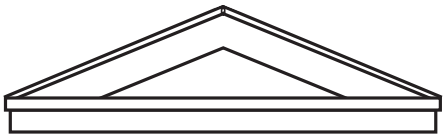
Architectural Language



To best understand architectural language, one needs to examine the simplest shapes and patterns that form the building blocks of architectural vocabulary, and, conveniently, these elements also form the elementary terms used in computer graphics.

Architectural Language; David Robert Donatucci

Primary Elements

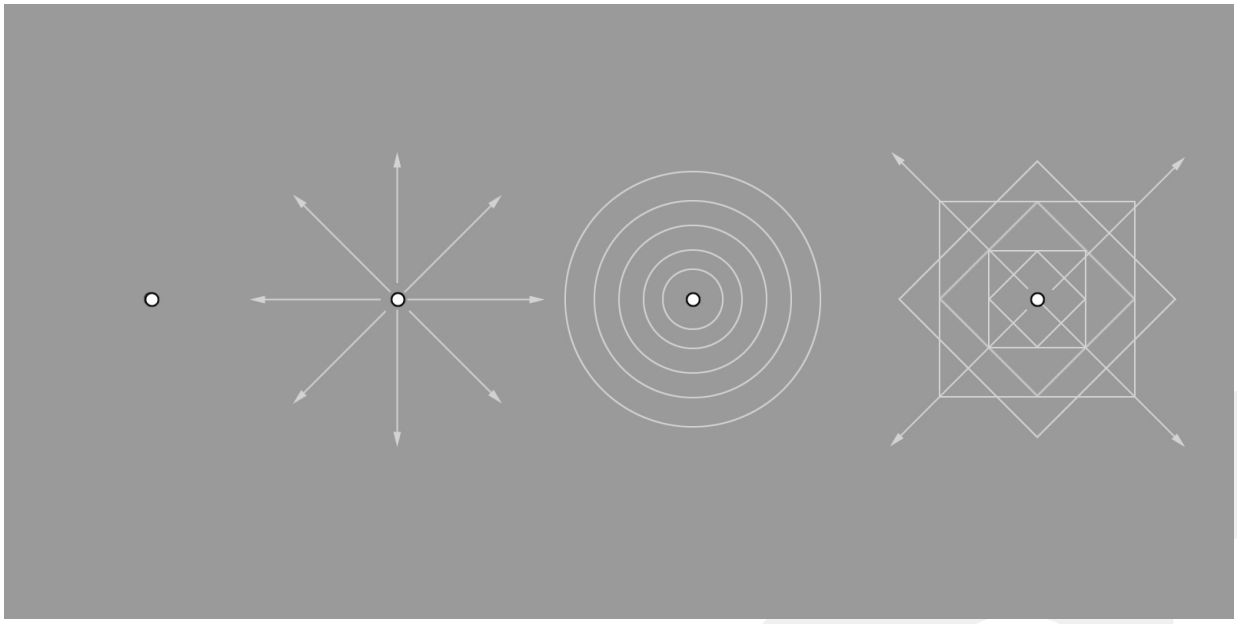
The primary elements of form can be compared to the corresponding terms used in computer graphic (CG) production. A point in space is simply a vertex to the digital artist, and a line is usually just that—or is sometimes called a segment or an edge. The extrusion of a line or edge results in a plane, but more specifically, we refer to these as a polygon when using software rendering packages. A three-sided polygon is commonly called a tri and a square polygon is known as a quad. Both are examples of a 2D surface. If a polygon is extruded along the perpendicular normal of the surface, then the resulting element is a volume that exists in all three dimensions.

Each element is a fundamental idea in architecture and is crucial to understanding and creating aesthetically intriguing forms and spaces. Each shall be discussed in further detail.

- Point/Vertex

A point is the simplest expression of architecture. It marks a position in space. Without length, width, or depth, a point exists as a static, directionless centralized notion of origin. A point can exist as the two ends of a line, an intersection of two lines, the corner of a plane or volume, and as the center point of a plane. This is the same for a vertex. It exists as a location in space and, more importantly, as the connections of lines in shapes, edges in polygons, and corners in primitives.

Points in space are a common occurrence in video games. They can be as simple as a reticle element on screen to help with targeting a weapon in a shooter or as a shiny glint of flashing light on objects of interest in an adventure game. These elements play an important part in video game development to help identify targets and treasures, but points also serve as beacons in space. The term breadcrumbs, derived from the tale of Hansel and Gretel, is often used to describe the gameplay mechanics of luring a player with the clever use of points in the environment. Pac Man and Mario have been eating dots and collecting coins for years.



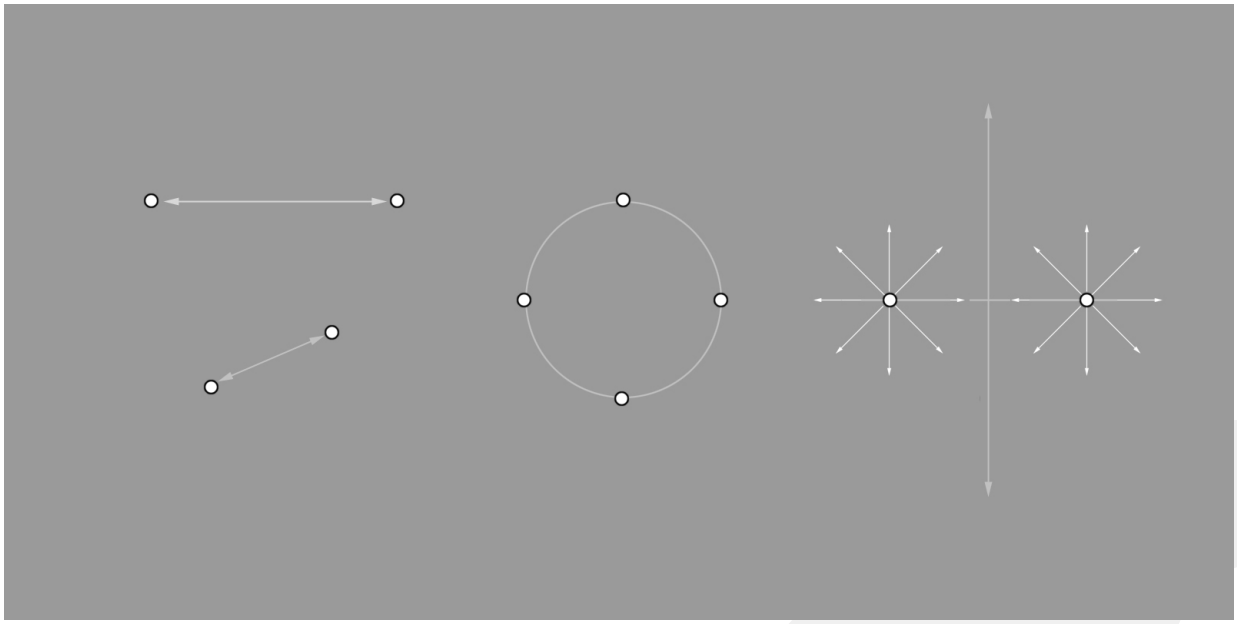
The Point; David Robert Donatucci

- Line/Segment

A line is the result of two points in space. Whether it is a straight path through the woods from point A to point B or a scratch in the sand that suggests team A and team B, lines are important primary elements of form and space. Lines denote both connection and separation. As a vertical element, lines appear as columns or towers and attempt to connect earth and sky. As a horizontal element, lines become beams, platforms, or bridges that span across a space or separate each story of a structure such as in Donkey Kong.

Lines help define boundaries in plan. The edges of an environment in a game such as Pac Man represent walls. In a game such as Donkey Kong, the lines are seen within a vertical cross section to help establish floors or platforms as boundaries to gravity.

Depending on one's orientation, a line can enclose a room seen in a top-down plan, but from the side, a line can represent the outline of, say, a window.



The Line; David Robert Donatucci

- Plane/Polygon (Tri and Quad)

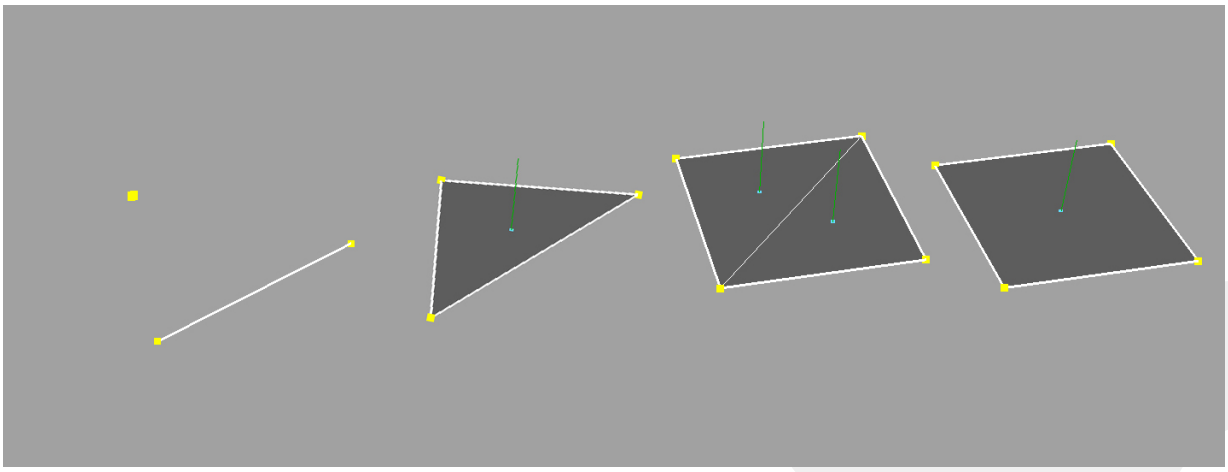
A plane is the beginnings of surface. By connecting three points in space with lines and filling in the shape, a polygon is born. The architectural element equivalent is the projection of a line along the edge to form a square plane. In computer graphics it is called a quad, which is actually two simple triangular polygons, or tris. These are the basic components of modeling in the CG world and serve as the skin to all objects.

There are three generic types of planes: the base plane, the wall plane, and the overhead plane.

The base plane is essentially the ground or floor. It represents the surface of activity, and in games it represents the plane of navigation where characters and players traverse.

The wall plane is the element that defines boundary and enclosed space. In games it visually blocks areas of the environment to control the player experience but also minimizes the rendering of geometry in view.

The overhead plane is merely the ceiling or roof. Architecturally, it represents shelter from the elements and protection from climate. In film sets this plane is often left out to allow for lighting or sound rigs.



The Plane; David Robert Donatucci

- Volume

Volume is the extension or extrusion of a surface to denote form or space. A pile of dirt created in digging a hole is just as much about volume as the hole itself. The dirt is form and the hole is space. Each represent a three dimensional volume that is fundamental when understanding architecture.

The mass of a building in the landscape is just as powerful as the open space of a piazza. Both speak clearly about the potential of volumes in architecture and games. Often in action adventure games, we arrive at a great structure in a desolate field such as a factory or a temple. These forms are usually massive oppressive volumes “in” space. Other environments, such as those in fighting games, concentrate on the arena and present a volume “of” space. Both form and space are types of volume that are more commonly referred to in computer graphics as geometry.

St. Peter’s Dome; David Robert Donatucci

St. Peter’s Basilica; David Robert Donatucci

Geometry

The simplest examples of geometry are shapes and primitives. These are the fundamental building blocks of architecture and any environment imagined. It is important to examine the basic 2D shapes from which these platonic forms are derived, such as the circle, triangle, and square.

- Shapes

Shape refers to the contours of a plane or the silhouette of a form. When creating architecture the basic shapes become important in establishing mood and atmosphere. Various forms and space are generated from these simple shapes and help to reinforce ideas about the purpose or theme of such architectural expressions.

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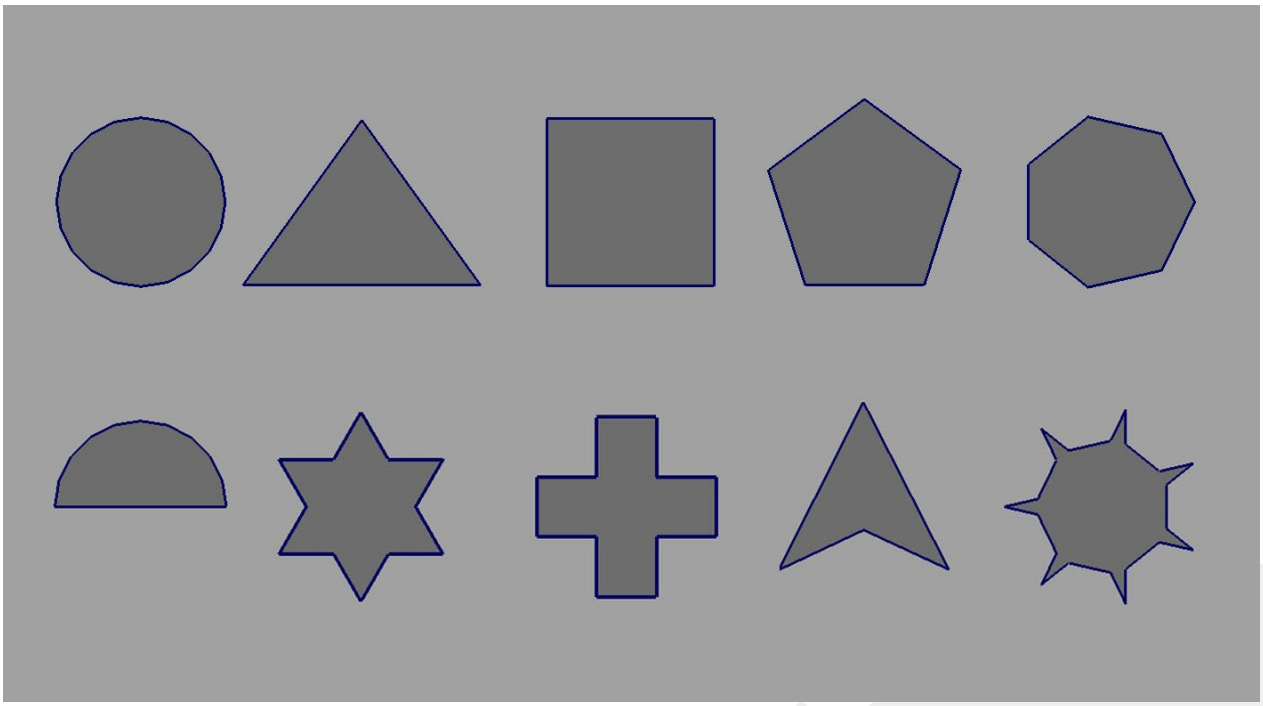
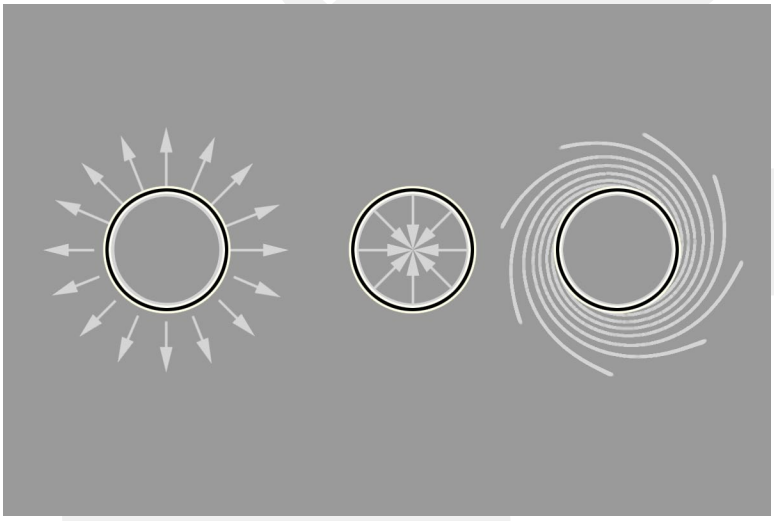


Shapes; David Robert Donatucci

- The Circle

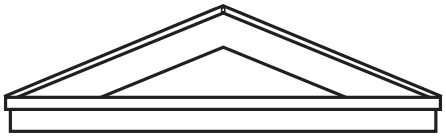
The circle is a powerful shape that is commonly reserved for a centralized notion. This shape recalls the sun or moon and becomes valuable in establishing a scared sense of place.

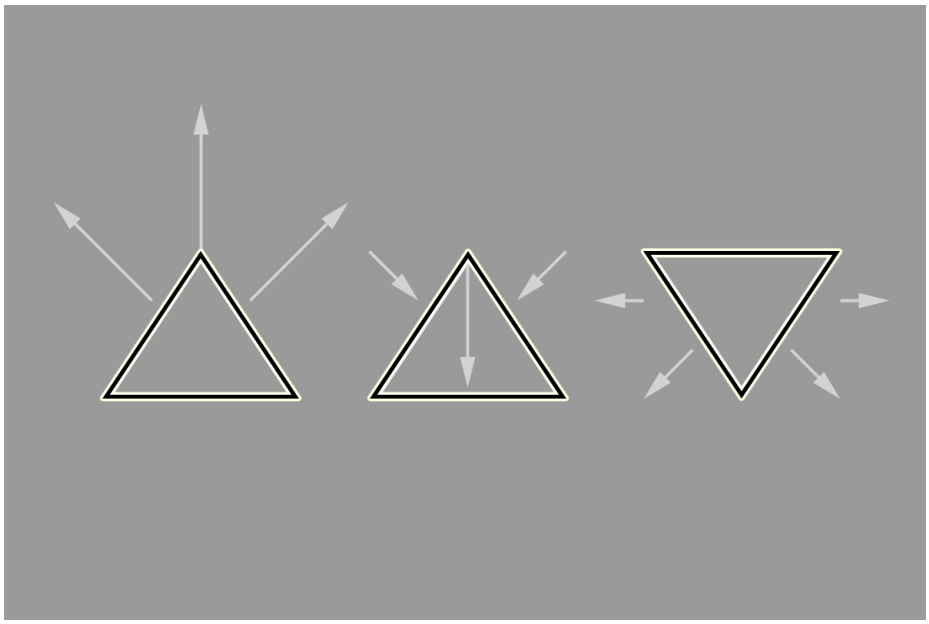


The Circle; David Robert Donatucci

- Triangle

The triangle is a strong shape that signifies stability. Like a mountain in the distance this figure evokes a sense of foundation and strength. In plan this shape invites ideas of direction or equilibrium.

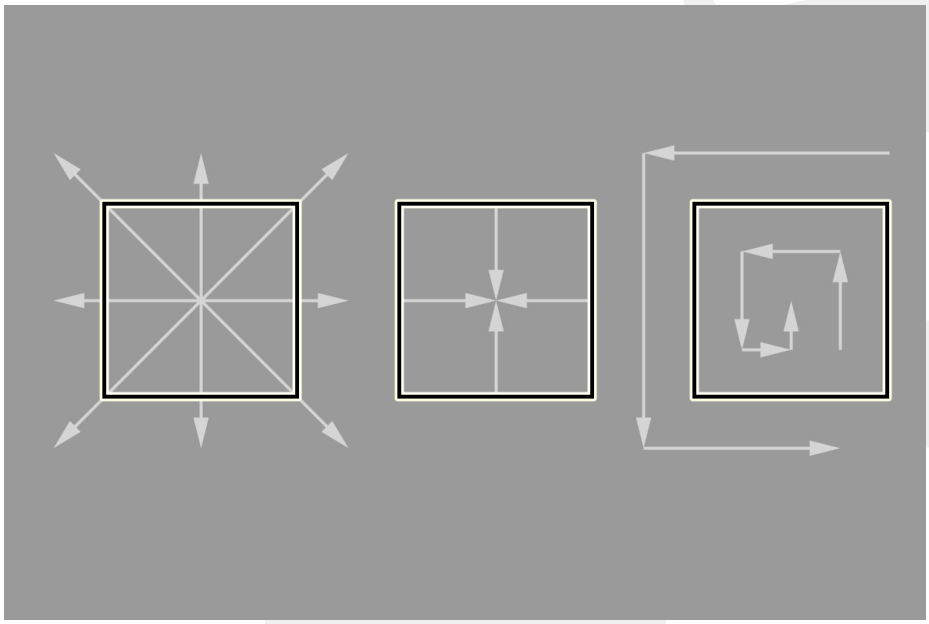




The Triangle; David Robert Donatucci

- Square

The square is the most tangible shape as it represents a rational understanding of form and space. Most of the architectural language with which we are familiar involves square or rectangle shapes.



The Square; David Robert Donatucci

- Primitives

Primitives are essentially three dimensional platonic solids based off of the basic shapes. Each is an extrusion or rotation of the circle, triangle, or square that form the basis of all architectural language.

The sphere, cylinder, cone, pyramid, and cube are the most essential building component forms available to the architect, set designer, or game environment artist. In 3D computer graphics, primitives are usually where one starts to lay out a scenario for designers. In games, entire environments are created using just primitives to establish forms and space for a level designer to develop gameplay. These early environments are called block out levels.

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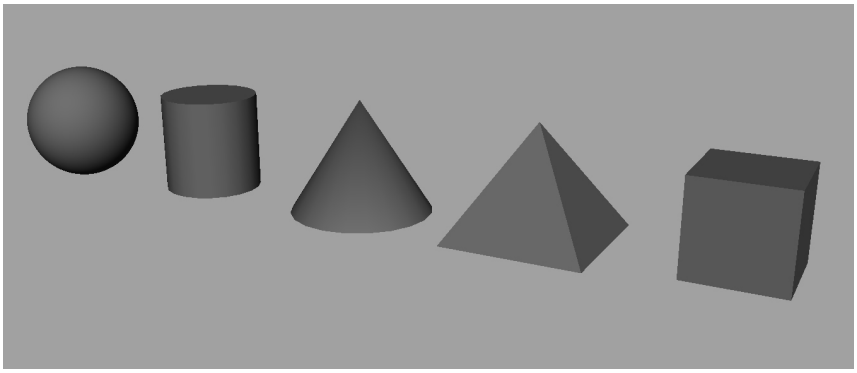
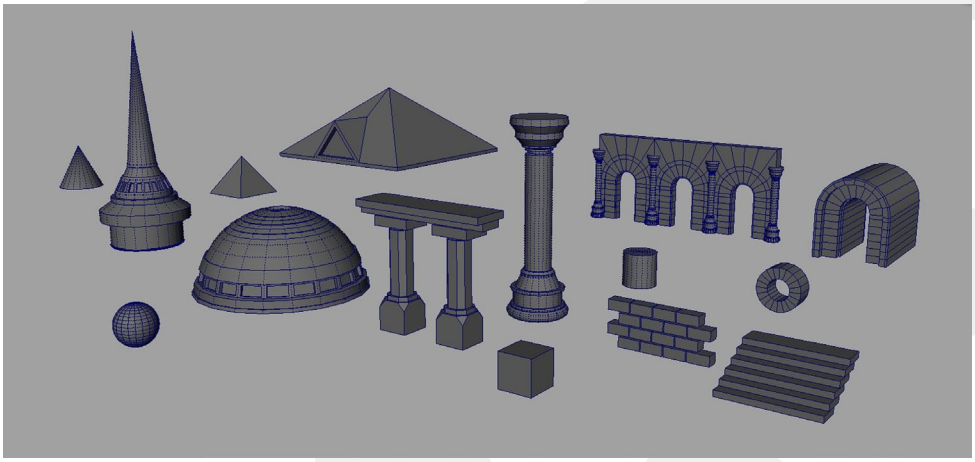


Primitives; David Robert Donatucci

- Transformation of Forms

When assembling primitives, artists and architects are not bound to the pristine scale, position, and orientation of these solids. The real life of architecture happens when these primitive are transformed. Through dimensional, subtractive, and additive transformation these forms become more interesting, detailed or complex. By stretching or squashing, cutting into, or adding to these platonic solids, artists begin to fashion the essential parts of architecture. The bricks, columns, posts, beams, arches, vaults, domes, stairs, doors, and windows used throughout architecture are all products of this transformation of forms. From simple shapes to basic primitives, the architectural vocabulary becomes clear.



Vocabulary; David Robert Donatucci

Orders of Form

The various orders of form when manipulated and assembled fall into several orders of form. These are methods by which an artist can establish themes and create dynamic synergy.

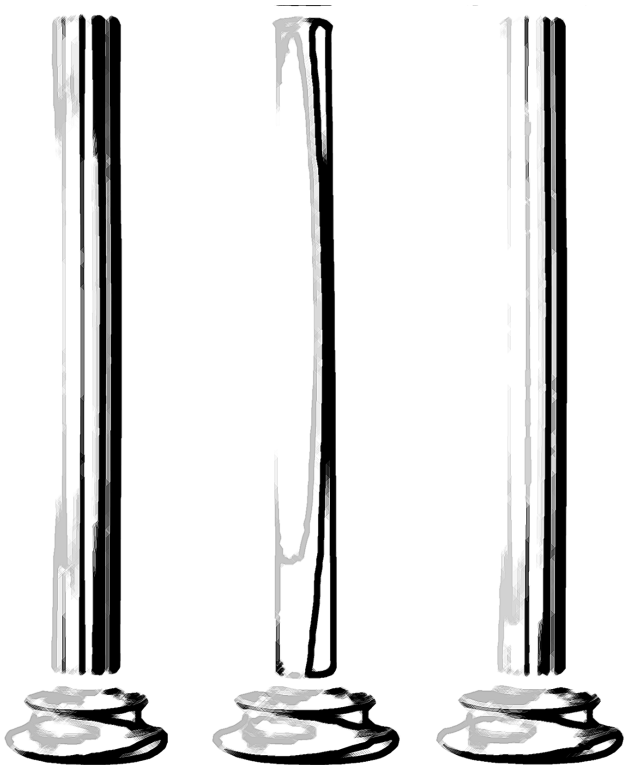
- Centralized

Centralized forms involve a dominant visual structure to establish a sense of monumental importance. A structure placed at the center of a courtyard presents a sacred and powerful gesture of architecture.

Baptistery; David Robert Donatucci

- Linear

Linear forms stretch along one axis to accentuate motion or a connection between two points in space. Bridges and towers provide excellent examples of this as they connect one bank to another or the earth to the sky with a clear sense of motion along a horizontal or vertical axis.

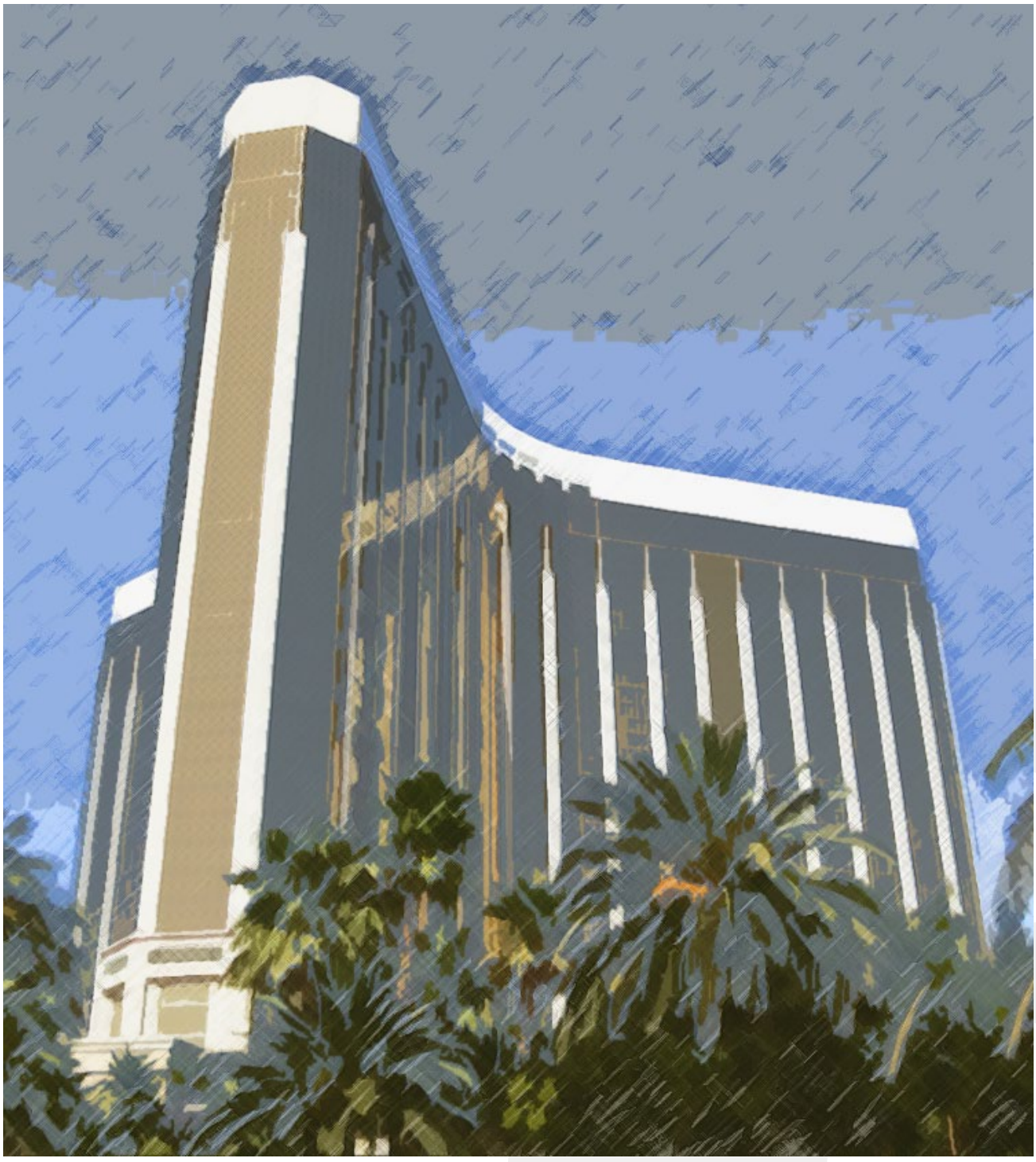


St. Mark's Campanile; David Robert Donatucci

Bridge; David Robert Donatucci

- Radial

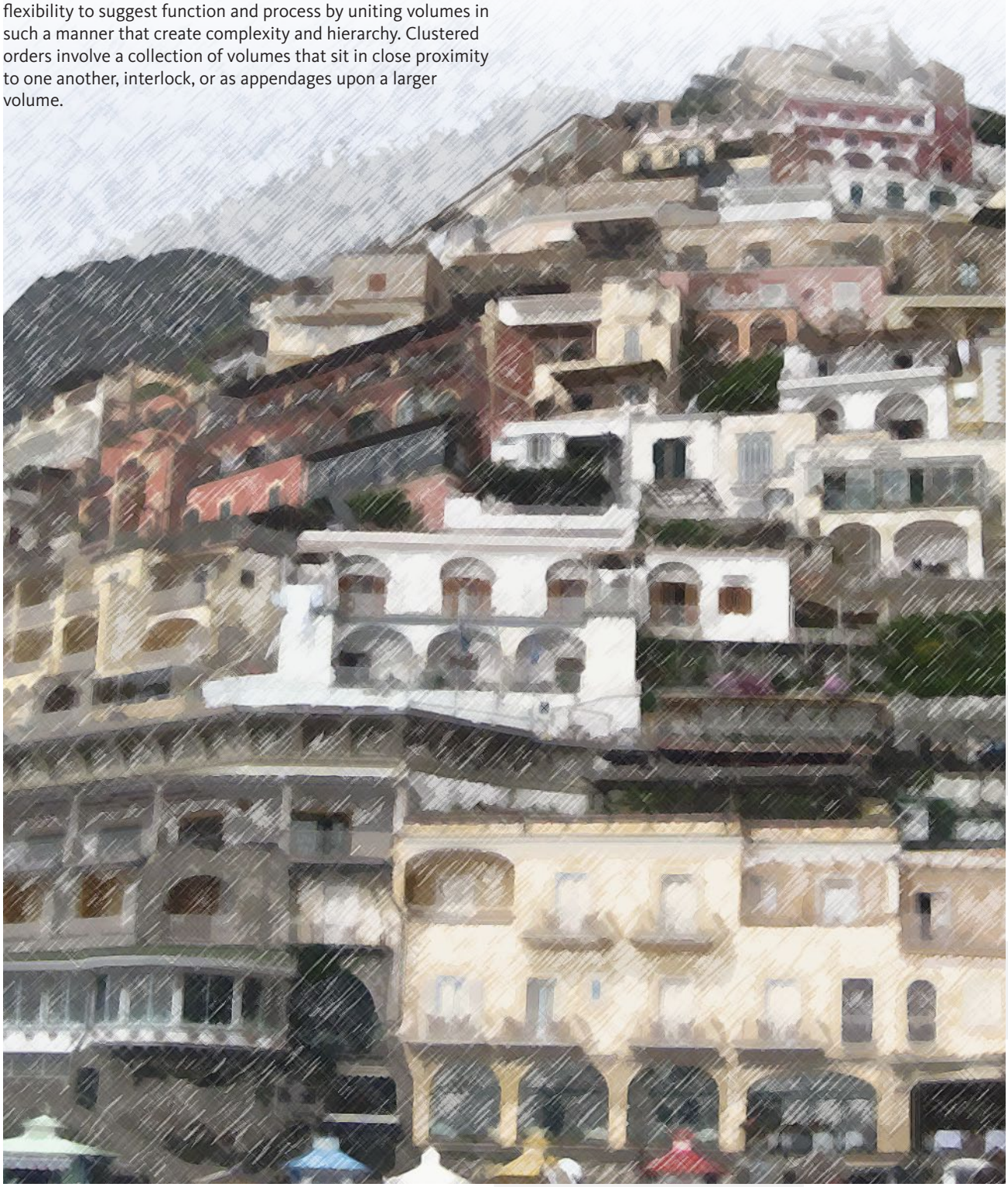
Radial forms combine a central pivot point with linear forms that extend from its heart. These forms represent a principle core that fingers outward to represent the idea of a network. The subordinate linear forms suggest auxiliary functions that hinge off the main nucleus structure.



Radial; David Robert Donatucci

- Clustered

Clustered forms provide a unique opportunity to combine a number of forms of varying shapes and size. This order of form benefits from a centralized appearance but is given the flexibility to suggest function and process by uniting volumes in such a manner that create complexity and hierarchy. Clustered orders involve a collection of volumes that sit in close proximity to one another, interlock, or as appendages upon a larger volume.



Positano, Clustered Town; David Robert Donatucci

Grid forms are defined as two or more sets of uniformly spaced points that create a formal matrix of space. The grid points on a square layout provide opportunity for structure and establish uniform spaces for occupation between these. Greek temples are based on this concept as are modern day office buildings.

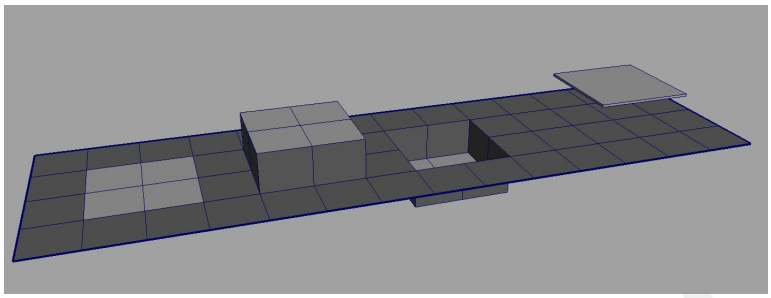
Defining Space

Architecture will always explore the notion of space. From the dawn of time mankind has recognized space as an open field edged by tall grass or the shaded patch under the canopy of a tree. Although a rudimentary understanding of space, it identifies the essence of defining it as a conscious decision to establish territory and boundaries. This could be as simple as laying down a blanket in a field to have a picnic or planting an umbrella on the beach.

The defining of space involves both horizontal and vertical elements that help create territory and boundaries. Architecture starts here and incorporates these ideas to create sacred spaces. Floors, walls, and ceilings are the basis of simple enclosures while columns and openings further define space.

Horizontal Elements

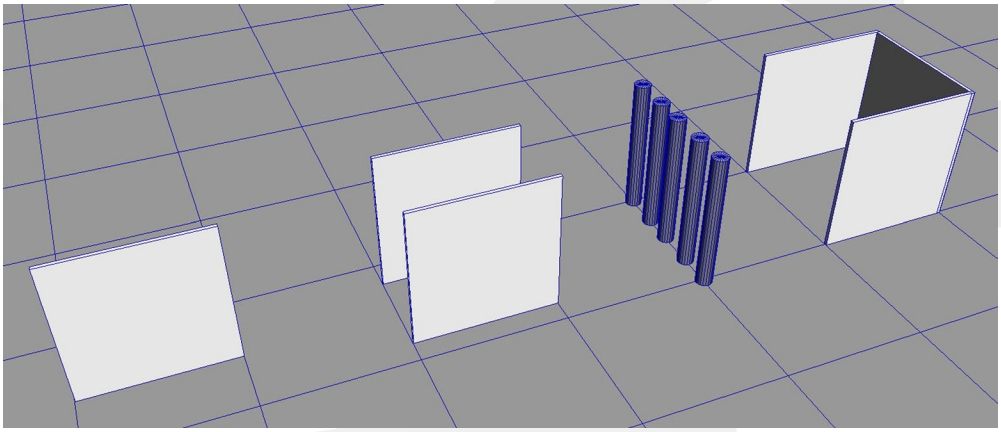
- Base Plane - Elevated Plane - Sunken Plane - Overhead Plane



Horizontal Elements; David Robert Donatucci

Vertical Elements

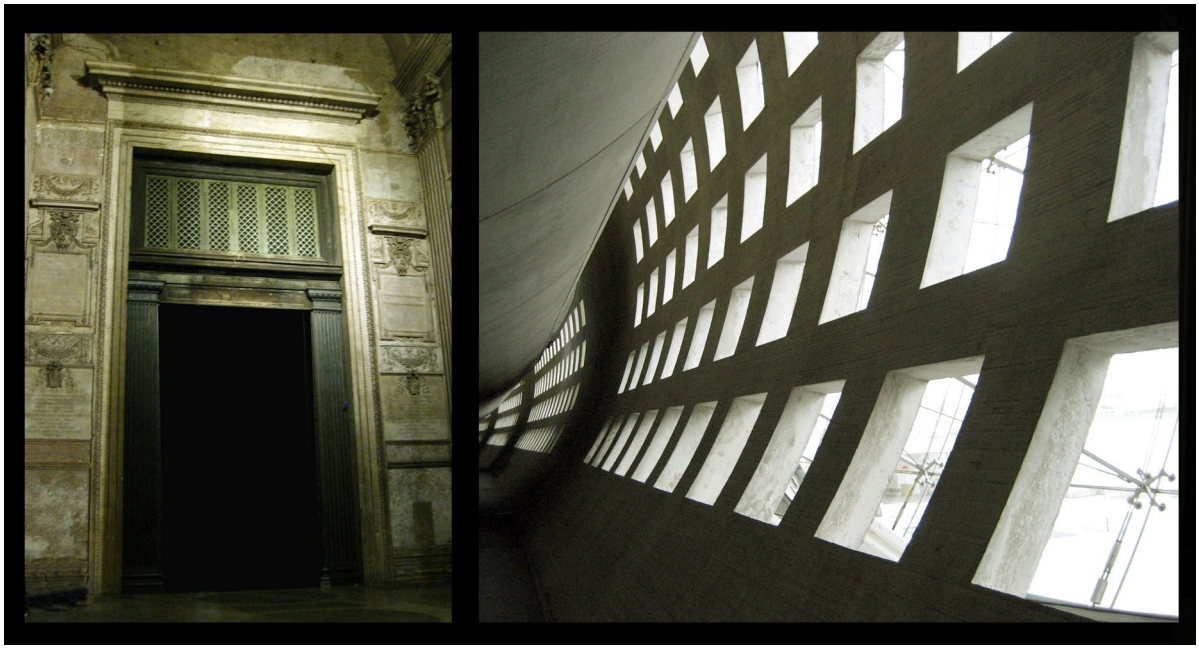
- Vertical Plane - Parallel Plane - Columns - Enclosure



Vertical Elements; David Robert Donatucci

Openings

- Doors - Windows - Vistas - Light



Openings; David Robert Donatucci

Openings-Vistas & Light - David Robert Donatucci