# Exercise: Algorithmic Thinking

This document defines bonus exercise problems from the [“Advanced C#“ Course @ Software University](http://softuni.bg/courses/advanced-csharp/). 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 |