

Why do some subdivision endpoints have more lines than others?

This model allows multiple lines in and out of certain points but not others. Both images share n , S , and have $SCF = 1$. They differ by P in order to examine why some points have more lines coming out of them than others. Each image has a **1** at the end of the P^{th} endpoint (line **1**); colored circles distinguish between the three types of VF subdivision endpoints.

- Perimeter subdivisions but not vertex, 2.
- Ray subdivisions but not center, 4.
- Center, $2n$.
- These are not subdivision endpoints.

One of the differences with the traditional string art model is that those images have one line into and one line out of any used subdivision. Both of these images use all subdivision endpoints because $SCF = 1$.

A given perimeter subdivision point (except endpoints of each VF segment) has only one line in and out because the jump to a new vertex (the first part of the three-part jump set of Jump, In, Out) occurs only once.

A given ray subdivision point (except center) is counted twice, once on the move *In* to the center and the second time on the move *Out* to the vertex. Therefore, each is associated with 4 segments. Note that the polygon's vertex is similar to interior ray segments from the center to each vertex.

The center is counted each time a vertex is counted since it is the end of the *In* and start of the *Out* move in each jump set. This means that a total of $2n$ lines are tied to the center of the image.

The last of the three red subdivision points ○ on the vertical ray ($2/3$ of the way to the center) in the upper image is difficult to discern as it looks like it could be an intersection of two segments (like the two ○ line intersections above this point). Note that the red circles are equidistant to one another on each ray ($1/S = 1/3$ in length).

The upper image shows 14 lines associated with the center and the lower image shows half that number, 7. There are 14 lines touching the center in the lower image: half are going into the center and half are going out and they are on top of one another. This also explains why there 4 lines not 3 at the inner red ○ endpoint $1/3$ from the center.

