**Homework: Methods**

**Problem 1. Say Hello**

* Write a method that asks the user for his name and prints “Hello, <name>”
* Write a program to test this method.

*Example:*

| **input** | **output** |
| --- | --- |
| Peter | Hello, Peter! |

**Problem 2. Get largest number**

* Write a method GetMax() with two parameters that returns the larger of two integers.
* Write a program that reads 3 integers from the console and prints the largest of them using the method GetMax().

**Problem 3. English digit**

* Write a method that returns the last digit of given integer as an English word.

*Examples:*

| **input** | **output** |
| --- | --- |
| 512 | two |
| 1024 | four |
| 12309 | nine |

**Problem 4. Appearance count**

* Write a method that counts how many times given number appears in given array.
* Write a test program to check if the method is workings correctly.

**Problem 5. Larger than neighbours**

* Write a method that checks if the element at given position in given array of integers is larger than its two neighbours (when such exist).

**Problem 6. First larger than neighbours**

* Write a method that returns the index of the first element in array that is larger than its neighbours, or -1, if there’s no such element.
* Use the method from the previous exercise.

**Problem 7. Reverse number**

* Write a method that reverses the digits of given decimal number.

*Example:*

| **input** | **output** |
| --- | --- |
| 256 | 652 |

**Problem 8. Number as array**

* Write a method that adds two positive integer numbers represented as arrays of digits (each array element arr[i]contains a digit; the last digit is kept in arr[0]).
* Each of the numbers that will be added could have up to 10 000 digits.

**Problem 9. Sorting array**

* Write a method that return the maximal element in a portion of array of integers starting at given index.
* Using it write another method that sorts an array in ascending / descending order.

**Problem 10. N Factorial**

* Write a program to calculate n! for each n in the range [1..100].

*Hint: Implement first a method that multiplies a number represented as array of digits by given integer number.*

**Problem 11. Adding polynomials**

* Write a method that adds two polynomials.
* Represent them as arrays of their coefficients.

*Example:*

x2 + 5 = 1x2 + 0x + 5 => {5, 0, 1}

**Problem 12. Subtracting polynomials**

* Extend the previous program to support also subtraction and multiplication of polynomials.

**Problem 13. Solve tasks**

* Write a program that can solve these tasks:
  + Reverses the digits of a number
  + Calculates the average of a sequence of integers
  + Solves a linear equation a \* x + b = 0
* Create appropriate methods.
* Provide a simple text-based menu for the user to choose which task to solve.
* Validate the input data:
  + The decimal number should be non-negative
  + The sequence should not be empty
  + a should not be equal to 0

**Problem 14. Integer calculations**

* Write methods to calculate minimum, maximum, average, sum and product of given set of integer numbers.
* Use variable number of arguments.

**Problem 15.\* Number calculations**

* Modify your last program and try to make it work for any number type, not just integer (e.g. decimal, float, byte, etc.)
* Use generic method (read in Internet about generic methods in C#).