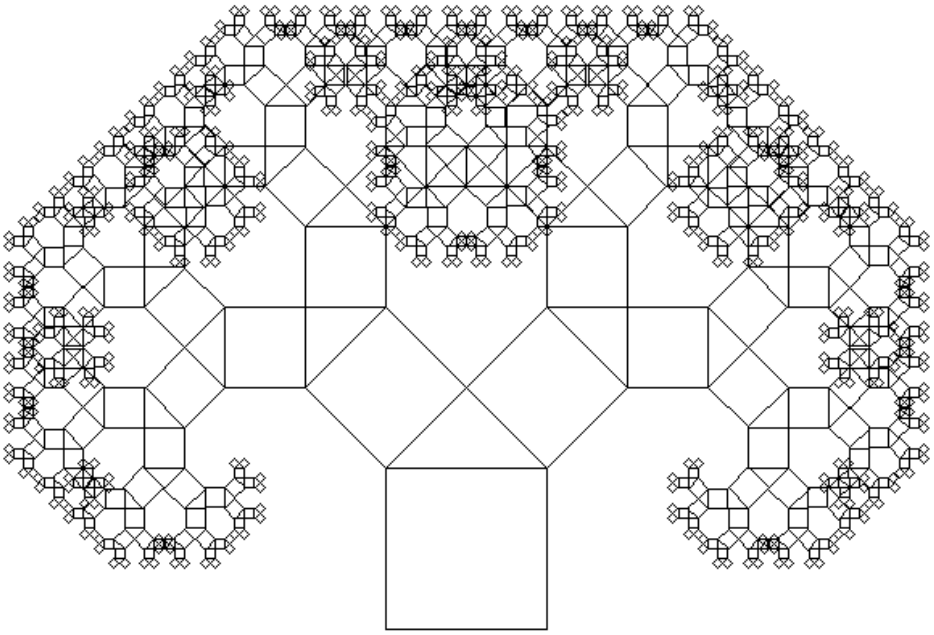
PS2: Recursive Graphics (Pythagoras tree)

In this assignment you will write a program that plots a Pythagoras tree as illustrated below.

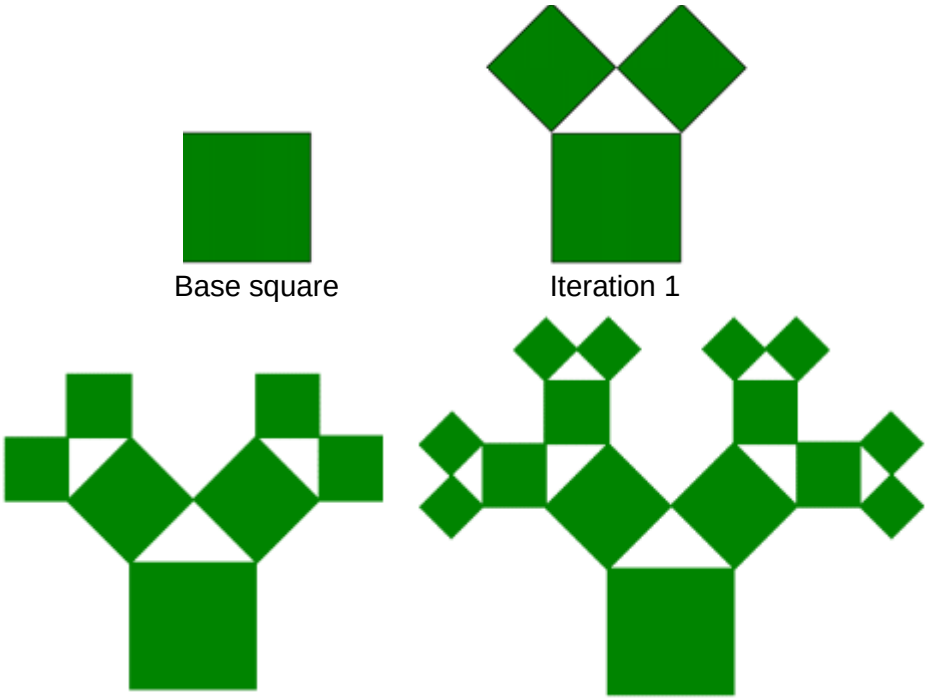


The Pythagoras tree is named after the Greek mathematician Pythagoras because each triple of touching squares encloses a right triangle, in a configuration traditionally used to depict the Pythagorean theorem. It is a plane fractal constructed from squares invented by the Dutch mathematics teacher Albert E. Bosman in 1942. In 1957 Bosman published a book on *Het wondere onderzoekingsveld der vlakke meetkunde* ("the wondrous exploration field of plane geometry") that contained a description of the Pythagorean tree. If the largest square has a size of $L \times L$, the entire Pythagoras tree fits snugly inside a box of size $6L \times 4L$.

Your task is to write a program **`PTree.cpp`** with a recursive function **`pTree()`**, and a **`main()`** program that calls the recursive function.

Your program shall take two command-line arguments *L* and *N*:

L size of the base square (int)
N the depth of the recursion (int)



API specification. You should implement class PTree

Notes:

- You should create a PTree class that derives from `sf::Drawable`. Then, you can have it just `draw` itself to your main window.
- Your executable must read two parameters (integers): size of base square and recursion-depth. You should create a SFML window that's exactly as big as *6L* × *4L* (your tree should fill it).

What to turn in

It's important that you turn in everything needed to build your projects.

Create a directory with all your work**.**

Your `Makefile` should contain two targets: `all` and `clean`. The former should build both executables, and the latter should remove the executables, `.o` files, and all other temporary files created during the build.

The directory should be named **ps2** and contain:

1. Your `Makefile`
2. `.cpp` and `.hpp` files for project
3. Any images and fonts you are using

4. Anything else needed to build and run your code
5. Screenshot of program output
6. A `readme.txt` file that includes:
    - Your name
    - A discussion of what you did—at least 100 words. What you actually implemented, and, what was interesting, hard, fun, or easy about your project.
    - How much time you invested
    - Anything else you'd like us to know (optional)

Remember, we will have to build and run your code, so make sure to submit all that's needed!

Use `tar` command from the parent directory of your `ps1`:

```
tar czvf ''<archive-file-name>''.tar.gz ps1
```

to compress your directory structure.

How to turn it in

Submit your compressed archive file via the PS2 assignment page on Blackboard.

Grading rubric

Feature	Value	Comment
PTree implementation	**10**	**full & correct implementation** 1 pt file name correct 1 pt reads base square size and depth args 7 pts draws tree properly (recursive implementation) (2 pts for non-recursive implementation) 1 pt implements draw function as derived class of `sf::Drawable`
Makefile	**6**	**full & correct implementation** 1 pt builds objects associated with PTree project 1 pt links "tree" executable 1 pt "make clean" removes temporary files, objects, and executables

tar.gz archive	**2**	all files packaged in .tar.gz file with correct directory structure (you MUST include Screenshot of program output)
readme.txt	**4**	**complete and discusses work**
Total	**22**	
Extra points (see examples below)	**6**	You can implement a variation of Pythagoras tree (with different angles)
	2	Add color to your tree
	3	Other (reasonable) added futures, i.e. animation