**Lab Assignment – 5  
Due Date: 9/24/2018 (end of the day).  
Total Points: 100**

***Objective:***

* *Programming exercise I is meant to demonstrate using a pre-defined class based on its Application Programming Interface (API) in a client program*
* *Programming exercise II is meant to help you learn to read an API. In this exercise, you will read the API of String class and call some of its methods.*

**For each of the programs, make sure to use java coding style with proper indentations, naming conventions, and describe your program using a multi-line comment at the top and comment your code appropriately. Ensure that your print statements are descriptive and verbose.**

**Create a NetBeans project named lab05 and include all of the below programs in the same project folder.**

**Programming Exercises:**

1. Write a client java program that will use a pre-implemented class BankAccount.java. BankAccount class provides a template to create BankAccount objects that represent real-world bank accounts. Each bank account object stores its own balance (field). The class provides various operations (methods) that can be performed (called) on BankAccount objects including checking balance, deposit and withdraw operations. ***(50 points)***

*Note: You do not need to have the knowledge of the code in the BankAccount class in order to use it in your client program. You could use this pre-implemented class using its API.*

**For this program you will do the following:**

1. Download and save the BankAccount.java and BankAccountAPI.docx files on to your desktop. *Please note these files are posted along with the LabAssignment-5 file in Blackboard.*
2. Drag the BankAccount.java from desktop into your Project Folder in NetBeans
3. Try to run BankAccount class by right-clicking inside the class and “run file”. Check **if you can run the program, why or why not?**
4. Open the ***BankAccount API*** word document to learn about how to create BankAccount objects using the two choices of constructors, what methods are available to perform different operations on BankAccount objects and how to call these methods.
5. Next, create a new Class named ***BankAccountTest*** which will be your client program by right-clicking the Project folder and select New 🡪 Java class.
6. Implement the main( ) method in BankAccountTest and do the following:
   1. Create a BankAccount object using the default constructor. Name the object reference as account1.
   2. Print the current balance on the terminal window by calling appropriate method of the BankAccount class
   3. Deposit 1000 dollars into account1 by calling appropriate method
   4. Print the current balance on the terminal window by calling appropriate method
   5. Withdraw 250 dollars from account1 by calling appropriate method
   6. Print the current balance of account1 on the terminal window by calling appropriate method
   7. Create another BankAccount object using the other constructor with initial balance as 500. Name the object reference as account2.
   8. Print the current balance of the account2 on the terminal window by calling the appropriate method.
   9. Try withdrawing 550 dollars from account2, run the program and notice what happens. Explain the reason as to why the error occurred.
   10. Correct the step to withdraw 100 dollars from account2.
   11. Assign account 1 to account 2 ( *account2 = account1;* )
   12. Deposit 50 dollars into account1.

Print the current balance of both account1 and account2 on the output window.  
***What are the balance values for the objects that are referred by both object references in step I? Explain your answer, why the balance values are same or different?***

Both balance values are 800.0. That is because variable account1 was assigned to account2. So they are referencing the same object now.

* 1. Which of the following is a client program: BankAccount.java or BankAccountTest.java? Explain your answer.

BankAccountTest.java is the client program. Because it executes the code in BankAccount.java.

* 1. Make sure is to comment your program appropriately.

1. **Program to demo String class methods**

Design and write a Java Program (StringTest.java) that assigns the string values “Hi” and “Hello World” to String variables. Display the following information on the output window.

1. Length of the two strings by calling appropriate method from the String class.
2. Index of the first occurrence of character ‘o’ in both the strings.
3. Index of the last occurrence of character ‘o’ in both the strings.  
   **Note:** *for this, you would need to use another method from the String class which we did not discuss. Check the API’s of String class here* <https://docs.oracle.com/javase/8/docs/api/>*. First, click on the package java.lang in the top left frame to display all the classes in this package in the bottom left frame. Scroll and find String and click on it. This will display the API for String class on the right frame. Scroll down to look for the appropriate method to accomplish this step*
4. Create a substring of “Hello World” that begins at the position of the white space immediately preceding the character ‘W’ and extends through the end of the string. Store the substring in a new variable. *Hint: You would be using substring( ) method of the String class.*
5. Print the substring you created in the earlier step on the output window.
6. Concatenate (join) the variable containing “Hi” with the substring generated in the earlier step. Store the result in a new variable and print it on the output window.
7. Display the second String variable in all lowercase characters on the output window.
8. Display the second String variable in all uppercase characters on the output window.

Make sure to keep your output verbose and descriptive. Comment your code appropriately for each method call and provide a program description at the top of the program. ***(Points 30)***

**Things to Turn in:**

1. In a new Word file and save the file naming convention that we have used for earlier labs. *Use landscape page layout. From here on you will be using landscape page layout for your assignments and display the source code as Courier New font style.*
2. Enter your name at the top of the document.
3. Copy and paste the source code of Program – I (BankAccountTest.java)
4. Copy and paste the contents of the output window of Program – I (BankAccountTest.java)
5. Type your answers in the word document for questions in step 3, 6i , 6l and 6m of program - I.
6. Paste the screenshot of the output window of Program – I.
7. Copy and paste the source code and output of Program – II (StringTest.java)
8. Copy and paste the screenshot of the Program – II displaying the output.
9. Zip your NetBeans Project.
10. Submit your word document along with the zipped NetBeans project folder using the ***Lab Assignment – 5 links*** on Blackboard by the due date.