CPSC 319 Tutorial 04
Techniques for 1st Assignment

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A Tour

Tuesday, Jan.26

1. Java Basics: “hello world”, etc.
2. Java Output: Console and .txt File.
3. Parse Command Line Arguments.

Thursday, Feb.02

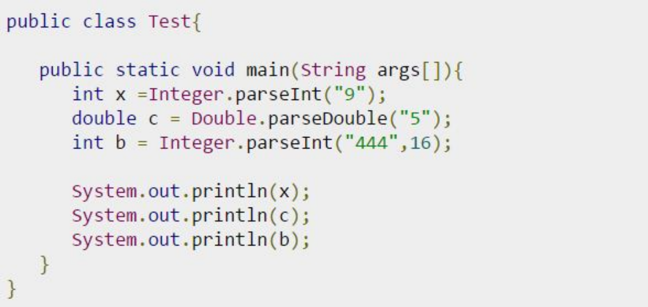
1. Create an Array with Arbitrary length and Random Integer.
2. Time Section of Code.
3. (Maybe) Bubble Sort and Insertion Sort.

How to convert a *String* to an *Integer*?

Recall the command:

java Assign1 order size algorithm outputfile

size is the number of items in the integer array to be sorted. However, *size* in the above is a String type parameter passing to the *main* function. You could use java **parseInt()** Method to cast a *string* to *int*.

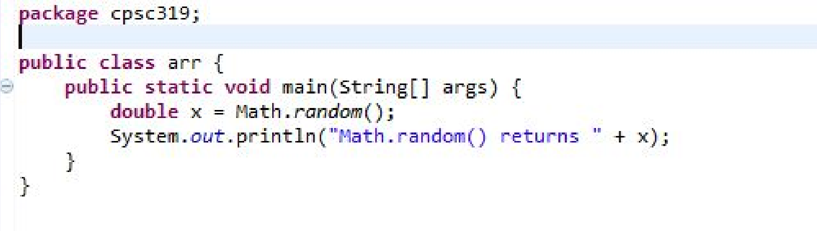


```
public class Test{

   public static void main(String args[]){
      int x =Integer.parseInt("9");
      double c = Double.parseDouble("5");
      int b = Integer.parseInt("444",16);

      System.out.println(x);
      System.out.println(c);
      System.out.println(b);
   }
}
```

Java.lang.Math.random( ) Method

The *java.lang.Math.random( )* returns a *double* value with a positive sign, greater than or equal to 0.0 and less than 1.0. Here is the declaration for it in Java:

public static double random( )



```
package cpsc319;

public class arr {
    public static void main(String[] args) {
        double x = Math.random();
        System.out.println("Math.random() returns " + x);
    }
}
```

This will produce the following result:

Math.random() returns 0.17403029945319293

What we want?

random, positive, integers, in the range *0* to *Integer.MAX_VALUE*

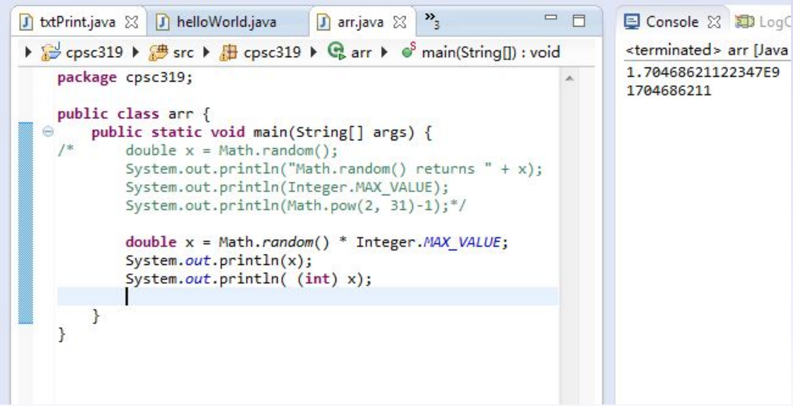
ps: in java, *Integer* is a class. Like other classes, *Integer* also contains some fields and method. MAX_VALUE is one of the fields which is a constant holding the maximum value [Exercise 1]

What we get via Math.random()?

random, positive, double, in the range *0.0* to *1.0.*

How to Convert?

One Option:



```
package cpsc319;

public class arr {
    public static void main(String[] args) {
/*      double x = Math.random();
        System.out.println("Math.random() returns " + x);
        System.out.println(Integer.MAX_VALUE);
        System.out.println(Math.pow(2, 31)-1);*/

        double x = Math.random() * Integer.MAX_VALUE;
        System.out.println(x);
        System.out.println( (int) x);

    }
}
```

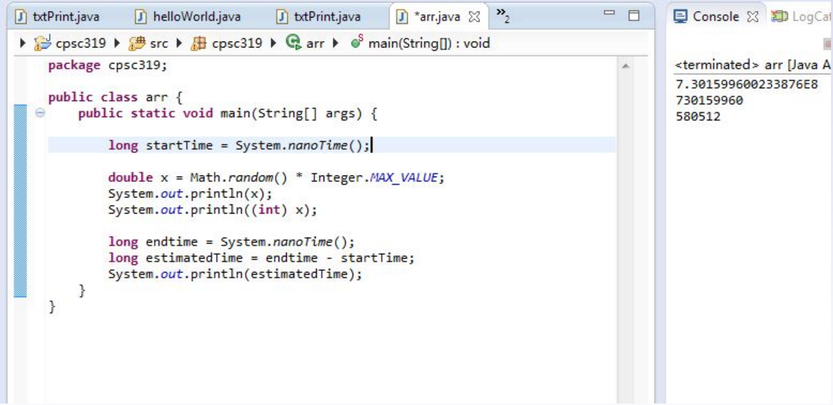
```
<terminated> arr [Java
1.70468621122347E9
1704686211
```

In Java, *nanoTime()* method could help us measure code performance. here is the declaration in java.lang package:

public static long nanoTime( )

Returns the current value of the most precise available system timer, in **nanoseconds**.

For example, to measure how long the above code takes to execute:



```java
package cpsc319;

public class arr {
    public static void main(String[] args) {

        long startTime = System.nanoTime();

        double x = Math.random() * Integer.MAX_VALUE;
        System.out.println(x);
        System.out.println((int) x);

        long endtime = System.nanoTime();
        long estimatedTime = endtime - startTime;
        System.out.println(estimatedTime);
    }
}
```

```
<terminated> arr [Java A
7.301599600233876E8
730159960
580512
```

REVIEW

- Integer.parseInt( ) method;
- Math.random( ) method
- Java Type Cast
- Range Conversion
- System.nanoTime( )

Exercise 2

Please write a java code (outputTest.java) to test the output efficiency of console and .txt file.

Requirements:

- Parse the command line:

```
java outputTest 100
```

- Create an array with the given length (100) and random positive integers from range 1 to Integer.MAX_VALUE.
- Output the array to the console and .txt respectively and output their running time by nanoTime( ) method.

ps: If you still feel uncomfortable to write a .java, please do some sample code reading first and try to remember and understand the basic java syntax. I will post my outputTest.java later.

Thank you!

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