Enlargement

```
enlargePolygon[vertices_, scaleFactor_, center_] :=
 Module[{originalPolygon, enlargedPolygon, plotTitle}, (*Create the original
   polygon from vertices*)originalPolygon = ConvexHullMesh[vertices];
  (*Create the enlarged polygon using geometric transformation*)
  enlargedPolygon = GeometricTransformation[originalPolygon,
    ScalingTransform[{scaleFactor, scaleFactor}, center]];
  (*Create plot title*)plotTitle = "Polygon Enlargement with Scale Factor = " <>
    ToString[scaleFactor] <> " from Center " <> ToString[center];
  (*Determine an appropriate plot range based on original and enlarged vertices*)
  allPoints = Join[vertices, Table[center + scaleFactor * (vertices[[i]] - center),
     {i, 1, Length[vertices]}], {center}];
  xMin = Min[allPoints[[All, 1]] - 1;
  xMax = Max[allPoints[[All, 1]] + 1;
  yMin = Min[allPoints[[All, 2]] - 1;
  yMax = Max[allPoints[[All, 2]] + 1;
  (*Create and return the plot*)
  Graphics[{(*Enlarged polygon-slightly transparent*)
    {LightPink, Opacity[0.6], enlargedPolygon}, (*Original polygon*)
    {LightOrange, Opacity[1], originalPolygon},
    (*Center point*){Red, PointSize[0.02], Point[center]},
    Text["Center: " <> ToString[center], center, {-1, -1}],
    (*Original vertices*){Green, PointSize[0.015], Point[vertices]},
    Table[Text["v" <> ToString[i] <> ": " <> ToString[vertices[[i]]],
      vertices[[i]], {0, 1}], {i, 1, Length[vertices]}],
    (*Enlarged vertices*){Orange, PointSize[0.015], Point[
      Table[center + scaleFactor * (vertices[[i]] - center), {i, 1, Length[vertices]}]]},
    (*Connection lines between original and enlarged vertices*){Gray, Dashed,
     Table[Line[{vertices[[i]], center + scaleFactor * (vertices[[i]] - center)}],
      {i, 1, Length[vertices]}]}}, Frame → True, Axes → True, AxesLabel → {"x", "y"},
   AxesStyle → Thick, GridLines → {Range[-100, 100, 1], Range[-100, 100, 1]},
   PlotRange → {{xMin, xMax}, {yMin, yMax}},
   PlotLabel → plotTitle, ImageSize → 600]]
(*Deploy a simple form interface*)
CloudDeploy[
 FormFunction[{"vertices" → "String", "center" → "String", "scaleFactor" → "Number"},
  Module[{vertexList, centerPoint}, (*Parse the input string of vertices*)
    vertexList = ToExpression[#vertices];
    (*Parse the center point*)centerPoint = ToExpression[#center];
    (*Run the function with user inputs*)
    enlargePolygon[vertexList, #scaleFactor, centerPoint]] &, "PNG"],
 "SimpleEnlargementTool", Permissions → "Public"]
```

In[•]:=
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enlargePolygon[{{0, 0}, {1, 0}, {1, 1}}, 2, {1, 0}]
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Out[•]=