Ans--Get Rg From Coordinates

A program in any general purpose language would be more useful than Excel or MathCad if one were generating a lot of chains in a simulation, for example. Just for illustrative purposes, here's how this kind of code looks in QuickBasic, QBasic, Liberty Basic or a Visual Basic 6 module (all similar). This code isn't even tested, but it's gotta be close. The logic in Fortran, C or Pascal would all be very similar. The syntax would look goofier, but…

| **Programming Statement** | **What it Does** |
|---|---|
| Open "XY.dat" for input as #1 | Let's assume the coordinates are in an x,y file separated by commas. |
| Dim X(100), Y(100) | You have to create space in the computer for the X coordinates & Y coordinates. This is called dimensioning an array. Here we make space for 100 x,y pairs, even though we don't have that many in the assignment. |
| While not EOF(1) | While there is no end of file, keep circulating through a loop that reads the x,y pairs. |
| I=I+1 | This index increments each time the loop runs; first used value is 1 (undeclared variable I starts at 0 in Basic) |
| Input#1, X(I), Y(I) | Read the data |
| WEND | Close the While Loop. Until it's time to do that, loop back to "While not" start of loop… |
| Close #1 | Close the file (you wouldn't have to, but…) |
| NPTS=I-1 'maybe it should be I…try it and see | The last value of Index is either the number of points or one more than that. Call it NPTS. |
| | |
| 'Get the center of mass | |
| XCM=0 | Initiate XCM and YCM , variables that will contain the center of mass x, y values. |

| | |
|---|---|
| YCM=0 | You wouldn't have to initiate them in Basic, but it's good practice. |
| For i=1 to NPTS | |
| XCM=XCM+X(I) | Add everything up in this loop |
| YCM=YCM+Y(I) | |
| Next i | |
| XCM=XCM/NPTS | Get average |
| YCM=YCM/NPTS | Get average |
| | |
| 'Get the Contour Length | |
| CONTOUR=0 | |
| For I=1 to NPTS-1 | Go from point 1 to 2, 2 to 3, 3 to 4,…..NPTS-1 to NPTS |
| CONTOUR = CONTOUR + SQRT((X(I+1)-X(I))^2+(Y(I+1)-Y(I))^2) | Pythagorean theorem, one point and its neighbor at a time. |
| Next I | |
| | |
| 'Get Rg | |
| SSQUARED=0 | |
| For I=1 to NPTS | |
| SSQUARED=SSQUARED+(X(I)-XCM)^2+(Y(I)-YCM)^2 | Pythagorean theorem again |
| Next I | |
| Rg=SQRT(SSQUARED) | |
| | |
| Print "Contour: ", Contour, " Rg: ", Rg | |
| | |
| Stop | |