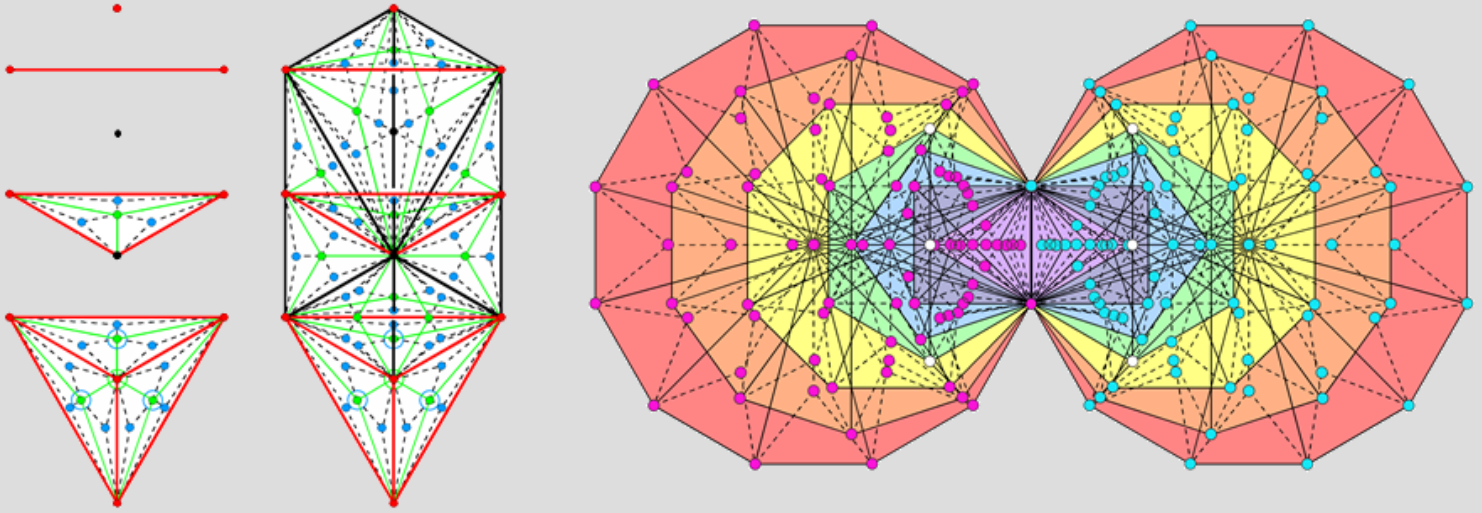# The outer & inner Tree of Life basis of the heterotic superstring symmetry group E_8

Root & Trunk   Outer Tree of Life

Outer Tree of Life

Root	Trunk	Branches
2 ●	9 ● (red)	
	5 ● (green)	10 ● (green)
	15 ● (blue)	33 ● (blue)

72

Number of corners = 74

Inner Tree of Life

Unshared corners	Shared corners	Unshared corners
84 ● (magenta)	6 ○	84 ● (cyan)

6+168

Number of corners = 174

Total number of corners = **248** = (2●+6○) + (**72+168**) = 8 + 240

The inner Tree of Life basis of the heterotic superstring symmetry group $E_8 \times E_8$

8 ○   8 ○
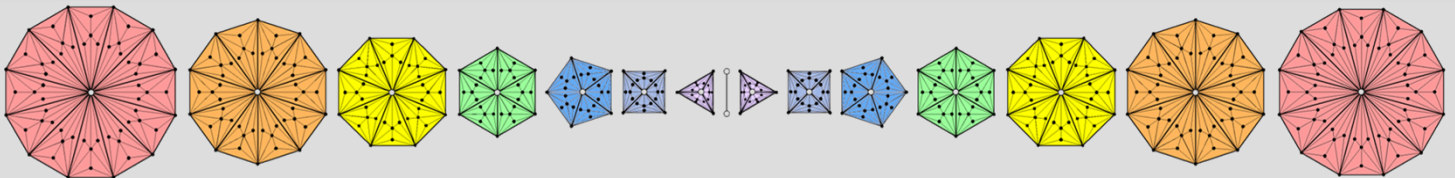
240 ●   240 ●

Total number of corners = **248**   Total number of corners = **248**

The 7 separate Type C polygons have 432 triangles with 240 corners surrounding their centres. Separated by the root edge, whose two endpoints count formally as corners, 248 corners are associated with each set of polygons. They symbolise the (**248+248=496**) roots of $E_8 \times E_8$, one of the two anomaly-free symmetry groups governing the forces between heterotic superstrings.

The outer & inner Tree of Life basis of the heterotic superstring symmetry group E_8

Outer Tree of Life

A Type B triangle is composed of 9 triangles with 3 corners on its sides and 4 corners inside it. The 16 Type B triangles of the outer Tree of Life have 10 corners on their 22 sides and (16×4=**64**) internal corners of their (16×9=144) triangles with (16×12=192) sides. The outer Tree of Life comprises its root, its trunk and its branches. In terms of the 74 corners, the root consists of two corners whose projection onto the plane containing the (7+7) enfolded polygons of the inner Tree of Life are the endpoints of their shared root edge. One corner is located at Daath, which is the centre of the triangle formed by Chokmah, Binah & Tiphareth. The other coincides with Tiphareth, the centre of the Tree of Life in both a geometrical and a metaphysical sense. This where the root joins the trunk, which is the sequence:

point-line-triangle-tetrahedron

symbolising the integers 1, 2, 3 & 4. The trunk is composed of the 9 red corners of the 16 primary triangles, 5 green centres of its 5 primary triangles and 15 blue corners of their (5×9=45) triangles. The branches are the remainder of the outer Tree of Life. They comprise 11 primary triangles with 10 green centres and (3×11=33) blue corners.

The 74 corners comprise the two black corners forming the root and the **72** corners of the trunk (29 corners) and branches (43 corners). The 16 primary triangles have (10+16=**26**) corners & centres, where

$$10 = \bullet + 9 \, {\color{red}\bullet},$$

and

$$16 = \bullet + \mathbf{15} \, {\color{green}\circ},$$

so that

$$\mathbf{26} = \bullet + \bullet + 24 \, {\color{red}\bullet}/{\color{green}\circ}.$$

This compares with the **26** dimensions predicted by quantum mechanics for spinless strings being made up of the time dimension, the longitudinal dimension and 24 transverse dimensions comprising the 9 superstring dimensions and **15** bosonic string dimensions. The root of the outer Tree of Life is analogous to the time and longitudinal dimensions of a string in **26**-dimensional space-time. Neither participate in creating shape. Rather, in each case they are its source.

Inner Tree of Life

The 7 enfolded, Type B polygons have 47 sectors with 41 corners. Their (47×3=141) triangles have (41+47=88) corners (86 outside the root edge). The (7+7) enfolded, Type B polygons have (2×141=**282**) triangles with (2 + 2×86 = 174) corners. **282** is the number value of *Aralim*, the Order of Angels assigned to Binah. The centre, top and bottom of each hexagon coincide with corners of triangles belonging to the outer Tree of Life. These six white corners are shared and (174-6=**168**) corners are unshared, (**168**/2=84) corners (turquoise or pink) being associated with each set of 7 enfolded polygons. The (47×2=94) sectors of the (7+7) enfolded polygons have **80** corners. **87** corners of (47×3=141) triangles are associated with each set of 7 enfolded polygons when they are Type B. **80** is the number value of Yesod and **87** is the number value of *Levanah*, its Mundane Chakra. The separate outer and inner Trees of Life have (74+174=**248**) corners of (144+282=426) triangles. Excluding the root, there are **246** corners, where **246** is the number value of *Gabriel*, the Archangel of Yesod. **248** is the dimension of the rank-8, exceptional Lie group E_8 appearing in $E_8 \times E_8$ heterotic superstring theory. The 8 white or black corners denote the 8 simple roots of E_8; the (**72**+**168**=240) other corners denote its 240 roots. The **72** corners in the trunk and branches symbolise the **72** roots of E_6, the rank-6, exceptional Lie group that is a subgroup of E_8. The **168** unshared corners in the inner Tree of Life denote the **168** roots of E_8 that do not belong to E_6. The 84:84 division of the superstring structural parameter **168** is characteristic of sacred geometries (see Article 64).

The 426 triangles in the combined outer & inner Trees of Life have 240 corners other than those in the root.

The inner Tree of Life basis of the heterotic superstring symmetry group $E_8 \times E_8$

Each of the n sectors of a Type C n-gon is divided into three smaller sectors that are further divided into three triangles. The 9n triangles have (5n+1) corners. The 7 separate Type C polygons with **48** corners have 247 corners. Consider the two sets of 7 such polygons separated by the root edge. The two endpoints of the latter can be regarded as two corners of a triangle in the limit that its third corner collapses into its base. **248** corners are associated with each set of 7 polygons separated by the root edge. The first 6 separate polygons with **36** corners have 324 triangles with 186 corners. Hence, **187** corners are associated with the root edge and each set of the first 6 polygons. **248** is the number value of *Raziel*, the Archangel of Chokmah, and **187** is the number value of *Auphanim*, the Order of Angels assigned to this Sephirah.

The **248** corners associated with each set of 7 polygons and the separate root edge correspond to the **248** roots of the rank-8, exceptional Lie group E_8. Their 7 centres and an endpoint of the root edge correspond to its 8 simple roots; the 240 other corners correspond to its 240 roots. The direct product $E_8 \times E_8$ (one of the two possible superstring symmetry groups) is the consequence of the inner form of the Tree of Life having two halves, one of which is the *mirror image* of the other. The (7+7) Type C polygons and the root edge have **496** corners. **496** is the number value of Malkuth (material universe) and the dimension that a superstring symmetry group must have to make all quantum anomalies disappear.