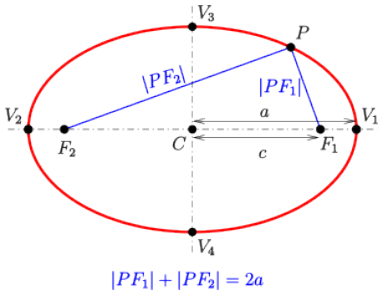
DSC 430: Python Programming
Assignment 0702: Overlapping Ellipses

In this problem you will use pseudo random numbers to estimate the area of two overlapping ellipses. An ellipse is a curve in a plane surrounding two focal points such that the sum of the distances to the two focal points is constant for every point on the curve. – Wikipedia.



Create a Point class that takes the x and y coordinates of the point:

```
p1 = Point(2,3)
p2 = Point(4,3)
```

Create an Ellipse class that takes two points and the width of the long axis:

```
e1 = Ellipse(p1,p2,4)
```

Write a function that takes two ellipses and returns the area of the overlap:

```
overlap = computeOverlapOfEllipses(e1,e2)
```

This function should leverage the pseudo random number generator you built in the previous assignment. (A0701). **Import the classes from that file** to this assignment in the same way you did for Module 5 assignment.

Details of the scheme are explained in the PPT **"DSC430_07_05_MonteCarlo_WarAndPeacePRNG.pptx"** and its accompanying video **"Monte Carlo Assignment Companion Video"**.

Ensure to provide a sufficient amount of documentation/comments in the code. Also write answers/descriptions to these in a comment section at the end of the code file:

- Test your code on the case where **two circles are at the origin**. Write a verification of the result.
- Test your code on **two more complicated examples** you came up with. For each one, write a verification of the result.
- For each test, display the output in the form (as shown in the example on the Discussion Forum):
  "**Ellipse(Point(x11,y11),Point(x12,y12),w1) has area a1**
  Ellipse(Point(x21,y21),Point(x22,y22),w2) has area a2
  YYYY out of ZZZZZ generated points are in both ellipses.
  The overlap of the two has area a3."

  Where a1, a2 are analytical results, and YYYY, ZZZZ and a3 are the empirical results from your simulation.

Submission: Submit the source file (.ipynb) and the exported html file (.html) to the D2L. Do not zip or archive the file. Your code must include comments at the top including your name, assignment number, and the honor statement, "I have not given or received any unauthorized assistance on this assignment." Also, each function must include a docstring.