# 44-542 Object Oriented Programming

# Lab02: Objects Lab Activity

**Objective:** Covers the usage of **String**, **Random**, and **Math** classes and its methods.

**NOTE:**

* For the **String** problems in this lab, use only **String** methods. You do not need to use arrays, split method, or any looping or selection constructs.
* Do not hard code any values unless specified and must follow the given naming conventions.
* Check the given sample output to know how the results need to be printed.

1. Create a New Project in NetBeans and name it as **Lastname\_Lab02Objects** where **Lastname** is your last name.
2. Create a new package in the project created and name it as **objects**.
3. Create a new Java Main Class in this package created and name it as **StringsAndNumbers. The** @author annotation must contain your full name.
4. Use the same **StringsAndNumbers** class to answer all the below questions.

**Questions**

**// String Class**

1. Inside the Main method do the following:
   1. Declare and initialize the below variables as **String** data types:
      1. **string1** - **Why** with 3 leading spaces,
      2. **string2** - **choose** with 1 trailing space and 1 leading space**,**
      3. **string3** -**Northwest** with 3 leading spaces and 2 trailing spaces**.**
      4. **string4** - **among** with no leading and no trailing spaces.
      5. **string5** - **other** with 1 leading and 5 trailing spaces.
      6. **string6** - **Universities** with 1 leading and 1 trailing space.
   2. Concatenate all the above strings and print the length of the concatenated string.
   3. Now, print the whole sentence with no leading and trailing spaces and one space between each word and also print the length of the string.
   4. Retrieve the word “Universities” from the above-concatenated string and print the first index of letter “i”.
2. a. Given the String **"computer Applied science Applied Computer science**

**science Applied computer Appleid computer Science Applied computer**

**Applied"**, write a statement to print the index of the first occurrence of the

word **“Computer”**.

1. Now with already above defined strings bring out the answer “**Northwest is one among the Universities which provides Applied Computer Science**” and print it. Here the words “is, one, the, which, provides” can only be hard coded.

**Note:** The order of the words given in the string in point number 2 can be changed. Write your code such that the output does not change.

**//Math Class**

1. Methods in the **Math** class are all static methods. Static methods do not require an instance of the class to be invoked. Instead, you use the class name, followed by a dot, followed by the method. Use the **Math** class to compute these problems. Use various methods in **Math** Class, refer Math class API for more information.
   1. Write statements for below:
      1. Declare two **int** variables**, value1 and value2,** and initialize them with 27 and 4 respectively. Write a statement that computes v**alue1** raised to the power of v**alue2** and print the result.
      2. From trigonometry, using **Math** class print secant of **value1**.
      3. Declare a **double** variable **myNumber** and initialize it with 43.35. Write a statement that returns the square root of **myNumber**. Print the ceiling and floor values of **myNumber**.
      4. Declare two **int** variables, **myNumber1** and **myNumber2**, and initialize them with 40 and 65 respectively. Write statements to find the cosine and tangent for each variable. Print the rounded values for each result obtained.
   2. Compute the result of) Print the ceiling value of the result.

**// Random Class**

1. The **Random** class can be used to generate pseudorandom numbers – they look like random numbers, and they act like random numbers, but they aren’t quite random. For help in completing the following problems, refer to **(Random class Java API)**
   1. Create an instance of the **Random** class using *no* seed value. Generate and print 4 pseudo-random integer values between 0 (inclusive) and 300 (exclusive) and print 3 random values without passing any integer values. Run your program two or three times.
   2. Do you get the same result each time? Write your answer in a sentence and print it.
   3. With seed value 20L create an instance of the **Random** class, generate and print 4 pseudo-random integer values between 0 (inclusive) and 300 (exclusive) and print 3 random values without passing any integer values. (**L** following the **20** indicates that the number is of type **long**, rather than **int**).
   4. Run your program two or three times. Do you get the same result each time? Write your answer in a print statement.
   5. Compare your results from b) and d) and explain the difference. Write your explanation in a print statement.

**Sample Output:** The output should be printed as it is in the below box.

|  |
| --- |
| Output:  \*\*\*\*\*\*\*\* String Class \*\*\*\*\*\*\*\*  The length of the concatenated string is: 58  Whole sentence: Why choose Northwest among other Universities?  The length of the trimmed string: 45  Index of first 'i' in Universities is: 2  The first occurrence of word Computer is: 33  String of strings: Northwest is one among the Universities which provides Applied Computer Science  \*\*\*\*\*\*\*\* Math Class \*\*\*\*\*\*\*\*  27 power 4 is: 531441.0  Secant of 27 is: -3  Square root of 43.35 is: 6.5840716885526085  Ceil Value of 43.35 is: 44.0  Floor value is: 43.0  Cos(30)-rounded: 0  Cos(60)-rounded: -1  Tan(30)-rounded: -6  Tan(60)-rounded: 0  Trigonometry: 2.0  \*\*\*\*\*\*\*\* Random Class \*\*\*\*\*\*\*\*  \*\*Without Seed value\*\*  First Random value:225  Second Random value:80  Third Random value:63  Fourth Random value:249  Fifth Random value:209897344  Sixth Random value:-1120432141  Seventh Random value:-274425792  \*\*4(b) Your answer to be here  \*\*With Seed value\*\*  First Random value:285  Second Random value:88  Third Random value:247  Fourth Random value:213  Fifth Random value:892128508  Sixth Random value:155629808  Seventh Random value:1429008869  \*\* 4(d) Your answer to be here  \*\* 4(e) Your answer to be here |

**Submit your solution by following the steps below:**

* Save your files in NetBeans.
* Zip your entire Project. (It should be called *Lastname*\_Lab02Objects.zip where Lastname is your last name.)
* Submit the Zip file to the Lab02Objects Dropbox.
* Download the Zip file you have submitted.
* Look in the Zip file and verify that **StringsAndNumbers.java** is correct. If not resave your project in NetBeans and resubmit.