

DESIGN BASED ON
CLASSICAL

india  
knowledge
systems

Design Thinking Curriculum

CBSE CLASS XII

May 2022

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Introduction

The book contains exposure content and resources for learning design based on Classical Indian Knowledge Systems for CBSE Class XII. The Learning Objectives of this book are:

1. Identify and explore the meanings of abstraction, symbolism and storytelling using principles from ancient Indian arts and design.
2. Familiarising with and following the classical Indian Design Process to give meaning to the abstract, converting formless ideas into form.
3. Learning abstraction using mapping of various design elements to the human body and elements found in nature.
4. Understand the human body using anthropometric measurements, ratios and movements from classical arts to create universal designs.
5. Learn the importance and application of different types of grids in design and architecture.
6. Learn theories of visual communication like balance, hierarchy, focus and transition using examples from classical Indian arts.
7. Explore recursive procedures like fractals to detail forms in design using examples from traditional Indian arts and nature.

Introduction and The Abstract

Indian Knowledge Systems use the ancient and indigenous knowledge of India to arrive at principles and techniques that are timeless, unique, and based on centuries of work. While the meticulously detailed temples with their mathematical grids are awe inspiring, the simple and innovative design solutions and techniques encountered in the rural and urban 'wilds' of India are genuinely surprising and inspiring. There isn't a shortage of indigenous solutions that surpass expensive designs while being sustainable, cheap and accessible. Indigenous Indian design has developed over time akin to evolution, arising at times from necessity and limited resources, birthing the best of ideas.

Classification of Indian Knowledge Systems

Since the topic of Indian Knowledge Systems is immensely vast, spanning over a large amount of content and time, it is important to first realise all the different ways in which it could potentially be classified, some of which could be based on:

1. Historical (knowledge gathered from scriptures and ancient documentation) or contemporary (looking at modern grassroots innovations). Contemporary innovations could be those done by people in extreme environments, either in rural or urban circumstances.
2. According to era: classical (before Mughals), medieval (Islamic) and modern (Post British)
3. Based on discipline, like Architecture, arts, etc.
4. Based on modern locations. India is huge, and focus could be set on Indian Knowledge Systems from specific states and communities.
5. Based on existing classification within design education, like colour, composition, etc.

6. Ancient scriptures (shastras) could be classified and one could be focussed upon. Another source of classical knowledge would be curricula of ancient universities like Nalanda, Taksha Shila, Vikramshila and Vallabhi.



Figure 1: Classifications of Indian Knowledge Systems

Design Process in Ancient India

In Western design tradition, stress on utility and function has led to the design process being an evolution of the final product from an exploration of the physical- materials and the forming processes. In contrast, the Eastern tradition, mainly emerging in India and China, gave rise to a design process where the object emerged as a result of giving Form to Ideas. Indian design process aims to give Form to the Formless. The Formless is an abstract principle/phenomenon, for which an Image is created to express the qualities and attributes of that phenomenon.

The Design Process begins with the realisation of an abstract idea. An integral understanding of the phenomenon to be visualised is essential. Some examples of abstract ideas that have been explored in the Indian scenario are 'Cosmic Order', 'Cyclicity', 'Time', 'Wisdom' and so on. The designer/artist is expected to fully understand the ins and outs of the principle and its attributes, as a Formless mental image.

The second step is metaphorising the abstract. This involves giving meaning to the Formless mental ideas using universally understood examples, like those from the real world. This is done using different techniques like mapping. The abstract is then concretised by extracting a universal design grammar from the metaphors. The design grammar can be a visual one if the final product is visual in nature, in which case the design grammar would consist of directly usable attributes like shapes, ratios and hierarchies.

The design grammar is then used to give the abstract a basic Form. This step involves exploring different ways of directly representing concepts such as hierarchies using techniques like grids. Once the basic form is in place, it is then enhanced through addition of at-

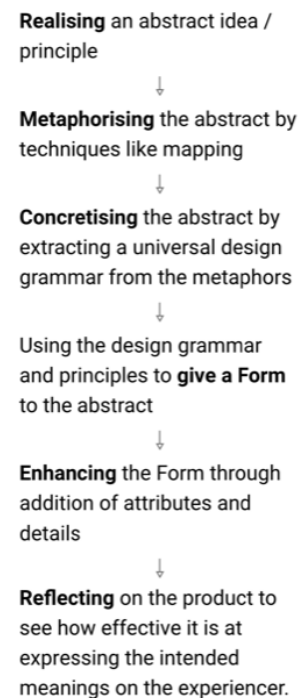


Figure 2: Design Process for giving Form to Formless

tributes and details. These enhancements are done using techniques like parametrization and ornamentation.

Finally, a reflection of the final product is done to see how effective it is at expressing the intended meanings to the experiencer.

The Indian Design Process has been followed in the creation of many ancient design artefacts and buildings, such as Temples.

Abstraction and Storytelling

Having an Abstract idea

'Cosmic Order', 'Cosmic Process', 'Cyclicality', 'Continuity', 'Time', 'Abundance', 'Wisdom', 'Grace'- are some of the common themes which have been visualised. In some cultures, the concepts of Cosmic Order have been realised as a relationship between the microcosm of man (purusa) to the macrocosm of the universe (Purusa). This microcosm is created here on Earth and is suggestive of the larger macrocosm (see Figure 3). Almost all religious places of worship, like temples, mosques and churches, aim to be such microcosms.

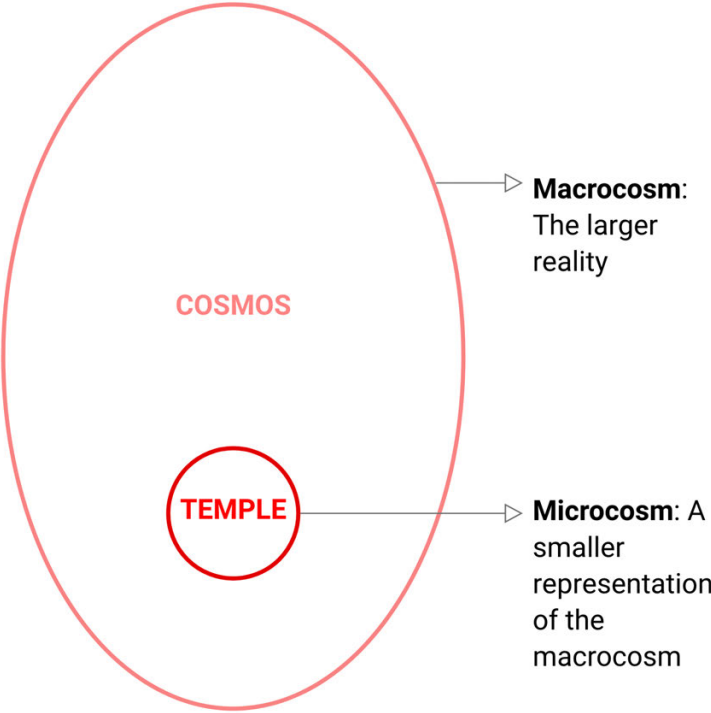
An abstract idea arises from a set of strong principles and beliefs, which need not be religious. Its principles are well understood by the artist/designer, and it exists in his mind as a Formless mental image. Although abstraction above a certain level might seem too vague and unrequired to an uninitiated outsider, it (a) helps giving a concrete direction to the design process which would otherwise be lost considering the diverse cultural and geographical backgrounds of artists all around India, and (b) it gives every design a "story", making the design itself more valuable, interesting and timeless.

Abstract v/s Real

The real world around us has what's called Form- it is a direct representation of what it is. A direct representation of the world around us is called a realism. Some examples of realism can be seen in visual arts, such as Greek sculptures and realist paintings. Realism attempts to represent the subject matter truthfully without any artistic embellishments and implausible elements.

Abstraction, on the other hand, is a representation of ideas, the formless, the abstract, in such a way that it doesn't directly depict any person, place or thing. The artist impersonalises the subjective, and the content then becomes that abstract emotion, rather than a representation of actuality. Abstraction takes liberties of not having to conform to any particular shape or colour. Total abstraction bears no trace to any recognisable reference. Abstraction allows the imagination to run wild and gives one a chance to escape from reality. It

Figure 3: Microcosm and Macrocosm



doesn't have any objective meaning, and its meaning depends on the perception of the experiencer. Some examples of abstraction in arts and architecture, depending on the level of abstraction, can be temples and other places of worship (high abstraction), abstract paintings (varying levels of abstraction), sculptures (low to medium level of abstraction depending on the representation), and so on.

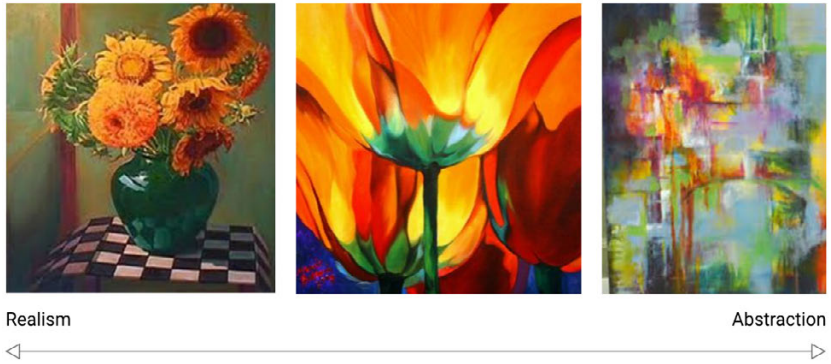


Figure 4: Abstract v/s Real representation in art

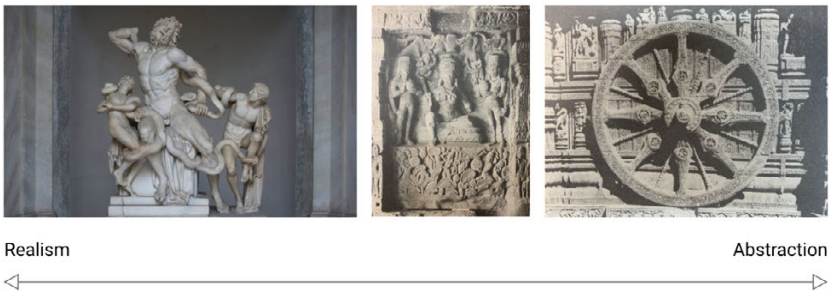


Figure 5: Abstract v/s Real sculptures



Figure 6: Abstract v/s Real architecture

Figure 4 shows the example of abstraction in art. The left most image is the most realistic representation of a vase of flowers. As one starts abstracting it, only the essence remains. As the level of

abstraction increases, we arrive at a product that barely represents the actual original flower vase.

Figure 5 shows three levels of abstraction in ancient sculptures. The first one shows a realist Greek sculpture which is a representation of three human figures. The second shows a Mahalakshmi Figure from Elura Caves. There is slight abstraction as the human figures are still discernible, but there is use of techniques like metaphors and symbolism. The third sculpture of a spoked wheel shows a high level of abstraction. Also called the Dharmachakra, it is a widespread symbol found in many Buddhist and Hindu arts, and holds multiple meanings.

Figure 6 shows abstraction using examples from architecture. The left most building is a famous fisheries office in Hyderabad, India, and is represented using the form of a fish. The middle one is the Beijing Airport by Zaha Hadid architects. The roof of the airport is folded in such a way as to resemble the wings of a bird. It holds the essence and communicates it visually, but doesn't literally depict a bird. The third image is that of a Hindu temple, which is a highly abstract representation of the cosmos on earth using multi-layered metaphors.

Symbolism and Storytelling

When the artist has an abstract idea, it is important to effectively communicate it to the audience, so that they can fully understand the product/art in its depth. In Ancient India, this communication was done with the help of storytelling and symbolism. An intriguing story is of paramount importance because it captures and captivates the audience, making them take even more interest in the design.

In ancient India, a countless number of stories emerged across the vast geographical landscape. Although different from each other in their own way, many of these stories shared common themes and characters which people could relate to. It also helped provide the artists a common design grammar, even though they were separated by thousands of kilometers.

One such story that led to the creation of almost all temples throughout India was that of the origin of the Cosmos, which began with the Primordial Man, the purusa, the Supreme Being, whose body parts became different parts and elements of the Universe, like Earth, Fire, Water and so on. The centre of the Universe formed from the navel of the Purusa. This story was slightly moulded to suit different cultures throughout the sub-continent, but the basic premise remained the same. That is the reason we see a common binding theme across all temples, although their detailing and form might

differ. This story of the Cosmic origin did not just influence temples and other architecture, it also greatly influenced other classical arts like Dance and Sculpture. A story acts like a binding theme, both for the artist and the experiencer, making the whole experience richer and deeper. It gives every element some meaning, some role to play in the grand scheme of things, and connects it to other elements effectively.

Exercises

1. **Class Exercise:** Refer to Exercise Sheet 1- Abstract and Real.
Time allotted: 20 minutes

Concretising the Abstract

Abstract ideas are given meaning with the help of intriguing stories. However, in arts, the ideas present in these stories need to be communicated to a large audience in such a way that they are consistent over space and time such that:

1. Communication doesn't mean different things for different cultures, since the audience belongs to a large geographical landscape with a plethora of backgrounds.
2. Communication is timeless. The meaning it holds doesn't change over time, and the symbolism is understood in the same way.

One such way of effectively communicating abstract ideas to concretise them over space and time is using metaphors. Simply put, a metaphor is an object used in the place of another such as to suggest an analogy between them. In arts and design, metaphors are simple and abstract representations used to communicate multiple ideas.

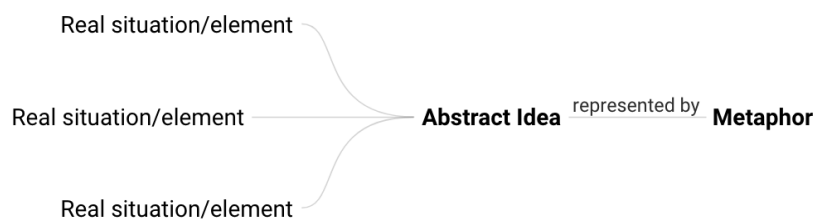


Figure 7: Metaphorisation

Metaphors

A story can have multiple characters and locations, along with various actions and emotions. A realistic depiction of all these attributes would, depending on the complexity of the story, clutter the information presented and confuse the viewer. Also, it wouldn't be consistent over space and time, as discussed, as such representations might

lose their meaning. Giving elements or a bunch of elements from the story a meaning that can be represented by another abstract element would solve the problem of inconsistency, provided the meaning communicated by the abstract element is understood equally by all viewers and fellow artists. This process of representation is called metaphorisation.

Indian arts and architecture are filled with examples of metaphorisation, be it in visual arts, temple architecture, or classical plays. The Upanisads discuss different metaphors like the chariot and the wheel, the sun and its rays, the body and its senses. All these are based on the same basic principles- the concepts of internalization and externalization, and the concepts of time and space, relationship of parts to a whole, one to many, concept of formless and the multiple forms, and so on. Understanding metaphorisation is also useful if one wishes to understand the meanings of classical arts and architecture, as all shapes and symbols like circles, triangles, lines and dots have multiple layers of meaning.

Many ancient Indian arts derive their metaphors from the concept of the ritual of Yajna, which has been referred to in some of the oldest Indian texts. Yajna is a sacred ritual done around a fire. It in itself is a metaphor- being a finite symbol of infinite cosmic space i.e., the universe. The motive of the Yajna is to create a microcosm on the earth suggestive of the macrocosm, that is the whole universe, using motifs and symbols to represent the larger elements like earth and fire (see Figure 8). Various actions done during the ritual also hold their own metaphorical meanings. For example, the act of circling the site for doing 360 degree revolutions refers to the concept of cyclical time. Cyclical time is a concept referred to in many cultures, which refers to the cycles apparent in the real world, like day-night, seasons and so on. Almost all traditional Indian arts take their basic symbols and ideologies from the concept of yajna- which included symbolic representation of Primordial man (Purusa), and other symbols like fire, water and earth. There is importance given to the shapes of square, semi circle and circle, and the centre (the axis mundi, or the pillar, that connects heaven to earth), which arise from the abstract Formless concepts of the ritual.

Metaphorisation in Indian Theatre

Indian theatre, the Natya, used metaphors to communicate different elements and scenes of the plays. The actual space of the theater in itself is a metaphor to represent the cosmos, a representation of all three worlds, with a central pillar symbolising a connection between the Earth and the Sky. The stage for the play, an erection of a micro-

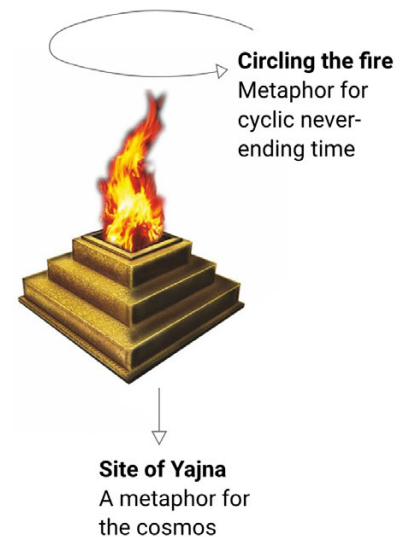


Figure 8: Metaphorisation in the Yajna

cosmos, is an area divided into units, with different marked colours symbolising different directions, with white being the color of the East, blue being West, Yellow being South and Red being North (see Figure 9).

To metaphorise the structure of the drama itself, an imagery of five concentric circles, as shown in figure 10 is used. These circles represent the major and minor episodes of a drama. The five stages of development of action- the beginning, the effort, the continuation of effort, the possibility of attainment and the attainment of the fruit- are conceived sequentially as circles of different sizes. The development of the plot of the play is also metaphorically compared to a seed which expands and develops.

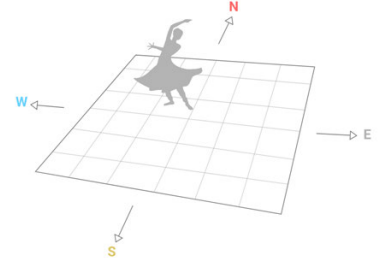


Figure 9: Natya stage as a metaphor to represent the Cosmos

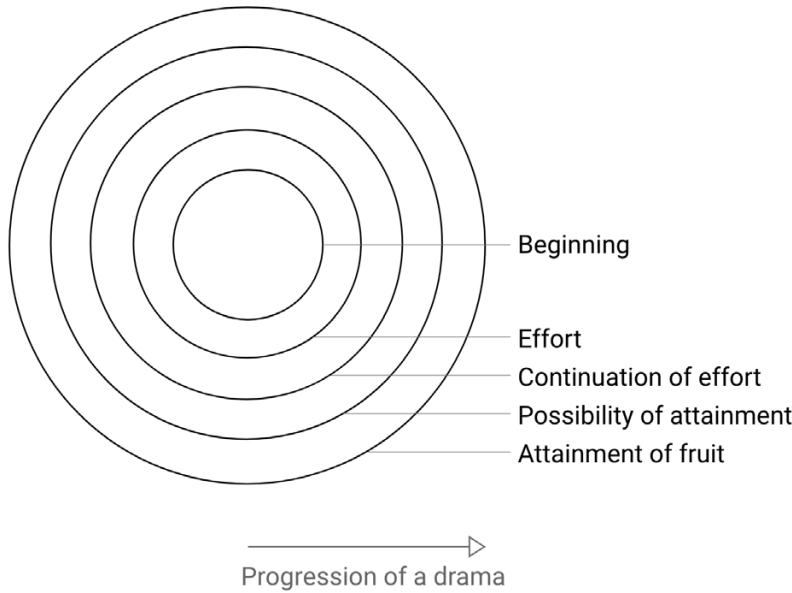


Figure 10: Concentric circles representing the structure of a drama

An analysis of a popular Sanskrit play 'Abhijnana Sakuntala' shows how different elements like simple and complex movements, thoughts and things have been represented using techniques like 'angikabhinaya' (depicting something using actions instead of props). The facial expressions, actions and speed of movements would depict the underlying emotions and tempo. Representation of deer, for example, was not done by actual deer, but by a dancer wearing a deer mask, constantly peering and frisking in fright. Along with acting, the physical position on the stage corresponded to the structure of the drama itself. Changes in locale did not take place in the drama through division of the script into scenes and acts, but through movement from one demarcated area to another. Abstraction

of these scenes were depicted using metaphors like zonal divisions and stylised walking on stage. The lyrical beauty of such scenes could not be possible with realism.

Metaphors in Visual Arts

Visually, ideas and concepts can be metaphorised using different shapes, colours, spatial positions and directions. The purpose of these metaphors isn't literal comparison, but importing similitude. They are physical vehicles for communicating the ideas- similes for explaining the phenomenon/abstract ideas of the stories.

The Bindu (a spiral shape) as shown in figure 11 is an important visual metaphor, which has conceptually guided Indian Arts for centuries. The centre of the Bindu signifies a state of rest, the unmanifest. This in turn creates the many, the manifest, which are in a constant state of flux within the area of the circle. This state of flux is depicted by the spiral arms emanating from the stationary centre. This metaphor of the Bindu has also been used to represent cyclical never-ending time.

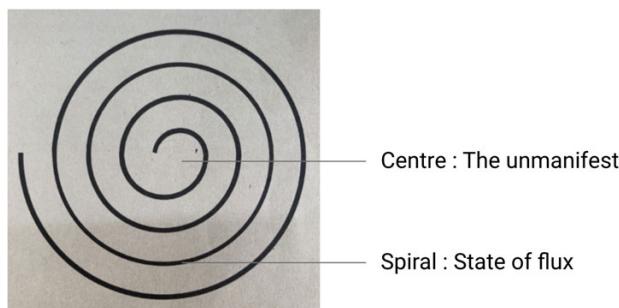
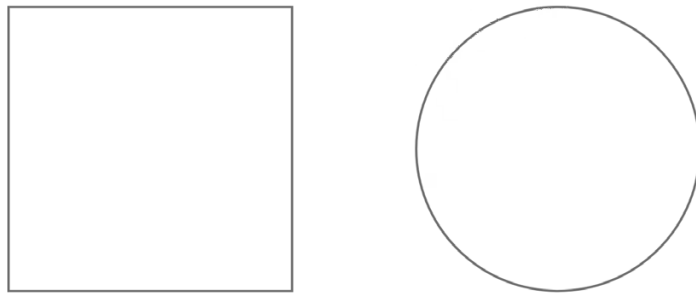


Figure 11: The Bindu

The shapes of the square and circle also became some of the most important and widely used visual metaphors in Indian arts, ranging from visual arts to architecture. They emerge from the analysis and comparison of opposite psychic states, or more simply put, exploration of complimentary pairs. Visually they give rise to the geometrical figures of circle and square, each of which symbolises the coming together of two opposites and an unbroken continuum (see Figure 12). Although these pairs are polar opposites, their relationship isn't one of tension, but of fading and evolving into one another. The square form symbolises order in a world of opposites, with two sets of parallel lines. The circle suggests the continuum of cyclic time. These metaphors provide an elaborate grammar of form. In Indian theater, the square plan represents the stage, while movement in space, which is related to time, happens in the dynamic rhythm of a circle, as can be seen in figure 13.



SQUARE

CIRCLE

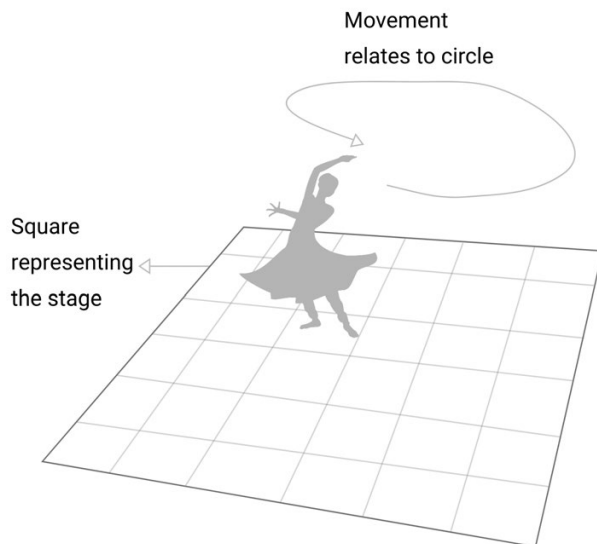
Opposites coming together

Unbroken continuum

Symbolises order

Cyclic time

Figure 12: Metaphors of Square and Circle



Movement
relates to circle

Square
representing
the stage

Figure 13: Square and Circle in Indian Theater

The imagery of a circle with its diameters, resembling a cartwheel as shown in figure 15, is used in various depictions. It signifies collecting energies from a central point, the bindu, and the shape of the chakra that is derived from it is used in various formats like depiction of different human poses.

The image of the Damru as shown in figure 14, a musical instrument, has been used in various art forms as a metaphor for cyclic continuous time. Being made of two triangles meeting at the apex, suggesting past and the future, the striker can reach either past or future from the moment of the present, the centre.

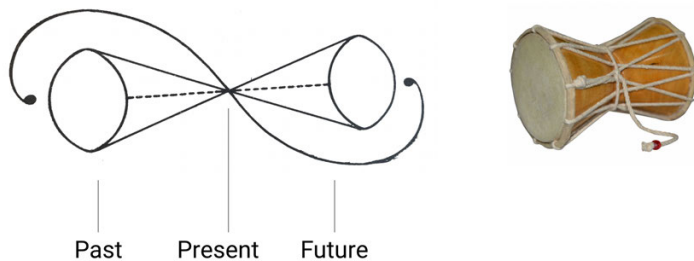


Figure 14: The Damru suggesting cyclic time

An important abstract concept in Indian arts is the depiction of the unison of the earth and sky, since most art forms seek to depict a relationship between the microcosm and the macrocosm. This depiction is shown by different metaphors. In architecture, it is shown by a vertical pillar, the Stambha, in the centre, an example of which can be seen in figure 16. In sculpture, a central vertical median is the chosen depiction.

A proper understanding of metaphors can help uncover several layers of abstraction from an artefact, as shown in figure 17. The first layer could be literal- what is actually visible to us, be it a chariot wheel, a pillar, or so on. The second layer is the first layer of meaning hidden by the metaphor- what the metaphor is trying to symbolise. Some examples can be cyclic time, opposites coming together and earth-sky unison. The third layer can be the deeper interconnected meaning of the whole artefact itself, while being a part of the larger context. For example, a cartwheel motif on the base of a temple could be a metaphor for an element of a story that the whole temple is trying to convey.

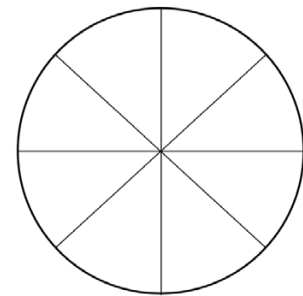


Figure 15: The Cartwheel



Figure 16: Ashoka Stambha

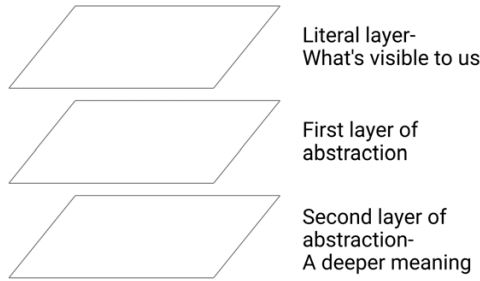


Figure 17: Layers of Abstraction

Mappings

A widely practised way to metaphorise abstract concepts is to map them to different well-known elements. These elements could be parts of the human body, elements of nature, and so on. Mapping allows creation of a design grammar that can be used by artists throughout space and time, and makes it easier for the viewer to understand and relate to the product.

Mapping to Elements of Nature

Elements of nature like Fire and Water are universally understood, hence it is easy to assign complex abstract concepts to them for better representation. Since all these elements are vital to supporting life, and have well-defined characteristics, the mapping is done in such a way that the said characteristic compliments the abstract idea. Different elements of nature- Earth, Water, Fire, Wind and Space- hold special significance in Indian arts and architecture, and have been mapped and represented in different ways.

Different elements of nature can be assigned to represent different abstract ideas based on their physical characteristics, thus being metaphors for those ideas. Earth, or the ground, is referred to calm, rigidity and stability, with the power to hold something. Water represents adaptation, healing and nourishment, as it leads life to food. Fire signifies energy, power and confidence, and has the ability to transform one form of matter to another. Air, or Wind, signifies movement, breath, clear communication and self expression. Space acts as the omnipresent binding element where all other elements originate and return to. Space can also refer to the sky, with its inspiring vastness (see Figure 18).

The Yajna, as discussed above, itself refers to many elements based on their characteristics. The two most important elements of the ritual, water and fire, are significant, with a third element, the Earth, being the base itself for holding the ritual. Water is equated to food,






	EARTH Calm Rigid Stable
	FIRE Energy Power Confidence
	WATER Adaptation Healing Nourishment
	WIND Movement Breath Clarity
	SPACE Vast Binding Omnipresent

Figure 18: Five Elements of Nature

since when water comes, there is plentiful food in this world. Fire is seen as the creative force full of energy which determines movement in the universe. It awakens matter and can be transformed into diverse forms of nature, since it doesn't have any particular shape.



Figure 19: Stars in Islam as a metaphor to represent abstract concepts

Arts and architecture across cultures refer to these elements of nature, taking conceptual inspiration as well as displaying them directly. Islam forbids direct representation of animate beings and objects, thus, Islamic architecture is embellished with intricate patterns and shapes that act as the visual symbols to represent the abstract concepts. The artists focus on the delicate shapes and geometries found in nature, and imitates these shapes to create beautiful patterns. For instance, the motifs and patterns of stars, as shown in figure 19 are found on almost all Islamic arts and architecture. Stars are a metaphor for light of the heaven, which guides the thoughts and actions of the follower, along with providing directions at night. In a similar way, the symbol of Moon also emerged, as a metaphor for providing light, guidance and directions.

Indian literature, which places great emphasis on realising and controlling human senses, has mapped these five elements of nature to the five senses of sound, touch, sight, taste and smell. This mapping has been used in several art and architecture forms. Smell has been associated with earth, taste with water, shapes and form (as conceived by sight) with fire, touch with air, and sound with space.

Mapping to the Human Body

In some cultures, different parts of the human body have been mapped to different elements of the universe, like Earth, Fire, Water and so on, with special significance given to the navel, which is considered the centre of the universe. There is a deep interconnectedness between the elements of nature, parts of the human body used as metaphors and their characteristics used to represent abstract concepts, and it is most apparent in temple architecture. All these mappings aren't just standalone metaphors, they indeed have connections and acquire significance only when placed in the special relationship with some other part.

The architecture of Hindu temples follows an imagery of Man

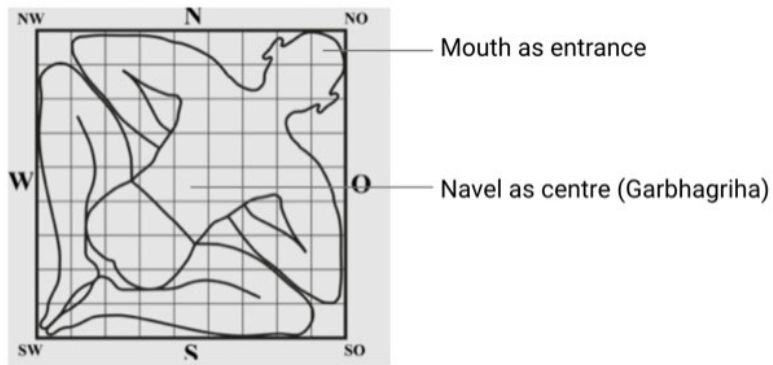


Figure 20: Mapping of human body a Square Temple Plan

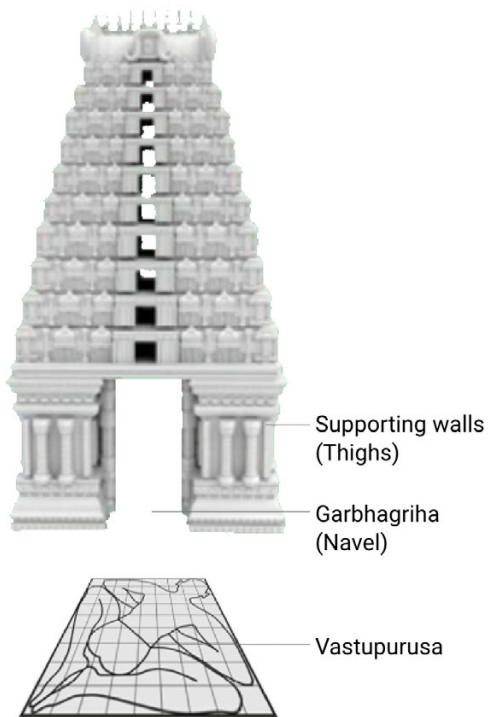


Figure 21: Mapping in a Square Temple Plan

called the Vastupurusa. If one analyses the plan of the temple, as in, the top-down view, The door of the temple is the mouth of the Man, signifying the entrance. The platform terminating the trunk of the superstructure becomes the shoulders. The projections on both sides become the arms. The lowermost mouldings at the periphery of the temple become the feet. In a general square plan of the temple, the centre, or the Garbhagriha, which is the most important part of the temple, corresponds to the centre of the human body- the navel. The Garbhagriha is surrounded by thick walls on which rests the high superstructure. These walls correspond to the thighs of the Man body, as a metaphor for providing support (see Figure 21). When viewed in a simplified fashion for a basic square plan, one realises that the image here is the Man body almost sitting on earth, contained in a square, as shown in figure 20.

This mapping is not just prevalent in the plan, but also in the elevation, which is the view of the temple from the side. In a side view, the head becomes the sky, the navel the Garbhagriha and the lowermost mouldings the feet. From the central square where the Garbhagriha is rises the central axis upwards, reaching the highest point of the temple. This corresponds to the head of the Man body, with the rest of the temple corresponding to the body. The Garbhagriha is always the central navel, regardless of the direction- horizontal or vertical, in which the temple is seen. There are two simultaneous images- one of a sitting man beginning with the navel which is the Garbhagriha (see Figure 22), which corresponds to the elevation, and the other of the horizontal man where the outermost portions become the feet and lead to the navel in the centre (see Figure 23), which corresponds to the plan.

The mapping is not to be taken literally but is important, as it gives a frame of reference and measure of construction. For instance, the smaller units of measurement are equal to the breadth of one finger. The symbolism is relating the aspects of the structural organism, which is the body of a human, to the macrocosm, or the whole universe.

Visual Design Grammar arising from the Mappings

Mapping and metaphorising elements of design helps understand relationships between them. These relationships can be quantified and converted into design principles, and can be used directly. Some of these relationships can be hierarchies of elements, ratios of sizes, element shapes, etc. Hierarchy refers to importance given to design elements. An element higher up in the hierarchy needs to be highlighted more, either visually or by other methods, depending on

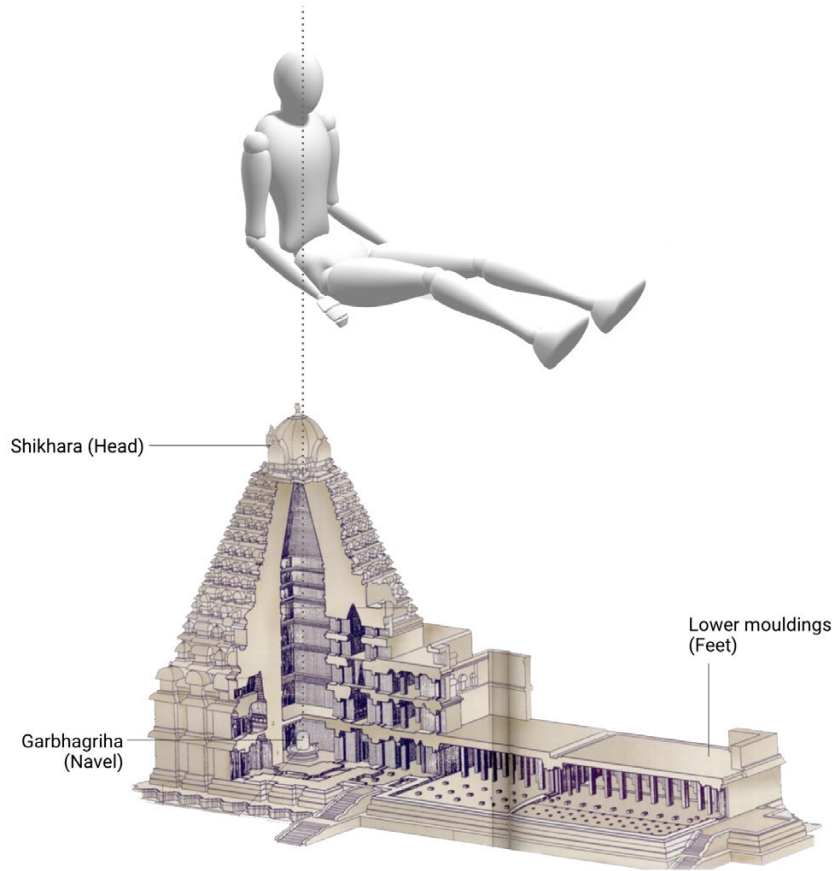


Figure 22: Temple mapping with a sitting Man

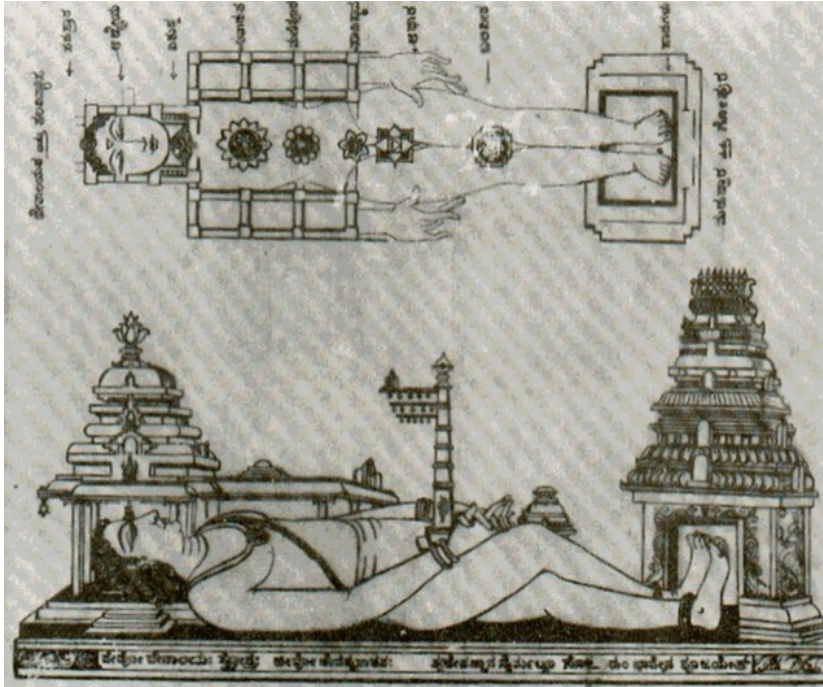


Figure 23: Mapping of human body in Temple architecture

the medium. These interrelationships between elements needs to be properly understood before visually displaying them.

Exercises

1. **Home Exercise:** Refer to Exercise Sheet 2A, 2B or 2C- Communicating the Abstract (do any one).
Time allotted: 1 hour
2. **Home Exercise:** Refer to Exercise Sheet 3- Mapping.
Time allotted: 30 minutes
3. **Class Exercise:** Refer to Exercise Sheet 4- Body Mapping.
Time allotted: 15 minutes

Giving Form to the Abstract

Once the design grammar constituting the metaphors and mappings arising from the initial abstract idea is in place, the artist/designer needs to start giving the idea a visual form. The metaphors assigned to each element dictate the importance/hierarchies between them, along with other relationships. There can be several ways to visually show these relationships.

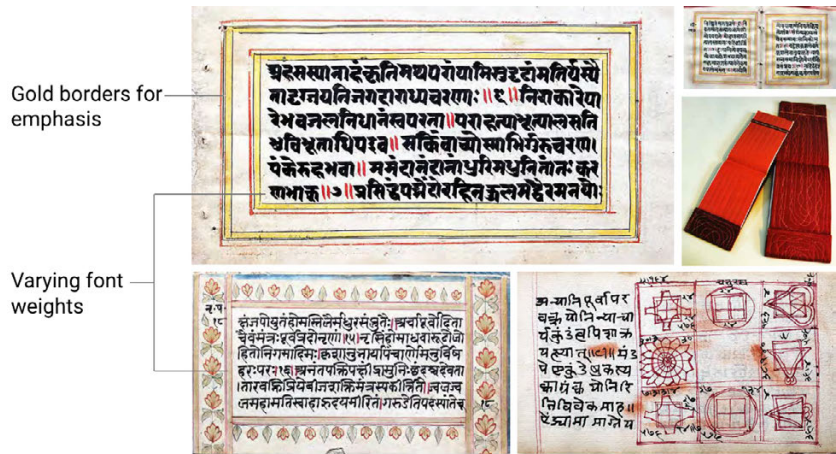
Visually Representing Element Relationships

Relationships between elements can be their hierarchies, proportions, spatial positions, and so on.

In temple architecture, elements are given a hierarchical importance based on their mappings. Garbhagriha, mapped to the navel, is the most important part of the temple, thus its spatial position is in the centre. Other aspects, like positions and sizes also depend on element hierarchies arising from the mappings. Considering the bounding shape, the square as a fundamental shape has given rise to a square plan for multiple temples over centuries. When one considers other arts like sculpture, an analysis of the compositional structure of most 2D sculptures, mostly on temple walls, show that effort is made to highlight the navel of the human figures, mostly by placing it in the centre of the composition, or in one of the focal points.

Element hierarchies can also be visually depicted using ways other than spatial placement. When one looks at ancient manuscripts (Figure 24), it is noticeable how different techniques have been used to represent different families of text. White spaces have been used as attention directing devices to highlight certain chunks of text that seemingly hold more importance. There is use of varying letterforms and font weights, ranging from thin to bold to emphasise certain text. Of importance from a graphic design perspective are the many treatments for borders and border decorations to establish areas of importance. Thus, hierarchy isn't just represented by attributes of the element itself, but also by attributes of the space surrounding it.

Golden ratio is an important principle to consider when analysing



Gold borders for emphasis

Varying font weights

White spaces to highlight text



Figure 24: Ancient Manuscripts

visual arts and architecture, and its presence has been prevalent throughout the designs of temples and mosques. Golden ratio is best approximated by dividing any two consecutive numbers in the Fibonacci sequence (a sequence where a number is equal to the sum of the previous two numbers), and is considered to be one of the most beautiful numbers in the universe, with a value lying close to 1.618. It is almost equal to the ratio of the length between the top of the head to the navel, and the navel to the feet. Golden ratio is used throughout Hindu and Islamic arts, ranging from governing proportions of plans of religious buildings to the beautiful geometric patterns and sculptures. Figure 25 shows the front view of the Taj Mahal, and how the ratio of its width to its height follows the golden ratio.

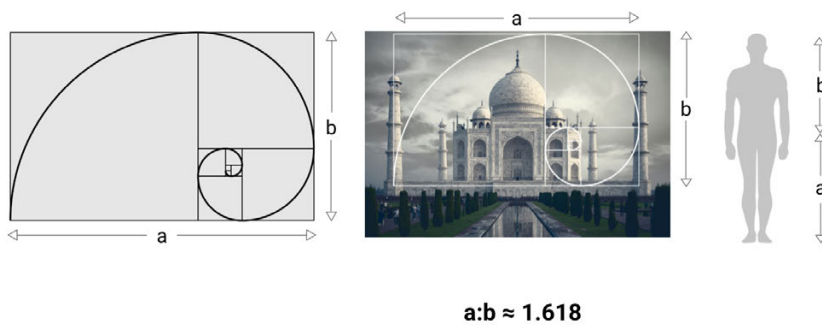


Figure 25: Golden Ratio in Taj Mahal

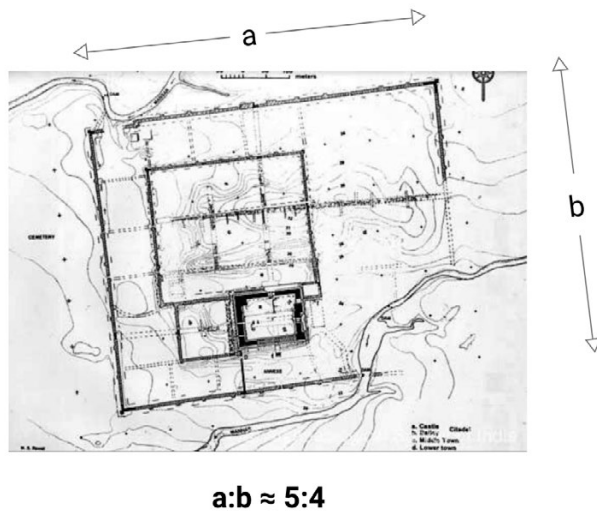


Figure 26: Golden Ratio in the Plan of Dholavira, Harappa

Apart from 1.618, another important ratio in ancient India has been 5:4. This ratio dictates the length to be a quarter longer than

the breadth. First witnessed in the town planning in the Harappan cities in the third millennium BC, and finding concrete expression in the excavations in the Gujarat city of Dholavira (see Figure 26), the golden proportion re-emerges almost a thousand years later in the ancient texts, where the ratio of 5:4 is used to create fire-altars for vedic ceremonies.

Grids and Compositions

Once the hierarchy and basic positioning of the design elements are in place, they need to be composed and organised. The grid system is a design method that helps visually compose these elements based on their attributes like hierarchical order, and helps lay them out.

Types and Elements of a Grid System

A grid consists of three elements- the Point, the Axial line, and the Mode of intersection (Figure 27). The shape and density of axial lines and the number of intersection points determine the complexity of the grid.

Classification of grids could be done based on their structural systems, as coordinate based, intersection based, module based, or line based, as shown in figure 29. Usually, these grid systems are found in pairs to form Point based and Field based systems, as shown in figure 30. Point based systems use a combination of Coordinate and intersection based sub-forms, while Field based systems use Module and Line based sub-forms.

In its most basic form, a grid system can be thought of as an array of squares that act as placeholders for laying out various design elements. Although a simple grid as shown in figure 28 may dictate similar sizes for all elements, hierarchy could still be dependent on the element position. Centrally placed elements would be considered more important.

Figure 31, based on the ancient Talamana system, shows a simple but well designed grid that is used as a hierarchical measurement system, and it ensures correct presentation of important components. It helps communicate large amounts of information according to its hierarchy and order.

Complex Grids

Unlike the static grids used in Western designs, Indian grids are more fluid, responsible for everything from the layout of temples to manuscripts to sari designs. Indian culture is rich in examples of creative and flexible uses of the grid, be it in the Yajna rituals, or the

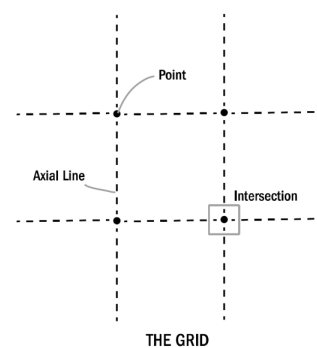
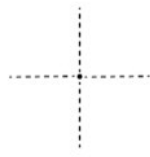


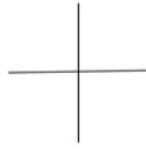
Figure 27: Elements of a Grid

Element A	Element B	Element C
Element D	Element E	Element F
Element G	Element H	Element I

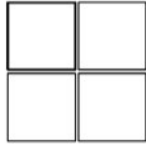
Figure 28: A simple rectangular grid with design elements



COORDINATE BASED



INTERSECTION BASED

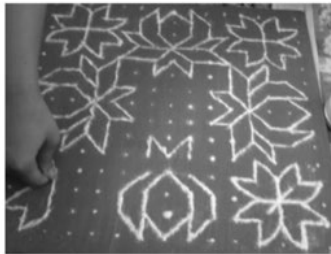


MODULE BASED



LINE BASED

Figure 29: Types of Grid Systems



Point Based

Coordinate + Intersection



Field Based

Module + Line

Figure 30: Pairs of Grid Systems

Corner
Not Central

Top
Higher

Corner
Not Central

Figure 31: The Talamana System

Left
Before

Centre
Main

Right
After

Corner
Not Central

Bottom
Lower

Corner
Not Central

Navgraha grid depicting the nine planets (Figure 32). Grids in Indian arts are not just a tool for enhancement of design, they themselves hold depth and meaning derived from the abstract ideas and stories. Traditional India shows that grids need not be strict and rectangular like the present, especially when one looks at examples of grids in the past, like Chakravayuha (Figure 33), which were modular and fluid, and served their purpose.



Figure 32: Navgraha grid and its meaning



Figure 33: Chakravayuha grid and its use in Mahabharata

Applications of Grids

Different types of grids were used in design and construction of all kinds of designs, ranging from arts to architecture. For better understanding, we can have a brief look at the grids used in the following:

1. Yantra
2. Floor Graphics
3. Textile
4. Architecture
5. Sculpture

Yantra Grids

Yantras are geometrical diagrams consisting of shapes such as the triangle, circle and square in numerous combinations and permutations that have symbolic significance in meditation and ritual worship. Although mostly associated with metaphysical and astrological connections, Yantras use elaborate grid systems to create different kinds of complex geometries. Yantras can be of different types, some of the most important being Ganesha, Durga, Sun and Moon durga, as can be seen in Figure 36. The basic elements of the Yantra are the Bindu (The central dot with maximum importance) and the shapes like circle, triangle, square and the lines.

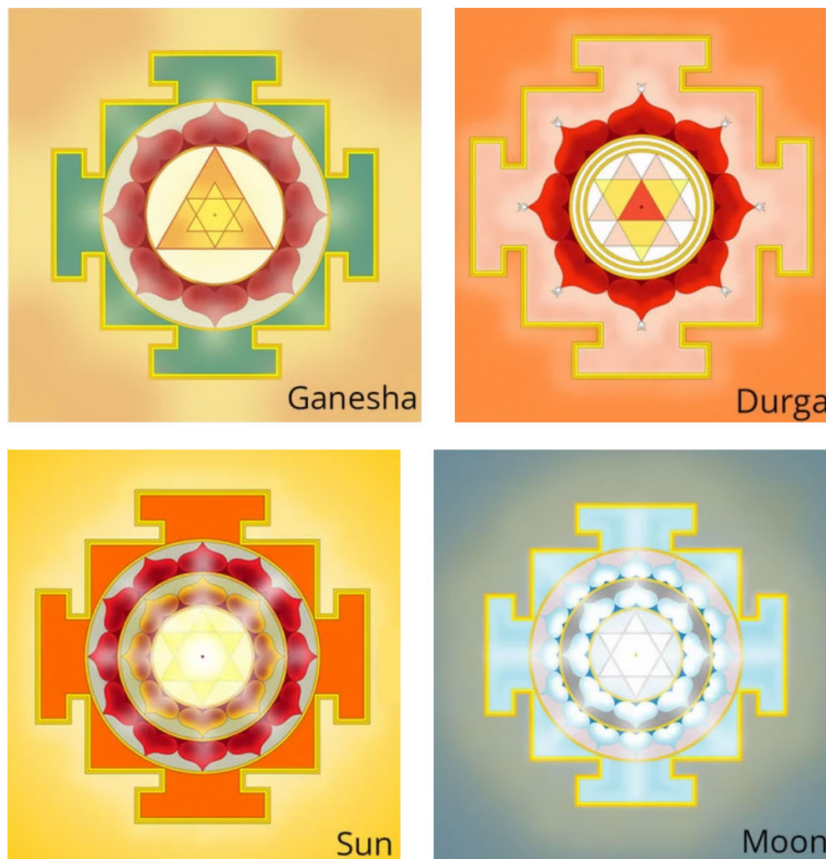


Figure 34: Types of Yantras

Grids in Floor Graphics

Floor graphics are patterns found in various architectural structures like temples, mosques and churches. Floor graphics like rangolis are made by the process of drawing on or around a system of dots using straight or curved lines, as can be seen in Figure 35. Rangolis them-

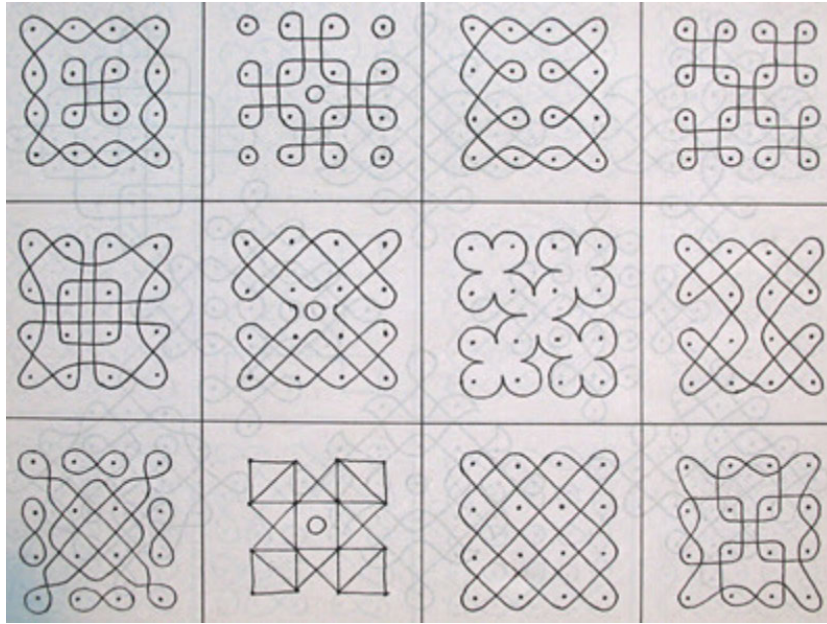
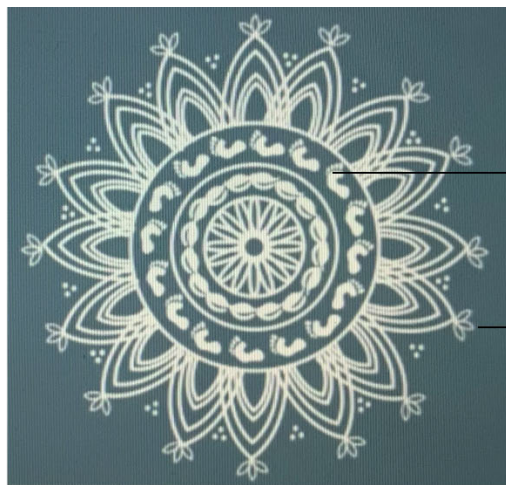


Figure 35: Rangoli Grids



Feet

Flowers

Figure 36: Rangoli

selves also have many symbols that act as metaphors for representing different meanings. Figure ?? shows a rangoli design with feet and flowers. The feet act as a metaphor for the path for the deity to enter the house. The flowers represent the fertility of the land.

Grids in Textile

Prints on clothing showcase highly elaborate patterns that emerge from following a set of fixed rules. Figure 37 shows one such example of a print known as Ajrak print, which uses shapes like hexagons, rectangles and circles to create motifs. The remaining spaces are filled with flowers and leaves, as a way of representing natural elements.



Figure 37: Ajrak print on Textile

Grids in Architecture



Figure 38: Rectangular Grids of Mohenjo-daro

Mohenjo-daro and Harappa, major cities of the Indus Valley Civilization, were built with blocks divided by a rectangular grid of straight streets, running north–south and east–west, as shown in figure 38. Each block was subdivided by small lanes.

When one looks at the plan for a traditional Indian theater, the different types of grids can be seen, as shown in figure 39. The shape of the theater can be rectangular, square or triangular, and these could be further subdivided into large, medium or small spaces, giving rise to multiple configurations. The size and basic shapes of these grid modules were dependent on the abstract idea the design was trying to convey, using its different elements.

An examination of temple plans shows that the principle of multiplying a spatial unit horizontally and vertically was uniformly

followed, with the unit being mostly square shaped (see figure 40). When seen against the Talamana grid, it is apparent how the element hierarchy works in the grid according to positions. Central position is the most important, which is given to the Garbhagriha. When one looks at more complex temple architecture, the ground plan can be broken up into geometrical motifs of the square and the circle, as shown in figure 41. The resulting geometry provides an elaborate grid system which conforms to the metaphors and mappings discussed above.

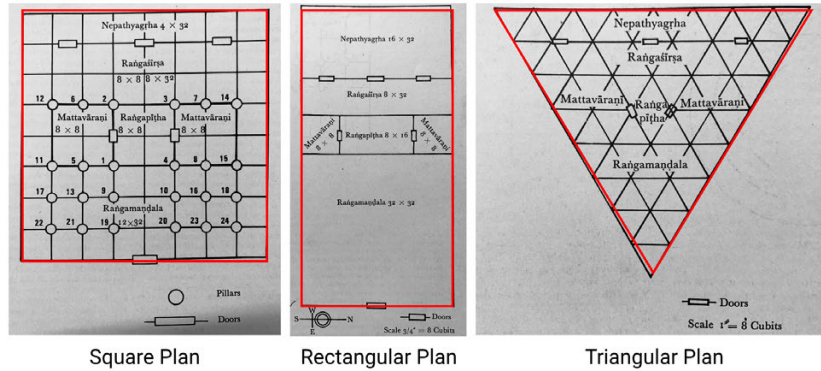


Figure 39: Different grids in theater plans

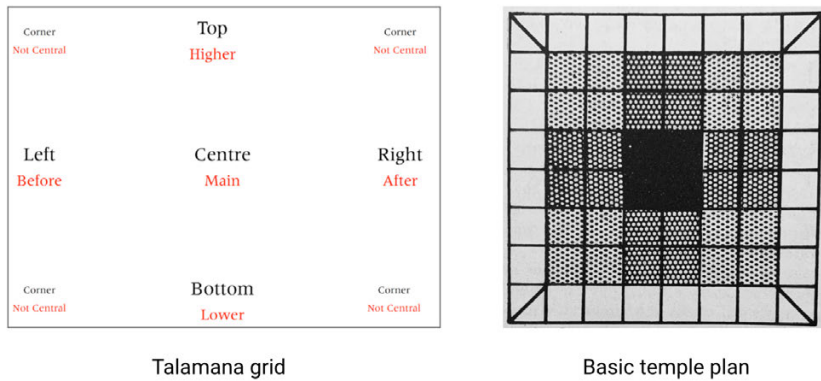


Figure 40: Talamana Grid as shown against a simple square temple plan

Temples usually follow a square grid which is subdivided into different number of squares. For example, figure 42 shows the grid of Kandariya Mahadev Temple, Khajuraho. figure 42 (a) shows the picture of the actual temple, figure 42 (b) shows its floor plan, and figure 42 (c) shows its grid. Counting the number of squares shows that the temple was built following a 16 square grid. Similarly, different temples have grids with different number of squares based on their size.

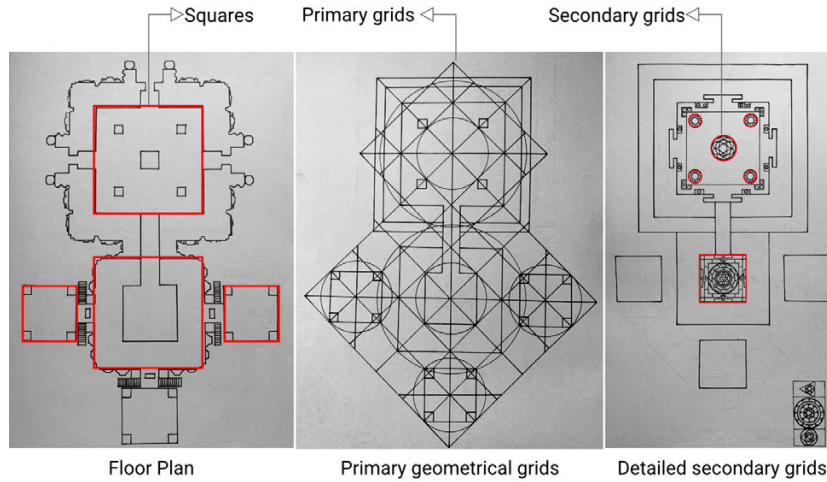


Figure 41: Primary and secondary grids in a temple plan

Islamic architecture, as seen in the previous chapter, extensively uses the star shape. The stars can be of different types, resulting from the various types of grids they arise from. The stars arise from dividing a circle into different number of segments. As can be seen in figure 43, there can be 4 point, 6 point, 8 point or 10 point stars based on the number of divisions of the circular grid. These stars are then tessellated to create large patterns by copying them over and over next to each other, which can be seen on places like roof patterns, floor patterns and jalis (figure 44). These grids clearly show the significance of the circular shape in Islamic geometry, a symbol of unity and diversity in nature.

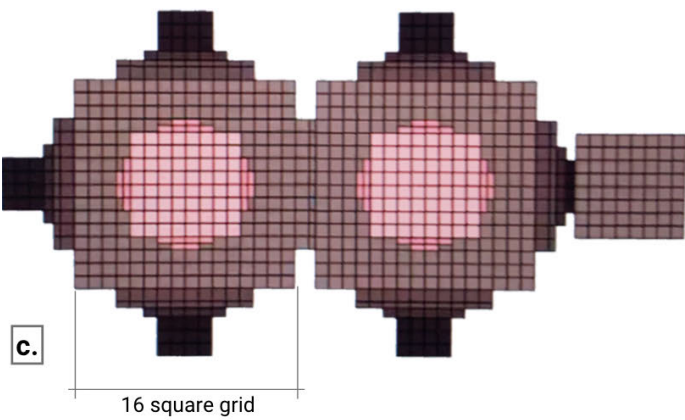
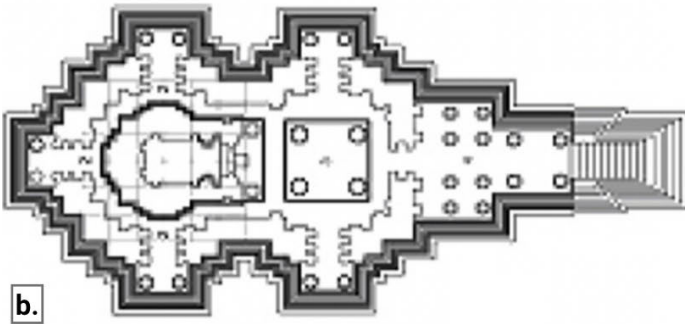
In Buddhist architecture, inspiration is drawn from the five elements of nature, called the Chakras (see figure 45-a). They are Space, Air, Fire, Water and Earth, with each holding its own meaning. These elements are represented by different geometrical shapes, which also become the guiding grids for the design of Buddhist Stupas, as can be seen in figure 45 (b) and (c). These shapes can have varying sizes across different stupa designs, but the basic structure and order remains constant.

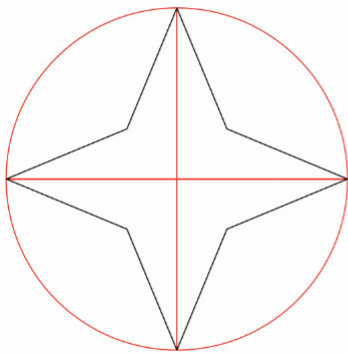
Grids in Sculptures and 2D Compositions

Ancient books, manuscripts, sculptures, motifs on building walls—all follow the grid system to display different elements of design. Figure 46 shows an example of a Jain manuscript, and how the layout is composed. The paper is divided into five horizontal units. The text is arranged in two columns, which appear rectangular in shape due to the width of the paper. The paper proportion is roughly 4:1

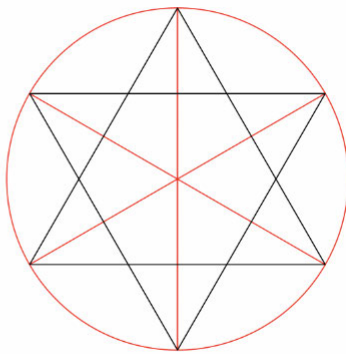


Figure 42: Grids of Kandariya Mahadev Temple, Khajuraho

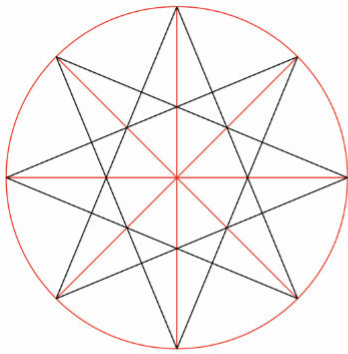




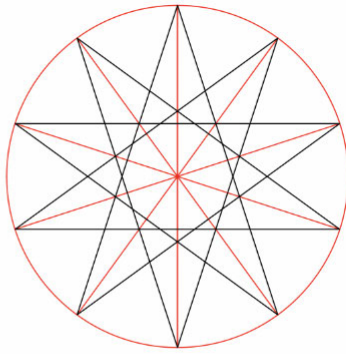
4 pointed star



8 pointed star



8 pointed star



10 pointed star

Figure 43: Different point stars in Islamic architecture

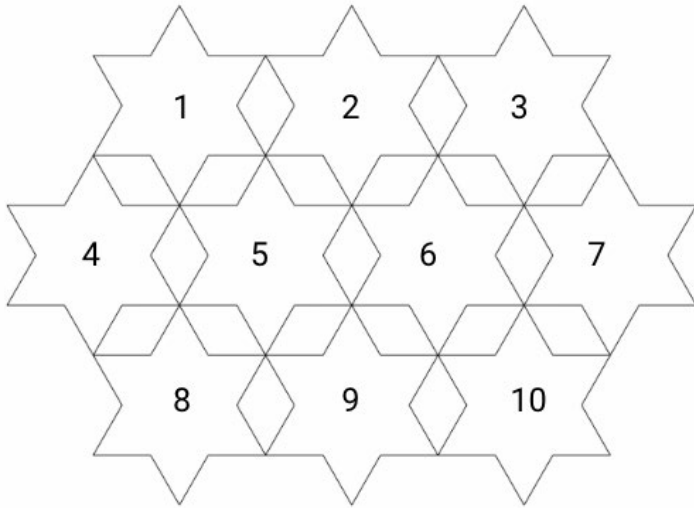


Figure 44: Tessellation of stars to create Jali patterns

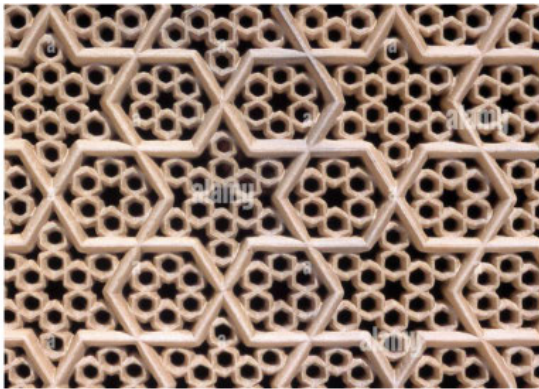
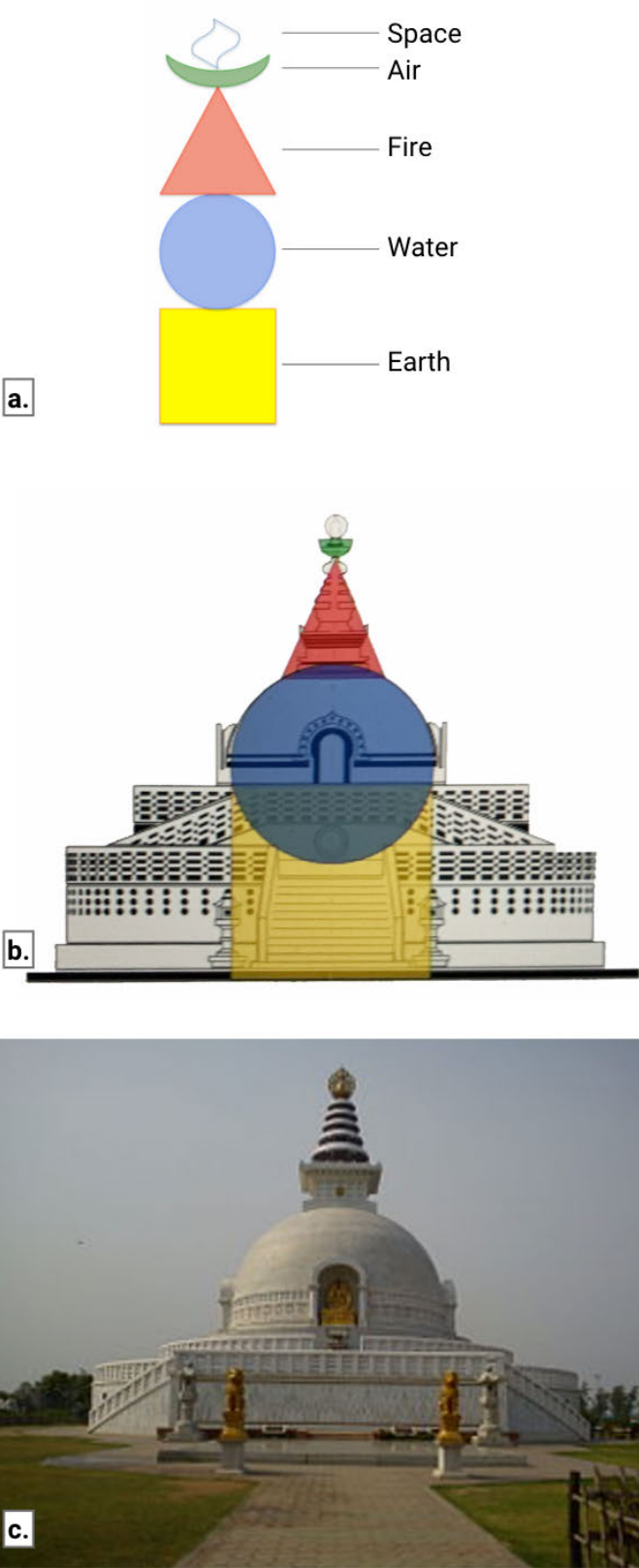


Figure 45: 5 Chakras of a Buddhist Stupa



as corresponding to the width and height respectively. The text block also responds to this ratio. The borders define the columns within the page layout, highlighted by red lines with black borders. The third and the fourth manuscripts show examples where a full height image takes up a column, occupying the top and bottom margins.

The Mahalakshmi Figure from Elura Cave XIV is an excellent example of how motifs on temple walls followed the grid system to bring forward theories of visual composition like balance and focus, while remaining true to the metaphors, storytelling and the abstract idea. The image shows the goddess sitting on a lotus throne, flanked by four deva. The symbolism is the connection of the bottom water world, the central earth element and the top celestial world, or the sky. A geometrical analysis of the composition reveals that it is set in a circle, with the devi's navel as the centre. The principle and the horizontal verticals (the diameters) can be deciphered as passing through elements of interest, or the focal points (see Figure 47). The composition gives us a grid that resembles a 16 spoked wheel with the navel as the hub, or the centre of the circle. Another layer of oblique chords give us triangles in the circle, which correspond to the movement of the devas. Using the circular grid system to set the composition up makes it look visually balanced, with an equal distribution of elements and action across the canvas. Figure 48 shows the figure of the Devi as a system of abstracted curves, which makes it easier to understand the different poses against different types of background grids.

Grids in Multiple Dimensions

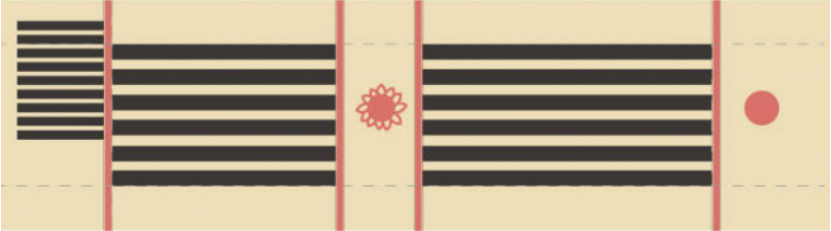
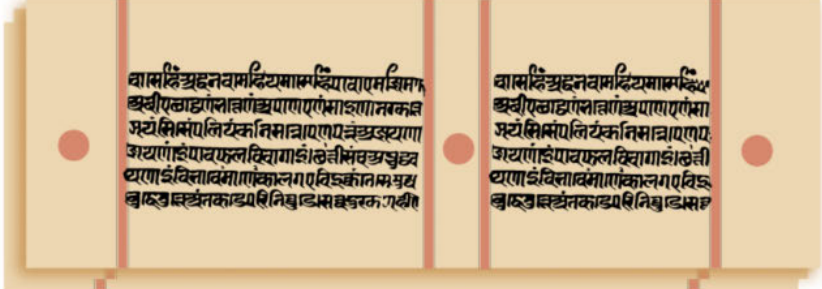
When considering temple architecture, grids don't just dictate the floor plan, but also dictate composition of elements in the vertical space, or the elevation (side view). As can be seen in figure 49 which shows the Kardmeshwar Temple as an example, basic rectangular grids can lead to highly geometric and ordered structures.

Human Anatomy and Movements

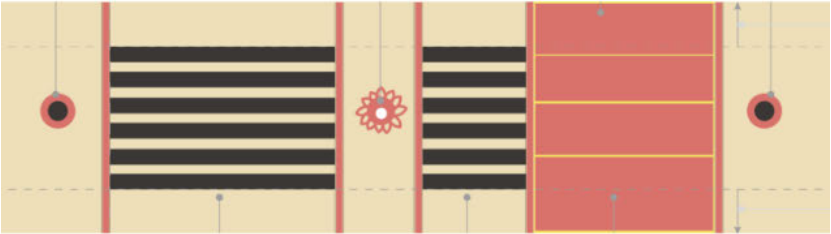
Since design is in most cases meant to be used by humans, a basic understanding of the human body proportions, movements and constraints is essential to create truly usable designs. This study of human body measurements is called anthropometry. Although the term is new, classical India employed various grids and techniques that made it easier to understand human anatomy.

Classical arts refer to the Sama, a basic posture in which the man body is shown erect with arms extended. Primary and secondary

Figure 46: Layout of Jain Manuscripts



Full height image ◁



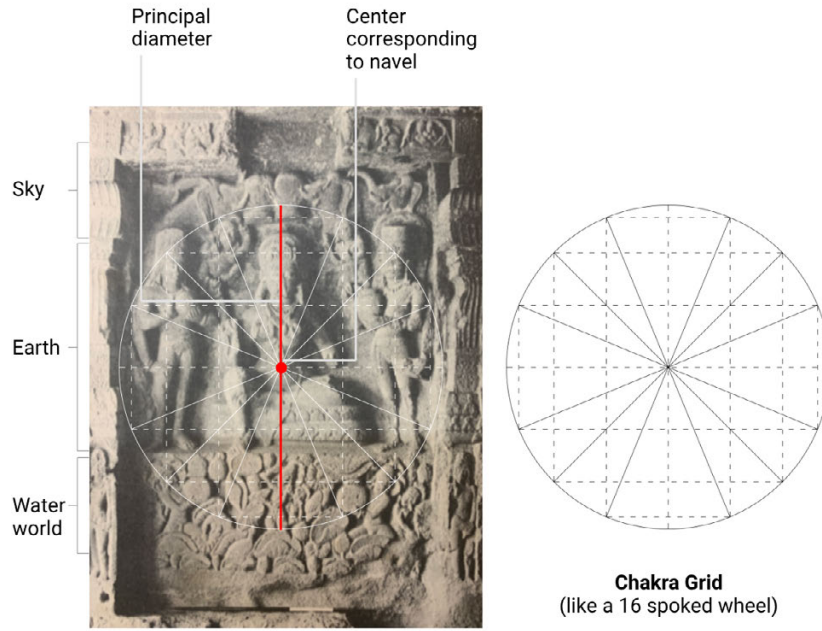


Figure 47: Mahalakshmi Figure and its Grids



Figure 48: Mahalakshmi Figure and its Abstraction

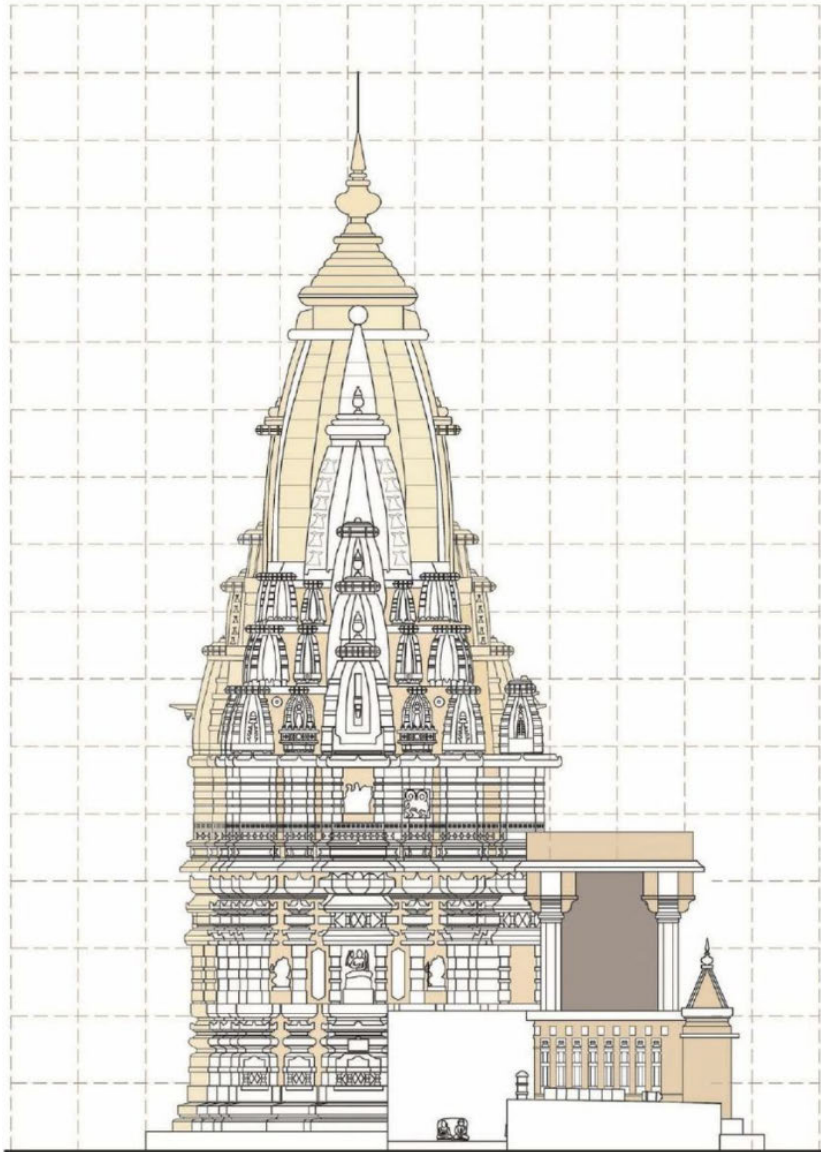
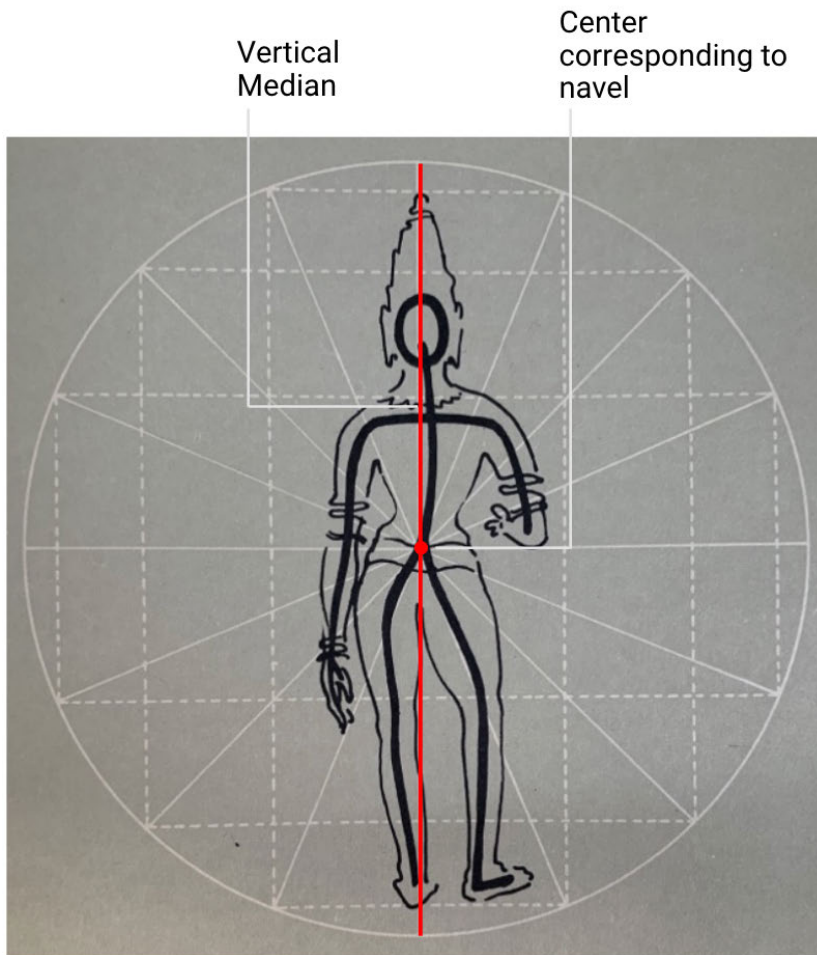


Figure 49: Grids in Elevation of Kardmeshwar Temple

movements, and various other positions like sitting, standing and reclining commence from this position of stillness. The imagery of a chakra is used (see Figure 50), the centre of which corresponds to the navel, similar to the one that was used in the Mahalakshmi Figure. The vertical median, which acts as a metaphor for connecting the sky and the earth, becomes the spinal cord. This circular grid, with its centre and diameters, acts as the cage of the body guiding the movement patterns within the circumscribed space of the circle.

Figure 50: Chakra Grid for the Human Body



The bounding circle of the Chakra grid is usually placed in a square, and sometimes a rectangle, as can be seen in many Indian sculptures. The circle is sectioned off by 4, 6, 8 or 12 diameters depending on the complexity of the scene. The most important diameter is the vertical one, and the second most important is the horizontal one, both passing through the navel.

Another way of dividing the circle in the Chakra grid, apart from diameters, is by making chords from the ends of those diameters (see Figure 51). Here, the division of the circle into the horizontal and vertical, as per the diameters, refers to the space division. The oblique chords refer to the time division. This is because the framework of vertical and horizontal is static and refers to the structural armature of all positions, whereas the oblique chords correspond to the movements of the body parts through time.

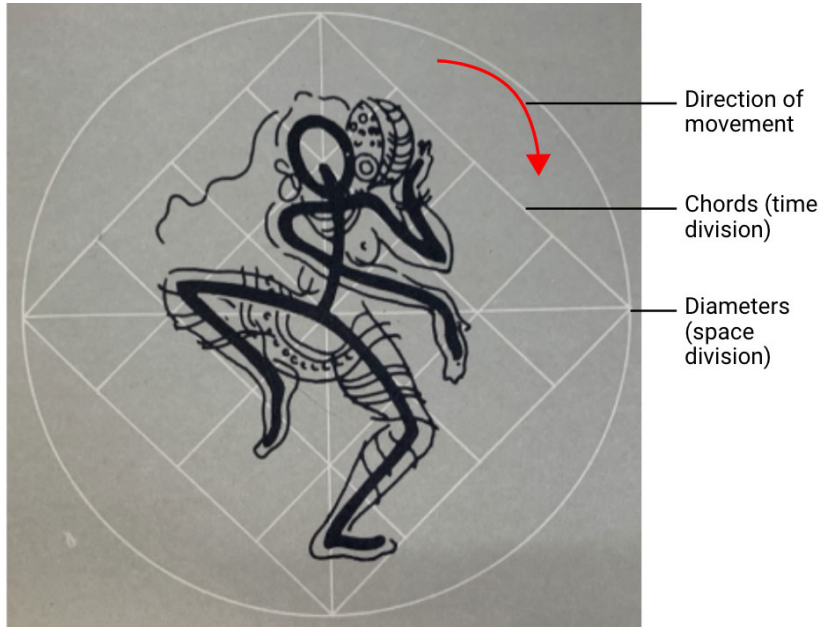


Figure 51: Chords in the Chakra Grid

The human body can be further abstracted into a system of shapes and lines, an example of which can be seen in Figure 52. Such abstraction helps in easily creating different poses while keeping all the proportions and movement constraints natural and not having to focus on the details.

Although the Chakra grid helps quickly and accurately construct different poses and movements of the human body, it also helps easily assign different emotions to those poses. For example, the vertical diameter (median) helps assign a balance to the pose. When the weight of the body is distributed equally on either side of the median, a sense of calm and poise is evoked. When the weight is unequally distributed, a sense of disturbance or imbalance is evoked. The sense of how the weight is distributed gives rise to different emotions the sculpture expresses. Thus, the sculptor doesn't need to rely on surface treatment or muscular tension to depict states of mood. The pose itself can get the job done. The positions of various

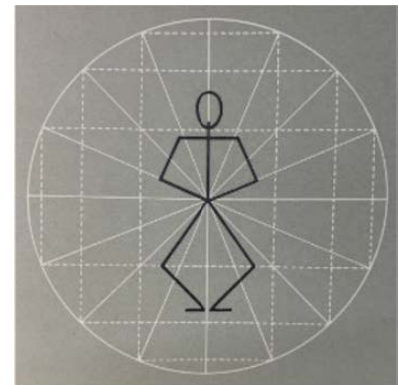


Figure 52: Abstraction of Human Figure into Basic Shapes

body parts with respect to the centre, principal diameters, oblique diameters and chords within the circle determine the emotion conveyed. For example, Figure 53 shows Nataraja with uplifted legs and crossing arms which lead to intersecting lines. This gives the image a sense of dynamism.

Exercises

1. **Home Exercise:** Refer to Exercise Sheet 5- Hierarchies.
Time allotted: 1 hour
2. **Home Exercise:** Refer to Exercise Sheet 6- Grids.
Time allotted: 1 hour
3. **Home Exercise:** Refer to Exercise Sheet 7- Compositions.
Time allotted: 1 hour
4. **Site Visit:** Refer to Exercise Sheet 8- Site Visit.
Time allotted: 1 day
5. **Home Exercise:** Refer to Exercise Sheet 9- Human Body.
Time allotted: 1 hour

Interactive Resources

1. **Human Poses:** Go to <https://jribh.github.io/Stickfigure/> or scan the QR code shown in Figure 54) and make the red figure perform the poses as shown in the images with the help of Chakra Grid (see Figure 55).



Figure 53: Nataraja Figure with a sense of Dynamism

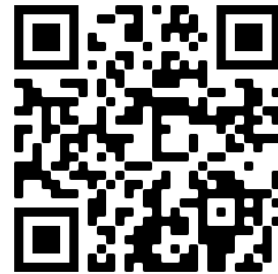


Figure 54: QR Code for the interactive human figure website

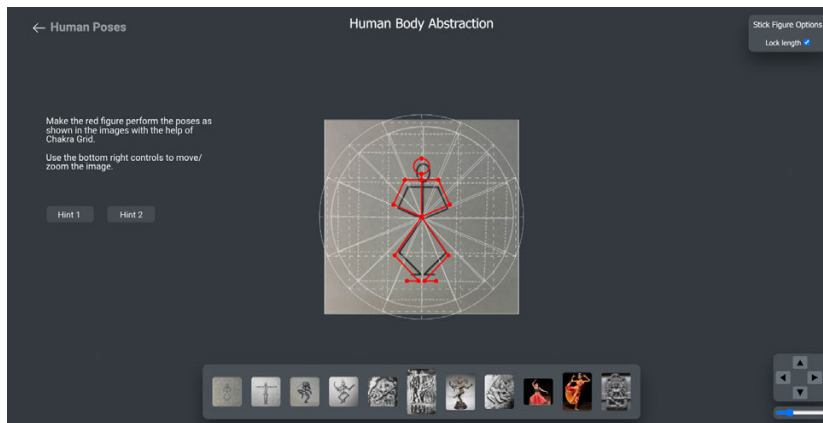


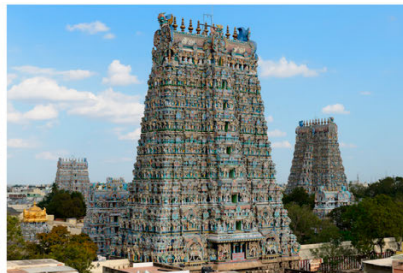
Figure 55: Human Poses in an interactive website

Detailing the Form

Once the abstract ideas are given a basic form, the artist moves on to the last step of the classical design process- enhancing the form by detailing it and adding attributes. Procedures followed for detailing allow full scope for a variety of creative expressions to emerge even when the earlier steps in the design process might appear rigid. This leads to a creation of a variety of unique and intriguing designs that don't look the same, even when they share the essence. A look at Indian temple architecture (some examples shown in Figure 56) clearly shows that all temples have a unique design and details, even though the basic abstract concepts, mappings and high level metaphors are constant. This is a crucial step owing to the need of constant newness of the contemporary world, where there is a constant demand for something new and appealing.



Virupaksha Temple



Meenakshi Amman Temple



Brihadeeswarar Temple



Sri Ranganathaswamy

Figure 56: Indian Temples with Unique Detailing

Ways of Detailing Form

There are various procedures and techniques for detailing forms depending on the type of form, inspired from artefacts ranging from architecture to manuscripts. These techniques involved ornamentation, procedures like parametrization, shape and form transitions to get complexity, and so on.

A look back at Figure 24 shows various embellishments used to decorate the text in Jain manuscripts. There are Gold borders that serve to highlight chunks of text. On some pages, these borders are filled with intricate designs of flowers that increase the aesthetic appeal, along with having a symbolic significance. Figure 57 shows how Jain manuscripts called the Kalpasutra use a variety of colours, intricate border ornamentation and hand made patterns to create visually appealing designs. Similar ornamentation can also be seen in the heavily decorated Mughal era writings as shown in Figure 58. A variety of handmade patterns inspired from elements of nature like plants and animals have been used to decorate the text, as can be seen on the margins. The text itself has been given different colours, along with a gold background.

A look at examples from classical Indian architecture sheds light on many ornamentation techniques. Mughal architecture like mosques and mausoleums contain embellishments with a heavy inspiration from elements of nature and geometry, as can be seen in Figure 59 which shows different details on the Taj Mahal. Figure 59 (a) shows a hexagonal Jali design, with small Jalis made of different shapes on top. Figure 59 (b) shows surface embossments inspired from plants and flowers. Figure 59 (c) shows religious text written around the opening, where the text itself is the ornamentation. All details are meaningful, and have a purpose of communicating some abstract idea. No detail is meant to be standalone, just for the purpose of filling up space.



Figure 57: Ornamentation in Jain Kalpasutra



Figure 58: Ornamentation in Mughal Writings

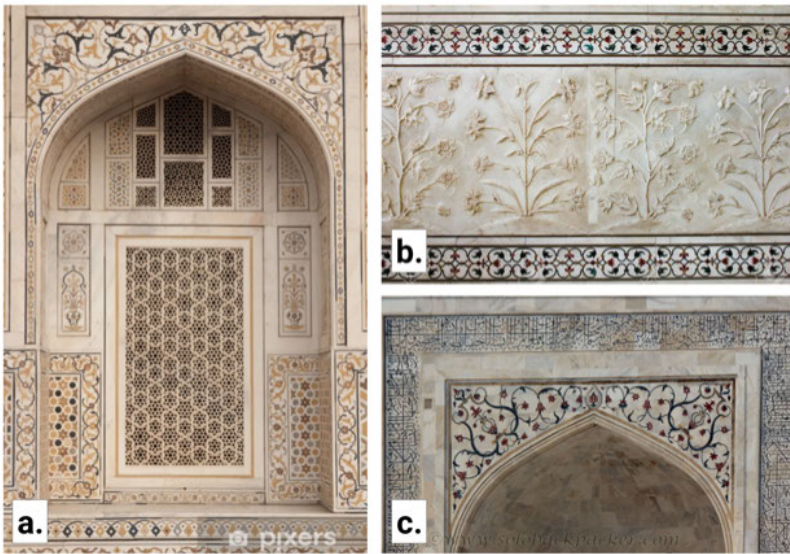


Figure 59: Detailing in Taj Mahal

Similarly, Hindu architecture also contains decorative motifs on temple facades, some examples of which can be seen in Figure 60. These motifs physically as well as conceptually are part of the structure as a whole, and complement the story being told.

Fractals and Parametrization

A way of detailing form that has been heavily employed in classical Indian arts, and is apparent from structures like Hindu temples, is by using fractals. Fractals, in simple terms, are self-similar patterns that are invariant to scaling. This means that they look the same no matter how much one zooms in. They are made by following simple iterative steps over time, which results in extremely rich, unique and non-repetitive forms which could not have been visualised by intuitive means. Nature is full of examples of repetitive patterns that can be classified as fractals, from which Indian arts and architecture are heavily inspired.

Natural objects around us are filled with fractal patterns at multiple levels, ranging from flowers, trees and plants to even coastlines and mountains. Figure 61 (a) shows the branching pattern of a tree. The branching pattern as a whole is self similar- it repeats until the branches become smaller and smaller, and would look the same when one zooms in. Similar branching can also be seen in lightning strikes and earthquakes. The branching in itself is a recursive process



Figure 60: Motifs on Hindu Temples

which results in unique non-repetitive shapes. Figure 61 (b) shows fractals in a flower. Here, the pattern gets increasingly smaller as it repeats towards the center. Since even a small change at this scale can create different patterns, each flower ends up being unique. These changes, or variations, are referred to as parametric variations, and the whole process of making fractals is called parametrization. Fractals need not be always symmetrical, as can be seen in a shoreline in Figure 61 (c). A shoreline, especially a rocky one, exhibits fractal behaviour as it is formed due to natural processes of erosion over a long period of time. It gets more detailed as one zooms in, and this behaviour needs to be kept in mind when one is measuring the length of the coast.

Indian arts, especially architecture, heavily employ fractals to generate detailed and unique forms with constant variations without exact repetition, much like nature. Hindu temples employ self replication as a method of fractal generation, in which shapes contain smaller replicas of themselves at various scales, as can be seen in Figure 62. Here, the recursive process becomes addition of these self similar shapes until the shapes keep getting smaller and smaller, to achieve a complex end result.

Simple shapes in themselves can be modified or filled up using simple recursive processes to achieve complexity of growth, as can be seen in Figure 64. This growth can happen on the edges, similar to coastlines, or it can happen within the shape to increase detail density. In all kinds of fractal creation, there is a rule which defines what recursive procedure to follow. For example, Figure 63 shows two different fractal patterns made using a scaled self-similar replication of a circular shape. In both the cases, smaller versions of the same circle are added over and over. However, there is a difference in the rule followed to create the fractal, leading to results which are visually vastly different. Similar recursive processes are applied to architectural forms, like temples to create more and more complex variations, as can be seen in Figure 65. The first image shows the detailing done on temple elevations. On the left is the simple form the architect starts with, on which the big details are added. Then, following recursive process, smaller versions of these shapes are added again and again to achieve a complex and detailed elevation, as seen in the right image. A similar technique can be applied to the temple plan, where details are added again and again to simple edges. The third image shows the fractal growth on temple motifs and pillars. Here, the details themselves have replication, providing the temple complexity at multiple levels.

Fractal growth can also be imagined in all three dimensions, as can be seen in Figure 66. Here, the process of self replication by adding

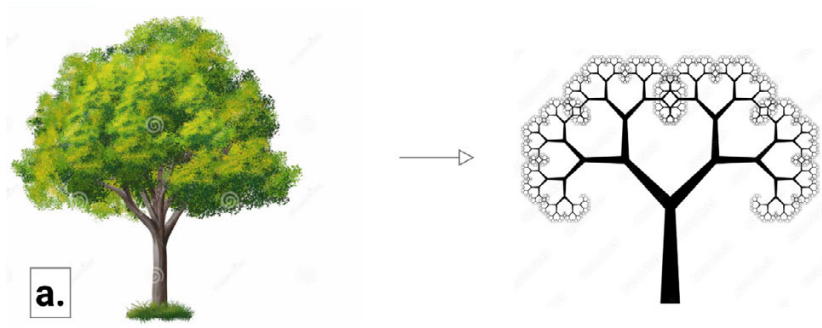


Figure 61: Fractals in Nature

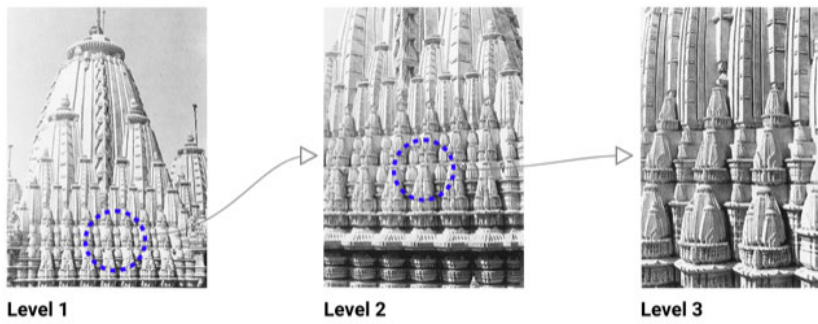


Figure 62: Self replication for Fractal generation in Temples

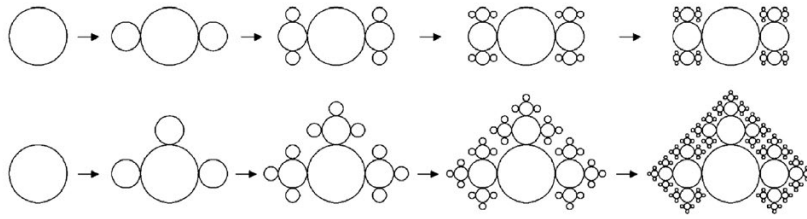


Figure 63: Generating fractals from circle using two different rules

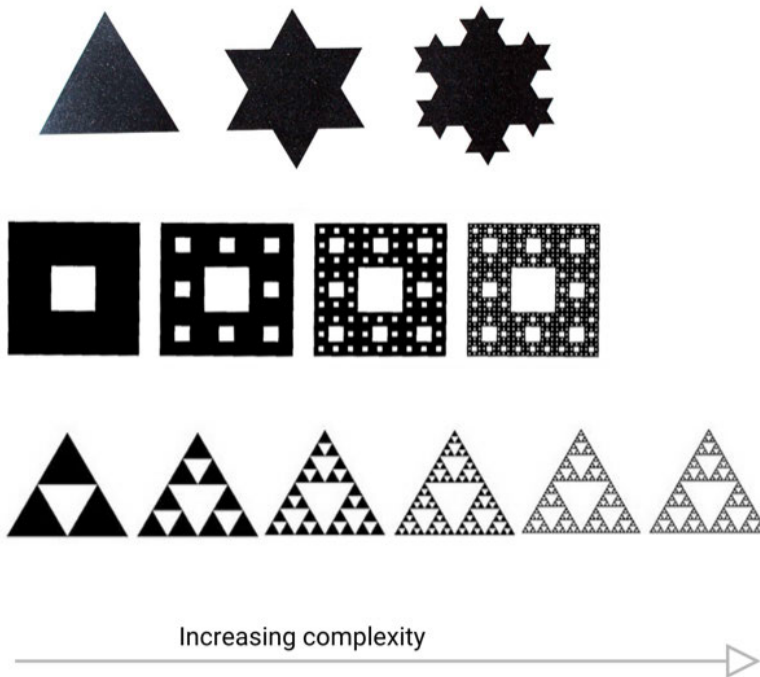


Figure 64: Increasing complexity in simple shapes

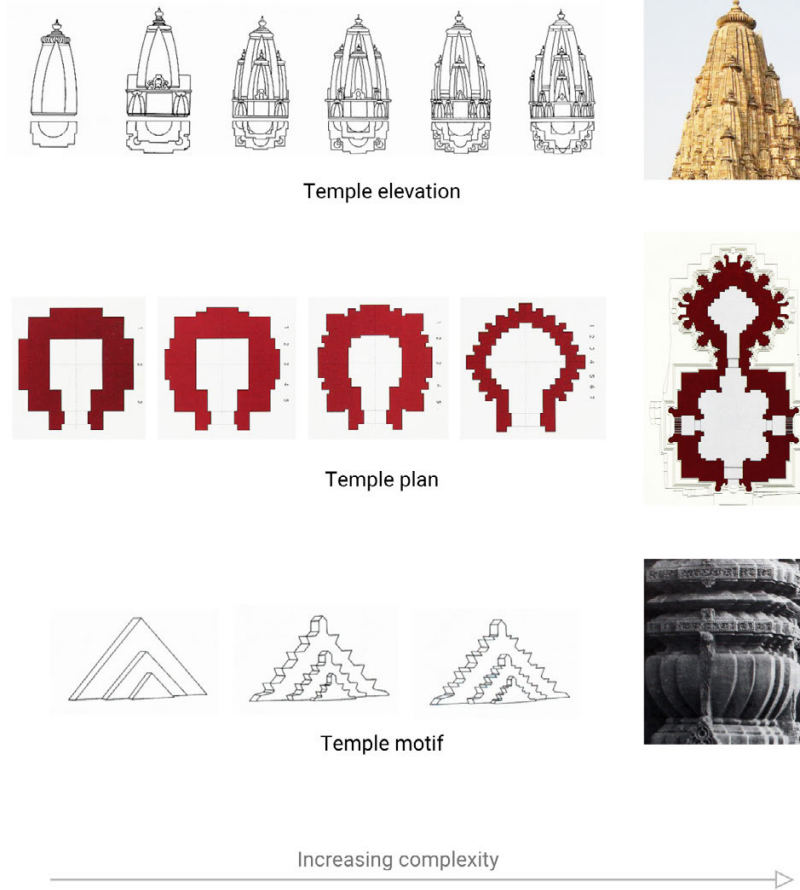


Figure 65: Increasing complexity in Temple architecture

smaller and smaller cubes to a bigger cube has been followed to achieve a complex end result.

The process of a scaled self-similar replication has been extensively used in Hindu temple roofs. The form of the main roof gets copied, scaled down and pasted on the faces of the original form. This process is repeated again and again, until the form gets very small. This process results in intricately detailed fractal structures. Figure 67 shows four different levels of parametrisation of a similar temple. With each level, a scaled self similar form is added to the original form, resulting in an increasingly detailed result.

Shape transitions are another way of adding complexity to form. Circle and square are two of the most important shapes in Indian arts, as they are metaphors for order and the continuum of respectively. Indian architecture, especially in temple plans, derives circle from square using various methods. This increases form complexity along with employing both the shapes for their abstract meaning. One approach can be deriving the circle from successive facetting of a square, as can be seen in Figure 68 (a). The size of the square would determine the complexity of the resulting shape. Another approach can be keeping on increasing the number of edges taking the initial shape as a square, as can be seen in Figure 68 (b). The third approach can be rotating a square to get a circular outline, as can be seen in Figure 68 (c). Modifying the parametric variations, such as changing the size of the initial square, its angle of rotation or the number of times it replicates, can result in vastly different end results.

Figure 69 shows the facetting technique more clearly. As one increases the number of small squares, the whole outer shape starts looking more and more like a circle, even though it is still made of squares. The number of small squares in this case becomes the parametric variation for this process of converting a square into a circle. This variation leads to many different results just by tweaking the number of squares.

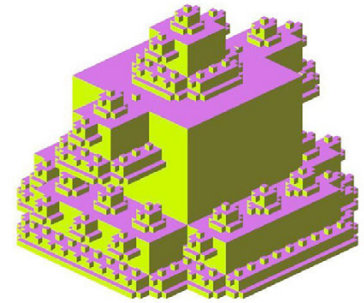


Figure 66: Fractal in 3D

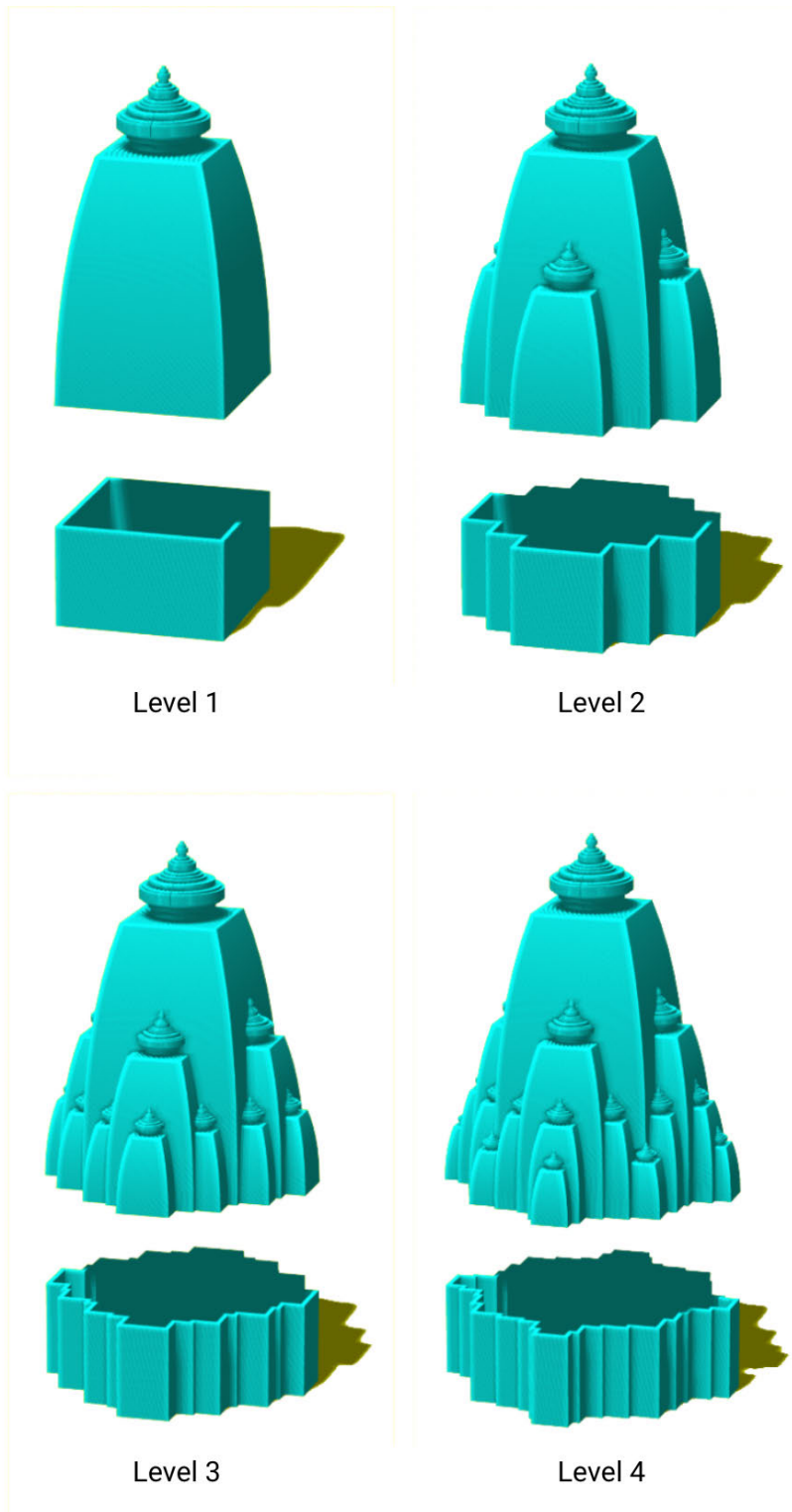


Figure 67: Levels of Parametrisation in a Temple

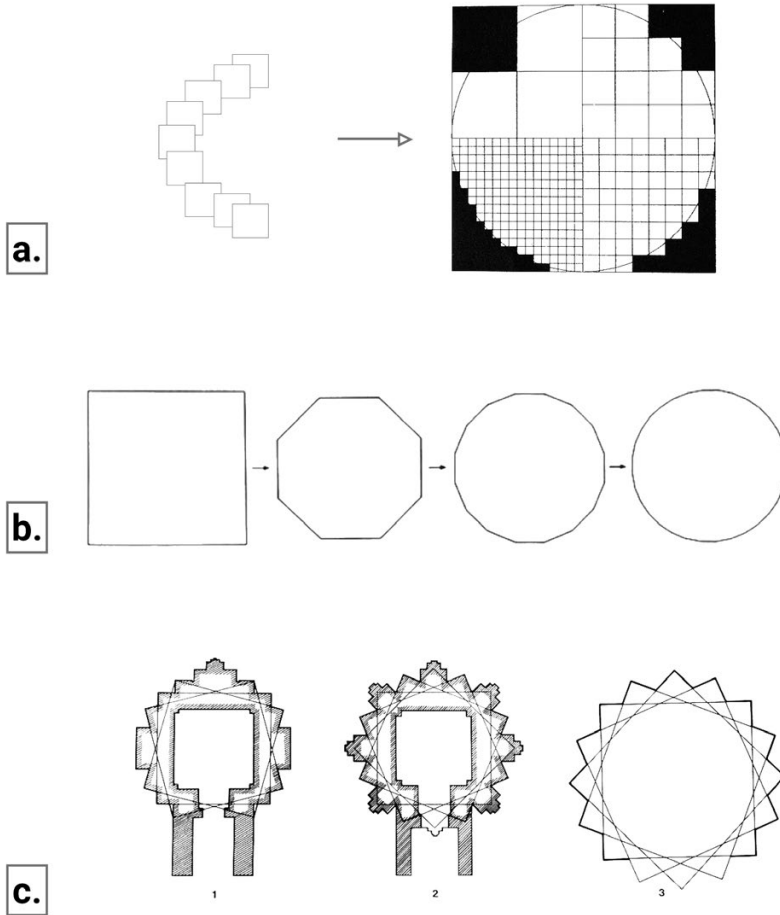


Figure 68: Various approaches to achieve Circularity

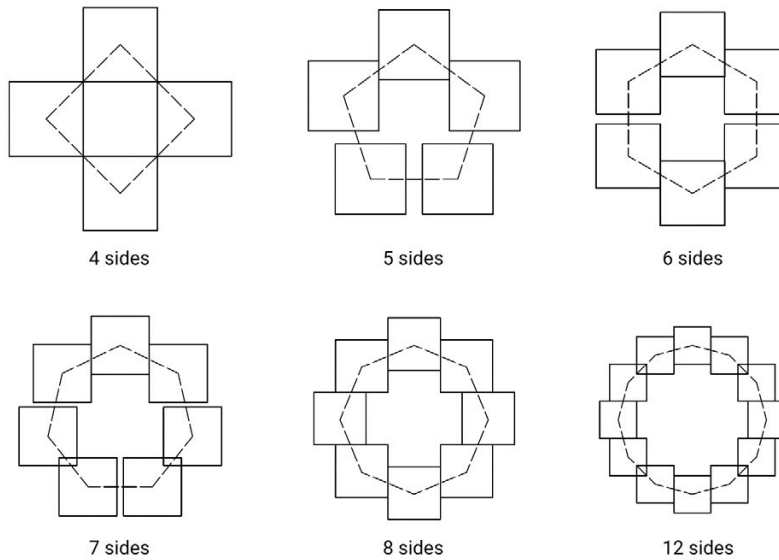


Figure 69: Facetting a square to make a circle

Fractals help in making complex forms, but they also help in ornamentation of these forms with complex patterns, the best example of which is Mughal architecture. Figure 70 (a) and (b) show fractal patterns added as ornamentation for ceiling and floor respectively.

Exercises

1. **Class Exercise:** Refer to Exercise Sheet 10- Detailing.
Time allotted: 10 minutes
2. **Home Exercise:** Refer to Exercise Sheet 11- Fractals.
Time allotted: 30 minutes
3. **Class Exercise:** Refer to Exercise Sheet 12- Parametrics.
Time allotted: 15 minutes

Interactive Resources

1. **Temple Parametrics:** Go to <https://jribh.github.io/TempleFractal/> or scan the QR Code in Figure 73 and explore different levels of parametrisation in a temple (see Figure 71).
2. **3D Print File:** Download the STL file from <https://bit.ly/3L3rvTY> or scan the QR Code in Figure 74. 3D print and assemble it to understand how self-replicating fractals work. (see Figure 72).

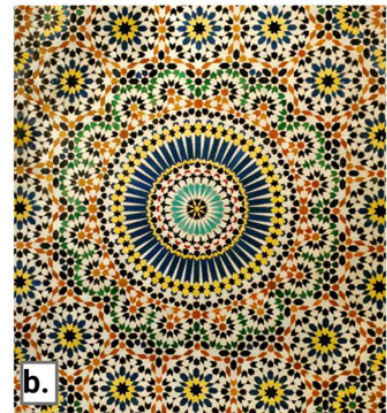


Figure 70: Fractals in Mughal patterns

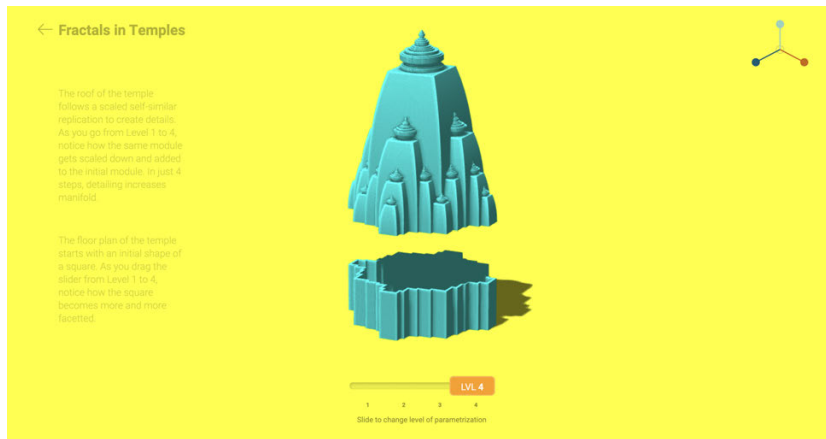


Figure 71: Temple Parametrics in an interactive website

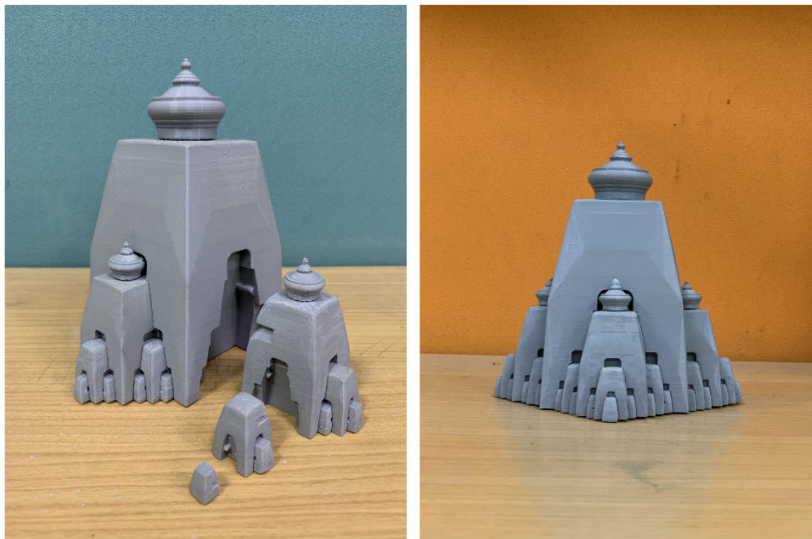


Figure 72: 3D printed Parametric Temple Roof



Figure 73: QR Code for the interactive Temple Fractal website



Figure 74: QR Code for the STL File for 3D Print

Reflection

The quality of the final product is measured by how effective it is at conveying the initial abstract idea to the viewer, or the experiencer.

An example of a temple can be used to demonstrate how different steps of the design process are implemented to reach the final form that we see. As can be seen in Figure 75, the process starts with realising an abstract idea, that is creating on earth a microcosm that represents the macrocosm (the whole universe). This idea is communicated using stories. This abstract idea is then metaphorised using different elements to make communication easier. Basic shapes like square and circle are given meanings based on their form and characteristics. Many elements are mapped to different parts of the human body, like the head, feet and the navel. Next, the relationships between these elements and their hierarchies are realised for giving the structure a basic form. These hierarchies are put into place using frameworks like grids and the Talamana System. These frameworks help create consistent and ordered designs. Finally, the basic form of the temple is detailed using techniques like parametrization, in which simple recursive processes are followed to achieve complex end results.

It should be noted that the temple is only an example, and the process can be extended in a similar way for other products as well. The Classical design process should not be seen as a rigid framework, but as a flexible guiding framework that adapts to the needs of the product, enabling it to convey the Formless ideas the artist has. There is no evidence that it had been followed by all artists across the subcontinent in ancient times, and much like the many other design processes being followed in contemporary times, it was but one of many ways of converting the Formless to Form.

Realising an abstract idea

A **microcosm** to represent the macrocosm

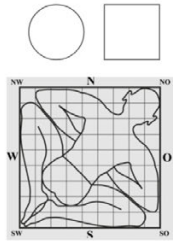


Communicate the idea using stories, like that of the **Origin of the Cosmos**



Metaphorise the abstract

Realise basic shapes and forms, like **square and circle**, to assign abstract meanings to

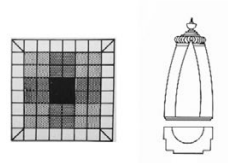


Take help of **mappings of nature and human body** to assign abstract meanings to elements



Give a basic form

Understand relationships between elements and their hierarchies

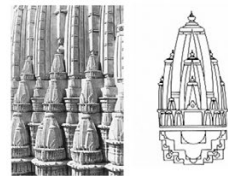


Use frameworks like **grids and Talamana system** to create order in the form and composition



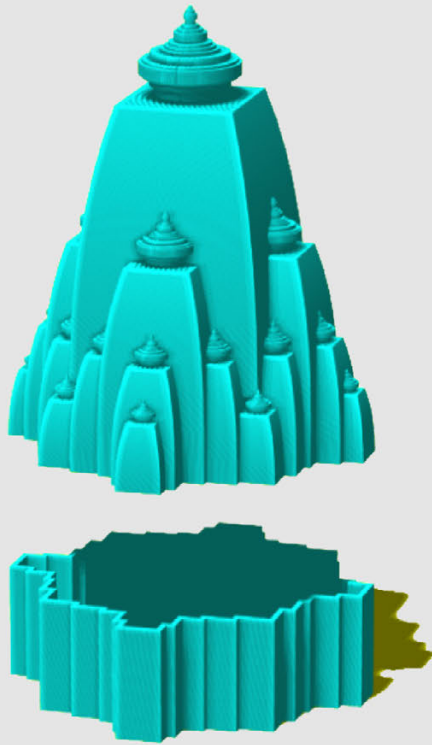
Detailing the form

Use techniques like **fractals and parametrics** to create shape complexities



Ornamentation of form using symbols and motifs

Figure 75: Various stages of creating a Temple



DONE AS PART OF THESIS BY **JRIBH SHANDILYA**