A Deeper Dive into Spiked Images

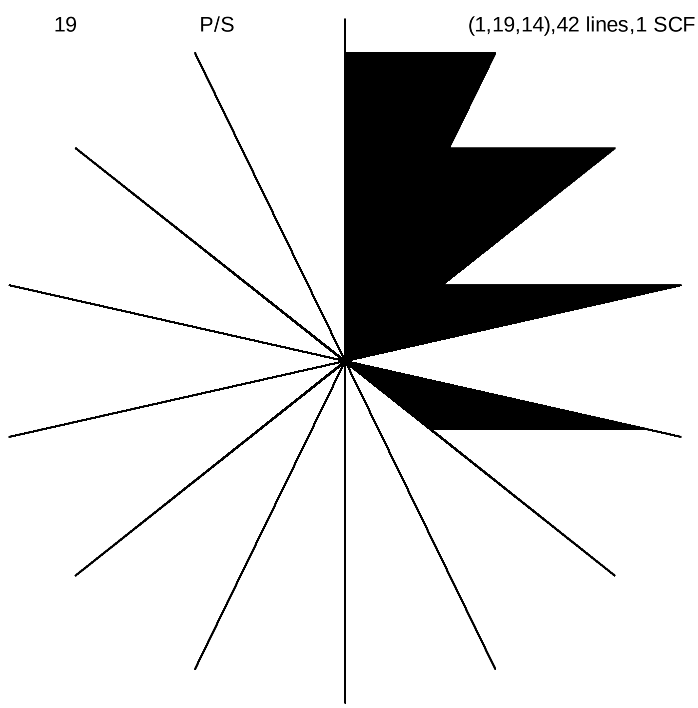
If you poke around CPF a bit more, you will find that you CAN get ***n***-spikes for even ***n*** HALF THE TIME. More specifically, if ***n*** is divisible by 2 but not 4, then ***m*** = 3/2***n***-2 produces ***n*** spikes, but if ***n*** is divisible by 4, ***n***/2 spikes are produced. The table for ***n*** = 12 and ***m*** = 16 found in the [***P*** = 2***S*** explainer]() will be useful as a contrast to the discussion below).

Automating the CPF file. If you type =1.5*L1-2 in C1 for ***P*** and set ***S*** = 1, then you can see spiked images for every even ***n*** created by ***m*** > 2 simply using the ⬍ for ***n***. A | line occurs for ***n*** = 4, ***n*** = 6 has the same ✳ image as ***n*** = 12, and ***n*** = 8 is a +. We focus here on the largest ***n*** which is divisible by 2 but not 4 available in the CPF file, ***n*** = 14. The resulting 42-line image is below. The table shows how this image was created (note the 43rd and 1st Lines share Start and End vertices).

Modifying the table. To deal with general ***n***, create a cell for ***n*** (add a new row and put it in B1), replace ***m*** with =1.5*B1-2 in B2, and replace 12 by ***n*** in MOD ***n*** vertices equations).

The pattern is a double jump backwards. The 1st line ends at ***n***/2 and the 3rd line ends 2 less than ***n***/2, just like with ***n*** = 12 (where the 1st line ended at 6 and the 3rd line ended at 4). In this instance, the 1st line ends at 7 and the 3rd ends at 5. The second cycle moves half-way around but does the same reduction by 2 vertices in moving from 4th to 6th lines (from 10 to 8 given ***n*** = 12 or 12 to 10 for ***n*** = 14. After this, the third cycles first ending (at Line 7) is 2 less than where the first cycle ended (at 2 for ***n*** = 12 or 3 for ***n*** = 14).

In both instances, successive jumps backward of 2 are the norm. The difference is when ***n*** = 4***k***, the values that are backing up to 0 are all even so it stops at 0. If ***n*** = 4***k***+2, these same vertices are odd (***n***/2 = 2***k***+1) and backing up 2 from 1 yields 13 in the move from Line 9 to 13. At this same time, even vertices begin to be filled in on the right half of the circle (Line 10 ends at 8 > ***n***/2 but Line 12 ends at 6 < ***n***/2). This is why all vertices are used when ***n*** = 4***k***+2, but only half are used when ***n*** = 4***k***.



n =	**14**	Vertex **number** of				
m =	**19**	***n*** -gon or Center, **C**		Vertices (MOD ***n***)		Diameter
Line, ***L***	***P*** = ***mL****	Start	End	Start	End	or radius
1	19	***0***	***7***	**0**	**7**	D
2	38	***7***	***C***	**7**	**C**	R
3	57	***C***	***19***	**C**	**5**	R
4	76	***19***	***26***	**5**	**12**	D
5	95	***26***	***C***	**12**	**C**	R
6	114	***C***	***38***	**C**	**10**	R
7	133	***38***	***45***	**10**	**3**	D
8	152	***45***	***C***	**3**	**C**	R
9	171	***C***	***57***	**C**	**1**	R
10	190	***57***	***64***	**1**	**8**	D
11	209	***64***	***C***	**8**	**C**	R
12	228	***C***	***76***	**C**	**6**	R
13	247	***76***	***83***	**6**	**13**	D
14	266	***83***	***C***	**13**	**C**	R
15	285	***C***	***95***	**C**	**11**	R
16	304	***95***	***102***	**11**	**4**	D
17	323	***102***	***C***	**4**	**C**	R
18	342	***C***	***114***	**C**	**2**	R
19	361	***114***	***121***	**2**	**9**	D
20	380	***121***	***C***	**9**	**C**	R
21	399	***C***	***133***	**C**	**7**	R
22	418	***133***	***140***	**7**	**0**	D
23	437	***140***	***C***	**0**	**C**	R
24	456	***C***	***152***	**C**	**12**	R
25	475	***152***	***159***	**12**	**5**	D
26	494	***159***	***C***	**5**	**C**	R
27	513	***C***	***171***	**C**	**3**	R
28	532	***171***	***178***	**3**	**10**	D
29	551	***178***	***C***	**10**	**C**	R
30	570	***C***	***190***	**C**	**8**	R
31	589	***190***	***197***	**8**	**1**	D
32	608	***197***	***C***	**1**	**C**	R
33	627	***C***	***209***	**C**	**13**	R
34	646	***209***	***216***	**13**	**6**	D
35	665	***216***	***C***	**6**	**C**	R
36	684	***C***	***228***	**C**	**4**	R
37	703	***228***	***235***	**4**	**11**	D
38	722	***235***	***C***	**11**	**C**	R
39	741	***C***	***247***	**C**	**9**	R
40	760	***247***	***254***	**9**	**2**	D
41	779	***254***	***C***	**2**	**C**	R
42	798	***C***	***266***	**C**	**0**	R
43	817	***266***	***273***	**0**	**7**	D
End		IF(2=MOD(P,3),"C",IF(1=MOD(P,3),(P+2)/3,P/3))				
MOD n Start		IF(COUNT(Start)=1,MOD(Start,n),"C")				
MOD n End		IF(COUNT(End)=1,MOD(End,n),"C")				