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RANDOM CLASS IN JAVA

- JAVA RANDOM class is used to generate a stream of pseudorandom numbers.
- The algorithm implemented by random class use a protected utility method than can supply up to 32 pseudorandomly generated bits on each innovation.

SCENARIOS IN RANDOM CLASS:

Methods	Description
doubles()	Returns an unlimited stream of pseudorandom double values.
ints()	Returns an unlimited stream of pseudorandom int values.
longs()	Returns an unlimited stream of pseudorandom long values.
next()	Generates the next pseudorandom number.
nextBoolean()	Returns the next uniformly distributed pseudorandom boolean value from the random number generator's sequence
nextByte()	Generates random bytes and puts them into a specified byte array.
nextDouble()	Returns the next pseudorandom Double value between 0.0 and 1.0 from the random number generator's sequence
nextFloat()	Returns the next uniformly distributed pseudorandom Float value between 0.0 and 1.0 from this random number generator's sequence

nextGaussian()	Returns the next pseudorandom Gaussian double value with mean 0.0 and standard deviation 1.0 from this random number generator's sequence.
nextInt()	Returns a uniformly distributed pseudorandom int value generated from this random number generator's sequence
nextLong()	Returns the next uniformly distributed pseudorandom long value from the random number generator's sequence.
setSeed()	Sets the seed of this random number generator using a single long seed.

HOW TO USE RANDOM CLASS?

METHOD-1:

USING RANDOM CLASS

1. Import the class java.util.Random
2. Make the instance of the class Random, i.e., Random rand = new Random()
3. Invoke one of the following methods of rand object:
    - nextInt(upperbound) generates random numbers in the range 0 to upperbound-1.
    - nextFloat() generates a float between 0.0 and 1.0.
    - nextDouble() generates a double between 0.0 and 1.0.

```java
import java.util.Random;

public class GenerateRandom {
    public static void main(String[] args) {
        Random rand=new Random();
        int upperbound=25;
        int int_random=rand.nextInt(upperbound);
        double double_random=rand.nextDouble();
        float float_random=rand.nextInt();
        System.out.println("Random integer value from 0 to"+(upperbound-1));
        System.out.println("Random float value netween 0.0 and1.0"+float_rand
        System.out.println(double_random);
    }

}
```

Javadoc Declaration Console ×

<terminated> GenerateRandom [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (30-Aug-2023, 10:42:08 pm – 10

```
Random integer value from 0 to24
Random float value netween 0.0 and1.01.6398872E8
0.6413664054218056
```

METHOD-2:

USING Math.random:

1. Declare the minimum value of the range
2. Declare the maximum value of the range
3. Use the formula Math.floor(Math.random() *(max - min + 1) + min) to generate values with the min and the max value inclusive.

Note: This method can only be used if you need an integer or float random value.

```java

class GenerateRandom2 {
public static void main( String args[] ) {
    int min = 50;
    int max = 100;
    System.out.println("Random value in int from "+ min + " to " + max + ":");
    int random_int = (int)Math.floor(Math.random() * (max - min + 1) + min);
    System.out.println(random_int);
 }
```

Javadoc Declaration Console

<terminated> GenerateRandom2 [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (30-Aug-2023, 10:47:36 pm

```
Random value in int from 50 to 100:
69
```

METHOD-3:

USING ThreadLocalRandom:

1. Import the class java.util.concurrent.ThreadLocalRandom
2. Call the method
    - To generate random number of type int ThreadLocalRandom.current().nextInt()
    - To generate random number of type double ThreadLocalRandom.current().nextDouble()
    - To generate random number of type boolean ThreadLocalRandom.current().nextBoolean()

```java
import java.util.concurrent.ThreadLocalRandom;

public class GenerateRandom3 {
    public static void main( String args[] ) {
        int int_random = ThreadLocalRandom.current().nextInt();

        System.out.println("Random Integers: " + int_random);

        double double_rand = ThreadLocalRandom.current().nextDouble();

        System.out.println("Random Doubles: " + double_rand);

        boolean boolean_rand = ThreadLocalRandom.current().nextBoolean();

        System.out.println("Random Booleans: " + boolean_rand);

}
}

```

Javadoc Declaration Console ×

<terminated> GenerateRandom3 [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (30-Aug-2023, 10:51:18 pm

```
Random Integers: -1072206287
Random Doubles: 0.7587539925904474
Random Booleans: false
```

METHOD-4:

USING SECURERANDOM:

Random class has a higher chance of repeating numbers during random number generation. Whereas, SecureRandom class allows us to generate cryptographically strong random numbers using the following steps:

1. Import the SecureRandom using java.security.SecureRandom.
2. Make the instance of SecureRandom class using new SecureRandom().
3. Use following methods to generate the random numbers:

- nextInt(upperbound) generates random numbers in the range 0 to upperbound-1.
- nextFloat() generates a float between 0.0 and 1.0.
- nextDouble() generates a double between 0.0 and 1.0.

```java
import java.security.SecureRandom;

public class GenerateRandom4 {
    public static void main( String args[] ) {
        SecureRandom rand = new SecureRandom();
        int upperbound = 1000;
        int int_random1 = rand.nextInt(upperbound);
        int int_random2 = rand.nextInt(upperbound);
        double double_random = rand.nextDouble();
        float float_random = rand.nextFloat();

        System.out.println("Random integer value from 0 to " + (upperbound -
        System.out.println("Random integer value from 0 to " + (upperbound -
        System.out.println("Random float value between 0.0 and 1.0 : " + float
        System.out.println("Random double value between 0.0 and 1.0 : " + doub
    }
}
```

Javadoc Declaration Console ×

```
<terminated> GenerateRandom4 [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (30-Aug-2023, 10:54:41 pm
Random integer value from 0 to 999 : 200
Random integer value from 0 to 999 : 592
Random float value between 0.0 and 1.0 : 0.94462836
Random double value between 0.0 and 1.0 : 0.45646540216921005
```