Lecture-2

Brief Introduction to Architecture

by

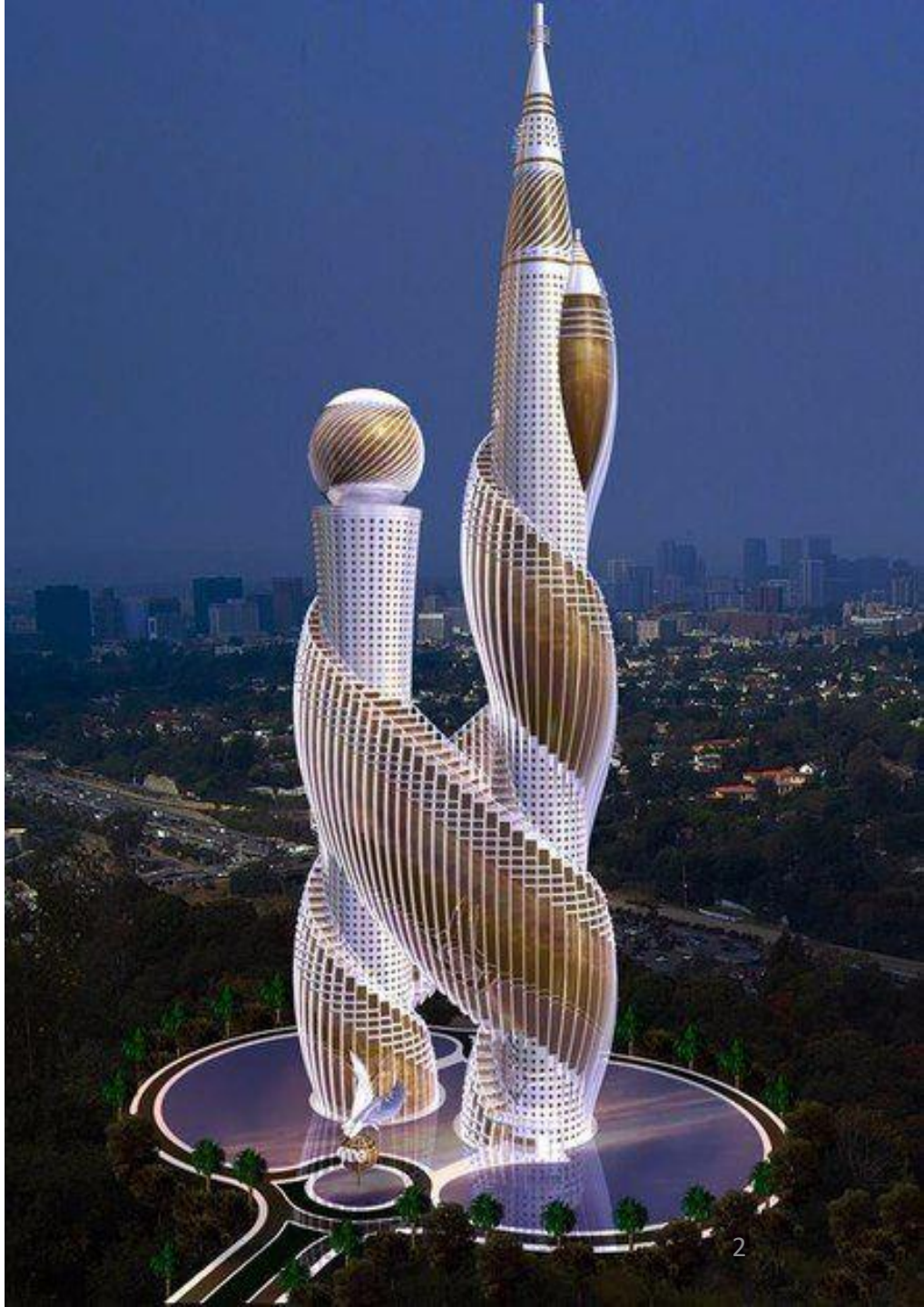
Dr. Himanshu Chawla

Assistant Professor, Civil Engineering Department,
TIET, Patiala.

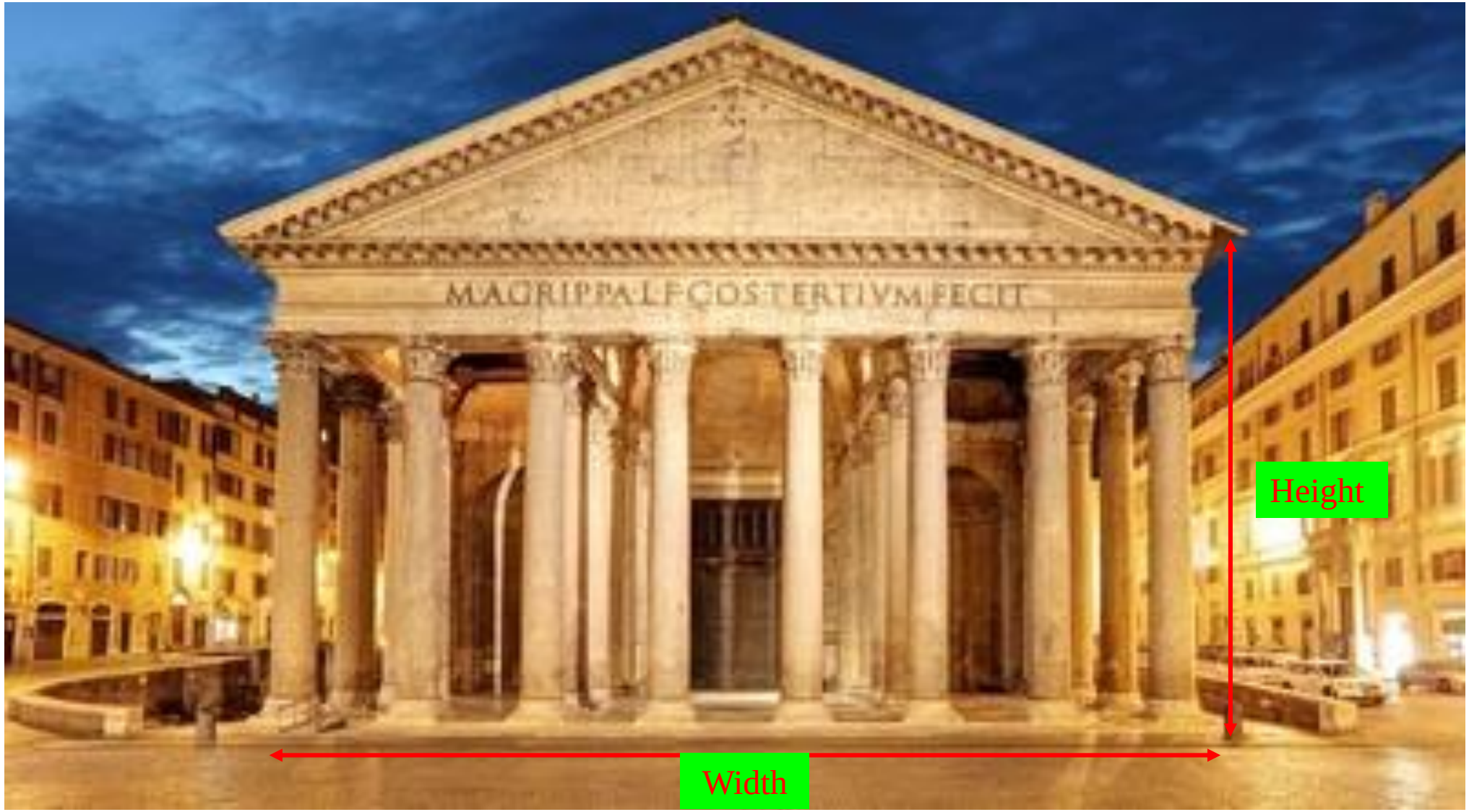
(Email id: himanshu.chawla@thapar.edu)

Learning Objectives

- To understand how proportion contributes to good architecture.
- To learn how proportion is applied in ancient architecture and contemporary architecture.
- To apply appropriate proportion in different types of three-dimensional arts.
- Importance of scale in structures.

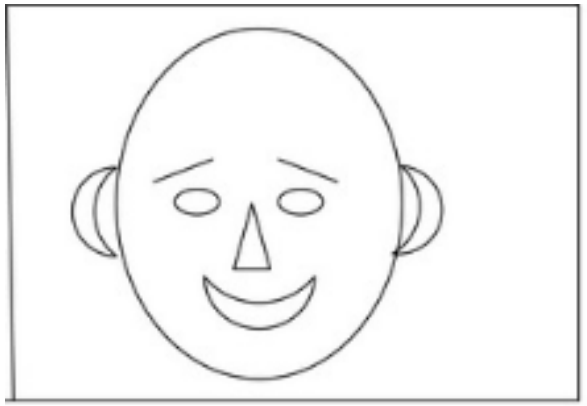


How does the proportion of a building decided ?



Proportion

Proportion: Proportion refers to the **relative size of parts of a whole** (elements within an object).
Proportion is the term used to describe the **relationship between two things of different size**.
It provides guidelines for laying out useful spaces, for designing structural systems, and for creating an aesthetically pleasing environment.

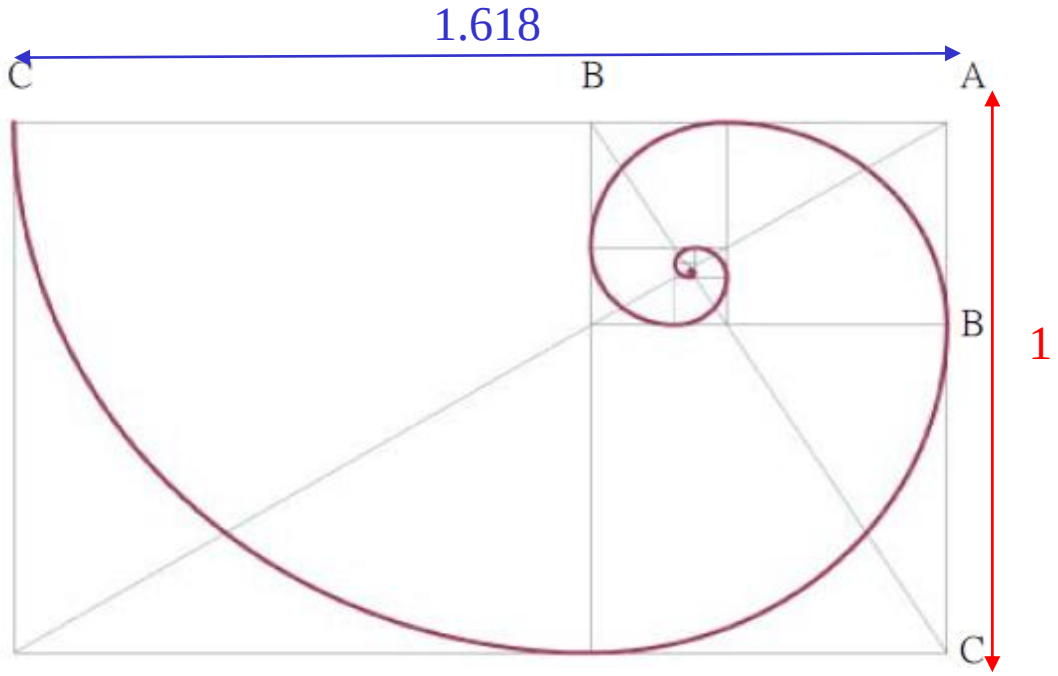


The Golden Ratio in Art and Architecture

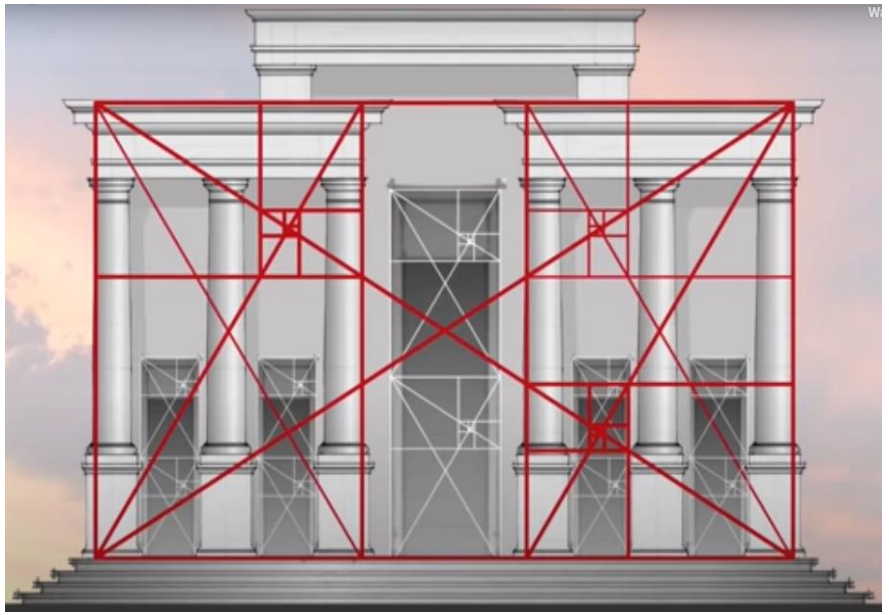
The golden ratio (also called the golden rectangle) is a proportioning system that governs the **relationship of smaller parts to the whole**. It has long been believed to produce some of the most aesthetically pleasing shapes in nature, and as such has been used in many works of art and architecture.

The ratio is AB:BC=BC:AC=1:1.618.

The ratio of width-to-length of each rectangle is 1:1.618.

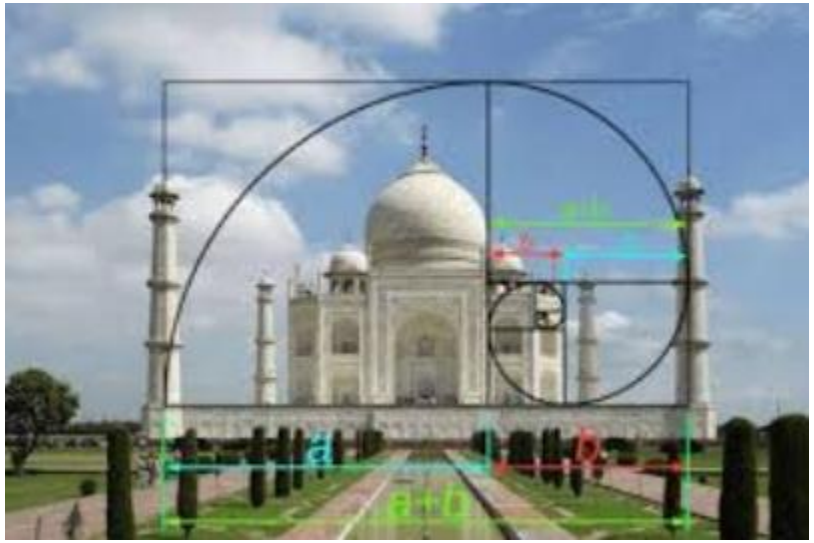


Proportioning of Structures Using Golden Ratio



Golden ratio (golden rectangle) gives aesthetically pleasing shapes

Examples of Structures Made with Golden Ratio



How the Golden Rectangle was made?

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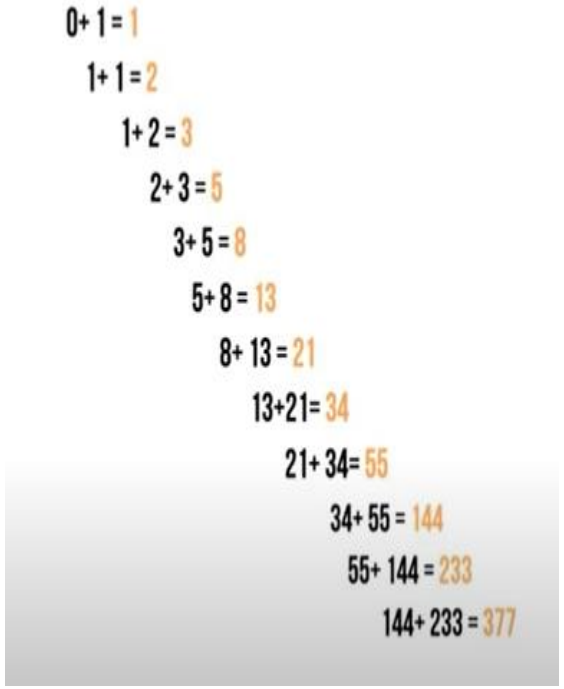
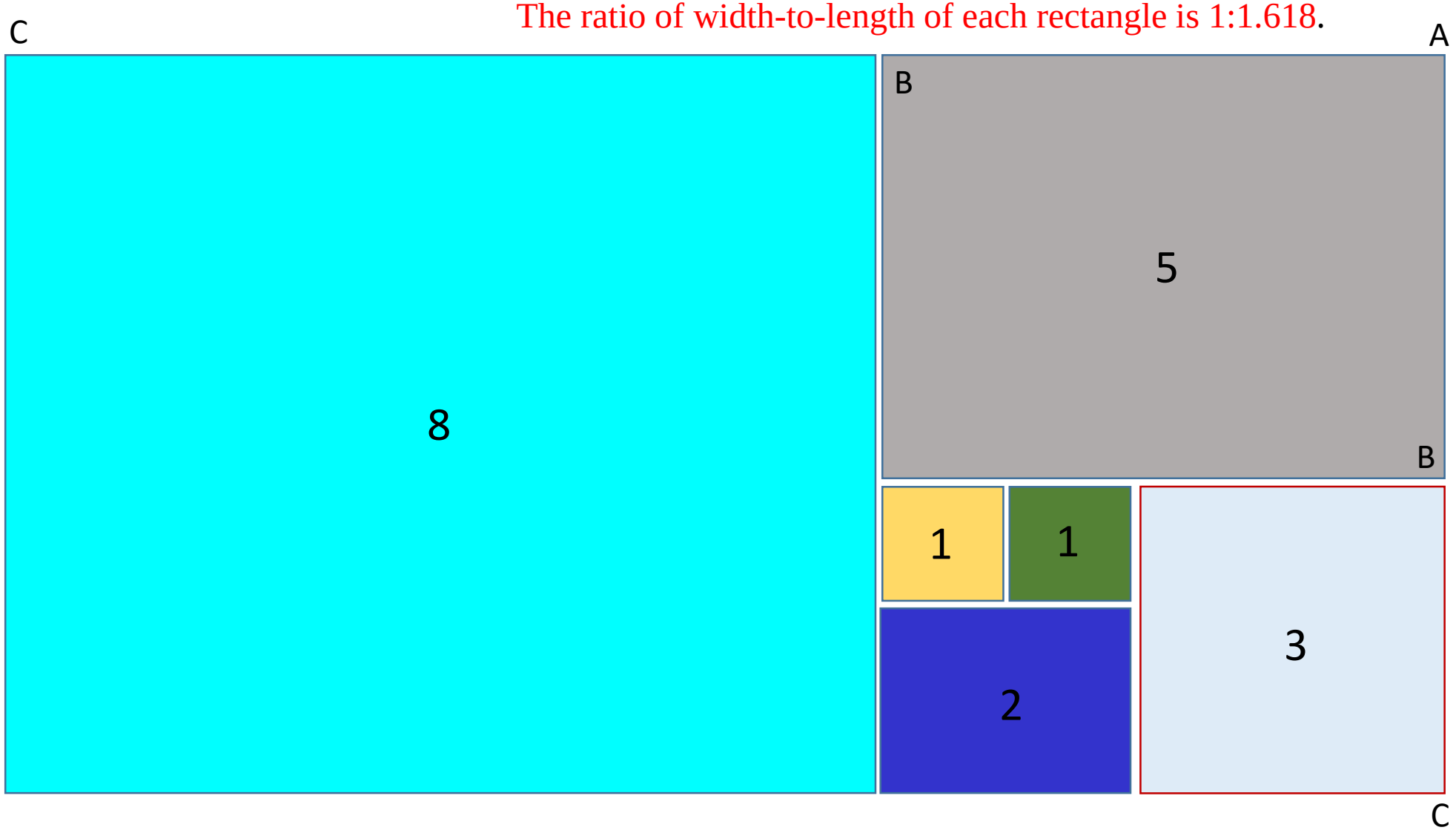


Fibonacci Sequence
(Nature's Code)



How the Golden Rectangle was made?

Fibonacci Sequence

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144...

1/1 = 1

2/1 = 2

3/2 = 1.5

5/3 = 1.6666666666666666

8/5 = 1.6

13/8 = 1.625

21/13 = 1.6153846

34/21 = 1.6190476

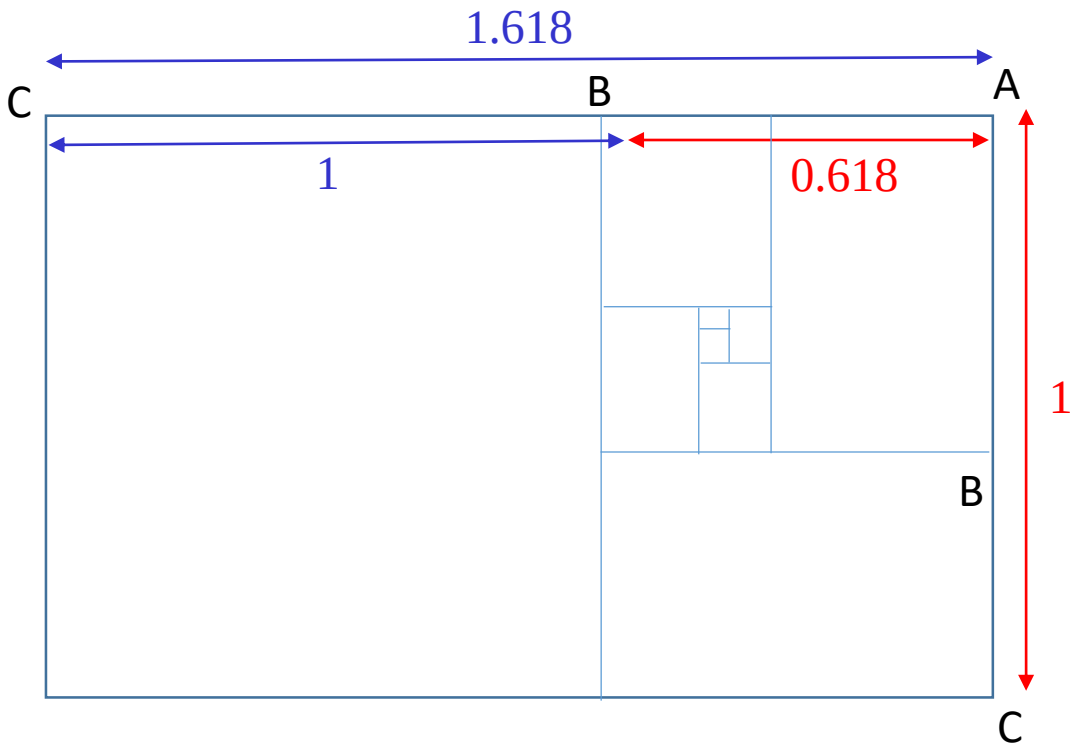
55/34 = 1.617647

89/55 = 1.6181818181818181

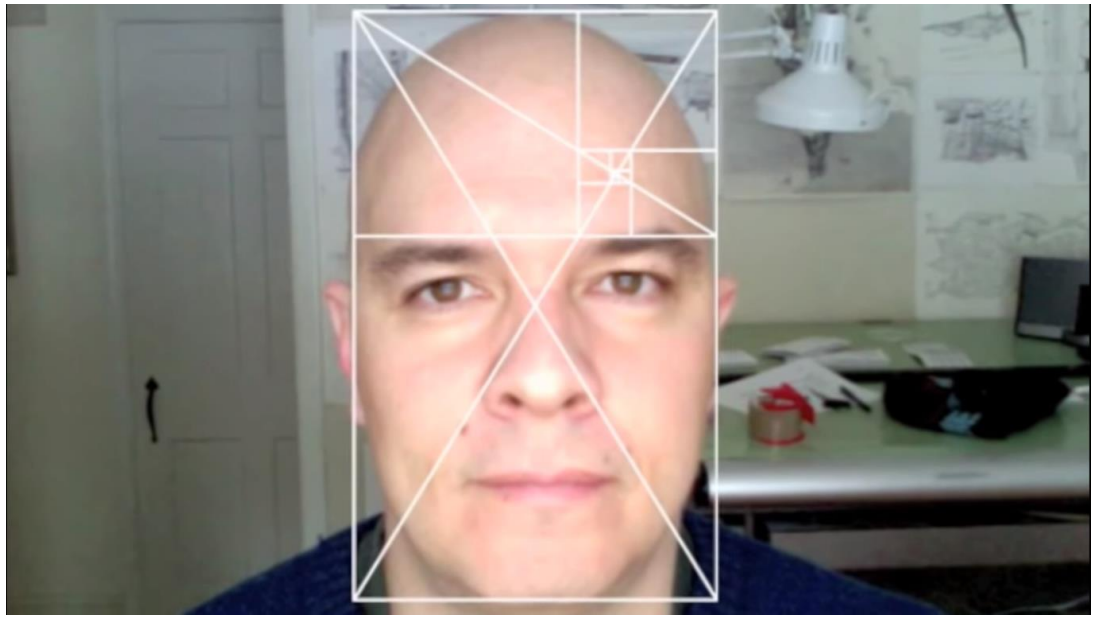
$\Phi = 1.618$

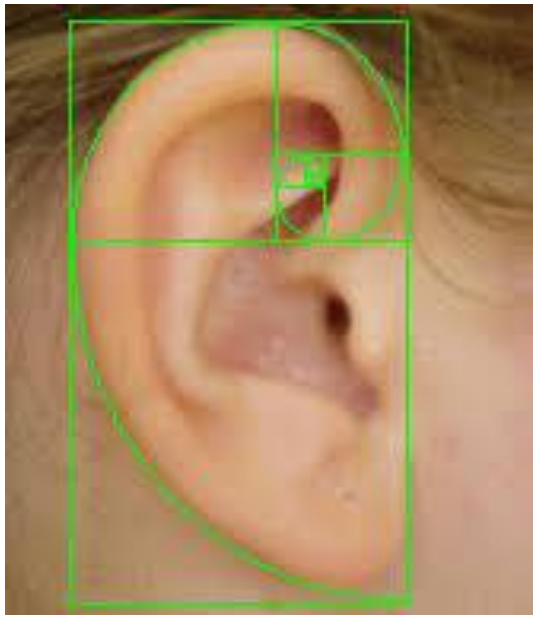
The ratio is AB:BC=BC:AC=1:1.618.

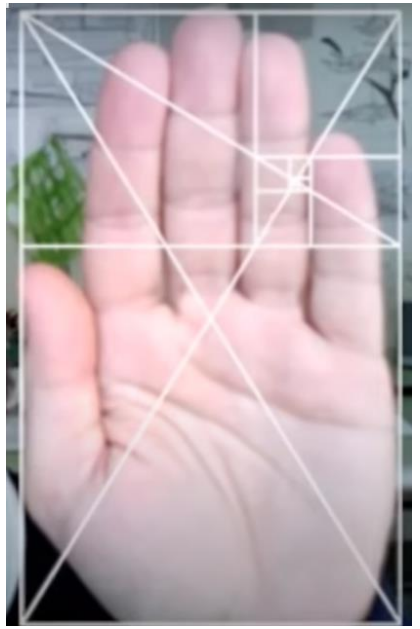
The ratio of width-to-length of each rectangle is 1:1.618.

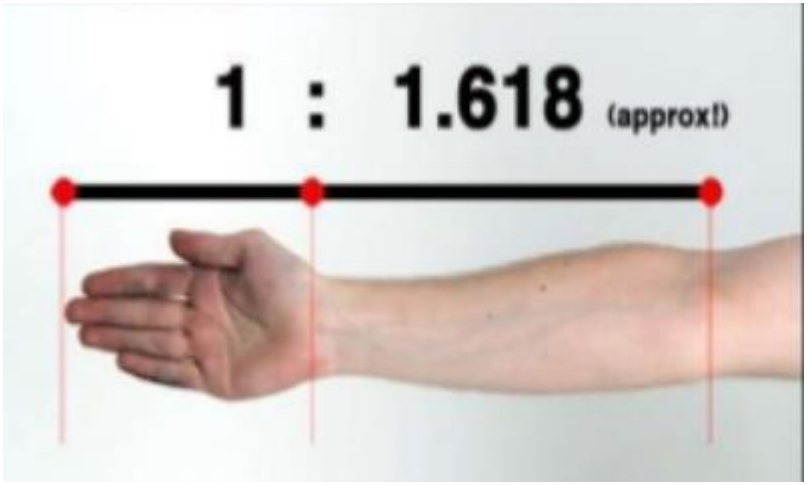


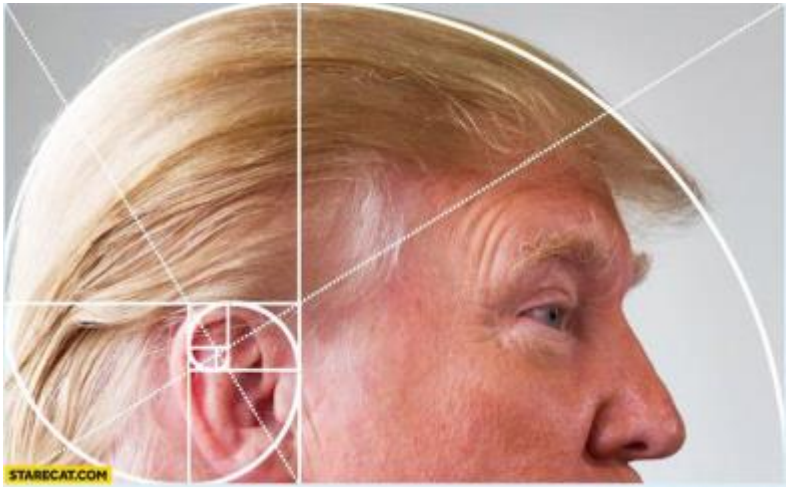
Proportioning of Human Parts









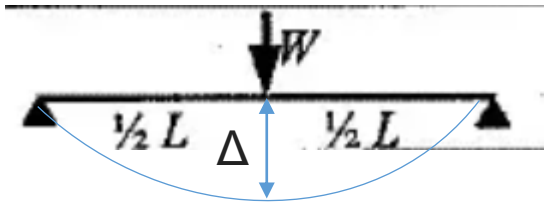


Proportioning of Structural Elements

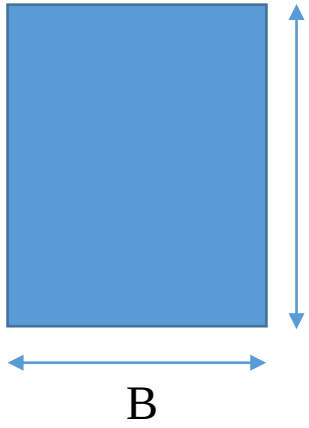
Structural members (beams, columns, etc.) are also proportioned based on their functional requirements and strength limitations.

- Usually, a beam has significantly more depth proportionally to its width. This allows it to span greater distances and support more weight.
- A column has low cross-section dimensions as compared to the length.

Both of these structural elements offer cues on the size and proportions of the spaces they occupy.



$$\Delta = \frac{WL^3}{48EI}$$

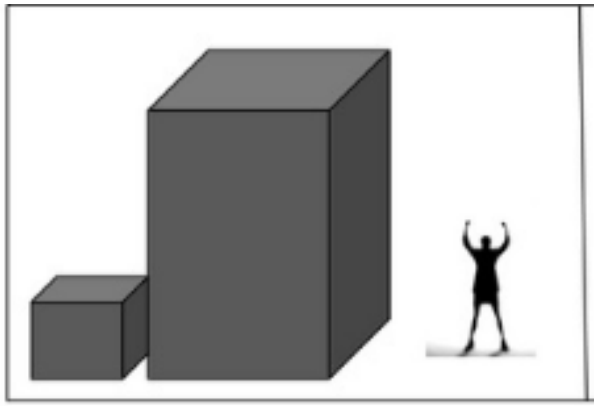


$$I = \frac{BD^3}{12}$$

Scale

Scale: Scale refers to the size of an object (a whole) in relationship to another object or standard.

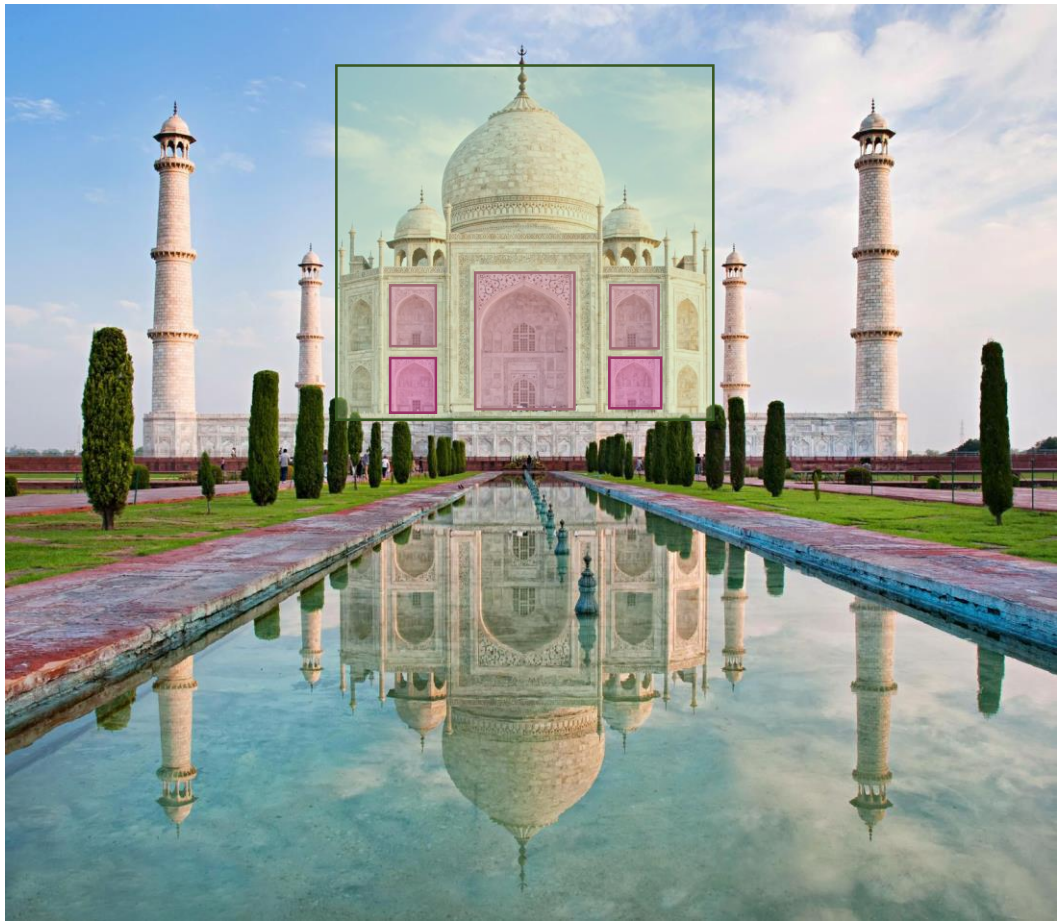
- Scale refers to the relationship between two or more objects, one that has a commonly known size.
- In most cases, the size of objects is compared to our own human scale.



Monumental Scale

- When the size of the object or a building gets increased that the actual size then it is termed as monumental scale.
- The scale is much bigger than human scale and generally used for public places where large crowds gather such places need to be constructed on monumental scale.
- This scale is also used for importance, domination and power.

Rashtrapati Bhavan



Scale of Different Elements of Taj Mahal

Miniature Scale

- When the scale of the object is set is such a manner that the size of the object or building decreases from the actual size then it is termed as miniature scale.
- Architects use it for making plans and models.
- Some times smaller scale is used for examples kids playing house and other structures.

Children's playhouse

Caged home in Hong Kong

Scale and Proportion

- Higher Scale and proportion is used for Emphasis
- Large scale can make for a very obvious focal point, or create visual emphasis.
- Scale and Proportion are closely tied to emphasis and focal point.

The big person in this painting is directly related to the importance of the subject.
Example: A king, Jesus, or the Madonna would be bigger than surrounding people.

THANKYOU

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