# PRACTICE: Fractal Image Compression

I.   Goals

- Students can use Python with libraries to implement image compresion using fractal.

II.   Introduction

- Fractal compression is a lossy compression method for digital images, based on fractals. The method is best suited for textures and natural images, relying on the fact that parts of an image often resemble other parts of the same image.

- Fractal algorithms convert these parts into mathematical data called "fractal codes" which are used to recreate the encoded image.
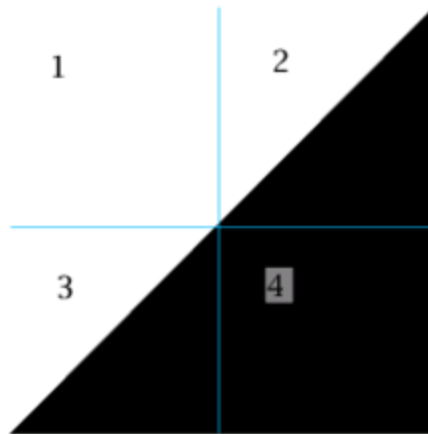
2 triangles, example to show how fractal compression works

III.   Content

1. Prepare the necessary programming environment.
   - **Python** programming language, minimum recommend version from **3.10**
   - Recommend using a **virtual environment** for developing
   https://www.jetbrains.com/help/pycharm/creating-virtual-environment.html
   https://code.visualstudio.com/docs/python/environments
2. Tasks
   - 1. Implement affine transformations: translation, rotation, scaling, reflection/mirroring for greyscale images.
   - 2. Implement affine transformations: translation, rotation, scaling, reflection/mirroring for RGB images.
   - 3. Implement fractal image compresion for greyscale images with affine transformations.

- 4. Implement fractal image compresion for greyscale images with affine transformations, and contrast + brightness.
- 5. **(bonus)** Implement fractal image compresion for RGB images.

P/s: report the detailed experimental results for each tasks, with comments or explanations.

IV. Requirements

1. The directory structure of the compressed submission
   - *doc*: report files include MSSV_report.doc and MSSV_report.pdf.
   - *source*: contains entire source code directory / Jupyter Notebook, removed temporary files, intermediate compiled files if exist…
   Note: no report: consider 0 (zero) point.
2. Other requirements
   - The report should be presented clearly and intuitively: summarize what had finished (each corresponding task with percentage), list the features included in the program with proof images, summarize the usage and implementation (for example: through pseudo-code, description of methods, or how to do it, *do not copy the source code into the report*).
   - The source code needs to be commented on the corresponding lines.
   Note: all cases of copying or even of being copied could be considered 0 (zero) point.