

PART II: Programming Part (Two questions in total)

Kindly remark that for obtaining full credits of the following two questions in Programming Part, you are required to write programs giving correct output, and the programming code need to be with good readability and good writing style (eg. modularity, good object-oriented structure, well-commented, etc.)

Question 2. *Pentagon Snowfake (PS)*. (40 or 20 credits)

In this question, you are required to write a program outputting the pentagon snowfake (PS) as described in the following. The initial configuration of PS is a regular pentagon with one unit long which is shown as follows in Figure 1.

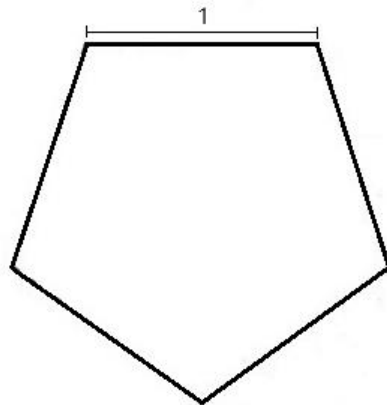


Figure 1. A regular pentagon with one unit long.

We then perform further subdivision to the initial pentagon. For the 1st subdivision of PS, an isosceles triangle is added at the center of each side following the rule as illustrated in Figure 2.

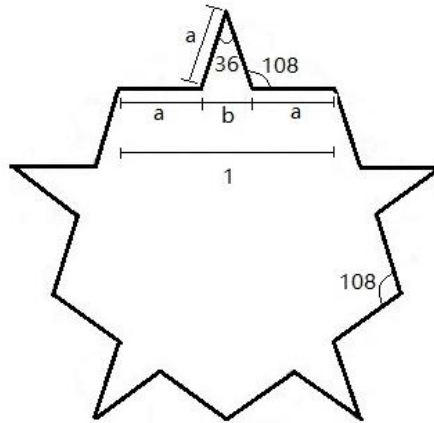


Figure 2. The 1st subdivision of PS.

Note that $\frac{a}{b}$ is the golden section.

Then, for the 2nd subdivision, an isosceles triangle is again added at the center of each side of the 1st subdivision of PS as illustrated in Figure 3.

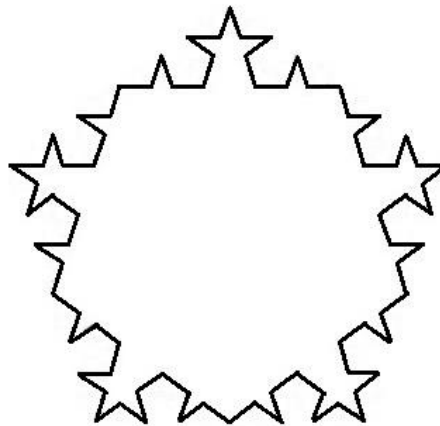


Figure 3. The 2nd subdivision of PS.

We repeat the subdivision process, and after one more round of subdivision, the 3rd subdivision of PS is obtained as shown in Figure 4.

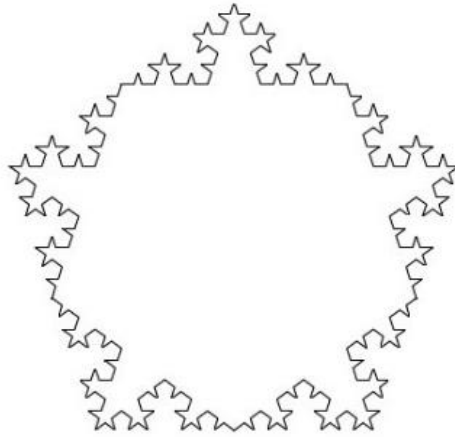


Figure 4. The 3rd subdivision of PS.

Your work is to design a recursive procedure for drawing the k^{th} subdivision of PS. The initial state is a regular pentagon and then use “+” button to increase each time one subdivision, and use “-” button to go back one subdivision each time.