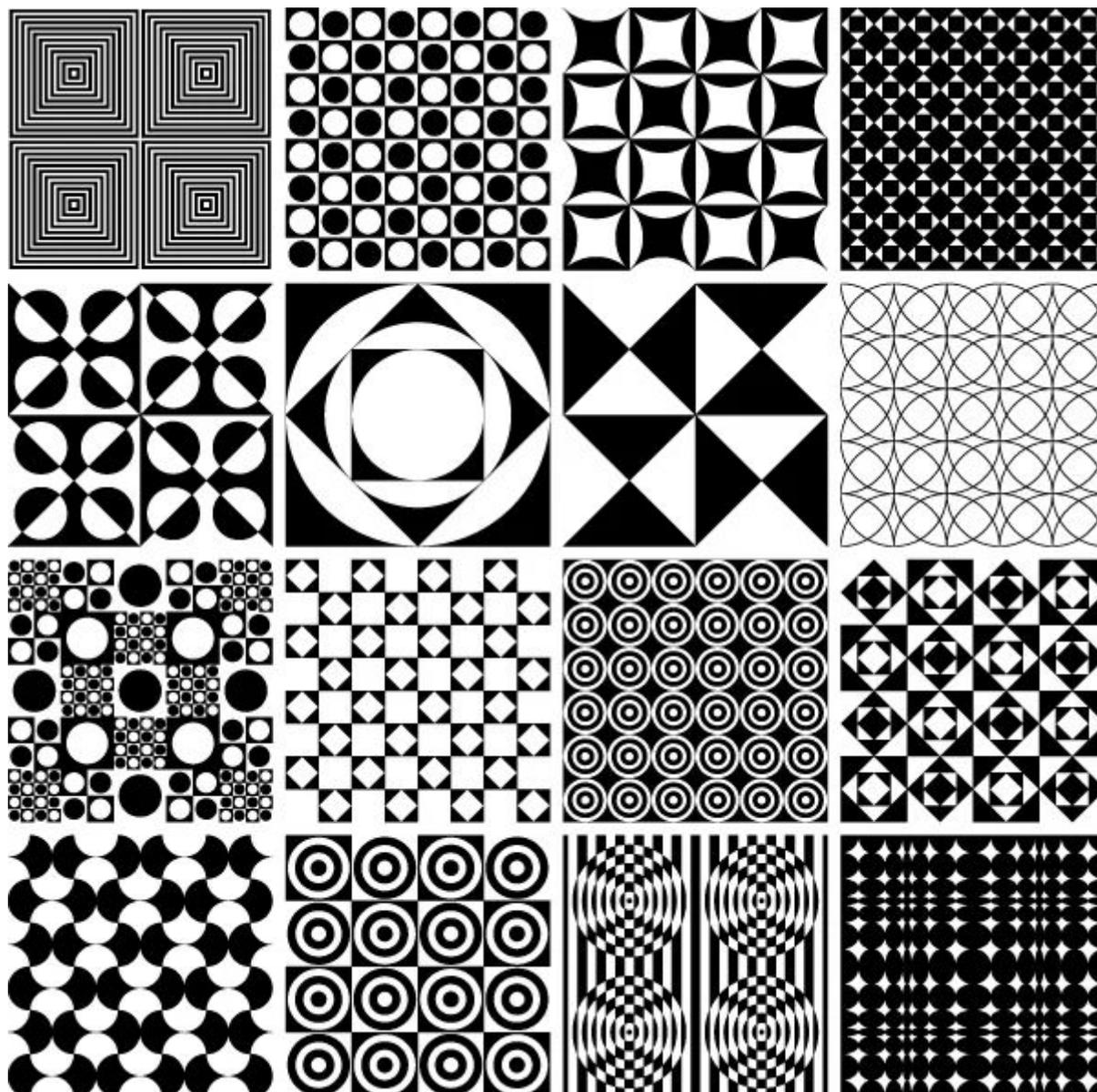


2D element texture design

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Designed by: Planetary Folklore <https://www.123freevectors.com/monochrome-geometric-seamless-patterns-vector-graphics/>

Element textures are a fundamental aspect of illustration. They add complexity to a drawing and support many artistic effects. They also depict important information such as materials in architectural plans, fabric in clothes, terrain type in topographic maps, biological materials in medical illustrations, etc.

Producing element textures is therefore mandatory for many illustration systems and application fields, such as 2D animation, cartography, and other computer-assisted design tasks like pattern creation for the textile or wallpaper industry. These applications often need to synthesize a large amount of each element texture either because the target image is very large (geographic map, wallpaper) or because the same texture is used in many images (comics, 2D animation). In this context, manual authoring quickly becomes tedious which motivates the need for a computer assisted production pipeline.

A first work has been done in our team to propose a complete programmable approach to synthesise element textures [1]. In this work we used planar maps as the data structure used to store and process the element texture we are working on. While very powerful this representation is not directly usable with simple vector graphics softwares.

As a second experiment we have worked on a web prototype using SVG vector graphics standard: <https://jthollot.gitlabpages.inria.fr/vectorpattern/V13> and with a collaboration with a designer teacher for the interface part.

These works open several research questions that can lead to master projects :

- How to help designers design original element textures? Generative approaches (like in [5]) or clever suggestions could help designers create new visual patterns. The question is then to find computer models able to generate a large variety of patterns while being intuitively controllable.
- How to extend the SVG standard to accommodate complex patterns, especially by controlling the overlap of the graphics element? As an example, interlocking patterns, like knitting, are very hard to design and edit in SVG. See [6] for a starting point.
- Does a set of constructive operators may increase the variety of element textures easily designed? As an example we can imagine simple operators, like union of intersection, at the element level in order to combine already designed element textures. Inspiration could be taken from shape grammars like in [2].
- How to keep the programmable advantages (freedom and control) for non developers? This question is at the heart of the [creative coding](#) community but some more direct interactions can also be thought of, like in [3] or [4].

Interested candidates are encouraged to contact me joelle.thollot@inria.fr in order to discuss and see what kind of project corresponds best to their goals.

Bibliography

- [1] [Programmable 2D Arrangements for Element Texture Design](#)
- [2] [gTangle: a grammar for the procedural generation of tangle patterns.](#)
- [3] [Vignette: interactive texture design and manipulation with freeform gestures for pen-and-ink illustration.](#)
- [4] [PATEX: exploring pattern variations.](#)
- [5] [JM&LA image design](#)
- [6] [Local layering](#)