SMARANDACHE GEOMETRICAL PARTITIONS AND SEQUENCES

Amarnath Murthy, S.E.(E&T), WLS, Oil and Natural Gas Corporation Ltd., Sabarmati, Ahmedabad,- 380005 INDIA.

{1} Smarandache Traceable Geometrical Partition

Consider a chain having identical links (sticks) which can be bent at the hinges to give it different shapes.

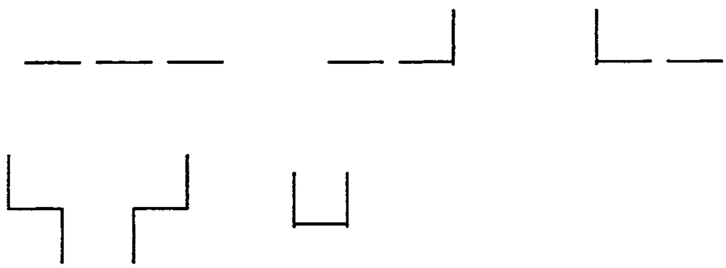
Consider the following shapes (**Annexure-I**) obtained with chains having one , two , three or more number of links.

(Annexure-I)

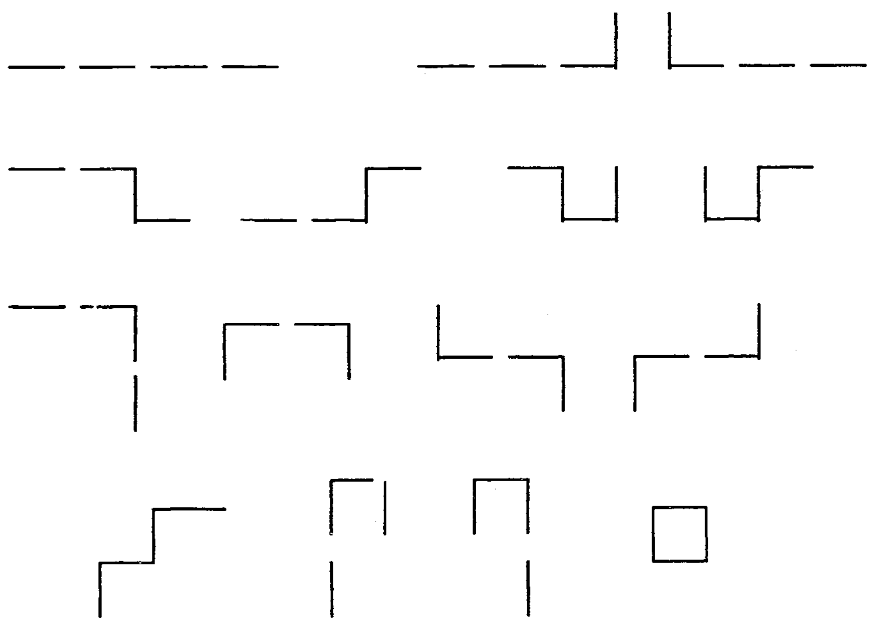
(1)

(2)

(3)



(4)



We notice that the shapes of the figures drawn satisfy the following rules:

1. The links are either horizontal or vertical.
2. No figure could be obtained by the other by rotation without lifting it from the horizontal plane.
3. As the links are connected , there are only two ends and one can travel from one end to the other traversing all the links. There are at the most two ends (there can be zero ends in case of a closed figure) to each figure. These are the nodes which are connected to only one link.

Number of such partitions we define as **Smarandache Traceable Geometric Partition** function STGP denoted by $S_{gp}(n)$. The sequence thus obtained is called **Smarandache Traceable Geometric Partition Sequence (STGPS).**

1 , 2 , 6, 15, . . .

Open Problem

(1): To Derive a reduction formula for the above sequence.

BEND:

We define a **bend** as a point at which the angle between the two terminating sticks is **90°**

Given below is the chart of number of partitions with various bends for 1,2, 3, 4 etc. sticks .

No of bends →	0	1	2	3	4
No of sticks ↓					
1	1	0	0	0	0
2	1	1	0	0	0
3	1	2	3	0	0
4	1	3	7	3	1

By extending this table for more number of sticks one can look for patterns.

{2} Smarandache Comprehensive Geometric Partition:

Consider a set of identical sticks (separate links of the chain in {1}) . If we also include the figures in which

(a) There are more than two ends.

(b) One may not be able travel from one end covering all the sticks without traversing at least one stick more than once.

in {1} then we get the following partitions. **Annexure -II.**

We call it **Smarandache Comprehensive Geometric Partition Function(SCGP)** and the sequence thus obtained **SCGPS.**

SCGPS $\longrightarrow$ **1 , 2 , 7 , 25 . . .**

In the above if we count number of partitions having two , three, four ends etc. separately we get the following chart

No of sticks →	1	2	3	4
No of ends ↓				
0	0	0	0	1
1	0	0	0	0
2	1	2	6	14
3	0	0	1	9
4	0	0	0	1

This table can be extended for more number of sticks and the task ahead is to find patterns if any and their inter-relations.

Open Problem (2) To Derive a reduction formula for SCGPS.

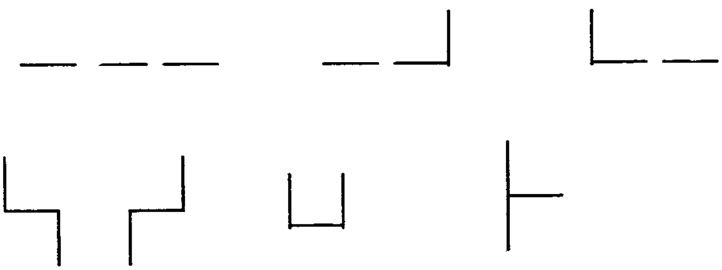
Further Scope: This idea of Geometric partitions can be **generalized** for other angle of bends e.g. for **60°** placement of the sticks/chain links.

Annexure -II.

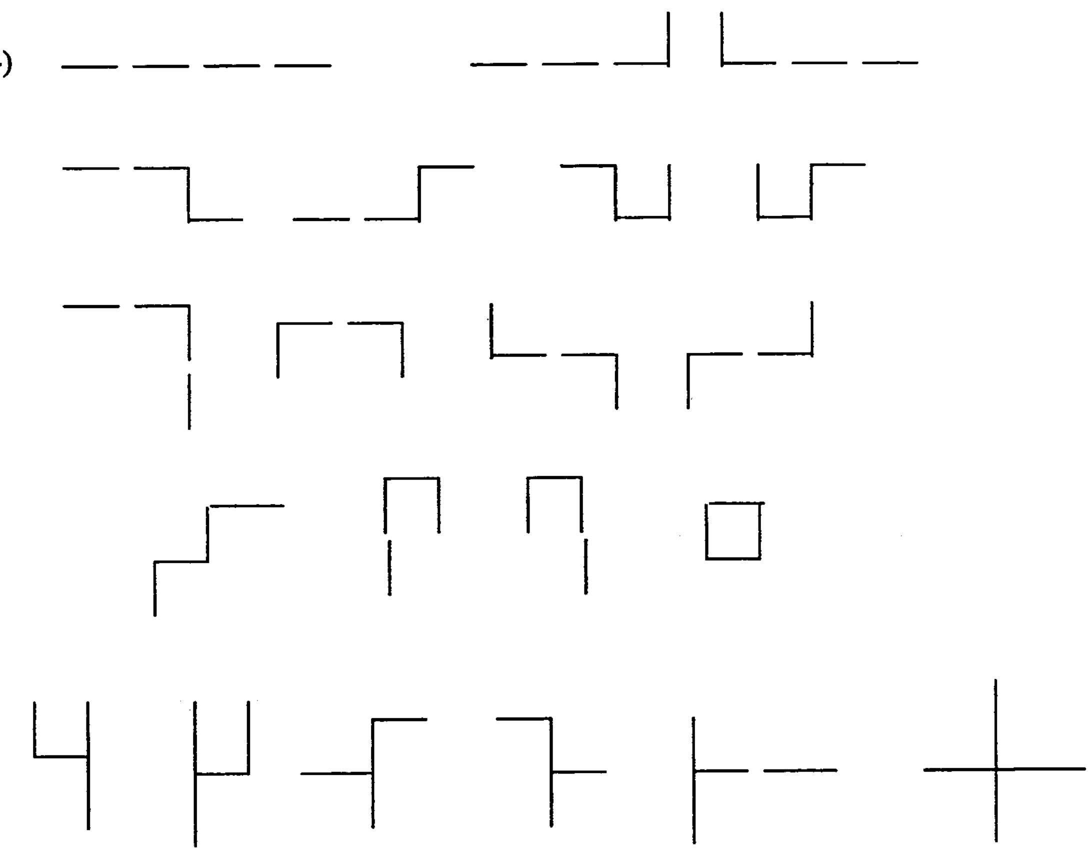
(1)

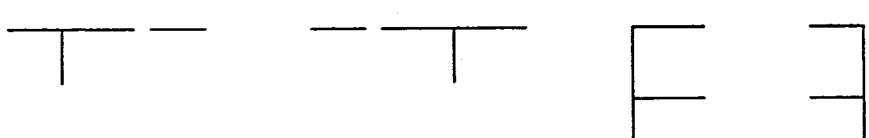
(2) 

Total = 2

(3) 

Total = 7

(4) 



Total = 25