Triangulation Algorithm in Python

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Introduction:
The process of triangulation is well known to engineers and architects and is used to measure the area of irregular polygons. It involves knowing the side of each straight segment of the polygon and the external angle between each side and the next.

Basis of the process.
In theory if a polygon has n sides it can be divided into (n-2) triangles. If you could calculate the height and base of each triangle you could calculate the area of each triangle and then add up all the triangular areas to get a final area.
However, the calculation of each base and each height can be complicated unless graphical methods are used.

Change of coordinates and use of vectors.

If we have in two lists or vectors the values of the length of each side we can assume as reference that the first side is on the x-axis in Cartesian coordinates, the first vertex of the polygon would be in the coordinates (0,0) and the second vertex in (side1,0).
Assuming that each side acts as a vector of a magnitude equal to the length of the side, its orientation would be given by the sum of all the external angles before that lake.
See equation

A(i)=sum(o(i))
Then, to calculate the positions of each vertex of the polygon we would have to consider the following

X(I)=x(i-1)+l(i)Cos(a(i))
Y(I)=y(i-1)+l(i)sin(a(i))

Once the coordinates of all the vertices have been calculated, the vector product can be used to calculate the area of all the triangles into which the polygon is divided.
To achieve this, the following formula is applied.

$$S=\left(\frac{1}{2}\right)\sum_{i=0}^{(n-1)} x_i y_{i+1} - x_{i+1} y_i$$

Where s is the total area of the polygon and the n vertex must be (0 ,0) to close the polygon.
The processing of these vector magnitudes can be accomplished using lists or arrays in python.
The corresponding source code is shown below.

Python source code

```
#Calculation of polygonal area
#SergioMartin
```