is : 0.32383276483316237
```

In [32]:

```python
import random

mylist = ["apple", "banana", "cherry"]

print(random.choices(mylist, weights = [10, 1, 1], k = 14))
```

```
['apple', 'apple', 'apple', 'apple', 'apple', 'apple', 'apple', 'apple', 'apple', 'app
le', 'apple', 'apple', 'apple', 'apple']
```

In [33]:

```python
import random

mylist = ["apple", "banana", "cherry"]
random.shuffle(mylist)

print(mylist)
```

```
['banana', 'cherry', 'apple']
```

In [34]:

```python
import random


# declare a list
sample_list = ['A', 'B', 'C', 'D', 'E']

print("Original list : ")
print(sample_list)

# first shuffle
random.shuffle(sample_list)
print("\nAfter the first shuffle : ")
print(sample_list)

# second shuffle
random.shuffle(sample_list)
print("\nAfter the second shuffle : ")
print(sample_list)
```

```
Original list :
['A', 'B', 'C', 'D', 'E']

After the first shuffle :
['B', 'C', 'A', 'D', 'E']

After the second shuffle :
['E', 'A', 'D', 'C', 'B']
```

In [35]:

```python
import random

mylist = ["apple", "banana", "cherry"]

print(random.sample(mylist, k=2))
```

```
['apple', 'cherry']
```

```python
import random

print(random.random())
```

```
0.5709136896467344
```

```python
import random

print(random.uniform(20, 60))
```

```
42.41029108051251
```

```python
import random

# Initializing list
li = [1, 4, 5, 10, 2]

# Printing list before shuffling
print("The list before shuffling is : ", end="")
for i in range(0, len(li)):
    print(li[i], end=" ")
print("\r")

# using shuffle() to shuffle the list
random.shuffle(li)

# Printing list after shuffling
print("The list after shuffling is : ", end="")
for i in range(0, len(li)):
    print(li[i], end=" ")
print("\r")

# using uniform() to generate random floating number in range
# prints number between 5 and 10
print("The random floating point number between 5 and 10 is : ", end="")
print(random.uniform(5, 10))
```

```
The list before shuffling is : 1 4 5 10 2
The list after shuffling is : 2 10 5 1 4
The random floating point number between 5 and 10 is : 6.861987713628656
```

```python
import random

print(random.triangular(20, 60, 30))
```

```
36.70393507159352
```

```python
import random

first_names = ['Aabhas', 'Aabheer', 'Aacharya', 'Aachman', 'Aachuthan', 'Aad', 'Aadala
rasu', 'Aadarsh', 'Aadavan', 'Aadesh', 'Aadh', 'Aadhar', 'Aadhavan', 'Aadhi', 'Aadhila
', 'Aadhira', 'Aadhirai', 'Aadhish', 'Aadhishankar', 'Aadi', 'Aadidev', 'Aadijay', 'Aa
dimoolan', 'Aadish', 'Aadit','Ajeeta', 'Ajinkya']
last_names = ['Smith', 'Doe', 'Jenkins', 'Robinson', 'Davis', 'Stuart', 'Jefferson',
'Jacobs', 'Wright', 'Patterson', 'Wilks', 'Arnold', 'Johnson', 'Williams', 'Jones', 'B
rown', 'Davis', 'Miller', 'Wilson', 'Moore', 'Taylor', 'Anderson', 'Thomas', 'Jackson'
, 'White', 'Harris', 'Martin']

street_names = ['Main', 'High', 'Pearl', 'Maple', 'Park', 'Oak', 'Pine', 'Cedar', 'El
m', 'Washington', 'Lake', 'Hill']
```

```python
fake_cities = ['Metropolis', 'Eerie', "King's Landing", 'Sunnydale', 'Bedrock', 'Sout
h Park', 'Atlantis', 'Mordor', 'Olympus', 'Dawnstar', 'Balmora', 'Gotham', 'Springfiel
d', 'Quahog', 'Smalltown', 'Epicburg', 'Pythonville', 'Faketown', 'Westworld', 'Thunde
ra', 'Vice City', 'Blackwater', 'Oldtown', 'Valyria', 'Winterfell', 'Braavos', 'Lakevi
ew']

states = ['AL', 'AK', 'AZ', 'AR', 'CA', 'CO', 'CT', 'DC', 'DE', 'FL', 'GA', 'HI', 'ID'
, 'IL', 'IN', 'IA', 'KS', 'KY', 'LA', 'ME', 'MD', 'MA', 'MI', 'MN', 'MS', 'MO', 'MT',
'NE', 'NV', 'NH', 'NJ', 'NM', 'NY', 'NC', 'ND', 'OH', 'OK', 'OR', 'PA', 'RI', 'SC', 'S
D', 'TN', 'TX', 'UT', 'VT', 'VA', 'WA', 'WV', 'WI', 'WY']

for num in range(100):
    first = random.choice(first_names)
    last = random.choice(last_names)

    phone = f'{random.randint(100, 999)}-555-{random.randint(1000,9999)}'

    street_num = random.randint(100, 999)
    street = random.choice(street_names)
    city = random.choice(fake_cities)
    state = random.choice(states)
    zip_code = random.randint(10000, 99999)
    address = f'{street_num} {street} St., {city} {state} {zip_code}'

    email = first.lower() + last.lower() + '@mail.com'

    print(f'{first} {last}\n{phone}\n{address}\n{email}\n')
```

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