NEPAL ENGINEERING COLLEGE

(Affiliated to Pokhara University)

Changunarayan, Bhaktapur

A report on : ....2.....

2. Generation of Random Number using in built functions & ~~implementing~~

Submitted By:

Name: RAJ KUMAR KHADKA

Roll No.: 020-348

Submitted To:

Department: Computer Engineering

Teacher's Signature:

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LABSHEET 2

OBJECTIVE

Generate Random Number using in built functions & implementing its application in dice roll.

THEORY

In Java programming, we often required to generate random numbers while we develop applications. Many applications have the feature to generate numbers randomly, such as to verify the user many applications use the OTP.

Random Number

Random numbers are the numbers that use a large set of numbers and selects a number using the mathematical algorithm, It satisfies the following two conditions:

- The generated values uniformly distibuted over a definite interval.
- It is impossible to guess the future value based on current and past values.

Generating Random Number in Java

In Java, there are 3-way to generate random numbers using the method & classes.

- Using the random() Method
- Using the Random Class
- Using the ThreadLocalRandom Class
- Using the ints() Method

Using the Math.random() Method

The Java Math class has many methods for different mathematical operations. One of them is the random() method. It is a static method of the Math class.

It generates only double type random number ~~ger~~ greater than or equal to 0.0 & less than 1.0.

Code 1 : Create a program that generates random numbers using the random() method.

RandomNumberExample1.java

```
import java.lang.Math;
public class RandomNumberExample1
{
    public static void main (string args[])
    {
        System.out.println ("1st Random Number: "+Math.random());
        System.out.println ("2nd Random Number:"+Math.random());
        System.out.println ("3rd Random Number :" +Math.random());
        System.out.println ("4th Random Number :" +Math.random());
    }
}
```

Output :

```
1st Random Number : 0.16434160325
2nd Random Number : 0.49274100907092
3rd Random Number : 0.48286553813
4th Random Number : 0.13267917059
```

Code 2: Create a program that generates random numbers between 200 to 400.

RandomNumberExample2.java

```
public class RandomNumberExample2
{
    public static void main (String args[])
    {
        int min = 200;
        int max = 400;
        System.out.println ("Random value of type double
                between "+min+" to "+max+" : ");
```

```
        double a = Math.random() * (max-min+1) + min;
        System.out.println(a);
        System.out.println("Random value of type int between
                "+min+" to "+max+" : ");
        int b = (int) (Math.random() * (max-min+1) + min);
        System.out.println(b);
    }
}
```

Output :

Random value of type double between 200 to 400 :
233.88329802655537

Random value of type int between 200 to 400 :
329

Using the Random class

- First, import the class java.lang.Random.
- Create an object of the Random class.
- Invoke any of the following methods:
  - nextInt(int bound)
  - nextInt()
  - nextFloat()
  - nextDouble()
  - nextLong()
  - nextBoolean()

The nextInt(int bound) method accepts a parameter bound (upper) that must be positive. It generates a random number in the range 0 to bound - 1.

#Create a program that generates random numbers using the Random class

⇒ RandomNumberExamples.java

```
import java.util.Random;
public class RandomNumberExamples
{
  public static void main (String args[])
  {
    Random random = new Random();
    int x = random.nextInt(50);
    int y = random.nextInt(1000);
    System.out.println("Randomly Generated Integers
                        Values");
    System.out.println(x);
    System.out.println(y);

  // Generates Random Double values
    double a = random.nextDouble();
    double b = random.nextDouble();

    System.out.println("Random Double Values");
    System.out.println(a);
    System.out.println(b);

  // Generates Float values
    float f = random.nextFloat();
    float i = random.nextFloat();
    System.out.println("Random Float values");
    System.out.println(f);
    System.out.println(i);

  // Generates Long values
    long p = random.nextLong();
    long q = random.nextLong();
    System.out.println("Random Long Values");
```

```
        System.out.println(f);
        System.out.println(i);

// Generates Boolean Values

        boolean m = random.nextBoolean();
        boolean n = random.nextBoolean();
        System.out.println("Random Boolean Values");
        System.out.println(m);
        System.out.println(n);
    }
}
```

Output:

```
Randomly Generated Integers Values
23
767
Randomly Gene Double Values
0.4782381449 42
0.9 3805817267 95

Random Float Values
0.87804186
0.93880254

Random Long Values
4974823544291679198
3650240138416076693

Random Boolean Values
false
True
```

CONCLUSION

To conclude, in this lab we got familiarized with the generation of Random Numbers in java.

We generated Random Numbers using in built functions using method & classes where we used math.random() method which generated random numbers from 0 to 1 & Random class which is used to generate random numbers of all types like Integer, float, boolean etc.