Assignment 2: Inventorio

Write a report (pdf or word) in which you answer the questions below. For each question:

- 1. repeat the question you are answering;
- 2. explain your approach;
- 3. describe your answer(s);
- 4. show (relevant) code snippets;
- 5. show the output of your program.

Once your report is finished, make sure your names and student numbers are on the title page, and send it to your instructor before the deadline.

Note that you are required to program in C# or C++, and must work in pairs of two. Assignments are graded with a G (good), V (sufficient) or O (insufficient).

Consider a RPG scenario where the player carries items such as potions, weapons or armor in an inventory. We will use Stacks and Queues to store these items.

Question 1)

Write a program that reads Strings as user input from Console and stores them in a Stack. When the user enters an empty line and presses enter, your program prints the inventory items in reverse order.

Hint: instead of writing your own Stack, you could use the Stack class instead

- C#: Stack is already part of System.Collections.Generic
- C++: add the following import: #include <stack>

Question 2)

Change your program such that it uses a Queue to store the inventory items.

Choosing for a Stack or a Queue to store items may have an impact on the time complexity of your code.

Question 3)

Which of these two datastructures leads to the most time efficient code? Base your argument on how stacks and queues work. Can we predict the Big-O for each method?

Question 4)

Run an experiment where you estimate the Big-O of each method (Q1 and Q2).

Hint: Average the program runtimes over many iterations (i.e. 1.000.000 times) to get significant results. In doing so, use an automated input method rather than real user input.

Question 5)

Does your program use dynamic programming (recursion)? If yes, show the relevant code snippets. If no, change part of your program so that works recursively.

Question 6)

What is the stopping criterion of your recursive function(s)?

Bonus Question)

Show how to implement a Queue using two Stacks.