Random Numbers in NumPy

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What is a Random Number?

Random number does NOT mean a different number every time. Random means something that can not be predicted logically.

Pseudo Random and True Random.

Computers work on programs, and programs are definitive set of instructions. So it means there must be some algorithm to generate a random number as well.

If there is a program to generate random number it can be predicted, thus it is not truly random.

Random numbers generated through a generation algorithm are called *pseudo random*.

Can we make truly random numbers?

Yes. In order to generate a truly random number on our computers we need to get the random data from some outside source. This outside source is generally our keystrokes, mouse movements, data on network etc.

We do not need truly random numbers, unless it is related to security (e.g. encryption keys) or the basis of application is the randomness (e.g. Digital roulette wheels).

In this tutorial we will be using pseudo random numbers.

Example

Get your own Python Server

Generate a random integer from 0 to 100:

```
from numpy import random

x = random.randint(100)

print(x)
```

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Generate Random Float

The random module's `rand()` method returns a random float between 0 and 1.

Example

Generate a random float from 0 to 1:

```
from numpy import random

x = random.rand()

print(x)
```

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Generate Random Array

In NumPy we work with arrays, and you can use the two methods from the above examples to make random arrays.

Integers

The `randint()` method takes a `size` parameter where you can specify the shape of an array.

Example

Generate a 1-D array containing 5 random integers from 0 to 100:

```
from numpy import random

x=random.randint(100, size=(5))

print(x)
```

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100:

```
from numpy import random

x = random.randint(100, size=(3, 5))

print(x)
```

Try it Yourself »

Floats

The `rand()` method also allows you to specify the shape of the array.

Example

Generate a 1-D array containing 5 random floats:

```
from numpy import random

x = random.rand(5)

print(x)
```

Try it Yourself »

Example

Generate a 2-D array with 3 rows, each row containing 5 random numbers:

```
from numpy import random
```

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Generate Random Number From Array

The `choice()` method allows you to generate a random value based on an array of values.

The `choice()` method takes an array as a parameter and randomly returns one of the values.

Example

Return one of the values in an array:

```
from numpy import random

x = random.choice([3, 5, 7, 9])

print(x)
```

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The `choice()` method also allows you to return an *array* of values.

Add a `size` parameter to specify the shape of the array.

Example

Generate a 2-D array that consists of the values in the array parameter (3, 5, 7, and 9):

```
print(x)
```

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Exercise ?

Which one of the following functions returns a random number from 0 to 100?

- `random.rand(100)`
- `random.randint(100)`
- `random.choice(100)`

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