

VertX a Very Useful Macro for Extracting Vertex

Coordinates of Freeforms - part #1

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- Freeforms are easy to work with and are very suitable to copying object contours from pictures.
- This presentation introduces a macro which can retrieve the x-y coordinates of a freeform autoshape group and place the data on two columns with an empty space between data for two consecutive shapes.
- This way all the group of shapes can be charted using a single curve on a 2D scatter chart.
- Another function of this macro is to plot each shape name, number of vertices and the number of shapes in the group.
- The macro will be explained here in a simplified form and its complexity will be increased as we advance through the sections of the presentation.

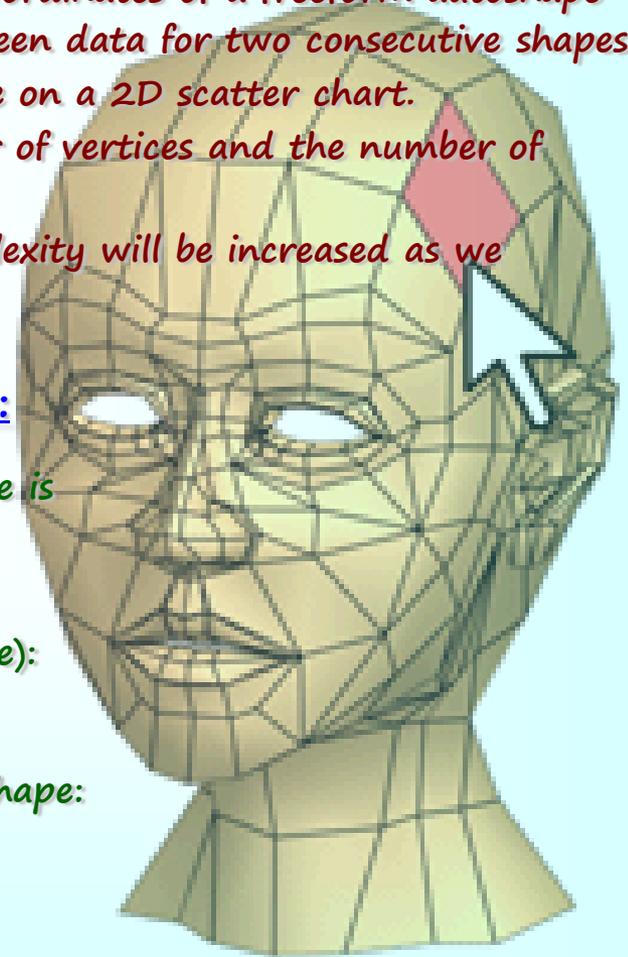
Extracting the number of points (vertices) of a freeform:

- There are various ways to identify the shape (by name for instance is one) but it can be chosen to be identified by selection
- We will assign the variable NC the node count using the following construct (I found this in a slightly different form on Microsoft's site):

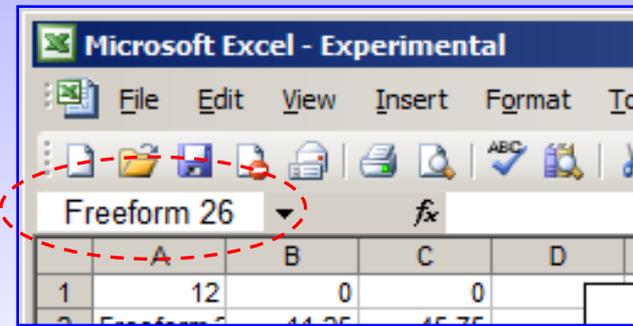
`NC = ActiveWindow.Selection.ShapeRange.Nodes.Count`

- An alternative way would be to use a name identification of the shape:

`NC = ActiveSheet.Shapes("Name").Nodes.Count`



- If we use the name identification we need to know the name of the shape which can be found by selecting the shape and reading the name in the “Name Box” in the upper left corner of the worksheet.
- We can also change the name to something else by typing it in the same box and then hitting Enter.



Extracting the vertex coordinate array of a freeform:

- We will identify the shape either by name or by selection and retrieve the vertex data as an array (this is standard syntax so you should just use it and if you forget just Google it):

`VertArray = ActiveSheet.Shapes("Name").Vertices`

`VertArray = ActiveWindow.Selection.ShapeRange.Vertices`

- Just like before, if you use the name identification you can find it by reading it in the name box after selecting the shape.

How do we find individual coordinates from the array of coordinates:

- The vertex coordinate array is of $n \times 2$ size so we will use the following syntax:

$\left\{ \begin{array}{l} \text{Variable}_x = \text{VertArray}(n, 1) \text{ assigns the variable "Variable}_x\text{" the } \underline{x\text{-coordinate}} \text{ of the } n^{\text{th}} \text{ vertex of the shape} \\ \text{Variable}_y = \text{VertArray}(n, 2) \text{ assigns the variable "Variable}_y\text{" the } \underline{y\text{-coordinate}} \text{ of the } n^{\text{th}} \text{ vertex of the shape} \end{array} \right.$

An absolute coordinate vertex-retrieving macro:

- Here is a macro that retrieves the node (vertex) count and assigns it to variable "NC". It also assigns the variable VertArray with the values of shape vertices. After this it prints all this data in a spreadsheet range. The name of the shape has to be "a" for this macro to work.

- The active cell is the selected cell and the macro will place an integer there equal to the number of vertices after which it will place the coordinates in

a 2-column table starting from the active row (the row containing the active cell) and going down.

- During the first iteration, the "For" loop pastes the first x-coordinate on the same row, a column to the right from the active cell and also inserts first the y-coordinate on the active row, two columns to the right from the active cell.

- In the next iteration, the loop inserts the x and y coordinates one row down from the active cell (on the same columns as the first x-y coordinates) and the loop continues its operation until a 2 x NC table is filled with all of the x-y coordinates of the shape vertices.

The use of the macro:

- In a new workbook named "VertX" insert a module in the VBA editor and in it paste the code above.

- Make the drawing toolbar visible: (on the top menu) View => Toolbar => Drawing

- In the drawing toolbar: Autoshapes => Line => Freeform and draw a freeform by clicking in several points on the worksheet.

```
Sub VertX_1()
```

```
    NC = ActiveSheet.Shapes("a").Nodes.Count
```

```
    VertArray = ActiveSheet.Shapes("a").Vertices
```

```
    ActiveCell.Offset(0, 0).Value = NC
```

```
    For n = 1 To NC
```

```
        ActiveCell.Offset(n - 1, 1).Value = VertArray(n, 1)
```

```
        ActiveCell.Offset(n - 1, 2).Value = VertArray(n, 2)
```

```
    Next n
```

```
End Sub
```

- I made a closed 8-point free form but you can create something different.

- Select the freeform and in the Name Box on the upper left corner type the letter "a" then hit return. The name of the shape has just been changed from "Freeform 1" into "a".

- Select cell "E1" then bring up the VBA editor (Alt+F11)

- In the VBA editor after you make sure your mouse cursor is placed anywhere within the text of the macro "VertX_1", hit the "Run Sub/User Form" triangular button.

- You will get the number of vertices in cell E1 and a list of the vertex coordinates in range F1:G8.

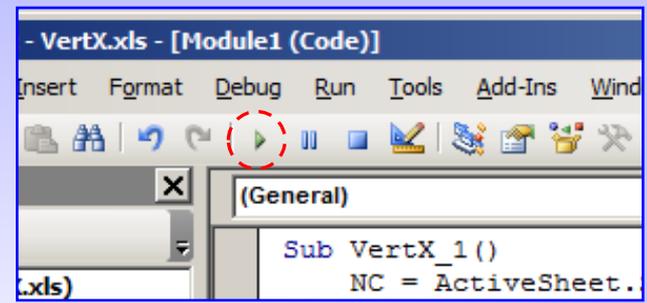


Chart the freeform coordinates:

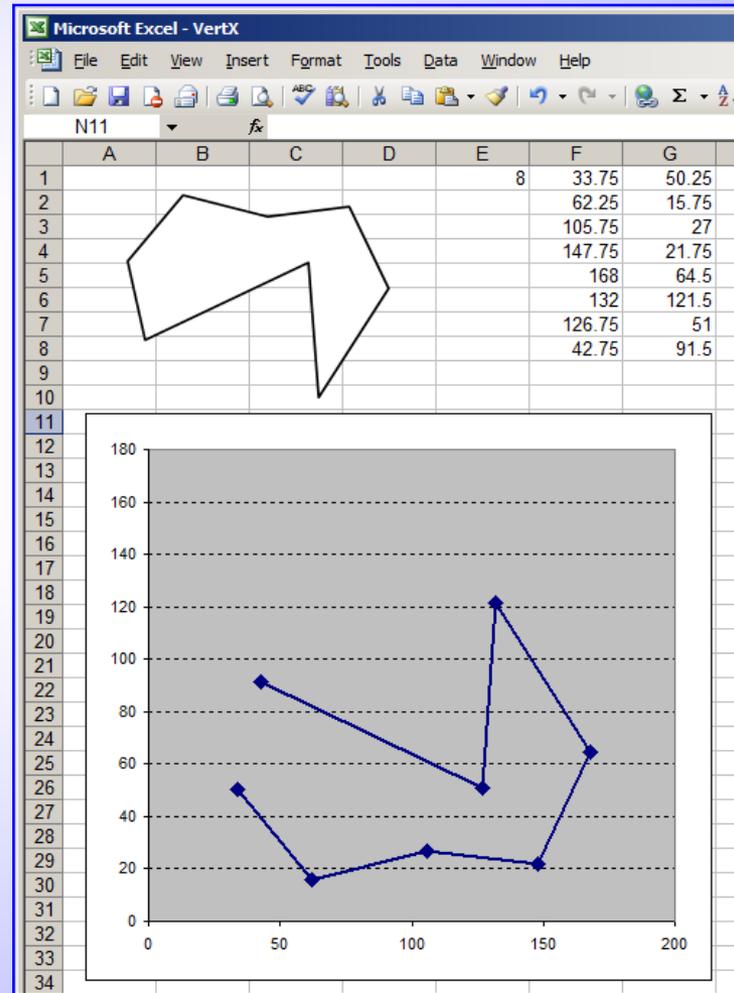
- Use a 2D scatter chart with equal size axes.

Important observations:

- Notice that the shape is right-left correct but upside down since the origin is placed in the upper left corner of the sheet.

- You can see that even if you close the shape, the first point is not recorded twice in the table, therefore if you want to have a closed charted curve you need to either paste the first point coordinates at the end of the table by hand or upgrade the macro to do that.

- Try rotating the shape and notice that the coordinates retrieved by the macro will not change unless you edit one point by dragging it. Linear shifts in the shape position will however result in new coordinates.



to be continued...