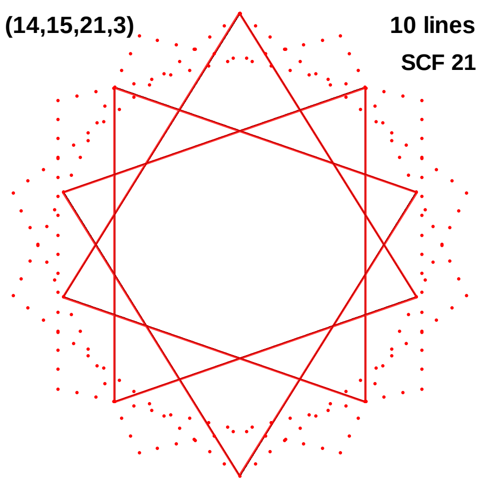
Composite *G*-Line Images

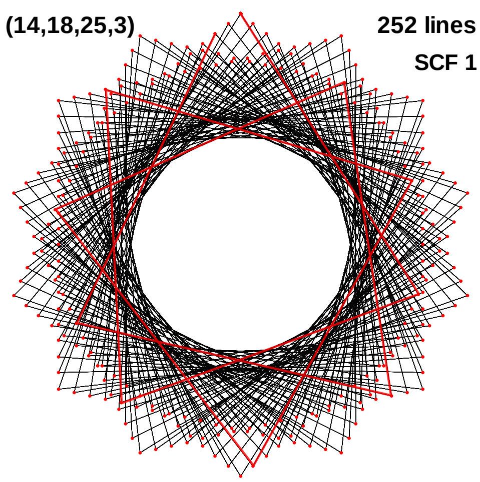
The ***G*-line generator function** produces values of ***P*** that are within ***G***/2 subdivisions of the top of the image after ***G*** lines are drawn. ***P*** = ROUND(***k***·***n***·***S***/***G***,0) for ***k*** ≤ ***G***/2.

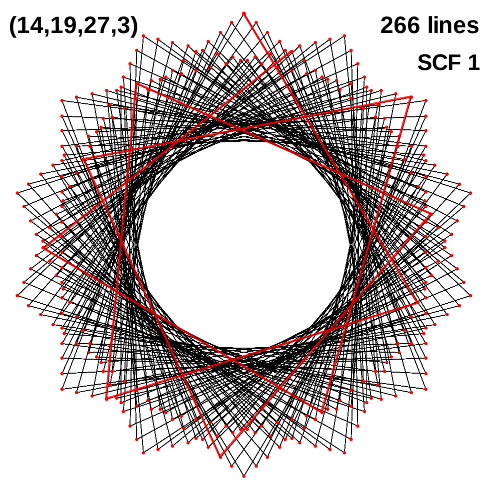
If ***G*** is composite (for example, ***G*** = 10) and one factor of ***G*** (2) is a factor of ***n*** (14) and the other (5) is factor of ***S*** (15), then a remainder zero image (denoted 0***r***10) can be obtained using all ***n*** vertices if VCF = 1. If ***J*** = 3 and ***k*** = 1, (14,15,21,3) is the 0***r***10 oval 10,3-star at left. Change ***S*** to get morphed versions of this image. Two ***S*** between 15 and 20 use every subdivision endpoint since SCF = 1; ***S*** = 18 and 19. At middle, (14,18,25,3) has 10th segment endpoint is at -2 because 10***P*** = 250, 2 less than 252. At right, (14,19,27,3) has 10th segment ends at +4 because 10***P*** = 270, 4 more than 266.

Each of these images is a ***k*** = 1 value of ***P***. If ***S*** is a multiple of 5, the same 0***r***10 oval 10,3-star occurs. When ***S*** = 16, ***P*** = 22 and SCF = 2; the 10th line is not smallest-step. (Indeed, the 51st endpoint ends at subdivision endpoint 2). But if ***S*** = 17, then ***P*** = 24, SCF = 2 and the 10th line is smallest-step and ends at subdivision point 2 because 10***P*** = 240 and ***nS*** = 238.

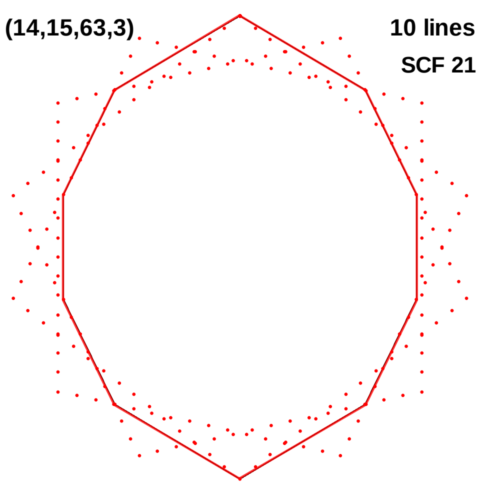
When ***k*** = 2 the 0***r***10 image (***P*** = 42) is a pentagram and when ***k*** = 4 the 0***r***10 image (***P*** = 84) is a pentagon. Both images use every other vertex of the oval 10,3-star.

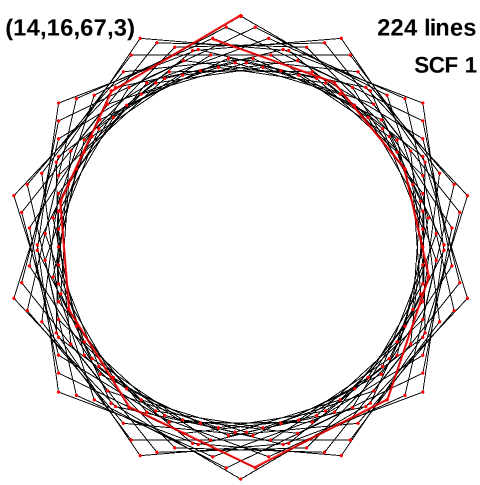


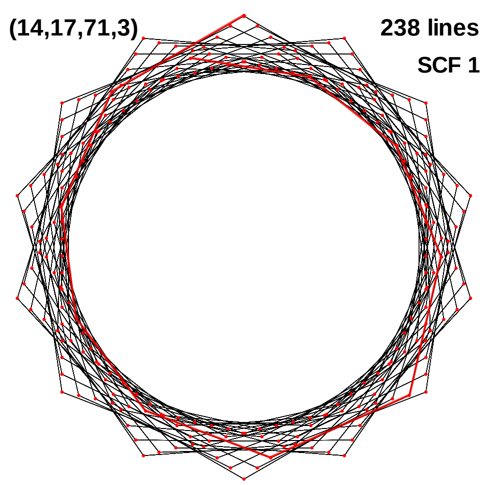




The ***k*** = 3, 0***r***10 oval decagon at left morphs into middle (10th segment ends at -2 = 10·63-3·224) and right (10th segment ends at -4 = 10·71-3·238). The next two values of ***S*** (18 and 19) have SCF = 4 and SCF = 2, respectively. The ***S*** = 18 version is *smallest-step* of length 21 at subdivision endpoint 84, and the ***S*** = 19 version is smallest-step of length 10 at endpoint 2.

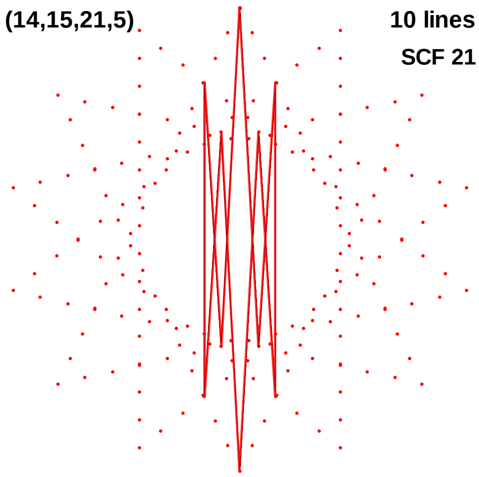


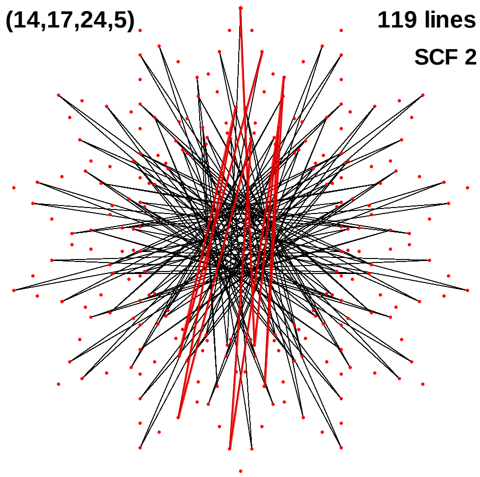


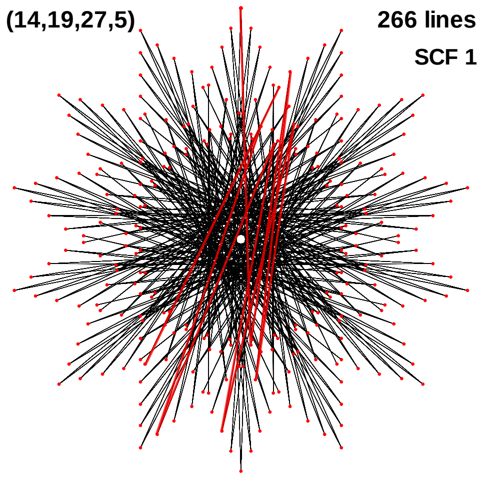


Each of the above was based on ***J*** = 3. When ***J*** = 1, and ***k*** = 1 the 0***r***10 image is an irregular 10,1-star (on a 14,1-VF) which turns into a 5,1-star for ***k*** = 2; a 10,3-star for ***k*** = 3; and a 5,2-star for ***k*** = 4. ***J*** = 2, ***k*** = 1 produces an irregular 5,1-star (on a 7,1-VF since VCF = 2); ***J*** = 4, ***k*** = 1 produces an irregular 5,2-star (on a 7,2-VF since VCF = 2); and ***J*** = 6, ***k*** = 1 produces an even more irregular 5,2-star (on a 7,3-VF since VCF = 2). This star has very small feet.

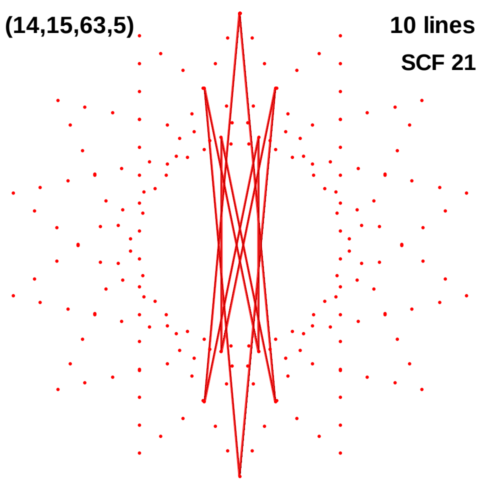
The sole remaining ***J*** < ***n***/2 is 5. This produces additional interesting images. The first shown is ***k*** = 1 which is reminiscent of finger traps with a smaller number of lines. The right image is the ***J*** = 5 counterpart to the right image in the first row.

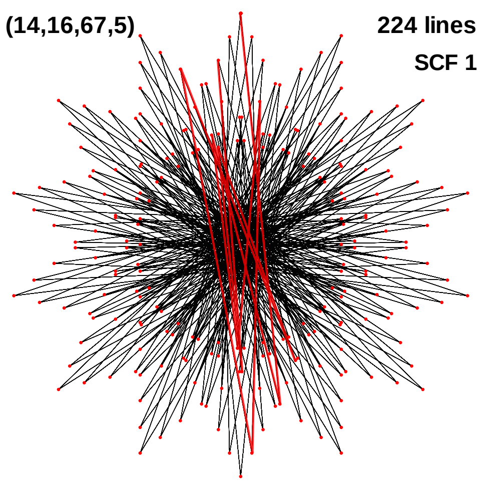

(14,15,21,5) 10 lines SCF 21

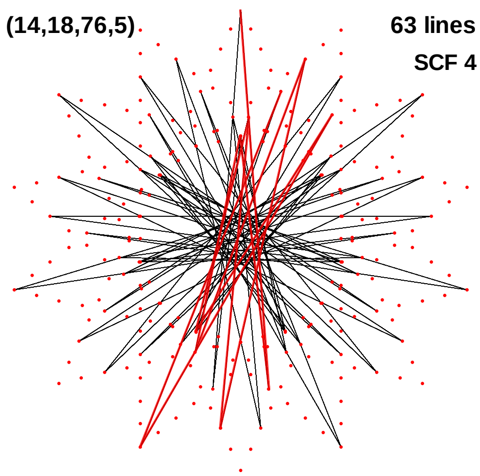

(14,17,24,5) 119 lines SCF 2


(14,19,27,5) 266 lines SCF 1

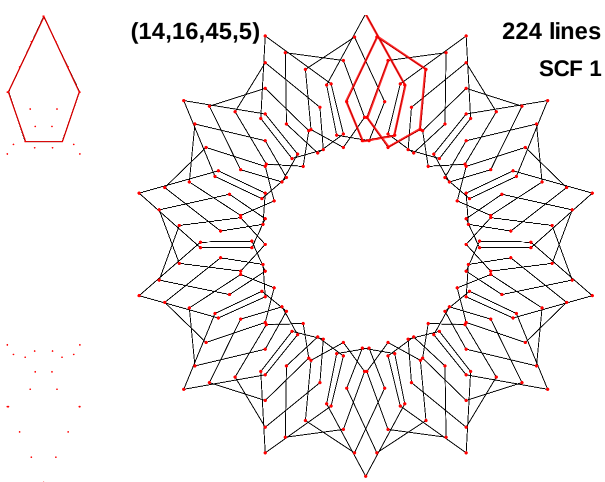
Next are the ***k*** = 3 images. The middle image is the ***J*** = 5 counterpart to the middle image on the second row. And note that the right image below has SCF = 4 and the 10th line ends at subdivision endpoint 4.

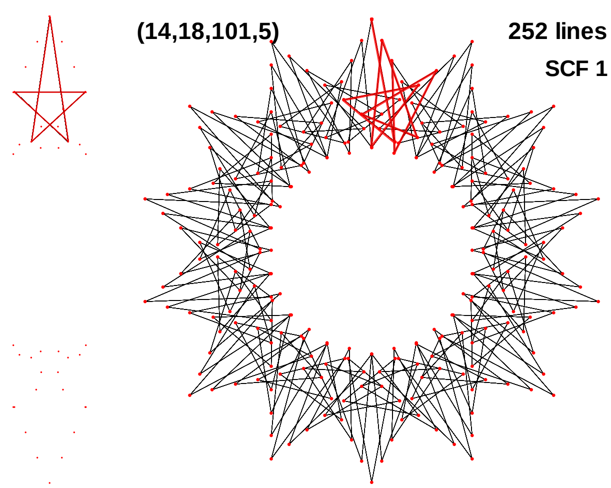

(14,15,63,5) 10 lines SCF 21


(14,16,67,5) 224 lines SCF 1


(14,18,76,5) 63 lines SCF 4

Note that each of these 0***r***10 images are composed of two cycles of 5 lines each. Hence all three have both horizontal and vertical symmetry. One final set of images is provided below, based on ***J*** = 5. When ***k*** = 2 and 4, only the even endpoints are used and we end up with a small 5,1-star for ***k*** = 2, (14,15,42,5), and a small 5,2-star for ***k*** = 4, (14,15,84,5). Both are shown below and both exhibit obvious connections to polygons and stars in a cycle and to small images.


(14,16,45,5) 224 lines SCF 1


(14,18,101,5) 252 lines SCF 1