

## Base polygons, Tessellations, Apophenia, Pareidolia

(What is “real” and what is not ?)

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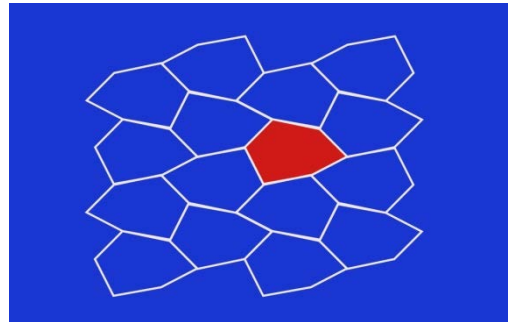
### *Mind tips , tricks & trips :*

By building a tile which covers the plane, by repeatance, without gaps or overlaps you have a Tessellation.



1. Gorgon

All Tessellations derive from Polygons (Triangles , Tetragons , Pentagons & hexagons). There are Infinite Tiles of this kind but , luckily for us , they are all grouped in less than 60 categories called **BASE POLYGONS** (The last of the 15 Pentagons, included, was discovered in 2015).

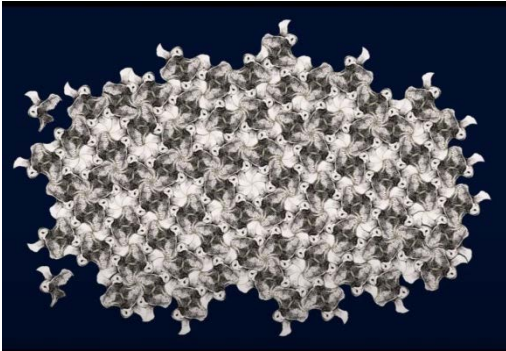
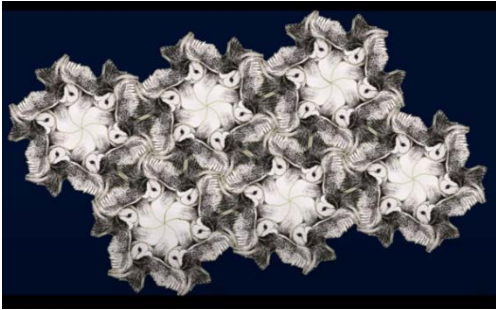


### 2.Example of a BASE POLYGON

In Euclidian 2D space you can transform the polygons edges in 3 ways , in order to match : by *Rotation* , by *Translation* or by *mirror Reflection*.

Every Base Polygon has it's on recipe of the above 3 linear transformations (if any).

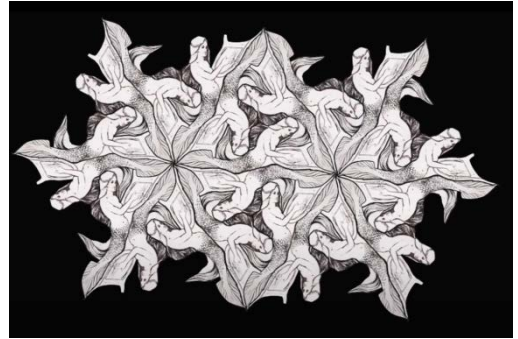
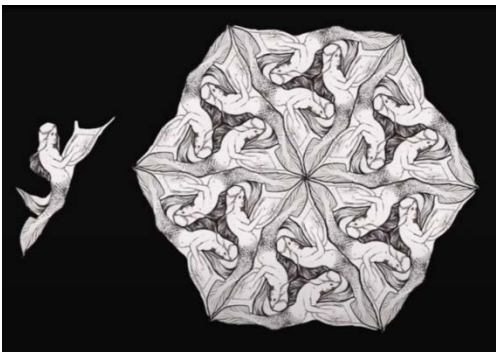
Imagination added but based on evolutionary attributes of the Human brain.



### 3.Tyto (Non-Periodic )

**Apophenia** : the tendency to perceive meaningful connections between unrelated things.[1]

**Pareidolia** : the tendency for perception to impose a meaningful interpretation on a nebulous stimulus , usually visual, so that one sees an object, pattern, or meaning where there is none.[1]



### 4.Sthenoo



### 5. Hippos (Equus)

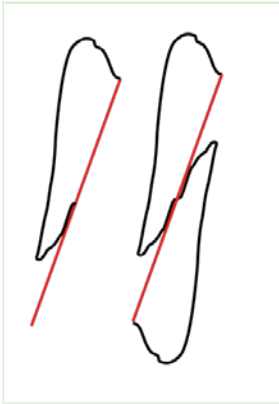
Endless hours of line manipulations. The slightest change on a line (polygon edge) has , most of the times, dramatic consequences on the whole tile triggering brain storm. Images trying to match the , mathematically derived, outlines . Visual associations without logical coherence. A visual memory path tracing with all following (memories , emotions etc..).

The Tile outlines , the boundaries, are True . They have to be !! After all they match like a glove if you follow the Mathematical rules. The inside?

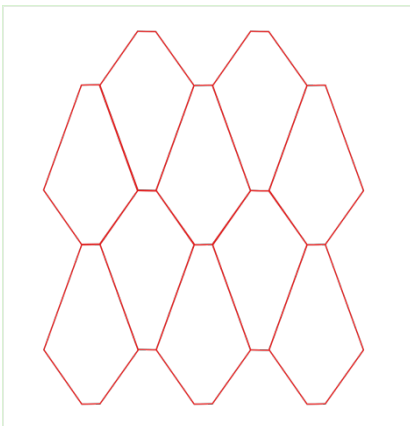
## Example

### (Byzantine Angel-Daemon )

“Wings” and “horns” are probably the first images coming to mind. A brain storm of past visual memories and a bit of reinforcement from Uncle Google. From experience and many many tries, comes the first line and its 180° rotation.

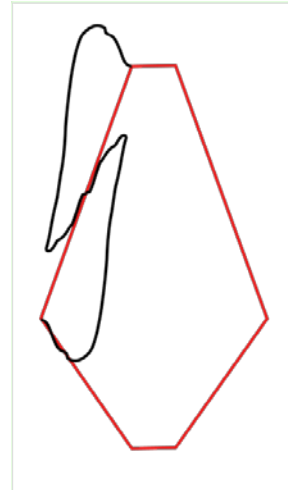


The R2 (180° rotation) reduces the available BASE POLYGONS by half. A Y

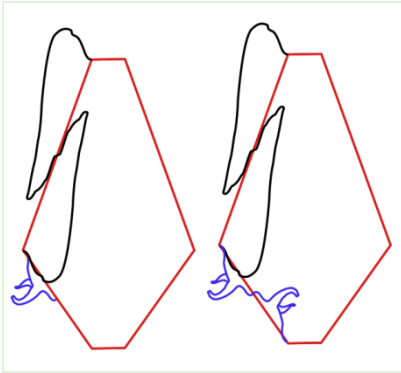


axis symmetry limits them more.

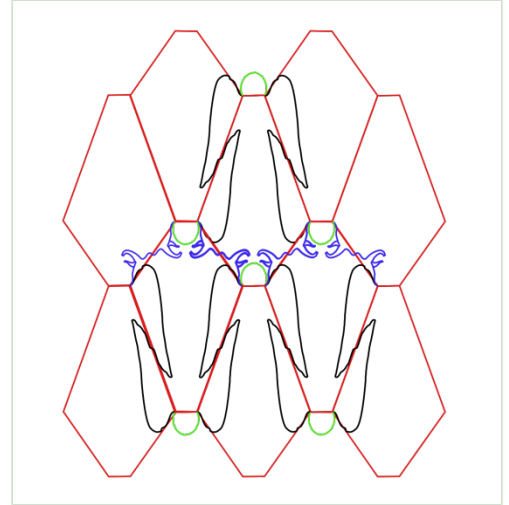
For more Byzantine artistic rigor the polygon chosen is **IH13**( 1 Translation (or mirror Translation) and 2 R2s and their mirror Translations).



Time for the daemon body outline design. A R2 rotation is mandatory now. Many many tries again .A gargoyle-lizzard mouth turns into ears and hornes when rotated 180°.

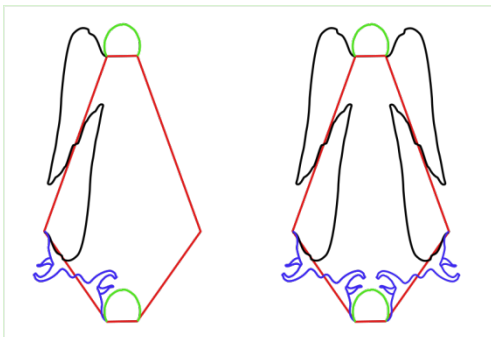


2 Y-axis mirror-symmetry translations and we're done. Done?



The golden Angel-Head Halo follows and forms the Daemon's horns when Translated.

The concept is predefined , again and again, while drawing the outer lines and their consequent transformations. The "canvas" has limitations. The cards are marked , but still, the tile color filling is a mind challenge.





6.BYZANTINE ANGEL-DAEMON TILE

OTHER EXAMPLES :



8.

MACEDONIAN FOLK DANCER



7.ANGEL-DAEMON TESSELLATION



9. CHORUS





**12. OCTOPUS (BASE POLYGON & OUTLINES)**



**10. ANTONIA TILE**



**13.OCTOPUS TILE**



**11. ANTONIAS IN PARADISE**

(SEE YOUTUBE Playlist : :  
"BRENIKOU TESSELLATIONS")

### **AN IDEA:**

A **tessellation program (app)** based on base polygons (NOT symmetry groups , which I find confusing). The user has a variety of Base Polygons to choose from (examples given). After picking one , can start drawing the edge lines. The app automatically draws the lines (by Translation , Rotation or mirror Reflection corresponding to the tessellation limitations). The user can also , between line drawing , modify the Base Polygon if

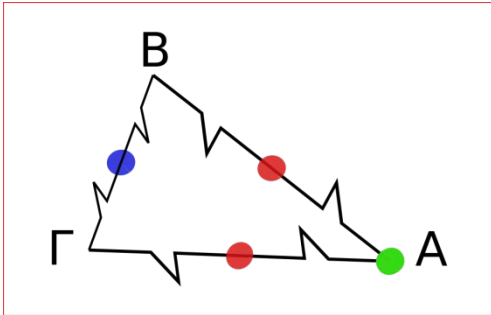


**14.OCTOPUS TESSELLATION**

necessary (in some cases it is not possible , in others it is).

## References

[1]: Wikipedia



**Example :**

LIMITATIONS: Angle A is of  $36^\circ$ . Red dot on AB corresponds to  $180^\circ$  Rotation (middle) , Green dot to  $36^\circ$  Rotation , Blue dot on BΓ to  $180^\circ$  Rotation (middle).

The user must only : draw 2 lines:  
**AtoRED\_DOT** and **BtoBLUE\_DOT**.

Program's outcome:

