

Random Method

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Java

random #'s

- Most games rely on a random number generator.
 - pick a number
 - slot machines
 - lottery
 - black jack

How do you make a random number in Java?

New Idea: static methods!

- no need to construct object of class
- call method using class name as the object
- no object of that class exists

Similar to Scanner, we construct!

```
import java.util.Scanner;  
Scanner sc = new Scanner(System.in);
```

Similar to the above, we import Random and construct it!

```
import java.util.Random;  
Random rand = new Random();
```

Now once created, we can use it!

```
Random rand = new Random();
```

```
int rand_num1 = rand.nextInt(1000) ;
```

↑
The class calling
the method

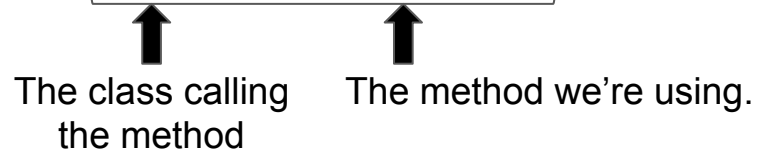
↑
The method we're using.

```
nextInt(1000)
```

A random number between 0 and 999
(remember start at 0!)

Math.random()

```
System.out.print ( Math.random() ) ;
```



The class calling
the method

The method we're using.

Math.random()

Returns a random number between 0 and 1

(Inclusive of 0, but not inclusive of 1)

Math.random()

This could return the following:

0.1

0.25

0.5

0.75

0.9999

And everything inbetween!

Making other numbers than 0 to 1

Examples below, but we can multiply by any number we want to create a range!

`Math.random() * 50`

$$0 \quad * \quad 50 = \mathbf{0}$$

$$0.25 \quad * \quad 50 = \mathbf{12.5}$$

$$0.5 \quad * \quad 50 = \mathbf{25}$$

$$0.75 \quad * \quad 50 = \mathbf{37.5}$$

$$0.9999 \quad * \quad 50 = \mathbf{49.995}$$

See how just multiplying by 50 lets us have a range between 0 and 50 now, but still doesn't include 50.

Same Example for 589

Examples below, but we can multiply by any number we want to create a range!

`Math.random() * 589`

$$0 * 589 = 0$$

$$0.25 * 589 = 147.25$$

$$0.5 * 589 = 294.5$$

$$0.75 * 589 = 441.75$$

$$0.9999 * 589 = 588.9411$$

See how just multiplying by 50 lets us have a range between 0 and 50 now, but still doesn't include 50.

What data type does `Math.random()` return?

Casting - from **double** to **int**

We want to covert the **double** to an **int** from `Math.random()`

We do this through **Casting**:

```
int x = (int) Math.random();
```

Think of it like multiplying by int. This MAKES it an int.

Note: Order of Operations still matter.

Now once created, we can use it!

```
Random rand = new Random();
```

```
double rand_num2 = rand.nextDouble();
```

↑
The class calling
the method

↑
The method we're using.

nextDouble()

A random number between 0 and 1 **not including 1**

Random Lab

1. Create 4 random numbers and output them
 - a. A number between 0 and 9
 - b. A number between 1 and 100
 - c. A number between 2.5 and 3.5
 - d. A double between 14 and 589