IT1013: Programming in Java

TUTORIAL_WEEK5

Part I

Drill:

1. Which of these operators can be used to concatenate two or more String objects?
   a) +
   b) +=
   c) &
   d) ||

2. Find the Output of this program

```
class String_demo {
 public static void main(String args[])
 {
   char chars[] = {'a', 'b', 'c'};
   String s = new String(chars);
   System.out.println(s);
 }
}
```

3. Find the Output of this program

```
class String_demo {
      public static void main(String args[])
      {
        int ascii[] = { 65, 66, 67, 68};
        String s = new String(ascii, 1, 3);
        System.out.println(s);
      }
   }
```

4. Find the Output of this program

```
class String_demo {
      public static void main(String args[])
      {
        char chars[] = {'a', 'b', 'c'};
        String s = new String(chars);
        String s1 = "abcd";
        int len1 = s1.length();
        int len2 = s.length();
        System.out.println(len1 + " " + len2);
      }
   }
```

5. **How many varieties of constructors exist in String class? List them**

```
class A {
     int i;
     int j;
     A() {
       i = 1;
```

```
        j = 2;
      }
   }
   class Output {
      public static void main(String args[])
      {
         A obj1 = new A();
         System.out.print(obj1.toString());
      }
   }
```

6. String in Java is a?
   a) class
   b) object
   c) variable
   d) character array
7. Which of these method of String class is used to obtain character at specified index?
   a) char()
   b) Charat()
   c) charat()
   d) charAt()

8. What is the output of this program?

```
class string_demo {      public static void main(String args[])
   {
      String obj = "I" + "like" + "Java";
      System.out.println(obj);
   }
}
```

9. Write a program called `Bin2Dec` to convert an input binary string into its equivalent decimal number. Your output shall look like:
   Enter a Binary string: **`1011`**
   The equivalent decimal number for binary "1011" is 11

   Enter a Binary string: **`1234`**
   Error: Invalid Binary String "1234"
10. On your phone keypad, the alphabets are mapped to digits as follows: `ABC(2)`, `DEF(3)`, `GHI(4)`, `JKL(5)`, `MNO(6)`, `PQRS(7)`, `TUV(8)`, `WXYZ(9)`.
    Write a program called `PhoneKeyPad`, which prompts user for a `String` (case insensitive), and converts to a sequence of Keypad digits. Use a nested-if (or switch-case) in this exercise. Modify your program to use an *array* for table look-up later.
    Hints: You can use `in.next().toLowerCase()` to read a string and convert it to lowercase to reduce your cases.

Part II

Hint:

String vs StringBuffer vs StringBuilder

String is immutable whereas StringBuffer and StringBuider are mutable classes.

StringBuffer is thread safe and synchronized whereas StringBuilder is not, thats why StringBuilder is more faster than StringBuffer.
String concat + operator internally uses StringBuffer or StringBuilder class.
For String manipulations in non-multi threaded environment, we should use StringBuilder else use StringBuffer class.

STRING AND STRING BUFFER:

Exercise 1: Create a class containing a method to create the mirror image of a String. The method should return the two Strings separated with a pipe(|) symbol

Method Name	getImage
Method Description	Generate the mirror image of a String and add it to the existing string.
Argument	String
Return Type	String
Logic	Accepts One String Find the mirror image of the String Add the two Strings together separated by a pipe(|) symbol. For Example Input : EARTH Output : EARTH|HTRAE Hint: Use StringBuffer API (Ex: For this problem reverse method in Stringbuffer can be used)

Exercise 2: Create a method which accepts a String and replaces all the consonants in the String with the next alphabet.
Note: Consonant refers to all alphabets excluding vowels

Method Name	alterString
Method Description	Replace consonants
Argument	String
Return Type	String
Logic	Return the String replacing all the consonants with the next character. For Example :JAVA should be changed as KAWA

Exercise 3: Create a method which can perform the following operations on two String objects S1 and S2. The output of each operation should be added to an arraylist and the arraylist should be returned.(Assume S2 is of smaller size)
Examples for below statements are shown in the Logic part
1. Character in each alternate index of S1 should be replaced with S2
2. If S2 appears more than once in S1, replace the last occurrence of S2 in S1 with the reverse of S2, else return S1+S2
3. If S2 appears more than once in S1, delete the first occurrence of S2 in S1, else return S1
4. Divide S2 into two halves and add the first half to the beginning of the S1 and second half to the end of S1.

Note: If there are odd number of letters in S2, then add (n/2)+1 letters to the beginning and the remaining letters to the end. (n is the number of letters in S2)
5. If S1 contains characters that is in S2 change all such characters to *

Method Name	modifyStrings
Method Description	Perform the above mentioned actions on a String
Argument	String,String
Return Type	String Array
Logic	Do the above mentioned actions on the entered String. For Example S1="JAVAJAVA" S2="VA' 1. **VA**A**VA**A**VA**A**VA**A (J replaced with VA, V replaced with VA etc.) 2. JAVAJAAV 3. JAJAVA 4. VJAVAJAVAA 5. J***J*** **Output:** {" **VA**A**VA**A**VA**A**VA**A"," JAVAJA**AV**"," JAJAVA"," **V**JAVAJAVA**A**","J***J***"}

Exercise 4: You are asked to create an application for registering the details of jobseeker. The requirement is:
Username should always end with **_job** and there should be atleast minimum of 8 characters to the left of **_job**. Write a function to validate the same. Return true in case the validation is passed. In case of validation failure return false.

Method Name	validateUserName
Method Description	Checks if the username is valid
Argument	String userName
Return Type	boolean
Logic	Checks if the username ends with _job and contains at least 8 characters to the left of _job. If valid return true. Else return false.

Exercise 5: Create a method that accepts a number and modifies it such that the each of the digit in the newly formed number is equal to the difference between two consecutive digits in the original number. The digit in the units place can be left as it is.
Note: Take the absolute value of the difference. Ex: 6-8 = 2

Method Name	modifyNumber
Method Description	Accepts a number and modify it as per the requirement
Argument	int number1
Return Type	int

Logic	Accept a number and modify it such that the each of the digit in the newly formed number is equal to the difference between two consecutive digits in the original number. For example. Input: 45862 Output:13242 **Algorithm:** 1. Convert number into String 2.Extract each char using charAt method 3. Convert char to int and find the difference 4.Create new StringBuffer object and keep adding the difference 5. Finally convert StringBuffer to int

Exercise 6: Create a method which can perform a particular String operation based on the user's choice. The method should accept the String object and the user's choice and return the output of the operation.
Options are
A: Add the String to itself
B: Replace alternate positions with *
C: Remove duplicate characters in the String
D: Change alternate characters to upper case

Method Name	changeString
Method Description	Modify the string based on user choice
Argument	String string, char ch
Return Type	String
Logic	Perform the required operation based on the user choice and return the resulting string

Exercise 7: Create a method that accepts a String and checks if it is a positive string. A string is considered a positive string, if on moving from left to right **each** character in the String comes after the previous characters in the Alphabetical order.
For Example
ANT is a positive String (Since T comes after N and N comes after A)
APPLE is not positive since L comes before P in the alphabetical order.
The method should return true if the entered string is positive

Method Name	checkPositive
Method Description	Checks if a String is positive
Argument	String
Return Type	boolean
Logic	Check if a string is positive based on the above criteria and return true if positive. Hint: **Step 1:** Convert to Char array. **Step 2:** Iterate through array, subtract 1st two characters (A-N). This will give the ASCII difference **Step 3:** If result is negative, then return false and

	break. Else continue to next loop

Exercise 8: A company requires each employee to maintain a secret code. The secret code needs to pass certain validation for getting accepted.
The validation rules are as given
1. The secret code should be six characters long
2. The first three characters should be cod (Use .startsWith method)
3. There should be at least one digit in the code (Use .isDigit)
4. The first character should always be an upper case letter(Use isUpperCase)
5. The code should contain only alphabets and digits.
6. The number of upper case letters should be greater than lower case letters.

Return true if the above validation is passed.

Method Name	validateCode
Method Description	Validate the entered code as per the given validation rules
Argument	String code
Return Type	boolean
Logic	Validate the entered code Hint: Use the String API methods to extract each character

Part III:

1. **Bank application extension with overriding incorporated.**

FYI:

http://www.quora.com/What-are-the-possible-interview-questions-asked-in-the-CTS-company-for-Java-developers-with-3-years-of-experience

http://java67.blogspot.in/2014/07/21-frequently-asked-java-interview-questions-answers.html

http://bateru.com/news/2011/03/484/

http://www.aucev.edu.in/placementcell/Materials/App3.pdf