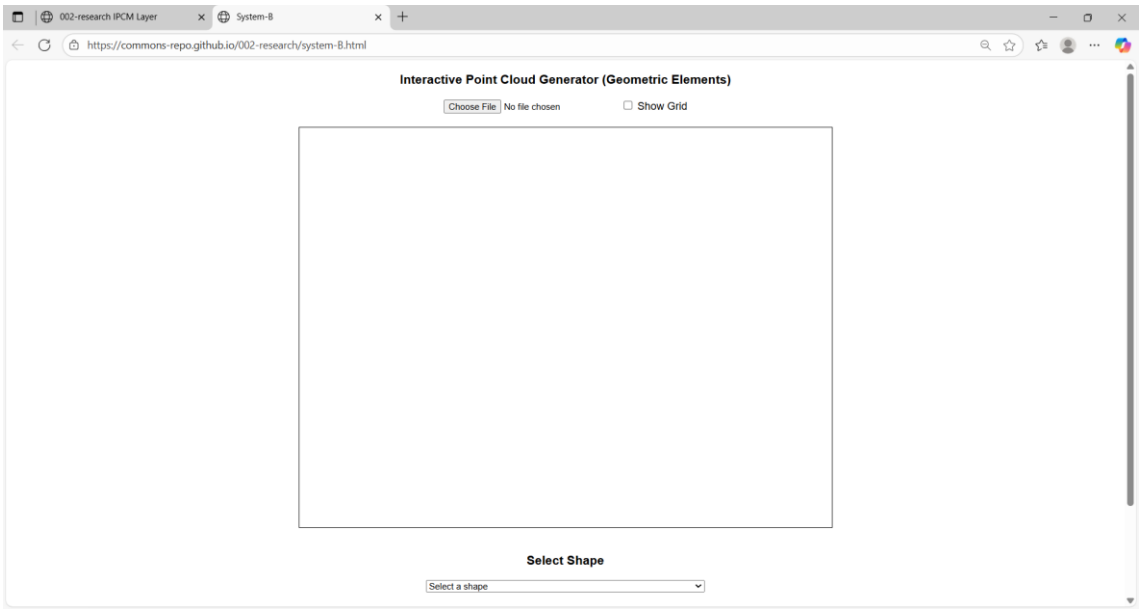
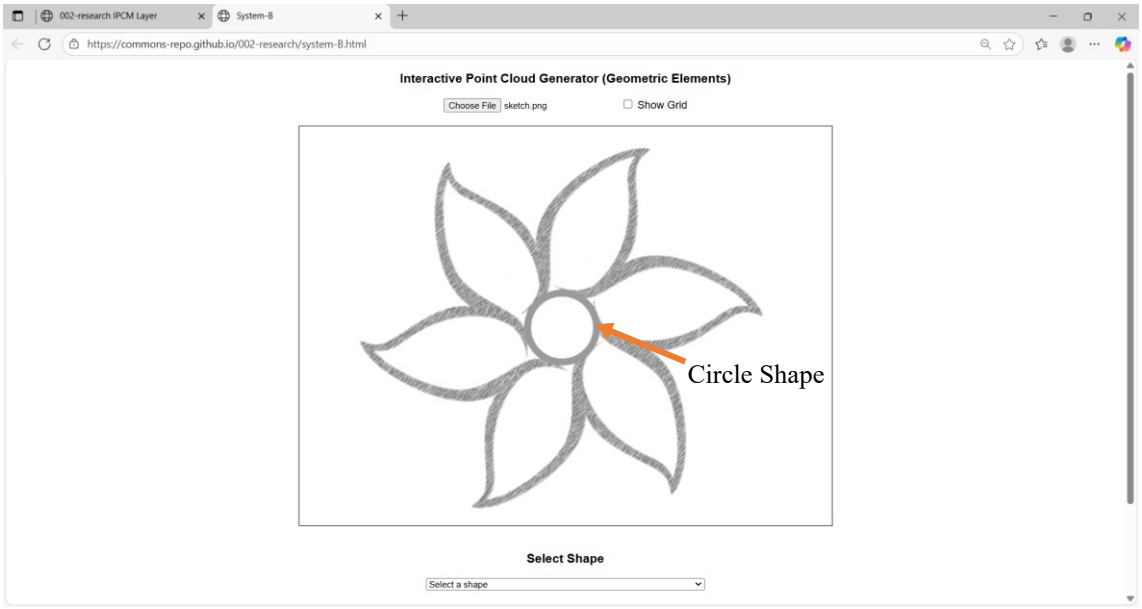
How to use System B

(Interactive Point Cloud Generator (Geometric Elements))

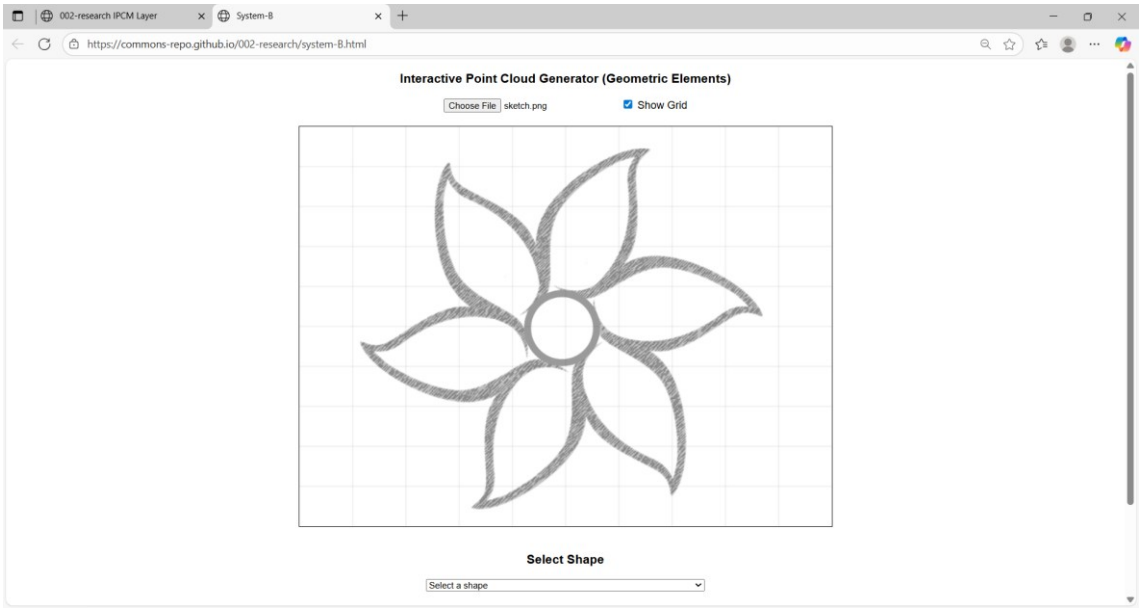
1. Open the system. An interface will be opened like below.



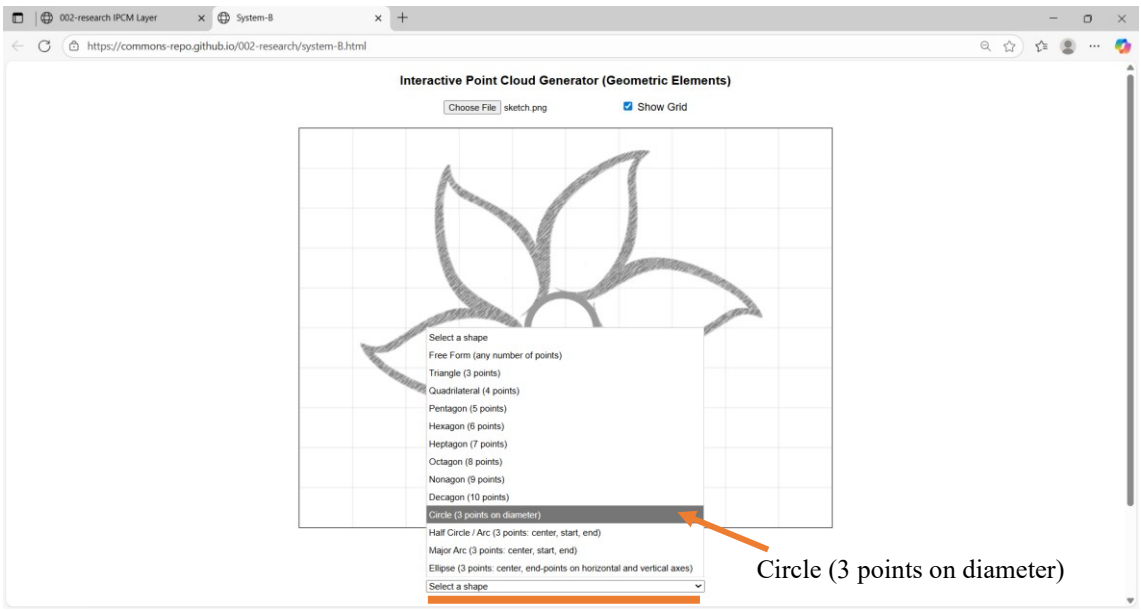
2. Load the concept image containing geometric element(s) into the workspace using the ‘Choose File’ button. For example, in this case, the circular element as shown below.



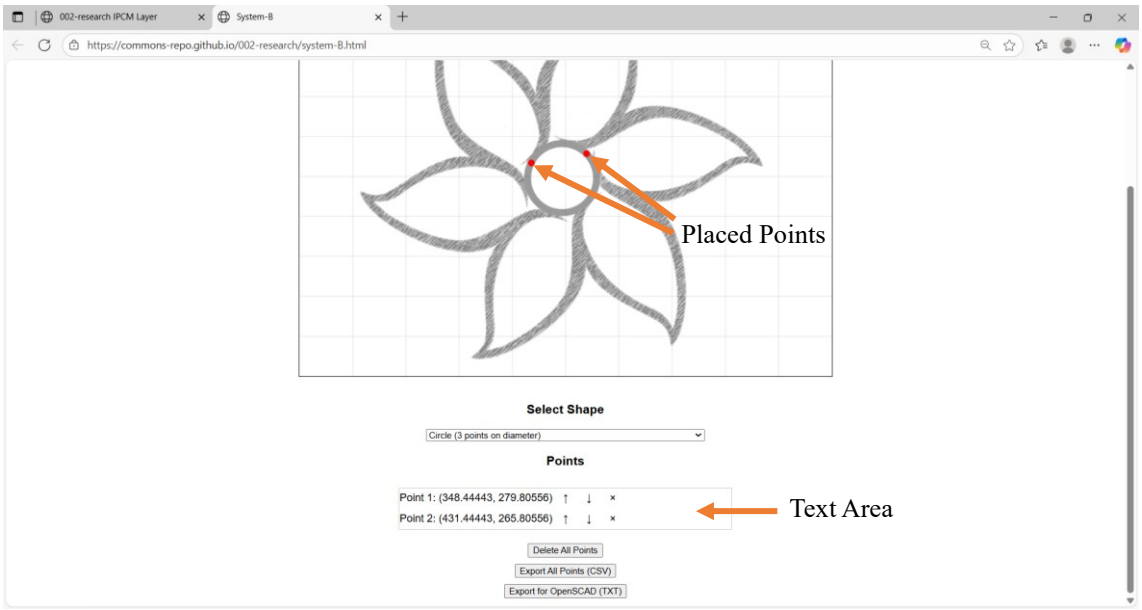
3. Optionally, check ‘Show Grid’ to display grid lines on the canvas for easier point placement.



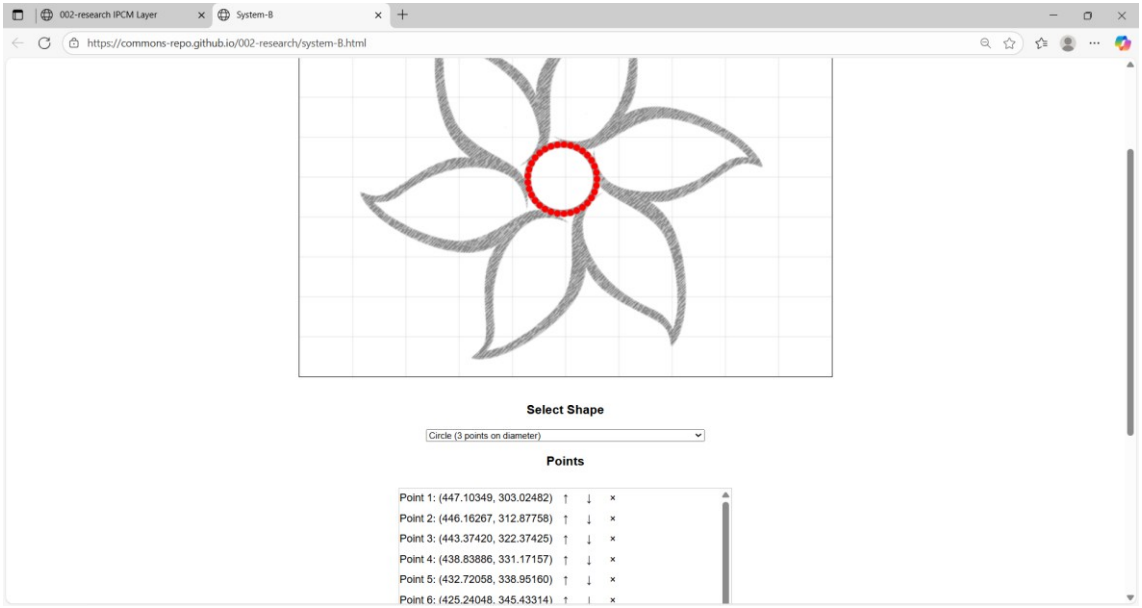
4. Select an appropriate option from the dropdown menu. For this example, choose ‘Circle (3 points on diameter)’. The label indicates that, after selecting this option, the user should click on the canvas to specify three points along the intended diameter, allowing the system to compute the circle’s center and generate the corresponding point set.



5. The following screenshot shows two placed points (red-colored points), with the third point yet to be selected. Notice the text area, which updates continuously as points are added. It also provides options to reorder the points or delete any individual entry. The ‘Delete All Points’ button performs a full reset by removing all points placed and computed so far.

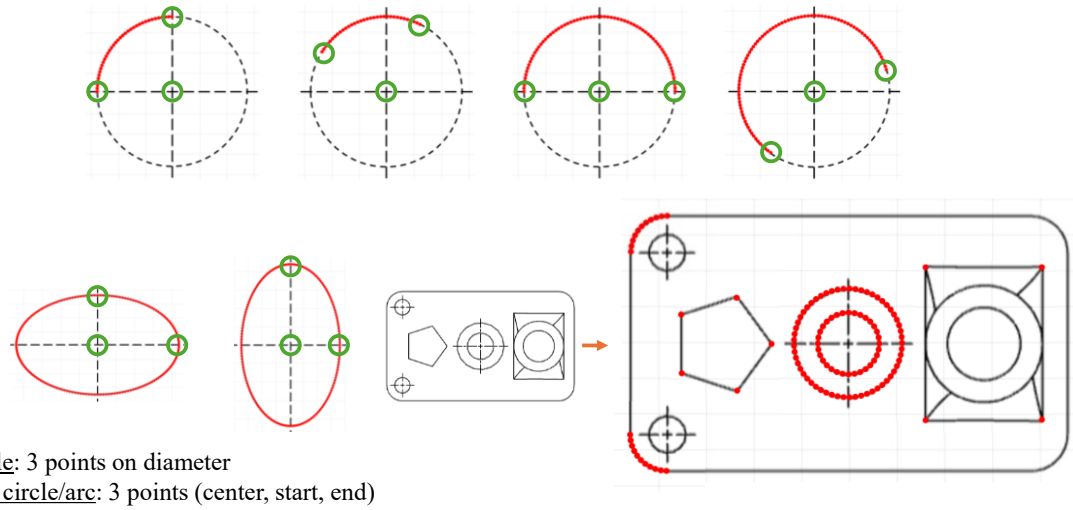


6. As soon as the third point is placed, the system computes the circle and renders the generated points. The text area updates accordingly to reflect the newly created points. The following screenshot shows this scenario.



Note that at present, the number of generated points is fixed by default. In future updates, this value will become user-defined, similar to Systems A1 and A2. For now, users who require a different resolution may modify the corresponding JavaScript routine directly, as the implementation is fully open and customizable.

7. For the remaining geometric primitives, the procedure follows the same pattern as described above. The system currently supports ellipses, arcs, major arcs, and polygonal shapes other than the circle. For ellipses, arcs, and major arcs, the user must place the required reference points on the canvas; the dropdown menu specifies both the number of points and the order in which they must be selected. For polygonal shapes—ranging from free-form (any number of points) to predefined types such as triangle through decagon—the process is entirely point-based: the user clicks to define the vertices, and the system connects them directly without additional computation. A consolidated example summarizing these remaining cases is shown in the following figure.

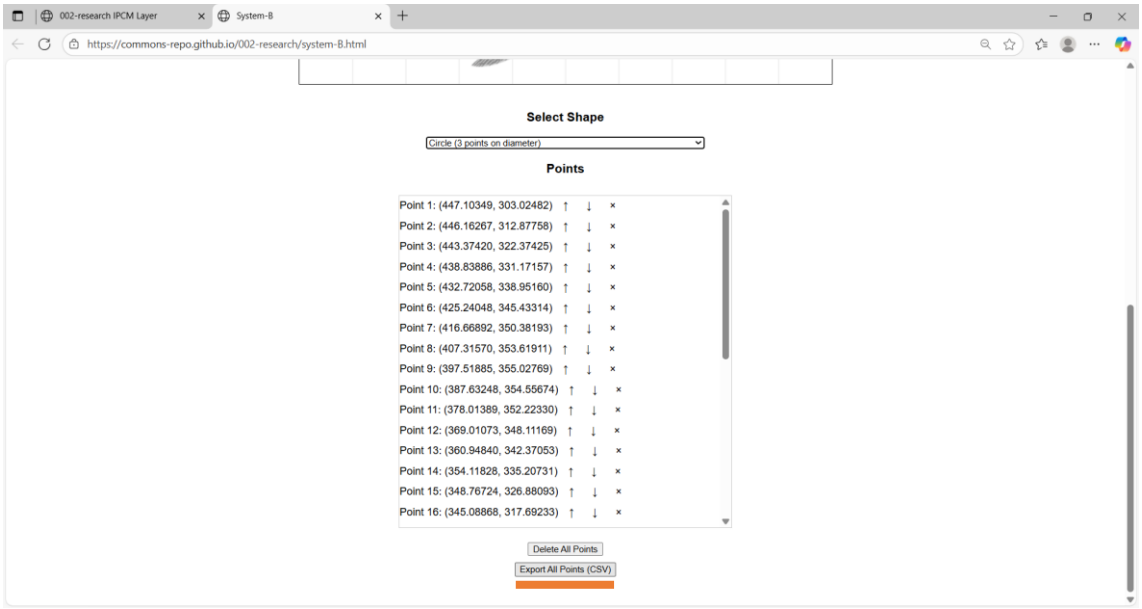


circle: 3 points on diameter
half circle/arc: 3 points (center, start, end)
major arc: 3 points (center, start, end)
ellipse: 3 points (center, end points on horizontal and vertical axes)
○ = User-selected points

free-form (any number of points)
to predefined types such as triangle through decagon: user selection on canvas

8. Clicking the 'Export All Points' button will download all generated points in CSV format. The exported points follow a simple CSV structure with the columns point, x, y. An example excerpt is shown below. For geometric primitives where a center or derived parameter is computed—such as circles, ellipses, or arcs—the system also exports an additional file named center.csv. This file lists the computed properties in the format: property, value. An example

excerpt for such is also shown below.



Example excerpt for exported points:

```
point,x,y
1,447.10349,303.02482
2,446.16267,312.87758
3,443.37420,322.37425
4,438.83886,331.17157
5,432.72058,338.95160
...
...
```

Example excerpt for center properties:

```
property,value
center x,395.04165
center y,303.02482
radius,52.06184
```

Thus, shapes requiring geometric computation produce two files (points.csv and center.csv), whereas purely point-based shapes—such as free-form polygons or user-defined polygon vertices—export only the single points.csv file.