Exercise: Algorithmic Thinking

This document defines bonus exercise problems from the "Advanced C#" Course @ Software University. These problems do not affect the final score. They are designed to improve problem solving skills.

1. Reverse Words in a String

Example: ***I have little patience*** -> ***Patience little have i***. Do not use built-in reverse methods. Implement your own algorithm.

Input	Output
`Gosho stana golqmo momche`	`Momche golqmo stana gosho`
`I am a student at Softuni`	`Softuni at student a am i`
`The bluest of skies`	`Skies of bluest the`

2. Count Consecutive Digits

Implement algorithm that counts consecutive digits and appends the resulting value in front of the sequence

Example 3354 -> *two 3s*, *one 5*, *one 4* or **231514**

111 -> *three 1s* or **31**

Input	Output
`1515`	`11151115`
`5566124`	`2526111214`
`0`	`10`

3. Calculator

Implement an algorithm that correctly calculates simple expressions.

Input	Output
`1 + 1 + 1`	`3`
`6 - 5 * 4`	`-14`
`12 * 3 * 1 / 5`	`7.2`

4. Convert String to Integer

Implement your own algorithm that converts a string to integer. Do not use ***int.Parse***, ***Convert.ToInt32*** or similar methods. Think of edge cases

Input	Output
`155`	`155`
	`FormatException`
`18789718957189578956`	`OverflowException`

5. Multiply Integers in Array

Multiply each integer by all other integers except itself. Example:

[5, 6, 7, 8] -> [336, 280, 240, 210]

336 = 6 * 7 * 8; 280 = 5 * 7 * 8; 240 = 5 * 6 * 8; 210 = 5 * 6 * 7

Input	Output
1 2 3 4	24 12 8 6
0 1 2 3	6 0 0 0
10 11 12 13 14	24024 21840 20020 18480 17160

6. Reverse number

Reverse numbers using only the math operators (**+ - * / %**)

Input	Output
4321	1234
100000	1
105101	101501