

## Vector ornamentation in design

Ștefana - Roxana STOICA<sup>1</sup>

**Abstract:** *Vector ornamentation in design refers to creating decorative elements, independent, secondary, tertiary or connecting motifs, forming patterns, ornamental borders, quadrants or patterns in specialized software. These vector ornaments have applicability in various areas and on different types of materials. Creating vector design also requires knowledge of compositional principles. The versatility of their design and various implementation methods in different fields and applicability on different materials make the subject under research complex.*

**Keywords:** *design; vector; ornamentation; pattern; composition;*

### Introduction

Vector ornamentation in design represents an important aspect of creating a product. The versatility of creating and using vector elements makes this subject extensive and especially interesting mostly for designers.

Vector design is always present in the conception of design projects. Both in graphic design, product design and interior design, we encounter the need to use vector elements in specialized software to create ideas that designers present to clients in the most professional way. In addition to presentation boards, designers use vector ornamentation in creating design products.

Designers create projects for multiple fields of activity, and for this reason, they must always be informed and up-to-date with the latest trends and technologies.

### 1. Objectives

The reasons for choosing the research topic were based on identifying problems or gaps in the literature of the proposed subject for documentation. For example, the absence of a complete presentation of the finished product realization cycle that involves the process of creating vector elements that are versatile and can be used on various materials to form a range or set was identified as a gap in the literature. Additionally, another weakness in this area is the lack of a concrete and comprehensive explanation for creating various design products starting from vector ornamentation, which encompasses the entire process from choosing the topic, through the documentation stage, implementation variant stage, detailing the optimal solution, to the realization of the final product.

One of the interests in addressing this topic is the desire to demonstrate the complexity of creating vector ornamentation. In graphic decorative composition, visual composition elements

---

<sup>1</sup> Design, Faculty of Visual Arts and Design, National University of Arts „George Enescu” Iasi, stoica\_stefana93@yahoo.com.

and principles are accessed, where rhythm and repetition<sup>2</sup> in a pattern or ornamental border represent the use of a repetitive order structure that organizes series of spaces and forms. Repetition can be created from multiple vector elements copied and rotated or mirrored in directions observed horizontally or vertically.

A visual composition can be created from vector elements framed in a module (a geometric shape) that, through repetition horizontally or vertically, forms a decorative border. That border<sup>3</sup>, multiplied over the entire surface of the page, creates the pattern. In a pattern, the ornamentation may not repeat itself strictly<sup>4</sup> when we talk about the modules (Fig. 1.) that are placed next to the contour borders. In a complex composition, we find secondary and tertiary elements that are introduced into the space between modules or once at a certain number of modules. Lines or connecting elements make the entire composition more complex or overloaded. Composition involves concepts of pagination, scaling, and ordering elements on the page.

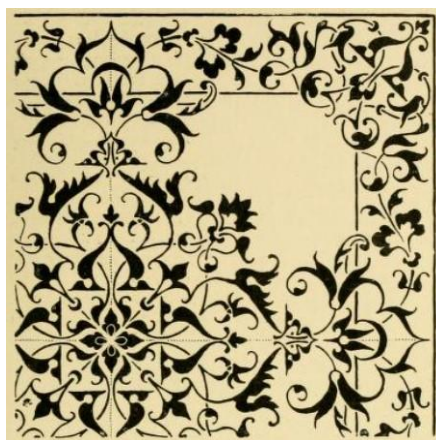


Fig. 1. *Ornament that extends outside the module, towards the border*. Electronic source: Lewis, F. Day. 1903. *Pattern Design*, London: B.T. Batsford Ltd., p. 243, from <http://archive.org/details/PatternDesign/page/n17/mode/2up?ref=ol>.

Ornamentation has its counterpart in the history of visual arts, interior design styles, and the cultures of peoples regarding the meanings of decorative symbols/motifs. All of these are argued through detailed analysis, creating an infographic of their history, the meanings of motifs in their traditions, and analyzing the psychological interpretation of the nuances used in ornamentation.

The visual composition conceived by assembling the ornaments<sup>5</sup> (Fig. 2.) found on various traditional ceramic vessels or on the decorative architecture of buildings, creates a complex composition which in turn can be used as a module in a complex and crowded pattern. Each number corresponds to a design taken from various objects.

<sup>2</sup> Reese, Michael. 1895. *Cusack's Freehand Ornament*. London: The Bishopsgate Press, p. 17, Retrieved November 26, 2007, from <https://archive.org/details/cusacksfreehando00armsrich/page/n27/mode/2up>.

<sup>3</sup> Lewis, F. Day. 1923. *Pattern Design*. Milano: B.T. Bastford Ltd., pp. 212-239.

<sup>4</sup> *Ibidem*, pp. 240-248.

<sup>5</sup> Batterham, David. 2022. *The World of Ornament*. London: Taschen, pp. 148-149.

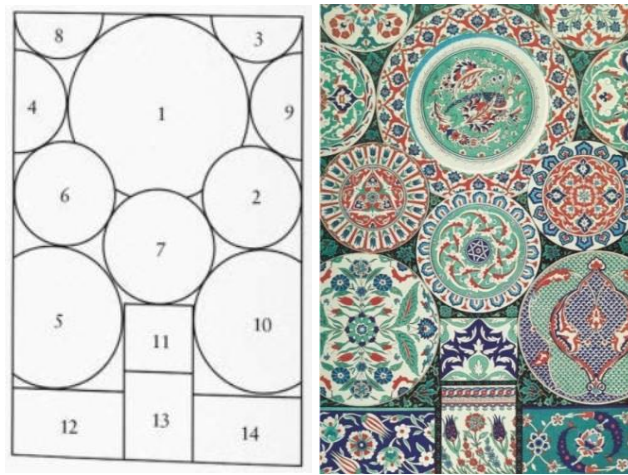


Fig. 2. *Ornaments – persian art*. Bibliographic reference: Batterham, David. 2022. *The World of Ornament*, London: Taschen, pp. 148-149.

The versatility of vector ornamentation and its multiple uses make this subject of interest to various areas or domains because graphic design represents a way for all firms and institutions to draw attention to their activities and attract potential clients or collaborators.

Vector ornamentation requires the designer to go through all the stages of the design process to create an original and reasoned design.

## 2. Materials and Methods

Vector ornamentation can be used in embroidery, printing, creating templates for material painting, molds, engraving, or stamping. Patterns can be made for textile materials, relief shapes or objects, or they can be used as graphics in posters, invitations, covers, business cards, visual identities (logos), etc.

The functional difficulties may arise in the process of creating a three-dimensional mold to produce the ornamentation based on the vector sketch designed in a graphic program. The questions that the designer needs to address are as follows: What material should be used to create the mold? What material should be inserted into the mold? Where will the produced ornamentation be used, and what finished product will it decorate? These questions should be tailored to fit the various stages of the design process. The ideas for using the mold are diverse, ranging from creating a mold for making wax candles to designing a mold for making decorative metal elements for key-locked cabinets, or even creating a mold used to produce silicon elements for baking molds or a roller with a relief pattern for wall decoration by painting. Molds can also be made from polymers, photopolymer resins used in 3D printing.

Depending on the ergonomics of the product to be decorated, the ornamentation is designed, or based on the ornamentation created, a product is sought that fits in terms of design, shape, textures, and shades.

When creating invitations, materials such as paper and cardboard are often used, which can be embossed based on the vectorial ornamental pattern created. For printing designs onto textiles, plastic stencils can be made for efficient cleaning, or they can be colored using the

traditional Indian block-printing<sup>6</sup> technique. Essentially, in order to create stencils and printing blocks (made from various materials such as wood, metal, or silicone - a reinterpretation idea), the printing module must first be established. The block-printing technique (Fig. 3.) involves creating the same framing dimensions for the ornamentation, but each module is assigned an element from the composition for a single color to be printed. Essentially, if we want to print a branch with flowers on the textile material, we will have one block for the branches, one for the leaves, one for the flowers, and so on for each color in that module.



Fig. 3. *Fabric printing blocks*. Bibliographic reference: Wilson, Henry. 2016. *Pattern and Ornament in the Arts of India*. London: Thames and Hudson Press, p. 10.

The difference between block-printing and stencil technique is that the latter is made only from one piece, but it requires more attention from the artist to place the colors where they should be, and on the other hand, there may be cases where the artist has to wait for the material to dry in order to add a new shade next to or over the ones already printed.

Both block-printing and stencil techniques, as well as matrices or embossing, are first created in the graphic version before being connected to the machinery that physically creates these objects useful in the design conception of the final product that includes ornamentation.

Designers draw inspiration for combining colors in vector ornamentation from books that specify the CMYK color codes<sup>7</sup>, which signify the amount of cyan, magenta, yellow, and key (black) pigment. At the same time, they keep up with the latest trends in color from the Pantone Institute, which sets the trends in color for design. Presenting the CMYK color palette in vector composition description sheets helps establish the optimal final implementation variant.

In ornamentation, the idea of positive-negative, filled space versus empty space, or the relief or inlay of decorative elements, starts from a concept sketch that is analyzed in more detail to observe the way finishes are created. In monochrome sketches, the ornamentation is flat, but if we intervene with a second or third color, we can imagine different thicknesses of reliefs or inlays in the material. For a better visualization of the ornamentation, it is recommended to sketch the lateral and frontal plan, in terms of height, or rather, thickness.

The method of creating vector ornaments in Turkish<sup>8</sup> culture (Fig. 4.) is based on a general concept: ornamentation that is designed only with outlines represents the feminine

<sup>6</sup> Wilson, Henry. 2016. *Pattern and Ornament in the Arts of India*. London: Thames and Hudson Press, pp. 10-11.

<sup>7</sup> Please see Arrizabalaga, Heidi. 2007. *Pattern Palette 2*. Massachusetts: Rockport Press, pp. 14-19.

<sup>8</sup> Akar, Azade. 1992. *Authentic Turkish Designs*. New York: Dover Publication Inc., pp. 12-13.

attribute (used for inlaying the ornamentation), while the filled ornamentation represents the masculine gender (used for embossing).

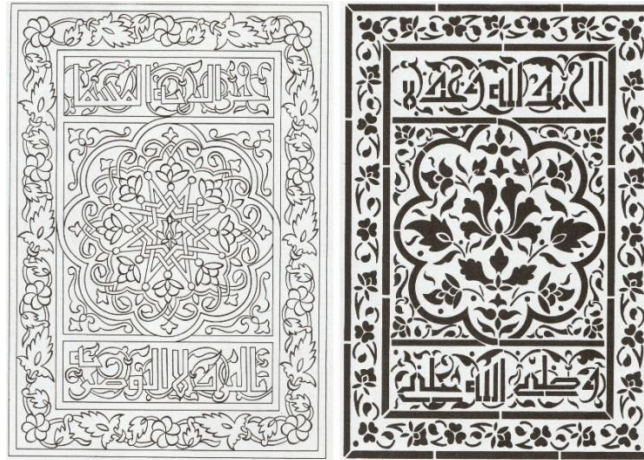


Fig. 4. *Ornamentation representing the feminine sex (on the left side) and the masculine sex (on the right side)*. Bibliographic reference: Akar, Azade. 1992. *Authentic Turkish Designs*. New York: Dover Publication Inc., pp. 12-13.

The design of vector ornaments can also be found in creating finishes such as graphic textures for wallpaper, ceramic tiles, faience, or parquet tiles, or in the texture of veneer. In the field of textiles, independent motifs or modules, borders or patterns are sketched vectorially and then the ways in which they can be programmed to output the finished product from special programs that are linked to industrial machinery are considered.

Among the materials most often used after the ornamentation has been sketched are: metal, wood, plastic, silicone, textile materials. Vector ornaments are designed to be used graphically, or to be integrated into products that help to create them. For example, stamps (used in sealing envelopes with wax) and molds (used to create patterned paint rollers for wall decoration or to create baking tins; both are made of silicone). Another example of the use of the stamp pattern is found in the iron object used in the practice of stamping the cattles.

Stamping the cattles with a hot iron, embroidering towels with the monogram containing the initials of the patrons, etc., are based on a design sketch. Even if in the two examples different techniques are used (in the first example molds are used, and in the second it can be done by machine embroidery or even by hand), both, at the same time, can be done first vectorially, as then to use templates (for manual embroidery), or to export to programs connected to the embroidery machine. Thus, the connection between CAD technology (representing the design process) and CAM (representing the production process) takes place, and to make the mold, the graphic sketch (flat, 2D) is needed and then the thickness or thicknesses necessary for the design are thought in depth for the creation of that monogram.

Following the above, a question may arise: Why do we need the 2D vector sketch of the vector ornamentation if we end up using 3D processes? First of all, any 3D design of an ornament is first thought in 2D views. The horizontal view of the ornamentation can be used as I explained in the previous example, or the same graphic can be applied to various other materials, as an independent motif (monogram), or multiplied in a decorative border or in a pattern. In order for that decoration to be harmonious and based on compositional principles, connecting

vector elements are introduced which can mean straight, wavy lines or even other parts separated from the main motive of the independent ornamentation.

The methods of selecting the design plan for vector ornaments are diverse and start first from the creativity of the designer, who must have a solid knowledge base on decorative motifs and how to create them in order to be able to use both the 2D and the 3D.

### 3. Vector Design and Applicability in Various Fields

The designer is sometimes forced to access other unapproached areas until receiving a new project that may involve knowledge from diametrically opposed fields, such as the field of medicine. During the documentation of the subject, the designer encounters certain similarities from which he can start the design concept. The designer can create for other domains or draw inspiration from other domains to design vector ornamentation.

Vector design (or graphic design) is a subject that connects at certain points with adjacent or even polar opposite fields. For example, the adjacent ones include product design, interior design, fashion design, crafts, marketing. Among the fields diametrically opposed to vector graphic design, which connect only in certain situations, we can identify: bioeconomy, economics, psychology, medicine, mathematics.

The Mandelbrot<sup>9</sup> set is a well-known fractal index in mathematics that contains ornamentation. The similarity between Mandelbrot images and vector patterns made from ornaments is the use of the same module in creating the composition and the ability to scale it to create a multitude of composition variations. The major difference between vector ornamentation and images formed from fractal indices lies in the quality and accuracy of the image, the latter being deficient in this respect. Mandelbrot fractal works can be GIF (acronym for Graphics Interchange Format) and create the idea of perforation and transition from ornament to ornament.

A connection between medicine and visual arts can be found in the colorful charts in ophthalmology offices. Ishihara plates are designed for quick and accurate evaluation of congenital color vision deficiency. These Ishihara tests are made up of circles of different sizes and shades, which, by combining similar tones, create a sensation of optical illusion. Another type of optical illusion, but this time stimulating three-dimensional observation, can be found in the works of Penrose and Escher<sup>10</sup> (Fig. 5.). Not all people are capable of reading or understanding the mechanism of optical illusion, but this fact, this time, is not considered to be a medical issue as presented above in the case of dyschromia. An optical illusion involves an error in visual perception. By convention, the term "optical illusion" is limited to sensory appearances that involve the perception of movement and shape. It should be emphasized that optical illusions are not due to visual defects. Both optical illusions in visual arts and Ishihara plates share elements of graphics and composition. A graphic designer can draw inspiration from these areas to create vector pattern designs to be used on various objects or in different design projects.

---

<sup>9</sup> Mandelbrot, Benoit B. 2004. *Fractals and Chaos: The Mandelbrot Set and Beyond*. New York: Springer, p. 4.

<sup>10</sup> Escher M.C. 2001. *The Graphic Work*. Koln: Taschen, p. 4.



Fig. 5. Escher – „Eight heads”. Module – observation rhythmic repetition. Bibliographic reference: Escher M.C. 2001. *The Graphic Work*, Koln: Taschen, p. 4.

Also related to the optical illusion are the Rorschach<sup>11</sup> sheets, which contain ink blots on paper, which the psychologist shows to the patient to communicate what he observes in them. In graphics programs, you can make those vector spots. Thus, they can be scaled to any size and can be multiplied to create a pattern that designers can use wherever they want, in a certain decoration object or in a textile material of a piece of furniture, or in a decorative border on the walls of the office waiting room.

Ornaments can also be found in anti-stress books for children or adults. Coloring the spaces of the ornamentation without going beyond the contour creates increased attention and thus disconnects the user from other thoughts.

If we enter the space of the bioeconomy, designers also have a notable implication here. Considering the current trends in which the idea of recycling and using natural, biodegradable materials is being discussed, they often seek to ensure that the materials they use comply with these standards to raise people's awareness on this subject. For example, in room design, environmental designers propose fabrics made of natural fibers (tapestries, lampshades, pillowcases, etc.) and storage boxes made of decorated cardboard in various shades and patterns. Both textile objects and cardboard objects that involve only a simple graphic print are based on a graphic scheme from which the composition starts. The vector ornaments made for the creation of textile materials can be found both in fabric intended for interior design objects and in textile materials in the field of clothing design.

Vector decorations are made in specialized programs that result in intermediate, helpful objects (such as templates or molds) with which we decorate the furniture, for example, by adding 2D patterns, by painting, or by creating decorations. Ornamentation can take the form of a texture. The series of lines, shapes and points form a graphic scheme that can be used on any material.

In the decoration of design objects made of glass, ceramic or metal, the ornaments are also first created in vector form, so that they can then be manually or automatically intervened with specialized machines. The use of graphic decoration involves a transformation of the design mode to fold on the engraving or printing machine. Basically, it is about the intersection of CAD

<sup>11</sup> Please see Exner, John E. 2002. *Rorschach - A Comprehensive System, Basic Foundations & Principles of Interpretation*. New Jersey: John Wiley & Sons Inc, p. 4.

technology with CAM technology. The materials<sup>12</sup> that can be laser cut or engraved to create ornaments are: wood (oak, balsa wood, etc.), plastic, acrylic, ceramic, glass, metal, stone, canvas, rubber, etc.

The use of vector ornamentation in the field of interior design implies a multitude of possibilities for its integration. It is identified in wallpaper, flooring (as in the case of epoxy flooring that does not limit our imagination), in decorative elements such as the dials of decorative mirrors. The interior designer must have the ability to select, design, or restructure the decorative elements with ornaments, so that every piece of furniture or finish in the interior design connects harmoniously. The most sensitive and complex thing is to connect two or more spaces that have similar decorations, but slightly different in style. This is where the designer's creativity comes into play to create a connecting ornamentation, which can be identified in the engraving of doors or door frames, or in the area of plinths.

Staying in the area of design, 2D vector ornaments are also thought about in the perspective of their realization in three-dimensional form, molded on the circumference of jewelry from different alloys. Thus, the designer must have the ability to think of a model in the perspective of making it both 2D and 3D.

Vector ornaments can be extracted from the traditional art of various artistic cultures, starting from architectural motifs or those found in ceramics or on traditional clothes. These traditional motifs are mainly geometric, vegetal, floral motifs, or contain illustrations of elements of an artistic period. It is nature that most inspires the area of motifs and ornaments. Vector stylizations of plant and floral elements can be used in a wide range of design areas.

Architectural ornaments also contain motifs inspired by nature and more. We often find architectural geometric motifs in wood, metal or stone panels. For example, you can create a vector pattern inspired by the perforated stone panels called "jalis" (Fig. 6.), representative of India. Depending on the design theme or subject, these patterns can be reinterpreted in contemporary times to be used in other design works.

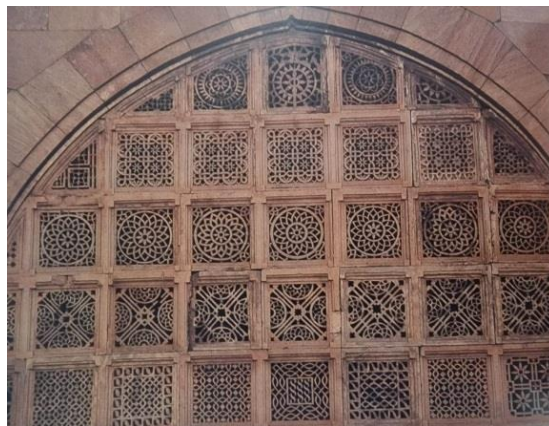


Fig. 6. *Dials or modules with ornaments*. Bibliographic reference: Wilson, Henry. 2016. *Pattern and Ornament in the Arts of India*. London: Thames and Hudson Press, p. 208.

---

<sup>12</sup> Kleper, Michael L. 2022. *Focusing on Laser Engraving and Decorating: Affordable, Versatile, and Creative Marking, Engraving, and Cutting*. Boynton Beach, FL, pp. 72-81.



Flipping pages from books with ethnic specifics is a source of inspiration for designers. One way in which designers build their new interpreted vector ornaments is the following: by introducing into the graphic program in which they work, various images with traditional motifs placed on top of each other, giving transparency to each one separately, thus several ways of connection of dots and lines can be observed, forming a new pattern.

Thanks to the vectors that, after resizing, do not lose their qualities, the vector ornaments used in digital art such as those in digital paintings, become decoration products that can be multiplied and sold in series. Looking at serial marketing, promotional or marketing support objects are formed by accessing graphic design programs. Any business<sup>13</sup> environment, any institution, agency, etc., calls on designers to realize various projects that need promotional objects, which involve working in specialized programs. Here, the vector ornaments can be found in business cards, on diaries, pens, panels, or placed on the back of the chairs, on the table, or on the table tops. It can be about the integration of the ornamentation in the company logo, or that ornamentation can represent a layout that harmoniously complements the logo or even separates from it.

As a common denominator between design and economy, we can identify the approach of a project based on identifying the beneficiary who fits into a certain hierarchy in society. Thus, the complexity, refinement, and quality of the product are also reflected in the higher price. Short, limited series production, designing a unique product, made to order according to the beneficiary's specifications, therefore involves an extra increase in the final score of the product. To this end, the designer creates an original graphic design to be used in the production of the finished product. In other words, the designer must be familiar with the representative details of fitting a vector composition into a certain sample.

Vector ornaments can also be used in flat form in web page layouts, posters or electronic invitations, or can constitute the graphic elements of a logo. Remaining in this area of using ornaments in digital form, they are created to represent a starting point for the physical realization of models. An example is the conversion or rethinking of decorative motifs created in vector programs from the CAD sector, to be transformed into a different type of design (CAM), which involves the physical, tangible realization of objects or materials. One example to mention is their use in the design of fabrics for automatic weaving machines.

From the above, we can see that the designer must take into account cultural, social, and bio-economic aspects in the product design process. Sometimes, the designer needs to access other areas outside of their expertise, such as the field of medicine, to complete a project. During the research process, the designer may encounter similarities that can inspire the design concept.

#### 4. Results

The strengths of choosing the research subject are detailed in the following explanations. In the aesthetic area, the versatility of vectorial ornamentation can be observed, regarding graphic design, in the realization of modules in various and countless ways, and at the same time, the multitude of variants for the interlacing of ornamental borders in a pattern is also highlighted. The countless variants of intercalating nuances of vectorial elements and selecting various background colors and establishing contour shades or highlighting areas of certain parts of the

---

<sup>13</sup> Perkins, Shel. 2006. *Talent is not enough: business secrets for designers*. California: AIGA, pp. 16, 227, 349.

vectorial ornamentation are also strong points of the aesthetic area that help to create an original design.

The strengths of the functional aspect are: the diverse use of vector ornamentation in creating objects that help in designing the final design product (templates, moulds, etc.); the connection of CAD-CAM concepts for designing modules for the program to which the machine connects (weaving loom - for creating a fabric); the direct use of vector ornamentation in the finished products to be printed (cover, business card, invitation, etc.). Establishing the design also involves determining the texture, relief, or cutouts (e.g. embossing, laser cutting for templates or contour cutting for packaging, etc.). In other words, by observing the various and different ways in which vector ornamentation has applicability in the design of the final product, we can state that they are of great interest in the design area in general because they cover a wide range of "needs", that is, they come to the aid of designing certain parts of a design product.

The weaknesses of choosing the research subject can also be viewed critically from an aesthetic or functional point of view. Given that vector design offers unlimited possibilities for creating vector ornaments, what we create could appear unfinished or resemble other works already created by other designers. A thorough investigation of these aspects is necessary to avoid repeating an already existing pattern. To avoid seeming like the proposed model or pattern is "unfinished", a multitude of variations must be created regarding the method of intercalating independent, secondary, and tertiary motifs and, implicitly, joining borders and inserting connecting elements between these borders (for example, once every few reports) to create a visually compositionally correct pattern.

Another way to create vector ornaments can also start from vectorizing the letters of a certain type of writing. This vector element can also be used in the structure of a logo, a visual identity. For example, if we take the initials of a name that starts with the letter "S" (Fig. 7.), we can create a logo, and by multiplying it horizontally or vertically, a decorative border is created. That vector decorative border, multiplied itself, becomes a pattern (Fig. 8.).

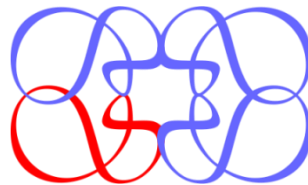


Fig. 7. Logo created by multiplying and mirroring the letter "S".

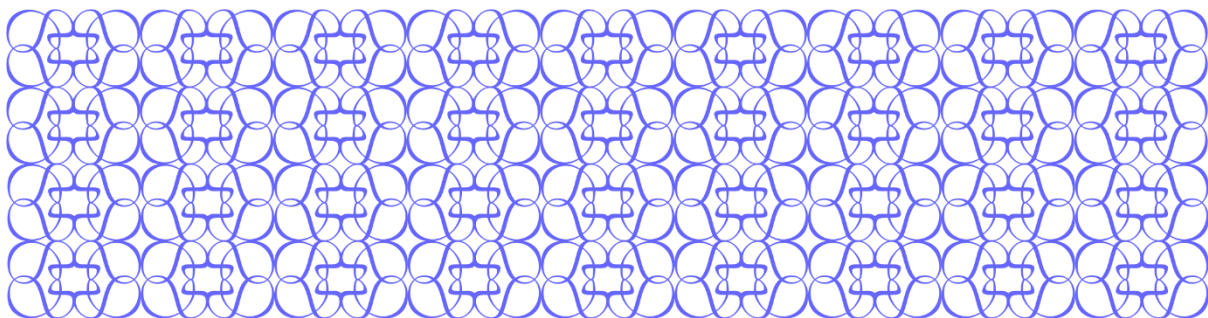


Fig. 8. Pattern created by multiplying the module (of the logo). Vector design.

An important notion to note is that the designer, when extracting ornamentation from existing sources, must specify this or obtain the author's permission to use the vector design in a future work. For this reason it is important for a designer to have the ability to create new patterns of vector ornaments.

## 5. Conclusions

Innovation, or rethinking an already implemented idea by tweaking certain elements that are deficient in terms of functionality or aesthetics, can create new products that assist users in a more natural way of handling objects, or those purely decorative objects can be improved from a visual composition and design rules perspective, by incorporating a relief or flat ornamentation.

The subject of ornamentation in design can be approached from multiple perspectives, involving research in the fields of economics, mathematics, medicine, psychology, and other related areas of design. The versatility of using vector ornamentation in design and the conceptual aspects that arise from this topic make the research complex and of interest for its applicability in various domains.

In conclusion, the complexity of vector ornaments in design lies in the way the designer extracts notions and ideas from different adjacent or diametrically opposed fields to bring novelty to his works, but also in the way they are thought of as flat 2D ornaments or which they can turn into palpable volumes.

To design a vector ornament, the designer must know technical drawing, have knowledge in the field of mathematics because these ornaments are created according to exact dimensions and based on the principles of visual composition, where the notions of elements and principles of composition implicitly enter.

The correct choice of the materials that make up the objects that start from these ornaments, also represents the designer's knowledge and ability to select both the materials and the machines that can produce the object, that means he must also know the way the machine programs work for which he designs.

Vector ornamentation is versatile regarding the multitude of variants of its conception, but also regarding the multitude of areas of implementation. The diversity and complexity of independent models or introduced in a pattern, results from a thorough study of the concept, of the theme to be followed by the designer.

## Acknowledgements

Many thanks to Proinvent Project – „Enhancing performance and innovation in excellence of doctoral and postdoctoral research” – PROINVENT, Contract no. 62487/03.06.2022 POCU/993/6/13 – SMIS code: 153299.

## 6. References

- **Books**
  - Akar, Azade. 1992. *Authentic Turkish Designs*. New York: Dover Publication Inc., ISBN 0-486-27211-7.

- Arrizabalaga, Heidi. 2007. *Pattern Palette 2*. Massachusetts: Rockport Press, ISBN 1-59253-317-5.
- Batterham, David. 2022. *The World of Ornament*. London: Taschen, ISBN 9783836556255.
- Escher M.C. 2001. *The Graphic Work*. Koln: Taschen, ISBN 3-8228-5486-1.
- Exner, John E. 2002. *Rorschach - A Comprehensive System, Basic Foundations & Principles of Interpretation*. New Jersey: John Wiley & Sons Inc, ISBN: 978-0-471-38672-8.
- Kleper, Michael L. 2022. *Focusing on Laser Engraving and Decorating: Affordable, Versatile, and Creative Marking, Engraving, and Cutting*. Boynton Beach, FL, ISBN 9-780930-904074.
- Mandelbrot, Benoit B. 2004. *Fractals and Chaos: The Mandelbrot Set and Beyond*. New York: Springer, ISBN 978-1-4419-1897-0.
- Perkins, Shel. 2006. *Talent is not enough: business secrets for designers*. California: AIGA, ISBN 0-321-27879-8.
- Wilson, Henry. 2016. *Pattern and Ornament in the Arts of India*. London: Thames and Hudson Press, ISBN 978-0-500-29241-9.

### Electronic sources

- **Book from the internet based on a printed source**
  - Lewis, F. Day. 1923. *Pattern Design*, Milano: B.T. Batsford Ltd. Retrieved April 26, 2023, from <http://archive.org/details/PatternDesign/page/n17/mode/2up?ref=ol>.
  - Reese, Reese, Michael. 1895. *Cusack's Freehand Ornament*. London: The Bishopsgate Press, Retrieved November 26, 2007, from <https://archive.org/details/cusacksfreehando00armsrich/page/n27/mode/2up>.