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FREE-FORM DESIGN VERSUS ORGANIC PRINCIPLES IN INTERIOR DESIGN

Dr. OLA SAMAA SHERIF

Décor Department, Interior Architecture Branch, Faculty of Fine Art, Alexandria University, Egypt. Interior Design Department, College of Engineering and Information Technology, University of Science and Technology of Fujairah (USTF), UAE. Email: olasama75@yahoo.com

ABSTRACT

Although the principles of organic design have been addressed in many pieces of research, especially after the organic theory was adopted by the American architecture pioneer Frank Lloyd Wright (1867-1959), there are many inaccuracies, dialectics, and controversies associated with this trend that calls for deepening in the study and research of the concept of organic design, its origin and development, its principles, and types. Especially that there is a commonly mistaken definition that each free-form design is an organic design and the organic design is must be free-form. It is important to clarify the philosophy of organic spaces in their different forms, including the literal tradition of natural forms, analytical and philosophical forms, ecological and environmental versions, and so on. The study of nature's multiplicity and the organic morphology in its infinity forms and theories of growth has a deep impact on the complete understanding of organic design and the deduction of its types, principles, and its effect on the interior spaces. The way is still paved to extract more advantages of organic and to apply it in line with the diverse local natural environment in its varied atmospheres, raw materials, social and intellectual levels, especially with the amazing technological advancements and the advanced international capabilities in design and implementation. This is with the negation and exclusion of all superficial ideas that were associated with organic design in our thoughts, with the aim of reaching a future vision of interior architecture through the connection with the natural, human, and heritage roots. Therefore, we must not be fascinated by the appearance, just, or the apparent features of a thing, but rather look deeply, and understand the causes and methods of its existence, and the effects resulting from it.

Keywords: Free-form; Organic design; Nature.

INTRODUCTION:

Through this research, we are trying to solve the argument about different organic theories and principles, reaching a clear specific answer to the following basic question; which one of the following projects could be specified as an organic project?, fig (1), (2)

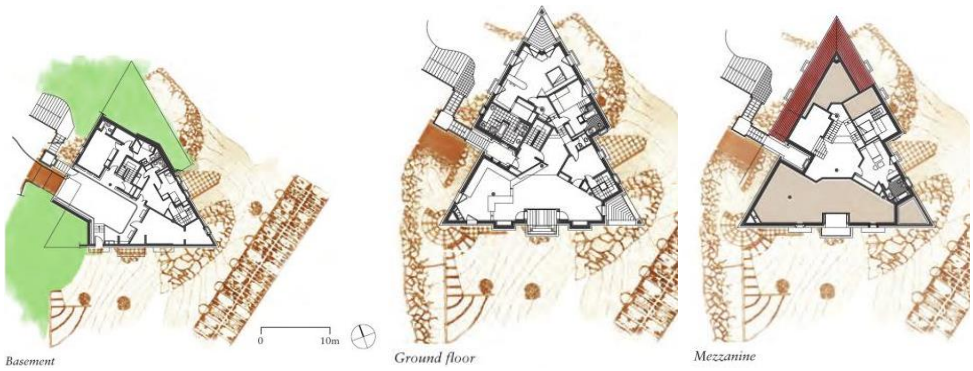

Fig (1): Project 1: The Audi/ Smith House, Lebanon- Simone Kosremelli
Source [A]

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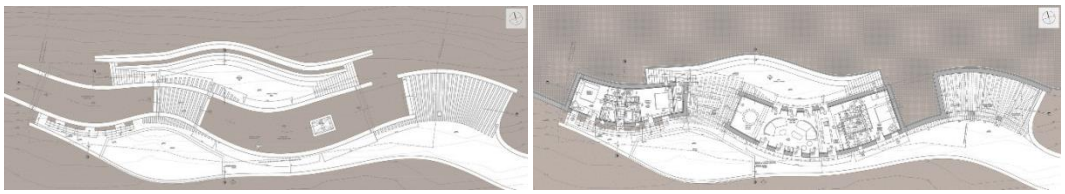

Fig (2): Project 2: Xerolithi House, Greece- Sinas Architects Source [B]

Answering this question in a correct way requires more understanding of organic concepts.

1. What does "Organic" mean?

"Organic" is derived from the Latin word "Organum", which is in ancient English "Organa", and in modern English "Organ".

This means a member of the organism or part of the body that performs a function or participates in a particular activity. [1]

From this, the literal meaning of the word organic was derived; it describes the arrangement of parts or elements together in an integrated organic unit. [2]

2. HISTORICAL BACKGROUND

The roots of organic principles in design extend across the different civilizations, even from the beginning of creation.

This appears in the primitive tools that the first humans invented and used in their life that were simply inspired by nature, perhaps the simplest example of this is how they have inspired the shape of the comb from their hand fingers form which they were used in combing their hair.

Organic Design arose with the beginning of human designs' inspiration from nature. In the beginning, there was no depth in form studies, but the direct aesthetic value inspired by nature came to the forefront, and it was not necessary to achieve ideal functionality to the fullest, and this is what was called "visual inspiration".

With continuous development, newer versions have emerged to link the design and the environment through the "analytical study" of the natural elements, and the concept of organic has taken a more profound form than before producing varied theories and principles, some of them have advanced widely which has led to some confusion about the Organic Design.

Therefore, it is necessary to distinguish the difference between the "Organic Design" concept as a natural phenomenon that includes many theories, and organic as an architectural movement led by Frank Lloyd Wright (1867-1959 AD) with its own features and principles. But, although the concept of "Organic Architecture" in design was attributed to him, it goes back to Horatio Greenough (1805-1852 AD), who had some articles on the meaning of organic and its relationship to form, composition, and functionality. Then it was transmitted by Louis Sullivan (1856-1924 AD), the author of the famous quote: "Form always follows function, and this is

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the law." that transmitted to his student "Wright", the pioneer of organic architecture, developing into his famous concept: "Form and function are one". [3] P.161

3. Organic Design Versions:

Organic Design can be classified into three main versions according to their common features and characteristics, each of them has distinct principles but with no definitive boundaries between them.

Many designers paid special attention to one of them, but this did not prevent the constructive interweaving between more than onein trying to achieve the maximum ideal of the organic principles. [4]

3.1. Organic by Form:

In this version, the designers get their Inspiration typically from the natural forms surrounding them, whether they were living things such as plants, animals, birds, or even insects, or non-livingthings such as rocks, mountains, and waves.Their uses of these forms varied between natural or abstract forms, two-dimensional (decoration) or three-dimensional (construction) forms. And it includes 4 main types of organic morphology: (Animal Morphology, Plant Morphology, Cellular morphology, and Random form). [5] p. 46, 47

a. Animal Morphology:

Animal morphology is characterized as an externally balanced shape around an axis of symmetry that adapts to different environments, whether terrestrial, aquatic, or other. It is all continuous, flexible, and articulated. It is also featured by free formation plus fluid shape and external form, its internal symmetrical structure is invisible from the outside, but is felt under the outer shell, fig (3).[6]

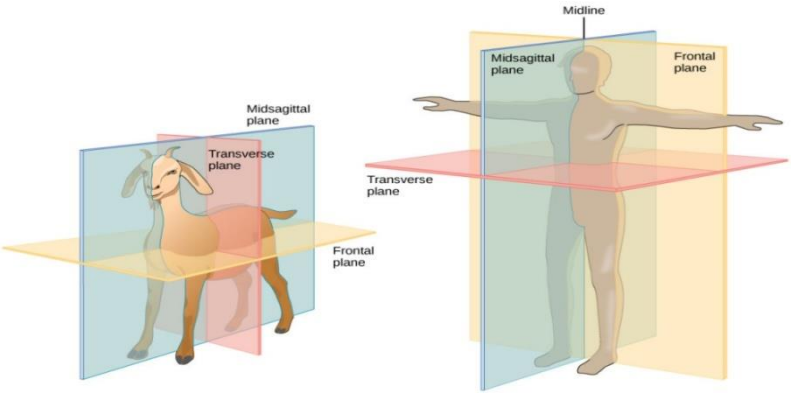

Fig (3): The planes of a goat and a human shows the symmetry around themidsagittal plane with the invisible structure. Source [4]

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Following are examples of natural forms and their counterparts in interior design, fig (4), (5):

Fig (4): The vertical spiral growth in Antelope horns and its application in different spiral stairs varied in design and materialsshowingthe inspiration from animal morphology. Source [C]

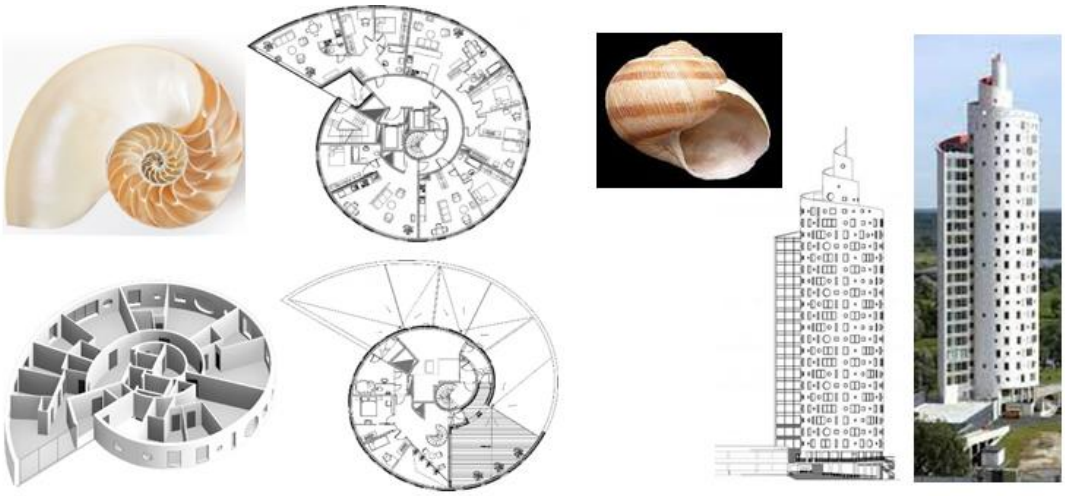

Fig (5): Snail Towerin Tartu, Estonia by Künnapu & Padrik Architects, the spiral is expressed in both the planand the sculptural part in the tower top Source [D]

b. Plant Morphology:

Plant morphology is characterized by a structure that follows the concept of growth, this formation may be symmetrical, or grow according to Spatio-temporal conditions.

In general, all plant structures have fixed roots, then trunks, and free-flowing cantilever branches, leaves, flowers, and fruits.

This formation is the main inspiration in architectural structures, as both are based on ground bases (foundation in architecture and roots in plants) and extend upward in resistance to gravity and the horizontal forces of winds and earthquakes. [7] p. 269, 270

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Inspiring plants' forms in design are used throughout the ages. For example, using the lotus plant shape as it was seen in the Ancient Egyptian columns it is still inspiring the contemporary designers. Fig (6): (9)

Fig (6): Lotus inspiration in Ancient Egyptian columns
Left: closed bud- Luxor Temple
Right: Papyrus, open capital- Philae
Source [E]

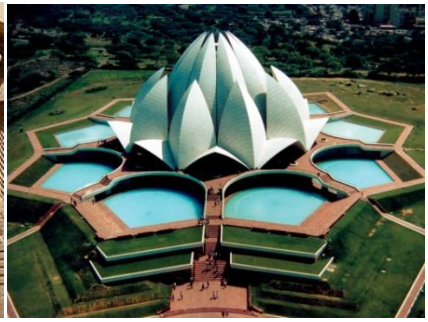

Fig (7): Lotus inspiration in Lotus Temple- India, 2017
Source [F]

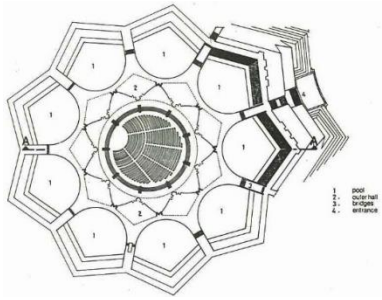

Fig (8-a): Plan

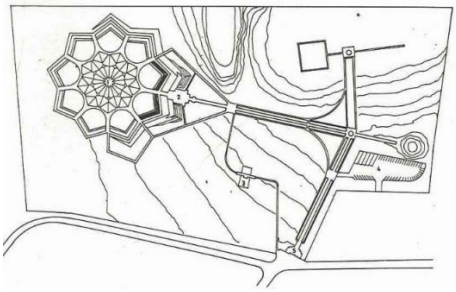

Fig (8-b): Site plan

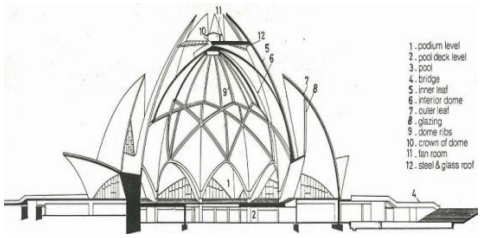

Fig (8-c): Section

Fig (8) Lotus Temple architectural drawings showing the lotus shape inspiration in both plan and section Source [G]

Fig (9) Lotus Temple Interior photo & lotus shaped skylight Source [F]

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c. Cellular Morphology:

This form of morphology is the origin of creation, life, and growth since the cell is the smallest structural unit of all bodies. This growth of living cells-which might have cubic, spherical, square, pyramidal, triangular, or Multi-faceted (hexagonal and octagonal..etc) shapes-, can be seen in varied formations such as the snowflake and the hexagonal beehives. The last one is a source of inspiration for many interior and architectural projects and it featured with it has the least total diameter compared with other geometrical shapes with equal area, as it is mathematically proved that the best shape to divide a space into equal areas with minimal required structural support is the regular hexagon, fig (10): (12).[8] p.79, [9] p.93, [10]

Fig (10) Different snowflakes

Fig (11) Hexagonal beehives

Fig (12): New living environment of the future, Gianluca Santosuosso, Inspired by the engineering marvel of nature; the honeycomb structure and its organization.
Source [10]

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d. Random Form:

Sometimes, organic shapes grow in free non-geometric forms, such as the spontaneous growth of crystals and rocks.

In architecture, the free form consists of atypical internal spaces that do not follow specific engineering rules, and therefore it is characterized by flexibility and the ability to expand and grow; it is possible to gather around a linear or circular movement corridor, or around a central space, or else. Anyway, this system lacks geometric regularity.

The "Boulder House" in North Scottsdale, Arizona is a national landmark and it is classified as one of the greatest worldwide home designs in the world in "The Home Book"by author Stanley Marcus. This house is built integrated into and around granite boulders' hugeoutcroppingthat formsmore than 60% of the structure, fig (11): (14).[11] p. 40, [12]

Fig (11) Top view shows the integration between the building and the site
Source [H]

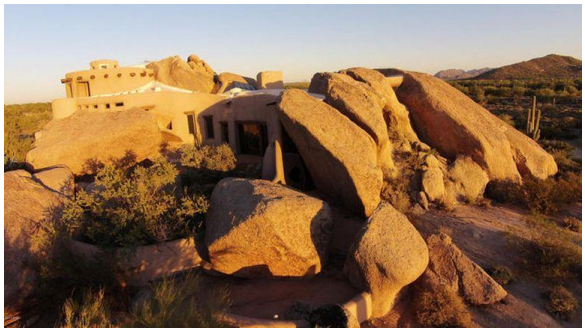

Fig (12) External view shows the integration between the building and the surrounding granite boulders
Source [I]

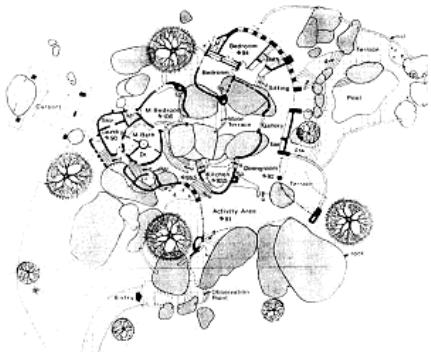

Fig (13) Architectural plan shows the integration between the building and the site
Source [11]

Fig (14) Interior design shot shows the connection between the external nature and the interior space
Source [I]

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Main Features of Organic by Form:

1. Reproduction of natural organic forms either literally by mimicry of the external form of plants and animals, or partially by simulating the line types, materials, and textures of natural structures.
2. Each design is part of an integrated unit just as eachorgan of the human body is complementary and vital to the whole body, even a chair, table, or built-in shelf can be a supporting element of the building, and it can also contribute to its ability to resist, embodying the communication, integration, unity and natural evolutionary growth of the structure. [13] p. 73, 74
3. Each design element should participate in a function " Implementing more with less"

3.2. Organic by Nature's Philosophy:

Followers of this version focused on design with the nature spirit,not just its form, analyzing its principles and philosophies to follow, linking to the function of the place, and achieving harmony between the man-made environment and the surrounding natural environment.

Falling Water Villa by Frank Lloyd Wright is the top he reached in the use of basic geometric shapes, with a mature expression of his philosophy of uniting humans with nature.The villa occupied the natural location of a waterfall in a dense forest and he placed the building directly on the waterfall to use the water flood in an unprecedented combination of design and nature. And he summarized his vision of the work in his words: "To live with the waterfall, not just to look at it", fig (15): 17.

[14] p.54, [15]

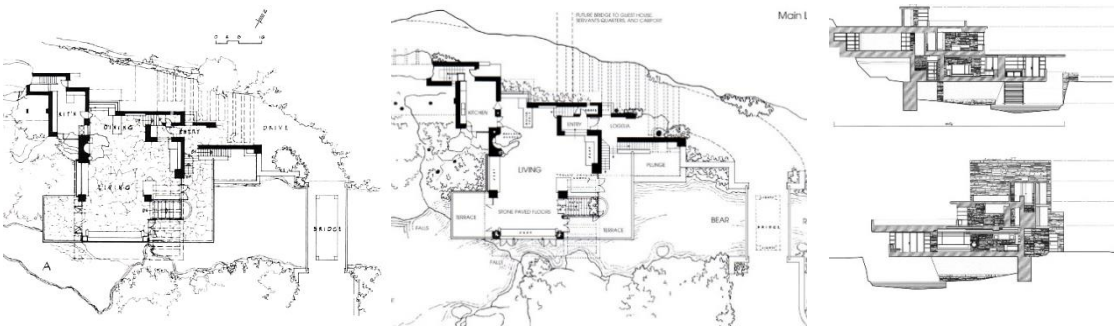

Fig (15): Architectural drawings of Falling Water Villa by Frank Lloyd Wright
From the left: Ground floor- First floor- Elevations
Source [J]

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Fig (16) External view shows the cantilevered blocks rushing over the waterfall Source [K]

Fig (17) Interior design shot shows the natural rock penetrating the living space Source [J]

Main Features of Organic by Nature's Philosophy:

1. Inspire from nature's philosophy andunderstand the principles behind the natural forms.
2. See the interior space as a dynamic multi-level unit, which reflects(Growth) principle in living things.
3. The building internally reflects the lifestyle and needs of its residents, targeting the maximum (Benefit) for people.
4. The Harmony between architectural form, interior space,and the natural surrounding environment, which confirms a main principle of organic design; (Unity).

3.3. Organic by Ecology:

It is the earliest version of the organic design as it is found even before the human creations; the animal kingdom preceded humans in using technical methods to adapt to their habitat environment. They even have the ability to carry out complex tasks such as building houses, constructing dams, digging channels and tunnels with correct structural foundations, in addition to ingenuity in the use of materials, imagination and architectural intelligence, and a deep ability to respond to all climatic conditions and environmental forces.

This made these natural buildings exemplary examples of superior organic design worthy of analysis and emulation, [13] p. 86.

The early models of shelter in the human primitive architecture were inspired by the elaborate animal structures, and they were the first model of organic design in terms of using the available natural materials in the most efficient way, fig (18), (19).

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Fig (18) Examples of Bower Bird nest
Source: Google Images

Fig (19) Primitive architecture inspired from the Bower Bird nest: Bushman houses, Namibia, Africa Source [L]

This, in turn, paved the way for green architecture, sustainable architecture, and other movements that support and follow the environmentally friendly approach in design, fig (20).

Fig (20) Finished nest of Eurasian penduline-tit
Left source: Robert Kreinz Nature Photography
Right source: Researcher section sketch

Fig (21) Dune Houses, William Morgan Architects- Atlantic Beach, Florida
Source [M]

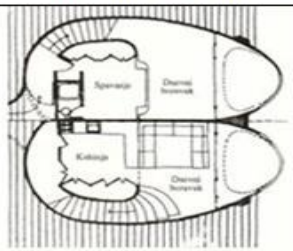

Fig (21) Two interior shots in the mirrored unites
Source [M]

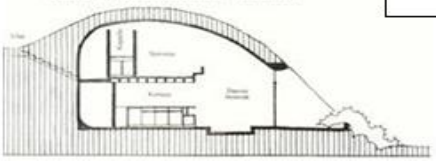

Fig (22) Above: plan shows both units (Half ground floor and have 1st floor)
Bottom: Longitudinal Section
Source [N]

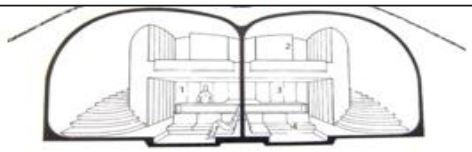

Fig (23) Cross Section
Source [M]

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Main Features of Organic by Ecology:

1. Complete integration with the surrounding environment and use of eco-friendly and recycled materials in implementation.
2. Considerall-natural factors such as climatic conditions and environmental forces.
3. Reduce energy use and replace the common energy sources with clean energy alternatives.
4. Protect from natural disasters.

4. New Versions of Organic Design:

Newer movements derive their concepts and principles from the organic design features emphasizing some points more than the others. They are known under varied names such as "Green Architecture", "Sustainable Design", "Eco-friendly Design", and "Biophilic Design". Most of these movements emanated from the "Organic by Ecology" Version.

Unlike the previous ones, "Biomimicry Movement" almost follows the same approach and directions as Organic Design.

What does "Biomimicry" mean?

The word biomimicry originates from the Greek words bios = (life) (living things), and mimesis = (copying) (imitation). [16]

As Janine Benyus, the Biomimicry authorsaid: "There are three types of biomimicry - one is copying form and shape, another is copying a process, like photosynthesis in a leaf, and the third is mimicking at an ecosystem's level, like building a nature-inspired city". [17]

a. Emulating Form: which is the same as "Organic by Form"
b. Emulating Processes: which is the same as "Organic by philosophy"
c. Emulating Ecosystems: which is the same as "Organic by Ecology"

5. Research result:

Returning to the beginning, whether project 1 or 2, fig (1, 2), is considered as an "Organic Design"?

Simply, "it could be both", as we cannot judge by reviewing the plans only, fig (24): (30).

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Fig (24): Project 1
Source [A]

Fig (25): Exterior views
Left: Source [O] Right: Source [A]

Fig (26): Exterior views
Source [O]

Fig (27): Interior design shots
Source [A]

Fig (28): Project 2
Source [B]

Fig (29): Site view
Source [P]

Fig (30): Connection between inside and outside
Source [P]

With a general overview, we can easily recognize that both projects are- definitely- organic designs; there is clear unity between the interior and the exterior environment, also there is inspiration from the topographic levels surrounding in creating the form and the plan lines, in addition of using location's natural materials either in the interior or external finishes.

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This is despite that project 1 is completely designed using straight lines and accurate angles, while project 2 is designed with curvy flowing lines.

6. Conclusion:

Organic Designs are either forms clearly related to the elements of nature, simulating or extracting the characteristics of natural creatures where they represent the apparent features of what they simulate, such as "Organic by Form".

Or, they are expressive organic forms that depend on the expression of essential characteristics without simulating the appearance, such as "Organic by Philosophy" and "Organic by Ecology".

The three versions can be applied together or individually depending on the client's needs and the designer's version to achieve the most efficiency, taking into consideration- side by side with the proviso features- that:

a. Unity between form and function in Organic Design has to be implemented.
b. Connect between the interior design and the outdoor is a must to reach the ideal Organic Design.
c. Curved shapes are not necessarily organic shapes.Also, "Organic Design" term does not mean ever it has to be curved or free form.

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