CS162

ASSIGNMENT 2

NAME:

ARCHIT AGRAWAL

ROLL NO. :

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SECTION:

A

ASSIGNMENT – 2: QUESTIONS

1. Reverse a given integer.

Ex. - Input: 7458965

Output:- 5698547

2. Remove duplicate letters from string and return the new string with all unique characters

in lexicological order.

Ex. - Input: “DataStructure”

Output:- “DatSruce”

3. Implement strstr() i.e. return the index of first occurrence of substring if present

otherwise return -1.

Ex. - Input: “DataStructure”, “tru”

Output: 5

Ex. - Input: “DataStructure”, “true”

Output: -1

4. Count no. of zeros at the end of n! i.e. (n factorial).

Ex. - Input: 5 (5! = 5*4*3*2*1 = 120)

Output:- 1

5. Count the number of ‘1’ bits in binary string.

Ex. - Input: “1010101”

Output:- 4

6. Valid email address (must contain “@” symbol) i.e. return True if email address is valid

otherwise return False.

Ex. - Input: 2020@.gmail.com

Output:- False

Ex. - Input: 2020@iiitvadodara.ac.in

Output:- True

7. String to integer (including cases like “00123”)

Ex. - Input: “0124510”

Output:- 124510

8. Given a string s and an integer k, reverse the string in batches of k.

Ex. - s=”abcdefgh” ; k = 3 ; return “cbafedgh”

Ex. - s=”abcdefghi” ; k = 3 ; return “cbafedihg”

9. Determine if two strings are isomorphic. Two strings s and t are isomorphic if the

characters in s can be replaced to get t

Input: s = "egg", t = "add"

Output: True (replace e -> a and g -> d)

Input: s = "foo", t = "bar"

Output: False

Input: s = "paper", t = "title"

Output: True

10. Pattern: Inverted Pyramid

```
* * * * * * * * *
  * * * * * * *
    * * * * *
      * * *
        *
```

1. Creating a class named Main and defining the Methods listed below in it (methods are numbered corresponding to the questions)

1. long reverseInteger (long a);
2. String removeDuplicate (String s);
3. int checkSubString(String str1, String str2);
4. int zeroInFactorial(int a);
5. int count1(String str);
6. boolean isValidEmail(String email);
7. long strToInt(String s);
8. String revStringInK(String s, int k);
9. boolean isIsomorphic(String s, String s1);
10. void invertedPyramid(int rows);

CODE:

```
//package com.company

//if running on an online compiler there is no need to uncomment the first

//line, else if running on IntelliJ then uncomment the first line before

//executing


import java.util.*;

public class Main {

    public static long reverseInteger(long a){

        long rev_a = 0;
        while(a != 0){
            int digit = (int) (a % 10);
            rev_a = rev_a * 10 + digit;
            a = a/10;
        }
        return rev_a;
    }

    public static String removeDuplicate(String s) {
        if(s == null) return "String does not contain any character";
        String n_str = "";
        for (int i = 0; i < s.length(); i++) {
            int count = 0;
            for (int j = 0; j < n_str.length(); j++) {
                if (n_str.charAt(j) == s.charAt(i)) count++;
            }
            if (count == 0){
                n_str = n_str + s.charAt(i);
            }
        }
        return n_str;
    }

    public static int checkSubString(String str1, String str2){
        if(str1.length() < str2.length()) return -1;
        int k, count;
        for(int i = 0; i < str1.length(); i++){
            if(str1.charAt(i) == str2.charAt(0)){
                k = i;
                count = 0;
                i++;
                for(int j = 1; j < str2.length(); j++){
                    if(str1.charAt(i) == str2.charAt(j)){
                        count++;
                        i++;
                    }
                }
                if(count == str2.length() - 1) return k;
            }
        }
        return -1;
```

```
    }

    public static int zeroInFactorial(int a){

        int c = 5;
        int count = 0;
        while(a/c != 0){
            count += a/c;
            c *= 5;
        }
        return count;
    }

    public static int count1(String str){
        if(str == null) return -1;
        int count = 0;
        for(int i = 0; i < str.length(); i++){
            if(str.charAt(i) == '1') count++;
        }
        return count;
    }

    public static boolean isValidEmail(String email){
        int count = 0;
        for(int i = 0; i < email.length(); i++){
            if(email.charAt(i) == '@'){
                count++;            //to check if there are multiple @
            }
        }
        if(count != 1) return false;

        int flag = 0;
        for(int i = 0; i < email.length(); i++){
            if(email.charAt(i) >= 65 && email.charAt(i) <= 90){
                flag = 0;
            } else if(email.charAt(i) >= 97 && email.charAt(i) <= 122){
                flag = 0;
            } else if(email.charAt(i) >= 48 && email.charAt(i) <= 57){
                flag = 0;
            }
            else if(email.charAt(i) == '_' || email.charAt(i) == '.' ||
email.charAt(i) == '-' || email.charAt(i) == '@'){
                flag++;
                if(flag > 1) return false; //if two continuous characters
are special characters, the email is invalid
                if(i == 0 || i == email.length() - 1) return false; //first
and last character cannot be a special character
            }
            else return false;
        }
        return true;
    }

    public static long strToInt(String s){
        if(s == null) return -1;
        long num = 0, c = 1;

        for(int i = (s.length() - 1); i >= 0; i--){
            num = c * ((int)s.charAt(i) - 48) + num;
            c *= 10;
        }
```

```
        return num;
    }

    public static String revStringInK(String s, int k){
        if(s == null) return "Invalid String";
        String rev_str = "";
        int i = 1;
        while(true){
            if(i * k <= s.length()){
                for(int j = i * k - 1; j >= k * (i - 1); j--){
                    rev_str = rev_str + s.charAt(j);
                }
            } else {
                for(int j = k * (i - 1); j < s.length(); j++){
                    rev_str = rev_str + s.charAt(j);
                }
                break;
            }
            i++;
        }
        return rev_str;
    }

    public static boolean isIsomorphic(String s, String s1){

        if(s.length() != s1.length()) return false;

        char[] visited = new char[26];
        for(int i = 0; i < 26; i++){
            visited[i] = '*';
        }
        for(int i = 0; i < s.length(); i++){
            char ch = visited[s.charAt(i) - 'a'];
            if(ch == '*'){
                visited[s.charAt(i) - 'a'] = s1.charAt(i);
            } else if (ch != s1.charAt(i)){
                return false;
            }
        }
        return true;
    }

    public static void invertedPyramid(int rows){

        for(int i = 0; i < rows; i++){
            for(int j = 0; j < i; j++){
                System.out.print("  ");
            }
            for(int j = 2 * rows - 1; j > 2 * i; j--){
                System.out.print("* ");
            }
            System.out.println();
        }
    }

    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter an positive integer whose reverse you
want to find");
        long m = sc.nextLong();
        System.out.println("The reverse of "+m +" is : "
```

```
+reverseInteger(m));
        System.out.println();
        sc.nextLine();

        System.out.println("Enter a string to remove duplicate characters
from it");
        String s = sc.nextLine();
        System.out.println("The new string is : "+removeDuplicate(s));
        System.out.println();

        System.out.println("Enter two strings s and s1 to get the index of
first occurrence of s1 in s (-1 if s1 is not a substring of s)");
        System.out.println("Enter string s");
        s = sc.nextLine();
        System.out.println("Enter string s1");
        String s1 = sc.nextLine();
        System.out.println("The index of first occurrence of s1 in s is : "
+checkSubString(s, s1));
        System.out.println();

        System.out.println("Enter an integer to calculate the number of
zeroes at the end of its factorial");
        int n = sc.nextInt();
        System.out.println("No. of zeroes at the end of "+n +"! are : "+
zeroInFactorial(n));
        System.out.println();
        sc.nextLine();

        System.out.println("Enter a binary string (containing 0's and
1's)");
        s = sc.nextLine();
        System.out.println("No. of 1's in the input string are : "+
count1(s));
        System.out.println();

        System.out.println("Enter an email address to check if it is a
valid email address or not (format wise only)");
        s = sc.nextLine();
        if(isValidEmail(s)) System.out.println("The email address " +s +"
is valid.");
        else System.out.println("The email address "+s +" is invalid.");
        System.out.println();

        System.out.println("Enter a numeric string to convert it into an
integer");
        s = sc.nextLine();
        System.out.println("The integer corresponding to the input string
is : "+strToInt(s));
        System.out.println();

        System.out.println("Enter a string to reverse it in batches of k");
        s = sc.nextLine();
        System.out.println("Enter integer k");
        int k = sc.nextInt();
        System.out.println("The original string is : "+s);
        System.out.println("The string reversed in batches of k is :
"+revStringInK(s, k));
        System.out.println();
        sc.nextLine();

        System.out.println("Enter two strings s and s1 to check if they are
```

```
isomorphic to each other or not");
        System.out.println("Enter string s");
        s = sc.nextLine();
        System.out.println("Enter string s1");
        s1 = sc.nextLine();
        if(isIsomorphic(s, s1)) System.out.println("The two strings are
isomorphic to each other.");
        else System.out.println("The two strings are not isomorphic to each
other.");

        System.out.println("Enter number of rows");
        n = sc.nextInt();
        invertedPyramid(n);

    }
}
```

OUTPUT:

```
"C:\Program Files\Java\jdk-16\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2021.1\lib\idea_rt.jar=57
Enter an positive integer whose reverse you want to find
4585543
The reverse of 4585543 is : 3455854

Enter a string to remove duplicate characters from it
massachusetts
The new string is : maschuet

Enter two strings s and s1 to get the index of first occurrence of s1 in s (-1 if s1 is not a substring of s)
Enter string s
mississippi
Enter string s1
ssi
The index of first occurrence of s1 in s is : 2

Enter an integer to calculate the number of zeroes at the end of its factorial
145
No. of zeroes at the end of 145! are : 35

Enter a binary string (containing 0's and 1's)
1101101
No. of 1's in the input string are : 5

Enter an email address to check if it is a valid email address or not (format wise only)
202052307@iiitvadodara.ac.in
The email address 202052307@iiitvadodara.ac.in is valid.
```

```
Enter a numeric string to convert it into an integer
00554642
The integer corresponding to the input string is : 554642

Enter a string to reverse it in batches of k
penandpaper
Enter integer k
4
The original string is : penandpaper
The string reversed in batches of k is : anepapdnper

Enter two strings s and s1 to check if they are isomorphic to each other or not
Enter string s
abaabaaab
Enter string s1
xyxxyxxxy
The two strings are isomorphic to each other.
Enter number of rows
7
* * * * * * * * * * * * *
  * * * * * * * * * * *
    * * * * * * * * *
      * * * * * * *
        * * * * *
          * * *
            *

Process finished with exit code 0
```

Alternative Outputs for a few methods

```
Enter two strings s and s1 to get the index of first occurrence of s1 in s (-1 if s1 is not a substring of s)
Enter string s
mississippi
Enter string s1
ssii
The index of first occurrence of s1 in s is : -1
```

```
Enter an email address to check if it is a valid email address or not (format wise only)
2020@archit@gmail.com
The email address 2020@archit@gmail.com is invalid.
```

```
Enter an email address to check if it is a valid email address or not (format wise only)
abcxyz12.34@gmail.com
The email address abcxyz12.34@gmail.com is valid.
```

```
Enter an email address to check if it is a valid email address or not (format wise only)
abc..xyz@gmail.com
The email address abc..xyz@gmail.com is invalid.
```

```
Enter a string to reverse it in batches of k
abcdefghijkl
Enter integer k
4
The original string is : abcdefghijkl
The string reversed in batches of k is : dcbahgfelkji
```

```
Enter two strings s and s1 to check if they are isomorphic to each other or not
Enter string s
abaabaaab
Enter string s1
xyxxyxxyy
The two strings are not isomorphic to each other.
```