Sofia University
Department of Mathematics and Informatics

Course : OO Programming with Java
Date: October 6, 2017
Student Name:

Lab No. 1

1. **Write an application to:**
   a) compute and output the `celsius` equivalent of an input Fahrenheit temperature, using the calculation

```
C = 5.0 / 9.0 * ( F - 32 );
```

   b) compute and output Fahrenheit the equivalent of an input **celsius** temperature, using the calculation

```
F = 9.0 / 5.0 * C + 32;
```

   c) Use the methods from parts (a) and (b) to write an application that enables the user either to enter a Fahrenheit temperature and display the Celsius equivalent or to enter a Celsius temperature and display the Fahrenheit equivalent.

2. Write code that **inputs a five-digit number** . Display an error message if the number is not five digits. Write code that separates the digits in the five digit number. Store the original value of number in variable ***originalNumber*** before performing calculations. **Write** code that determines whether the first and last digits are identical and the second and fourth digits are identical. Assign ***resultString*** a string indicating whether or not the original string is a **palindrome**.:

3. A company wants to transmit data over the telephone, but they are concerned that their phones may be tapped. All their data is transmitted as four-digit **Integer**s. They have asked you to write a program that encrypts their data so that it may be transmitted more securely. Your program should read a four-digit **Integer** entered by the user and encrypt it as follows: Replace each digit by *(the sum of that digit plus 7) modulo 10*. Then swap the first digit with the third, and swap the second digit with the fourth. Print the encrypted **Integer**. Write a separate program that inputs an encrypted four-digit **Integer** and decrypts it to form the original number.

4. A four- digit number N is used to store genetic information about the four nucleotide bases denoted by each one of the A, C, G and T in terms of the powers of the digit 4. Let

$$N = \sum_{i=0}^{n} k_i 4^i,$$

where $k_i \in [0, 3]$. Assume, the digits 0, 1, 2 ,3 denote the characters ‘A’, ‘C’,’G’, ‘T’ of the four nucleotide bases. Write a Java application that reads a four digit integer number and outputs its representation in terms of the characters ‘A’, ‘C’,’G’, ‘T’