# Computer Science 320 S2 (2020)

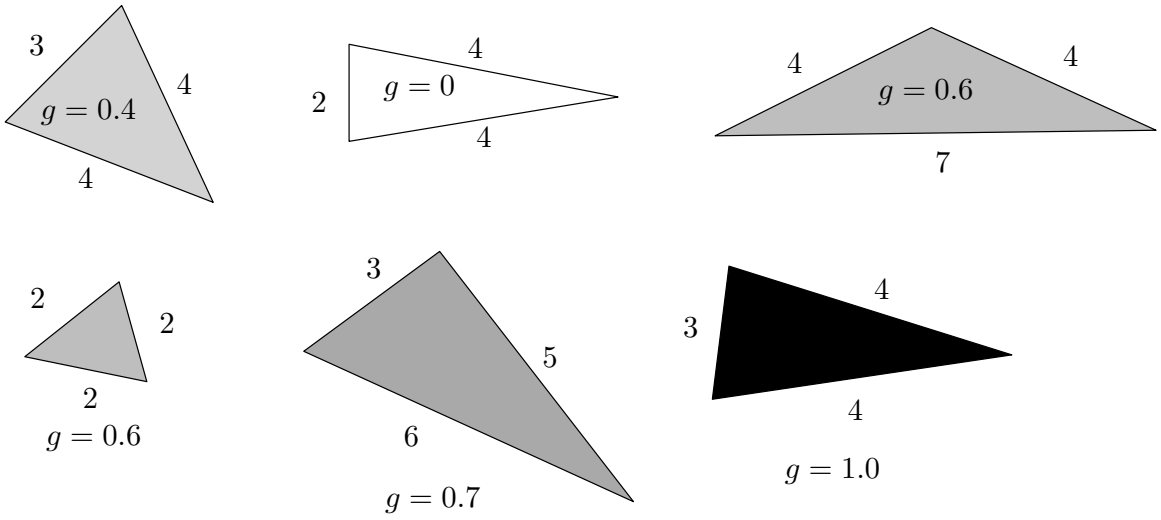
## Assignment 4 (Dynamic Programming)

### Due date: Oct 3rd, 2022

## Problem Statement

For this assignment, you will develop a program to demonstrate your understanding of the use of dynamic programming as an algorithm design technique.

We want to create a long paper chain of triangles for Cindy, the princes of New Zealand. Cindy requires that the various supply of grey colored paper of triangles be connected together such that the shades of grey increase from light (white has value 0.0) to dark (black has value 1.0). Each triangle can be fastened together with one or two other triangles along sides with equal length. To increase flair, each triangle of the chain must be a different shade of grey. For example, for the triangles shown in the figure below, we can connect together four of them to make a chain.




## Input

The input consists of a first line containing an integer $1 \leq n \leq 10000$ denoting the number of triangles available. This is then followed by a $n$ lines containing three positive integers $l_1, l_2, l_3$ that denote the triangle side lengths and a real value $0.000 \leq g \leq 1.000$ that denotes the grey scale color.

## Output

For each test case output a single positive integer that represents the longest chain (number of triangles) that could be made.

Taken from the earlier pictorial example we have the following sample input and expected output.

| Sample Input | Sample Output |
|---|---|
| 6<br>3 4 4 0.4<br>4 4 2 0.0<br>4 7 4 0.6<br>2 2 2 0.6<br>3 5 6 0.7<br>3 4 4 1.0 | 4 |

## Submission and Due Date

Submit your code to the automated marker `www.automarker.cs.auckland.ac.nz`. The program should be named `triangles.ext`, where the filename extension corresponds to the allowed programming languages. There will be four test cases provided for this assignment (and another four used later when determining marks). Note that for this problem, one reads input from stdin/keyboard and prints the output to stdout/console/screen; read the automarker's Help page for more information.

The deadline is 11:59pm (automarker time) on the 3rd of October. The marks for this assignment is worth 5% of your course grade. Some partial credit may be given if you do not achieve "Correct" (green) on the automarker. Note we use plagiarism detection software so do not share any source code with your fellow students.