INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ROORKEE – 247 667

(Autumn Semester 2018 – 19)

Fundamentals of Object Oriented Programming (CSN 103) **Assignment 4**

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1. On your Smart 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 SmartPhoneKeyPad, 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.

2. Write a program to find whether given string is palindrome or not.

3. Write a Java program that converts an English word into PigLatin. To do that there are three rules: if the word starts with a vowel add way to the end, ex. **apple=appleway**. if the word has a vowel but doesn't start with it then take the consonants it front of the first vowel and put the to the end of the word and add ay to the end. ex: **ball=allbay, strong=ongstray**. and if the word has no vowels just add ay to the end. ex. **pfft=pfftay**.

   Suppose the string is "**Proud to be an IITian**" then its corresponding **piglatin** string is "**Oudpray otay ebay anway IITianway**". (piglatin translator is available in http://www.snowcrest.net/donnelly/piglatin.html).

4. Write and test a method to print all the factorial numbers upto an input limit: (for e.g if the input is 6, your program should print 1, 1, 2, 6, 24, 120, 720).

5. Write and test a method int `sum_digit(int n, int k)`. This method returns the sum of *k* digit of the positive integer *n*. For e.g., if *n* is the positive integer 56789, then call `sum_digit(n,0)` would return 9, and the call `sum_digit(n,2)` will return 24.

6. Write and test a method to check that a given digit is present in a given number or not.

7. Input two numbers one is the power and another is upper limit. Write and test a method which gives power of every number ≤ upper limit. For example if input power is 2 and upper limit is 4 then result must be 1, 4, 9, 16.

8. Write a permutation nP_r using JAVA method. Invoke this method to the program main.

9. Consider the following recursive method and compute `f(11)`

```
int f(int i)
      {
           if (i == 0) return 0;
                if ((i % 2) == 0)
                     return f(i/2) + f(i/2);
                else return f(i-1) + 1;
      }
```

10. Write and test a recursive method to convert a decimal into octal number.

11. Write and test overloaded methods to find sum of three integers, sum of three double values and sum of four integers.