

CS 39 Final Project: Symmetry in Architecture

Sravan Mokkala

Introduction



Lundetårn of Copenhagen



Leaning Tower of Pisa

Symmetry has existed in architecture for centuries. Shown above are two architectural masterpieces constructed four centuries apart. Both show many of the same types of symmetry and both are widely analyzed to this day. Symmetry is most often used in architecture for the purpose of acting as a unifying concept - something that brings all aspects of a piece together. But symmetry can be found in architecture in so many different ways that it is almost impossible to find a piece of architecture that exhibits no symmetry at all. If this is true, then why does any of this matter? It turns out that symmetry can be broken down into several different categories and sub-categories. Identifying these types of symmetry was a major component of this class. For this project, I wanted to learn how these types of symmetry convey ideas and motifs to the

human eye. Why do architects deliberately utilize some forms of symmetry as opposed to others?
This is the question that I wanted to answer.

Outline

There are six major categories of symmetry that I focused on for my research. Given below are brief overviews and examples of each:

1. Bilateral Symmetry: This occurs when two halves of a piece mirror each other. This is by far the most common type of architecture and it is meant to be expressive of nature and the human bodies. Our bodies, as well as many other animals, exhibit bilateral symmetry with a mirror plane running vertically through the center of our bodies. In ancient times, it was a common belief that since humans are God's creation, bilateral symmetry was divine and this motif of divinity is what architectures aim to capture when using this type of symmetry.



Parthenon



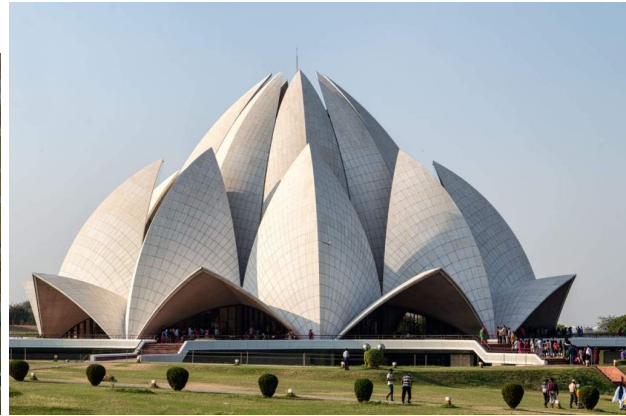
Alamo

2. Rotational Symmetry: This type of symmetry occurs when a piece can be rotated any specific number of degrees around a point and still look the same. Rotational symmetry is used by

architects to convey a sense of movement and rhythm. Since this movement occurs with respect to some central point, this symmetry is also used to draw emphasis to the center of the piece.



Pentagon

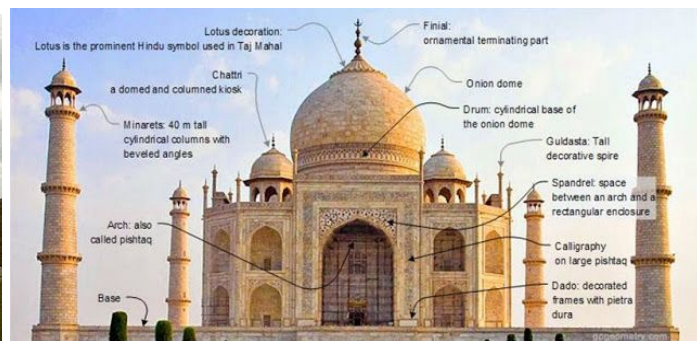


Lotus Temple

3. Cylindrical Symmetry: This type of symmetry is an extension of rotational symmetry in that it is rotationally symmetric for any degree of rotation. A common example would be any towers or columns. Architects use this to represent a defiance of gravity.



Capitol Building



Taj Mahal

4. Chiral Symmetry: Chiral symmetry occurs when there is a mirror plane but these two halves cannot be superimposed upon each other. This is often used in gateways and pathways to draw emphasis to a central structure.



St. Peter's

5. Similar Symmetry: This occurs when repeated elements retain their shape but change in scale. It is often used to taper off buildings and create a higher degree of order and unity in composition.



Sydney Opera House

6. Spiral Symmetry: This is essentially similarity symmetry transposed onto multiple levels of space without taking up the whole space. The most common example is winding staircases.

