Connect the dots

From data through topology to representation theory

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TUM

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Connect the dots

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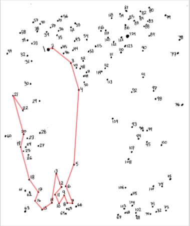
"Dot to dot" redirects here. For the annual music festival, see Dot to Dot Festival.
For other uses, see Connect the dots (disambiguation).

Connect the dots (also known as **dot to dot** or **join the dots**) is a form of puzzle containing a sequence of numbered dots.[1] When a line is drawn connecting the dots the outline of an object is revealed. The puzzles frequently contain simple line art to enhance the image created or to assist in rendering a complex section of the image. Connect the dots puzzles are generally created for children. The use of numbers can be replaced with letters or other symbols.



A partially solved connect the dots puzzle.

In adult discourse the phrase "connect the dots" can be used as a metaphor to illustrate an ability (or inability) to associate one idea with another, to find the "big picture", or salient feature, in a mass of data.

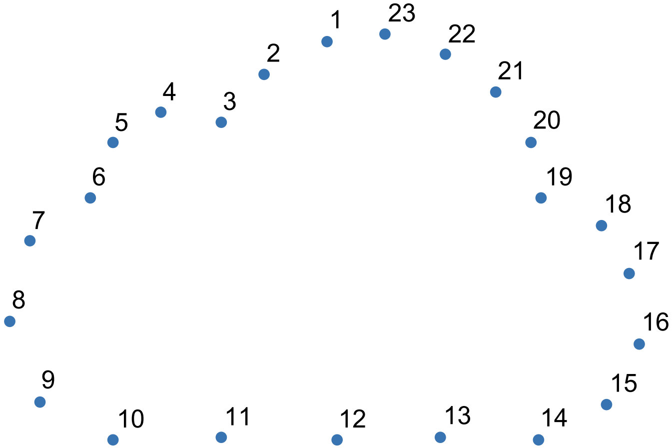
Reuven Feuerstein features the connection of dots as the first tool in his cognitive development program.

See also [edit]

- Trail Making Test

References [edit]

1. ^ dot (definition) OED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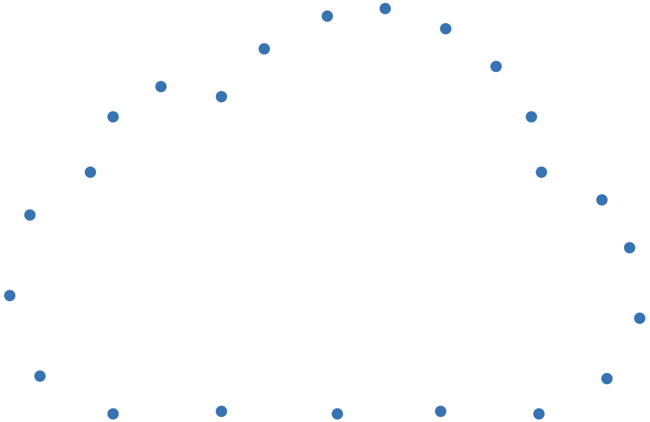

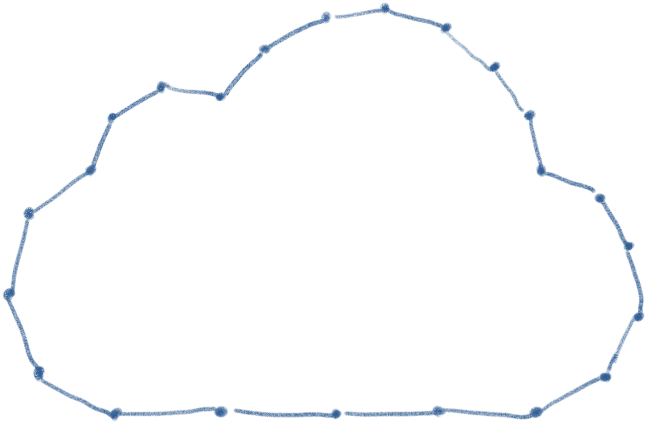

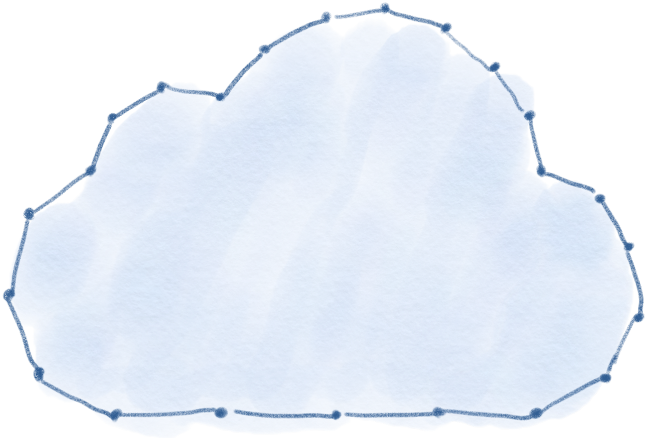

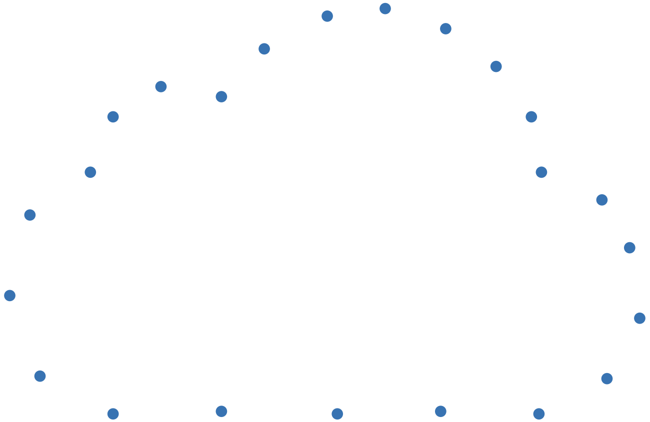

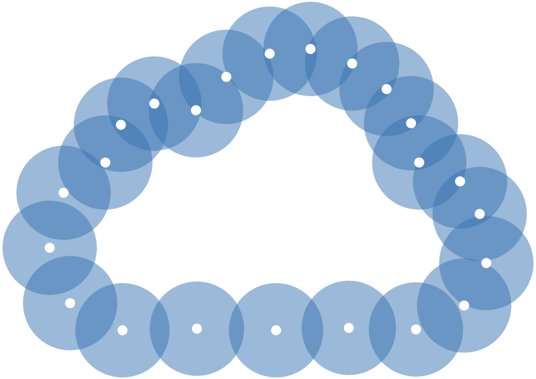

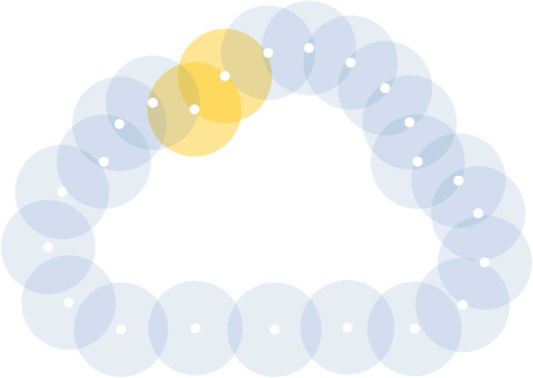

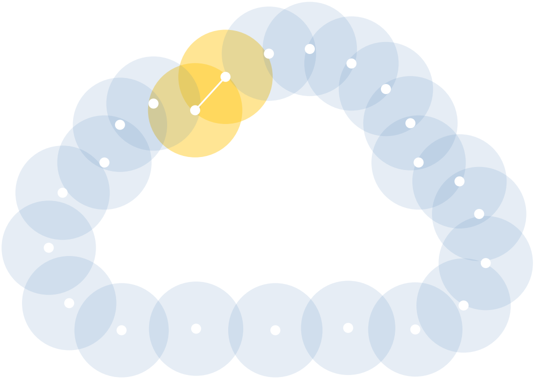

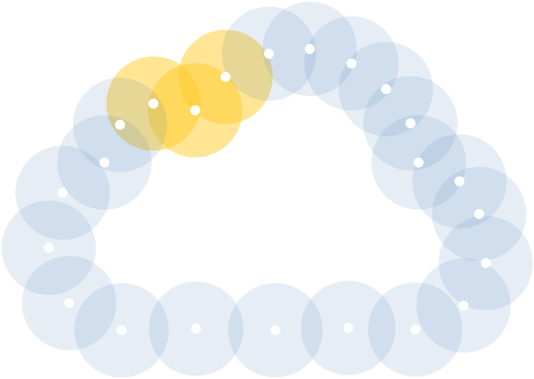

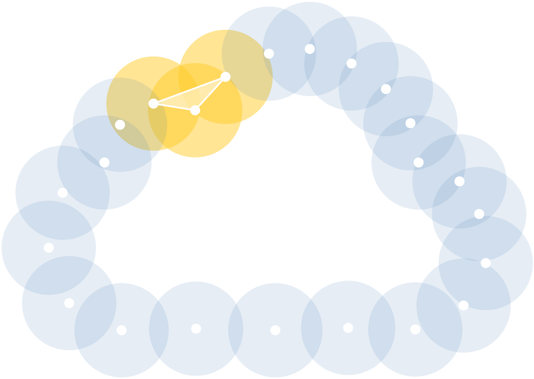

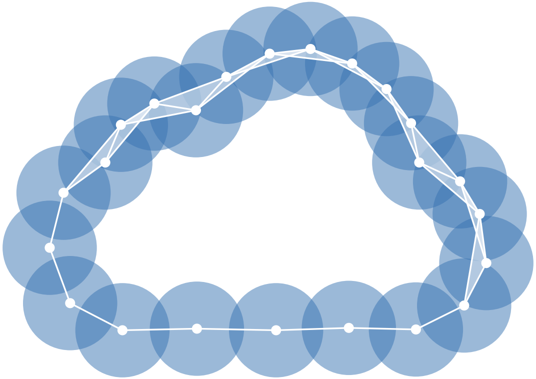

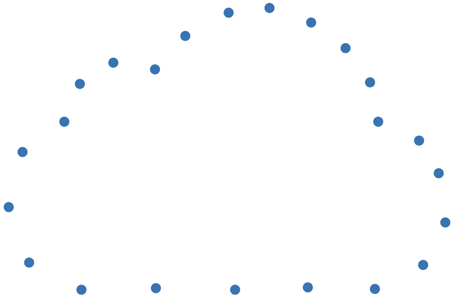

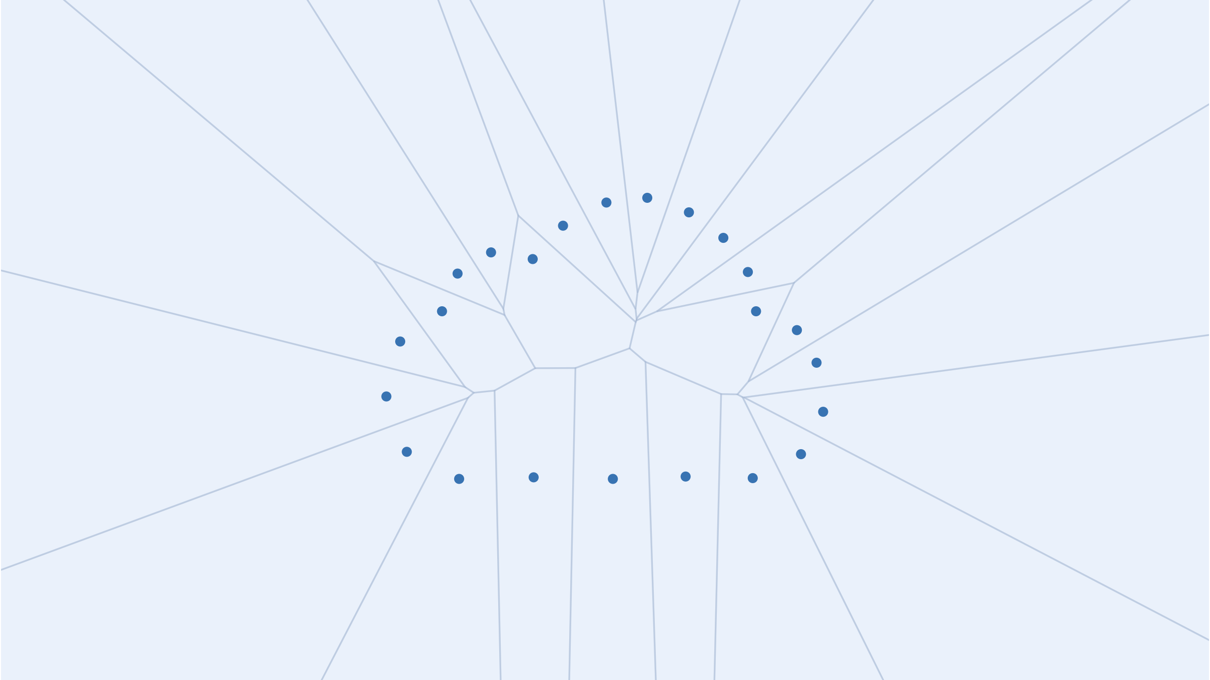

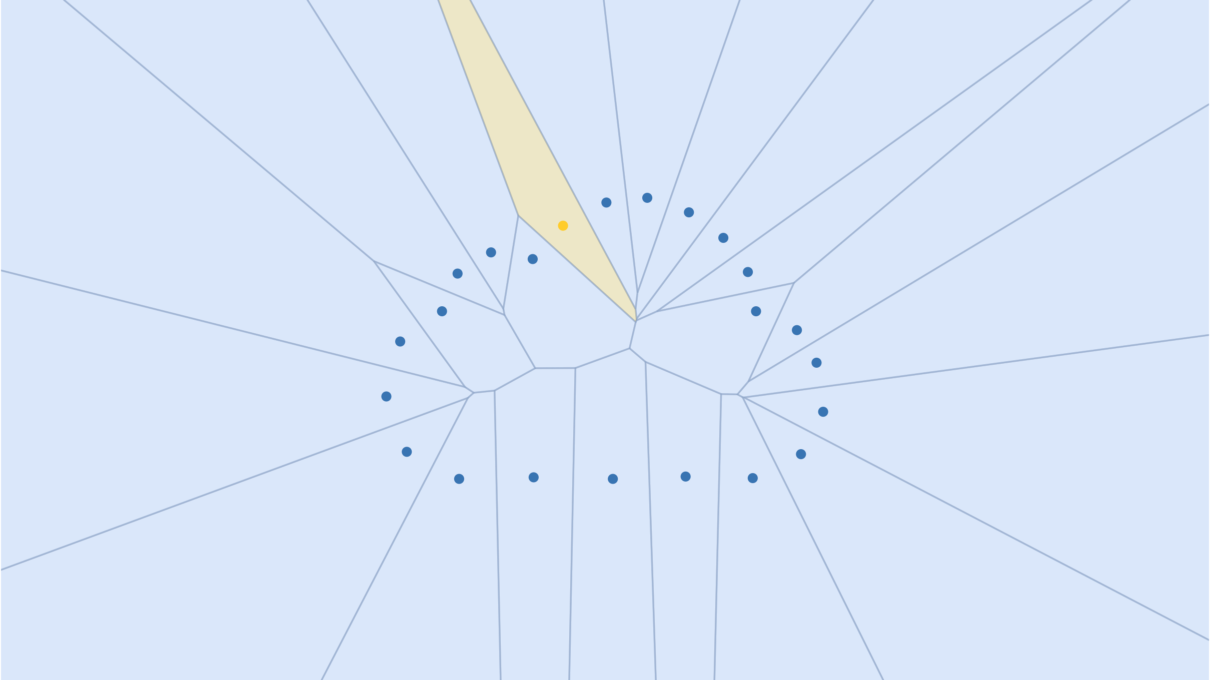

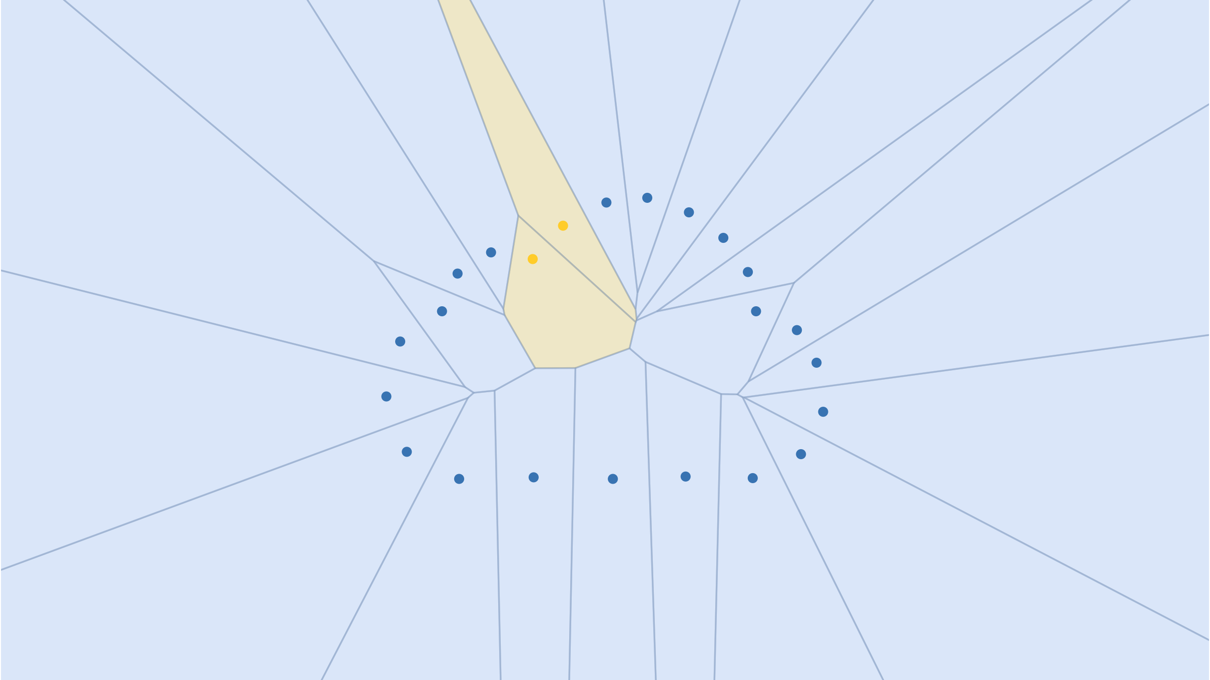

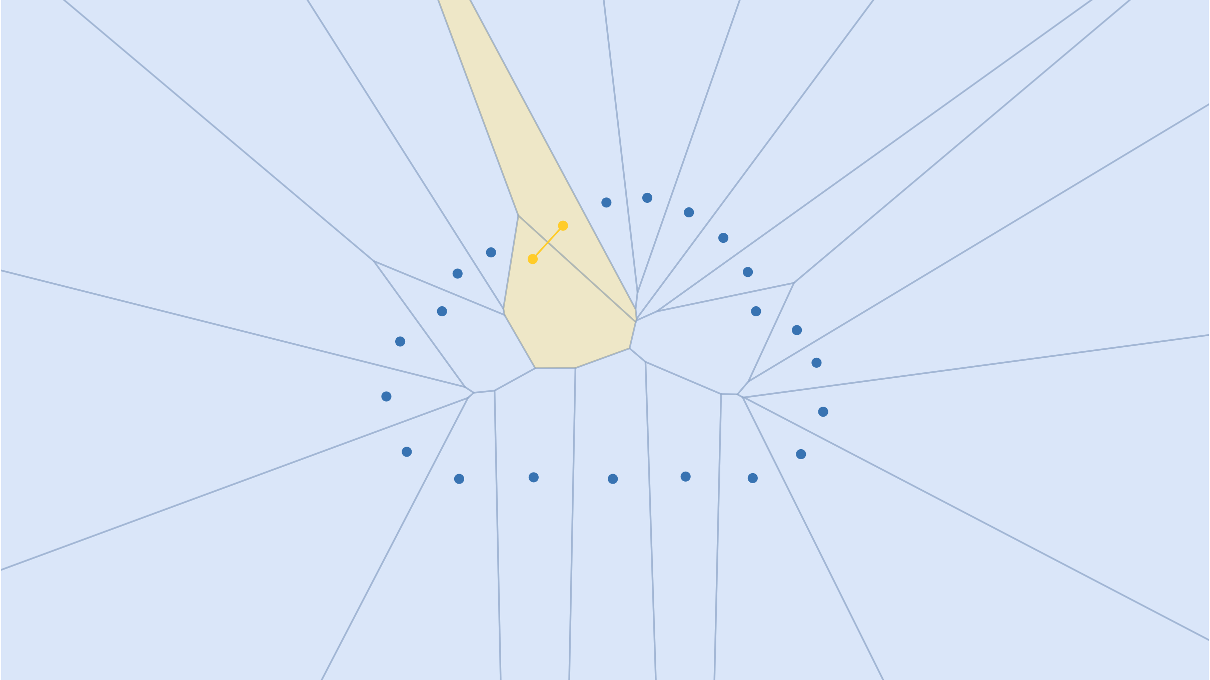

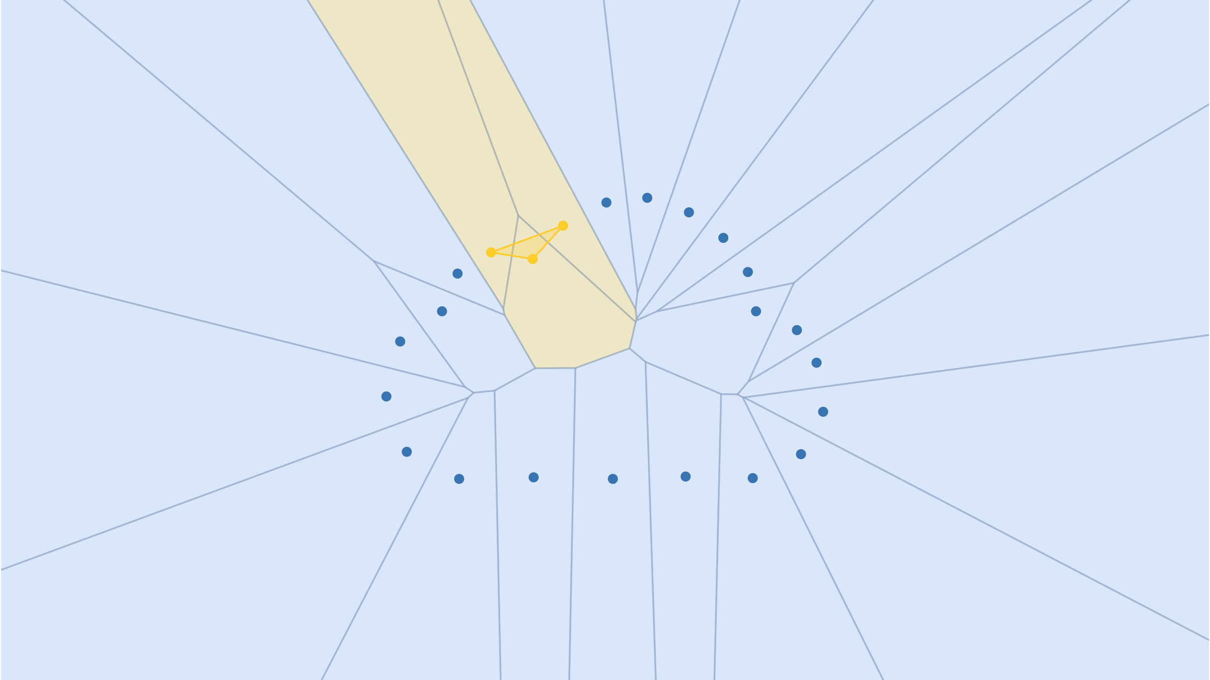

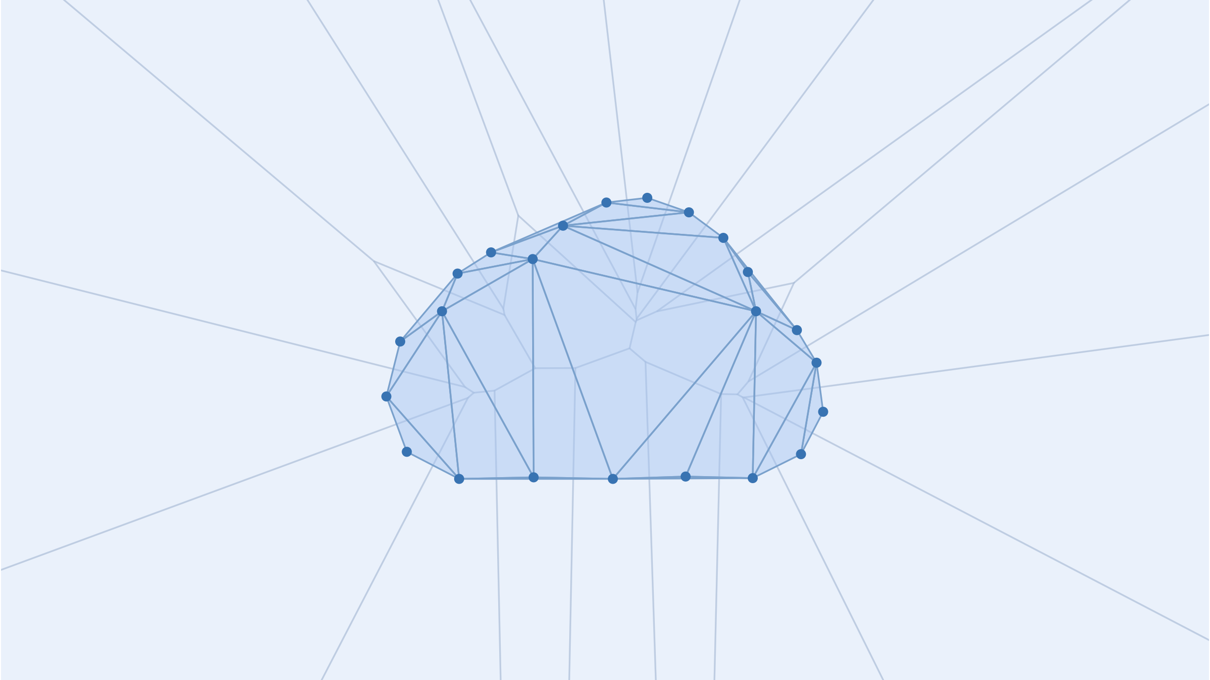

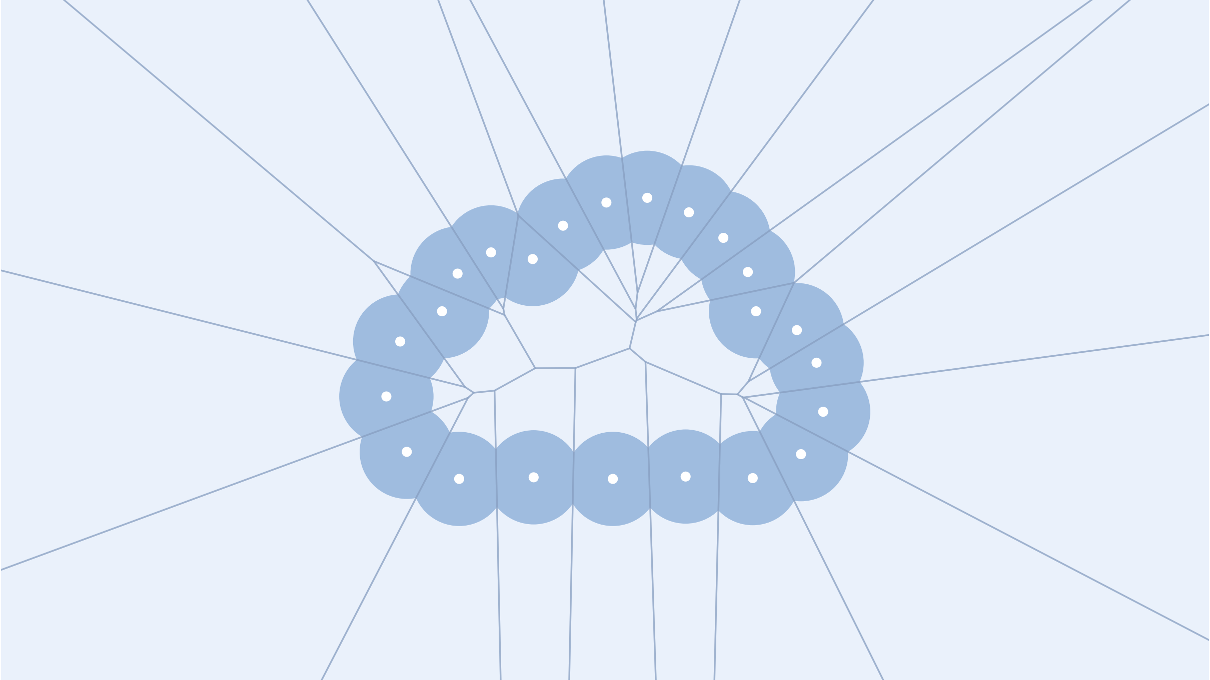

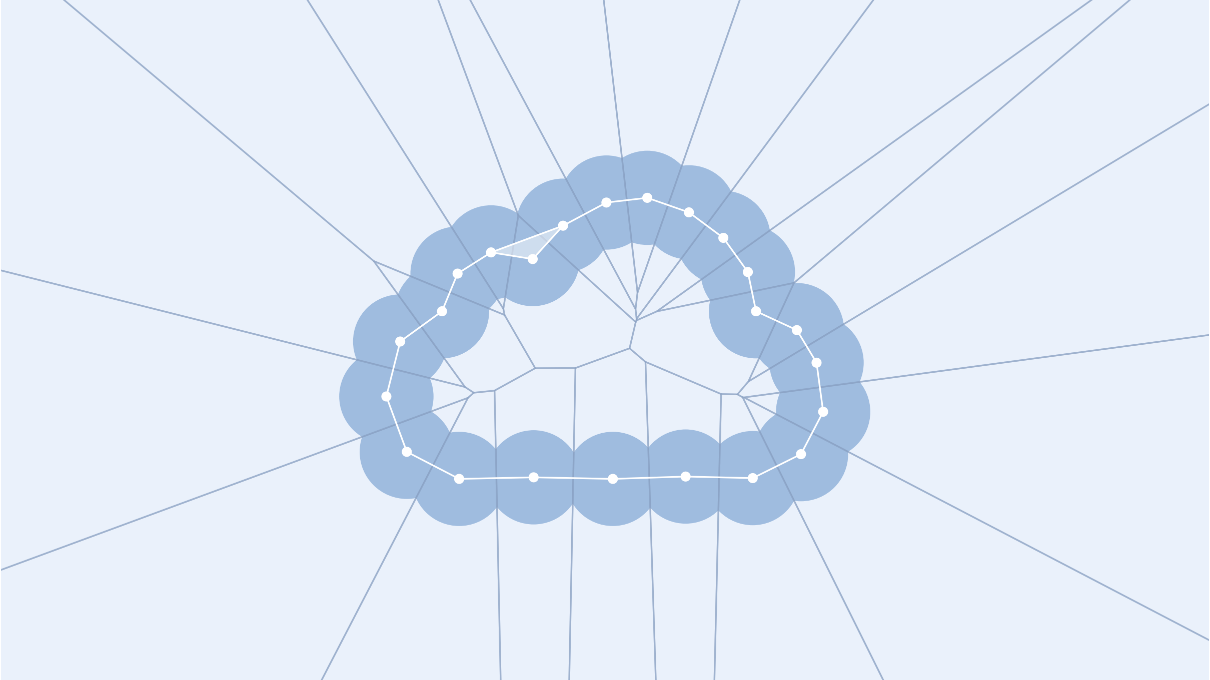

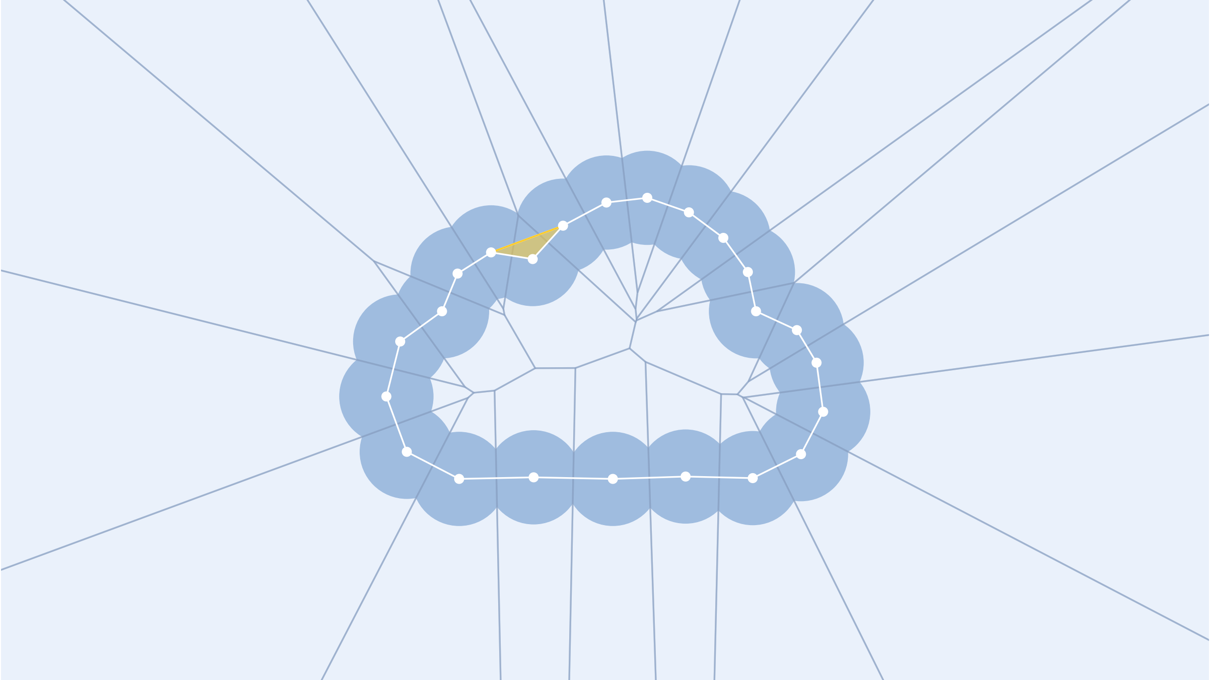

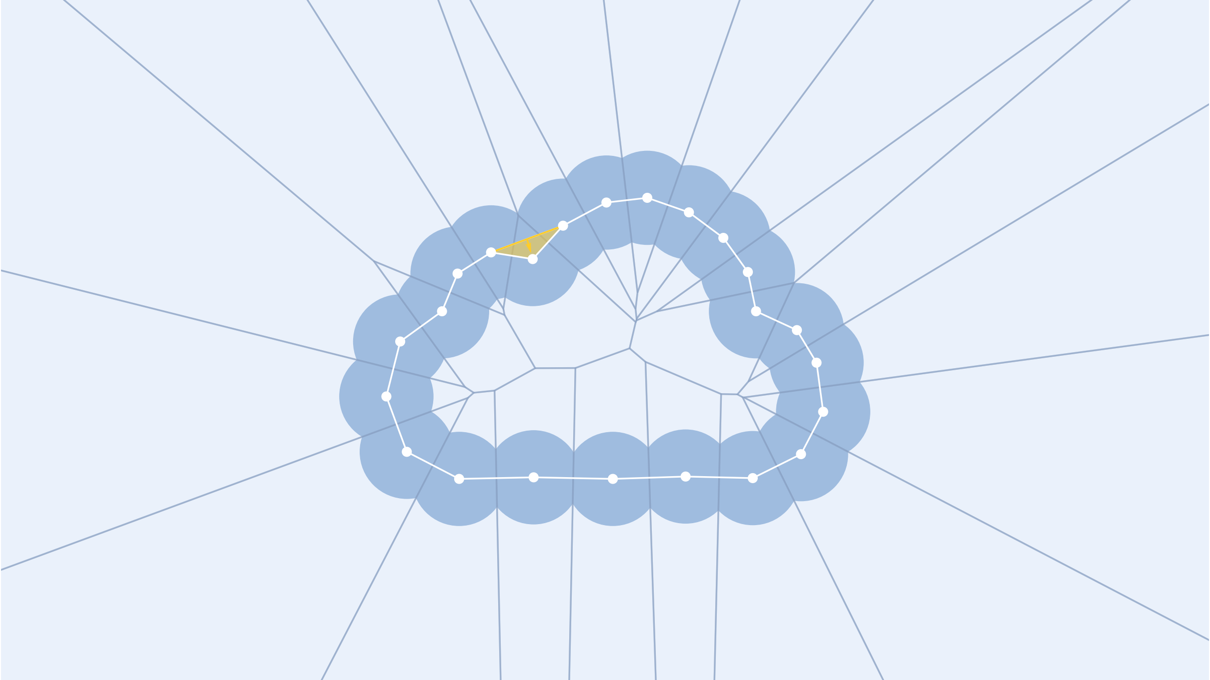

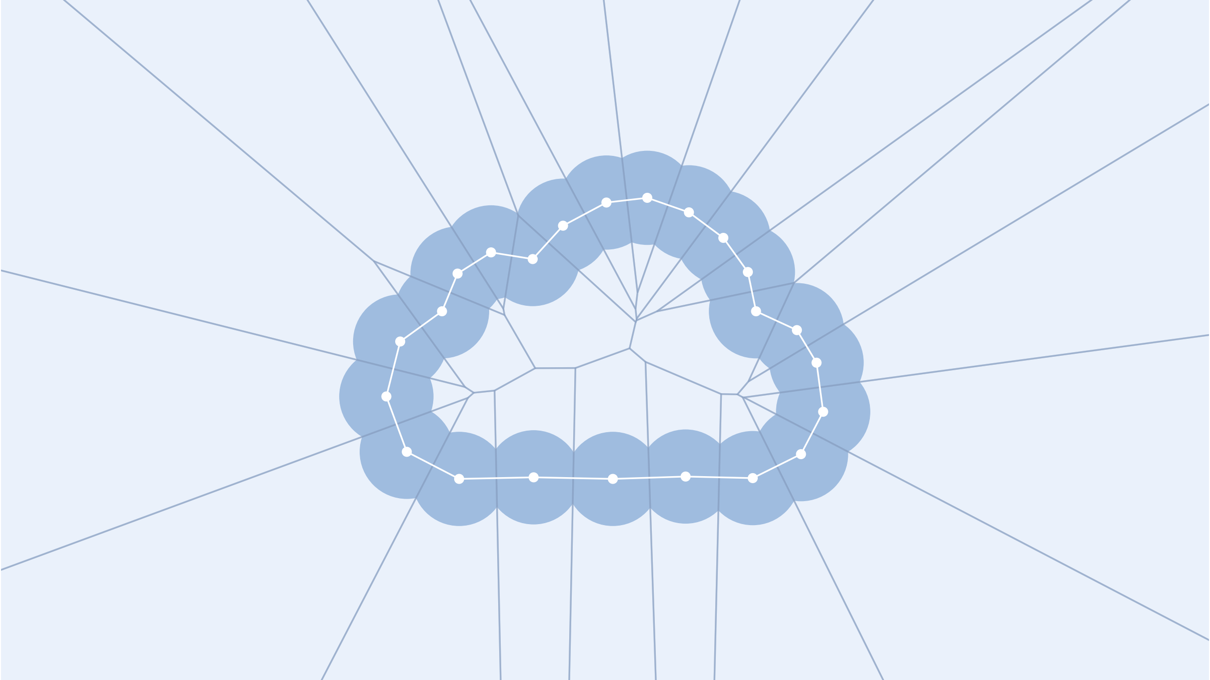

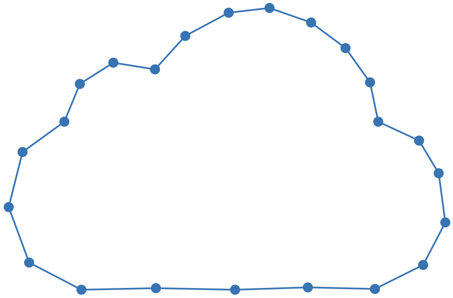

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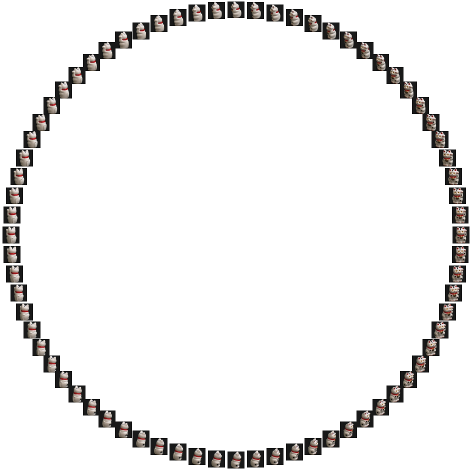

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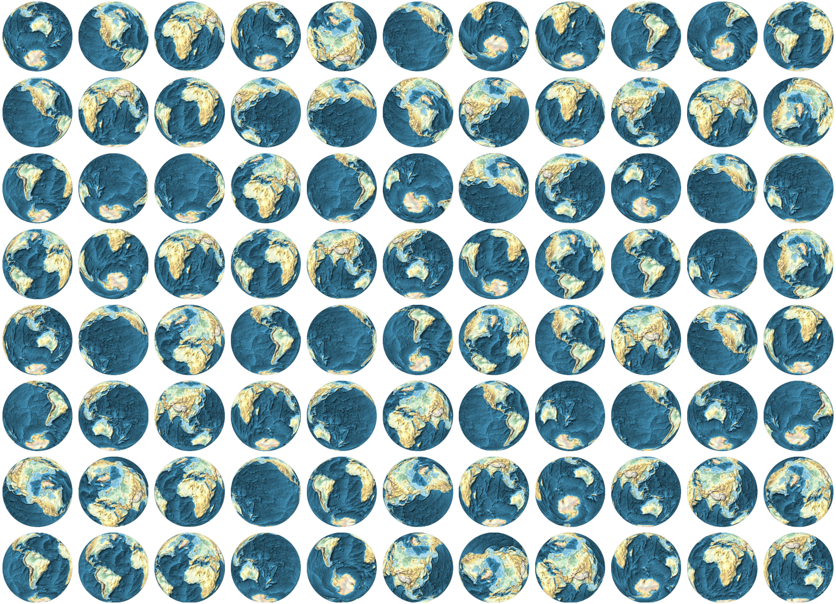

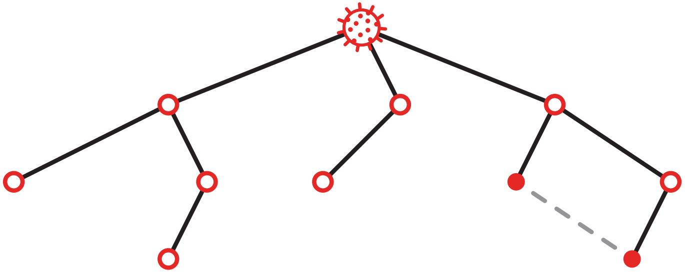

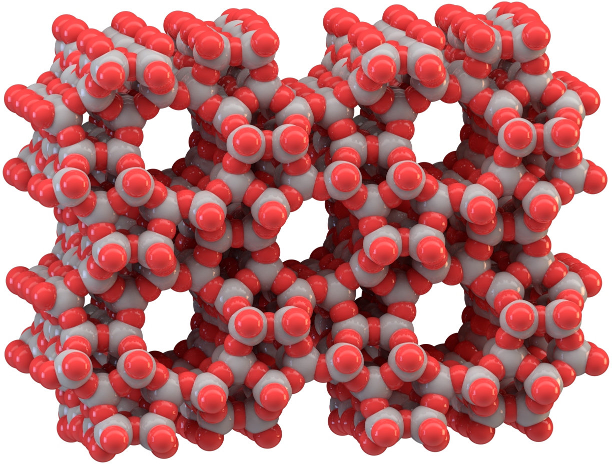

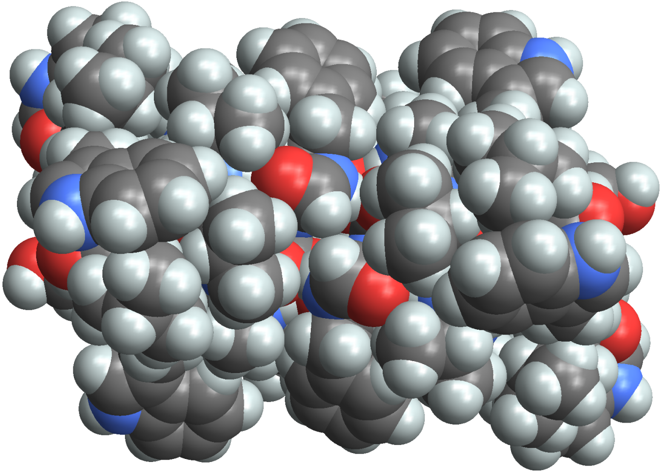

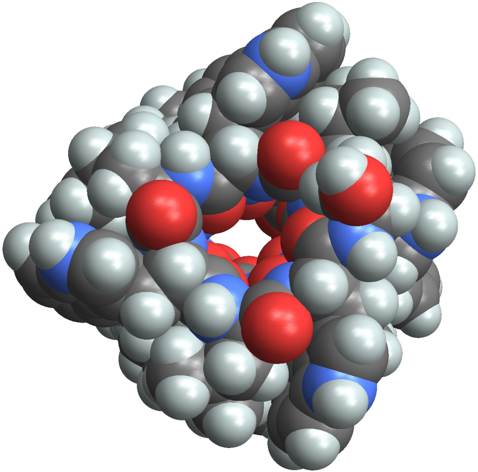

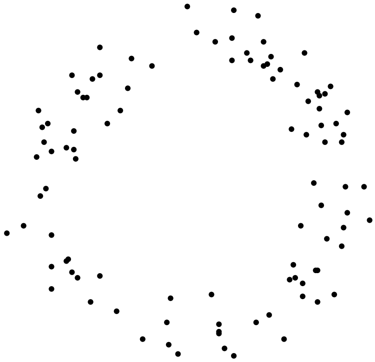

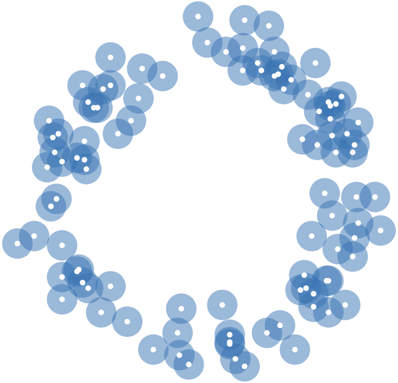

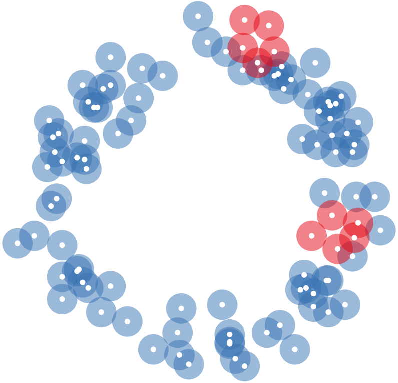

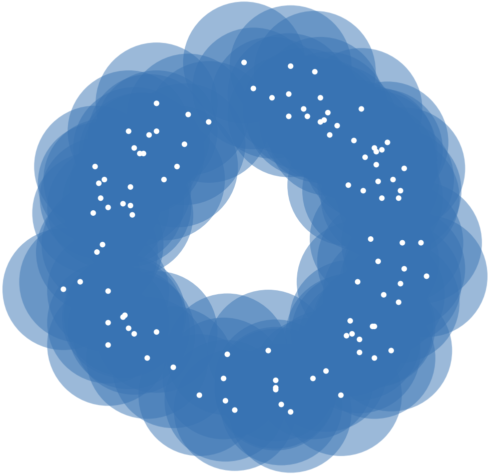

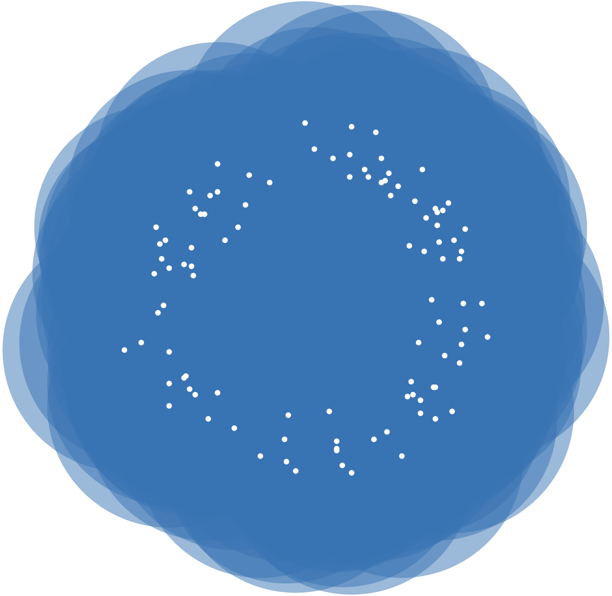

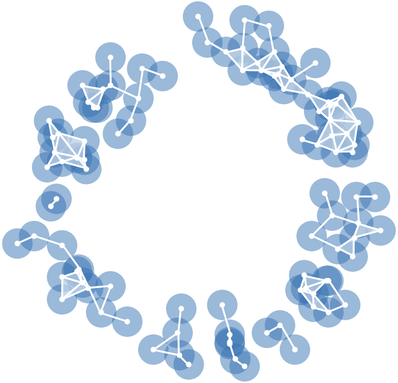

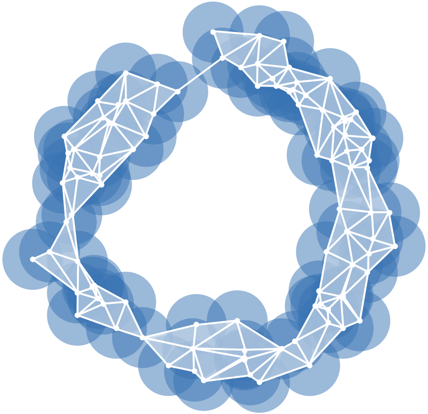

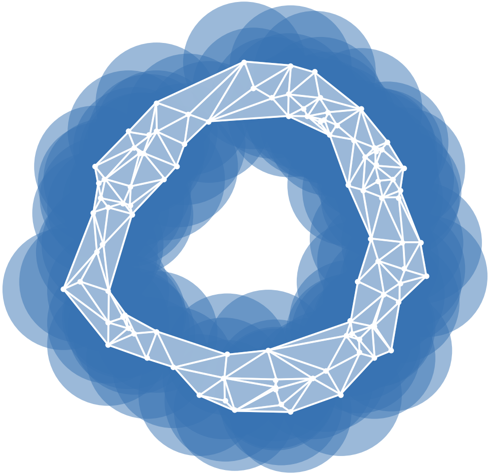

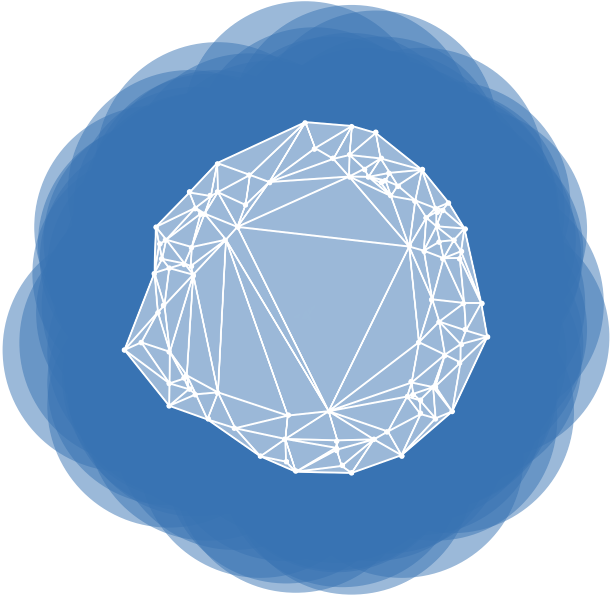

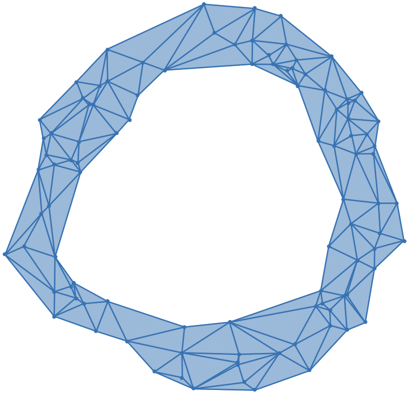

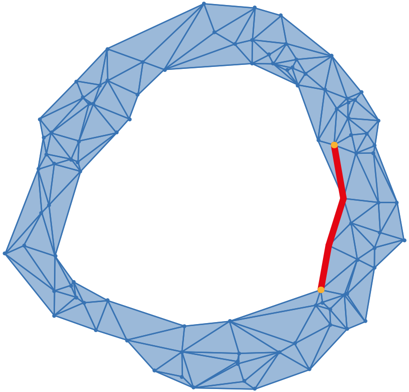

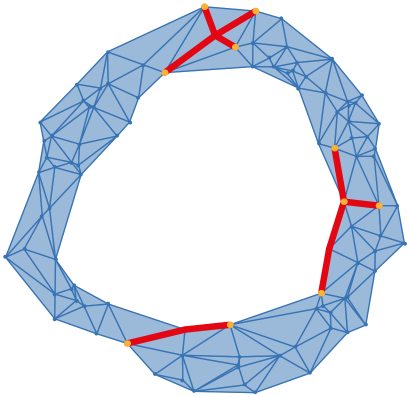

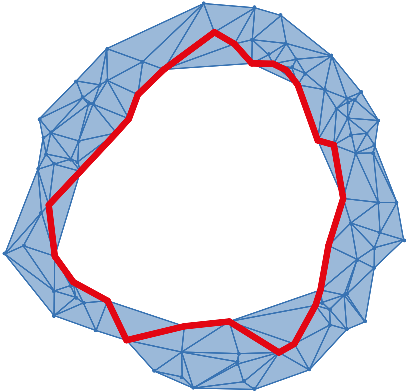

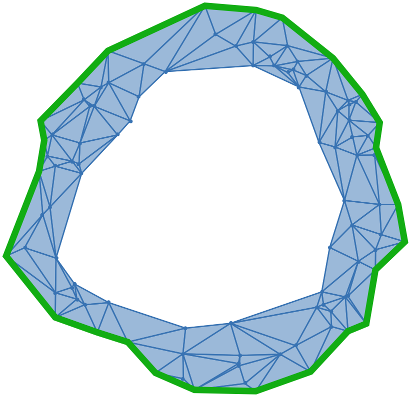

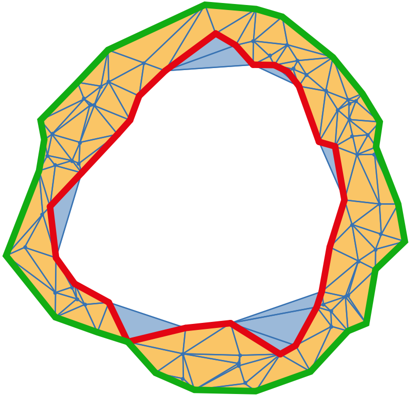

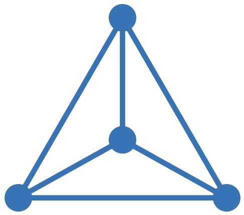

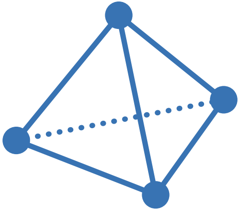

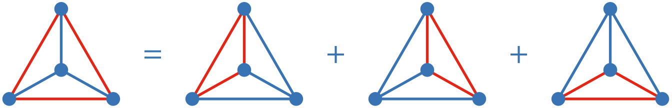

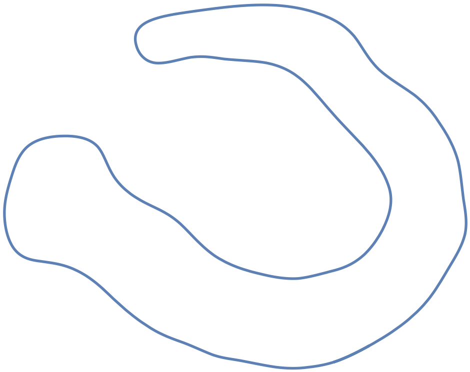

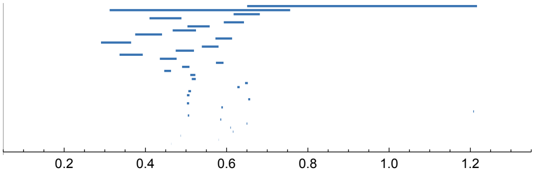
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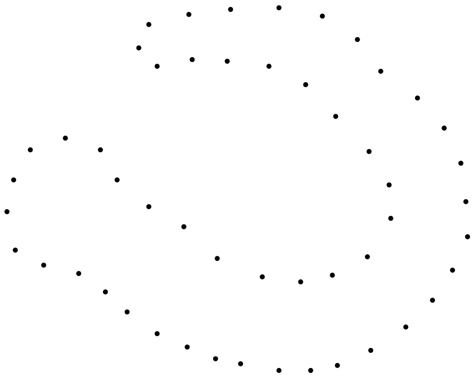

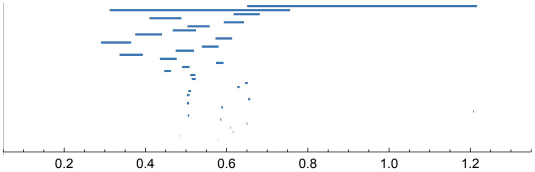

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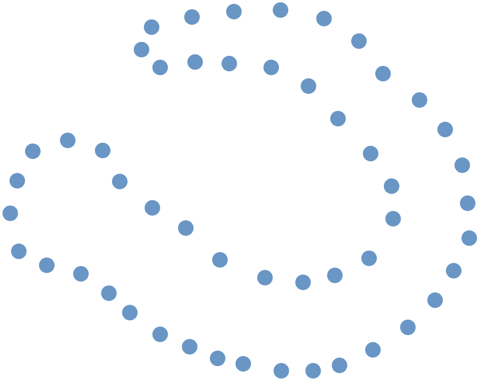

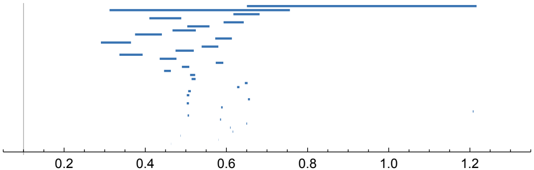
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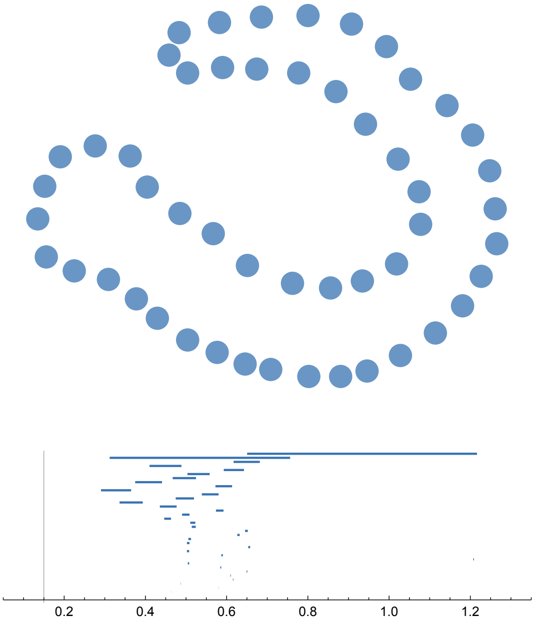
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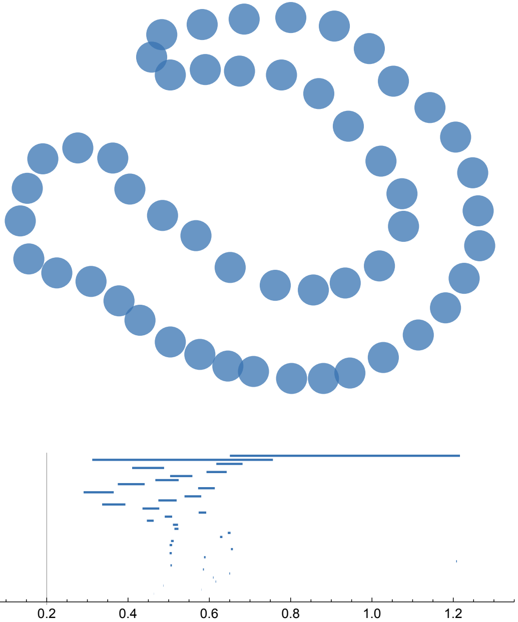

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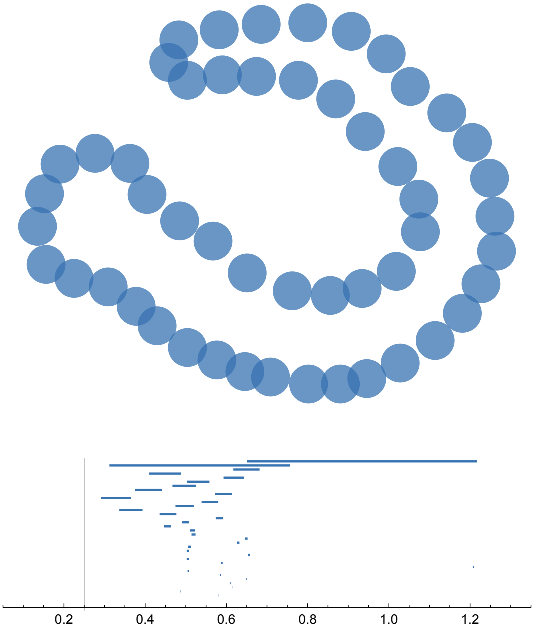
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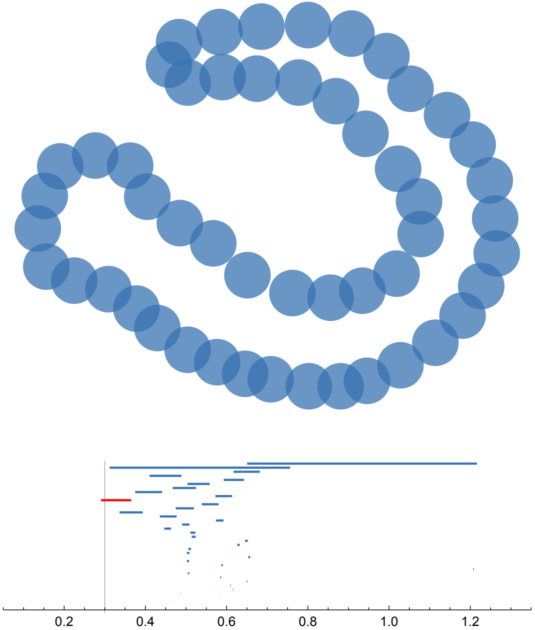
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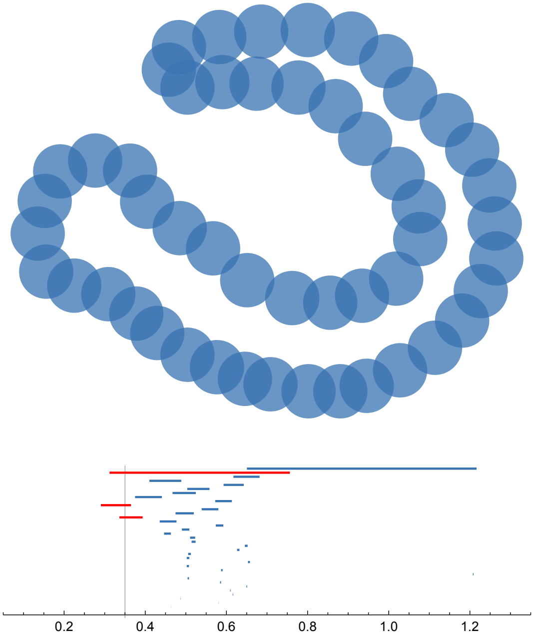
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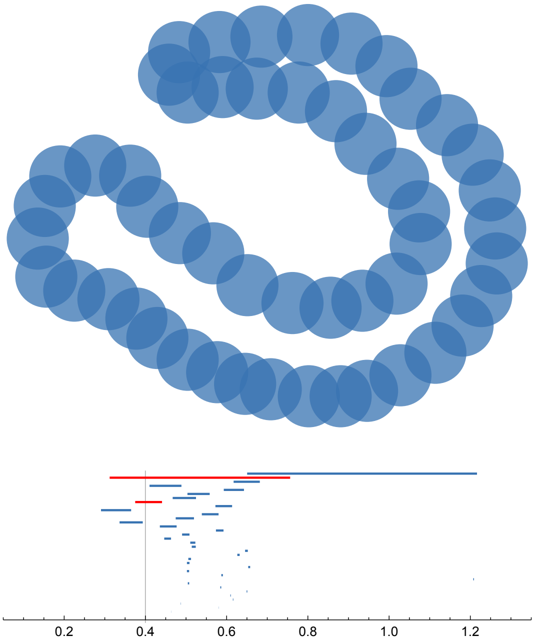
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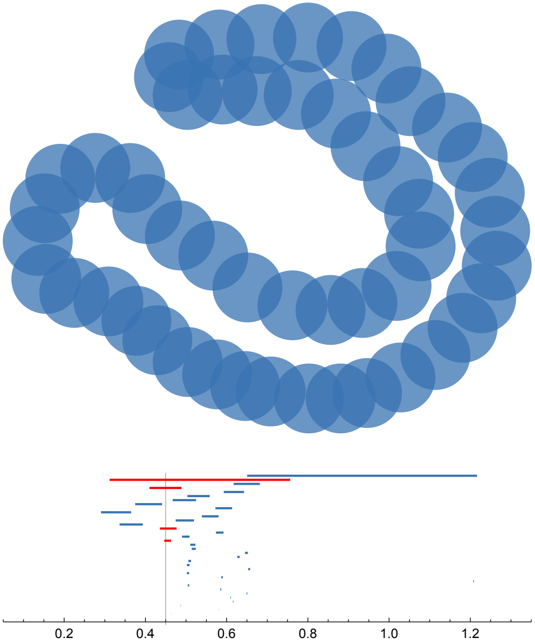

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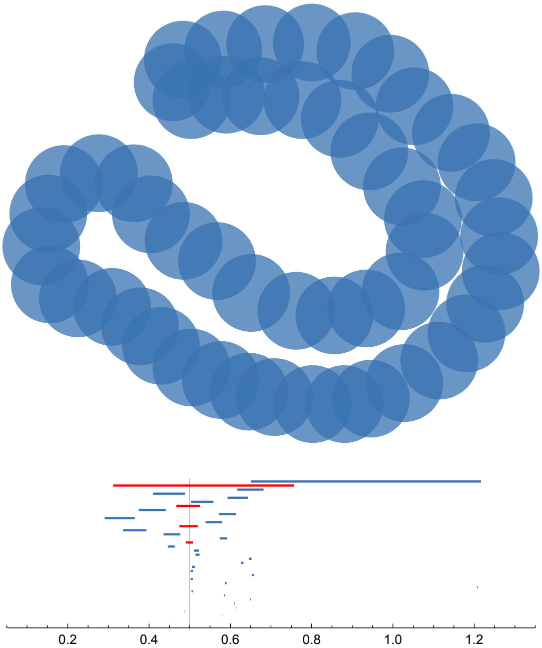
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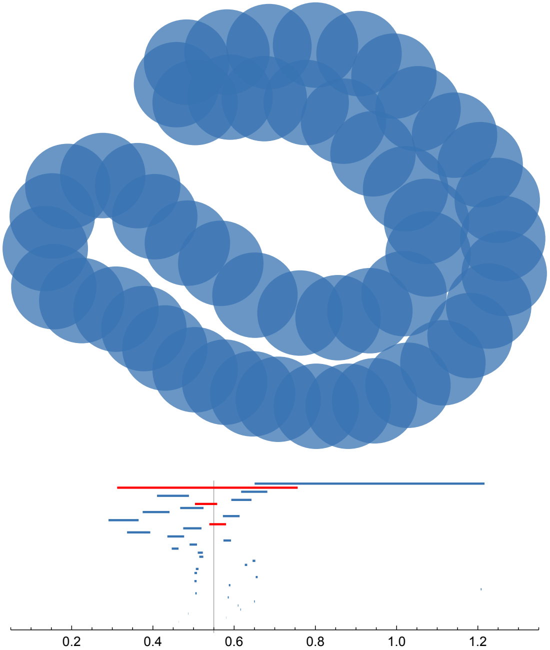
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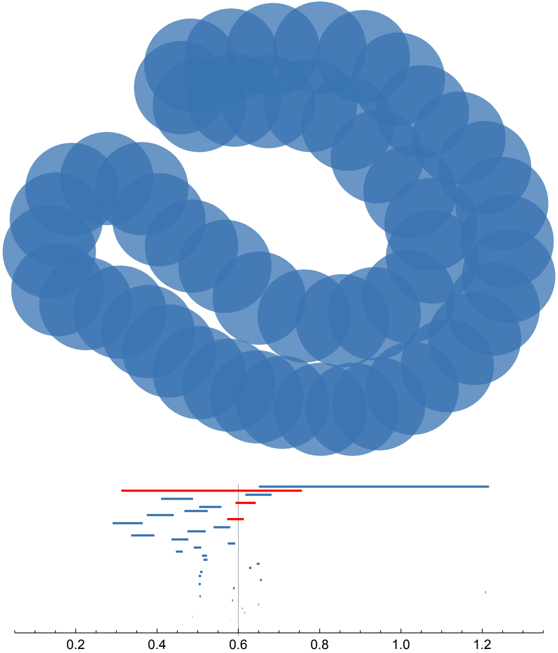
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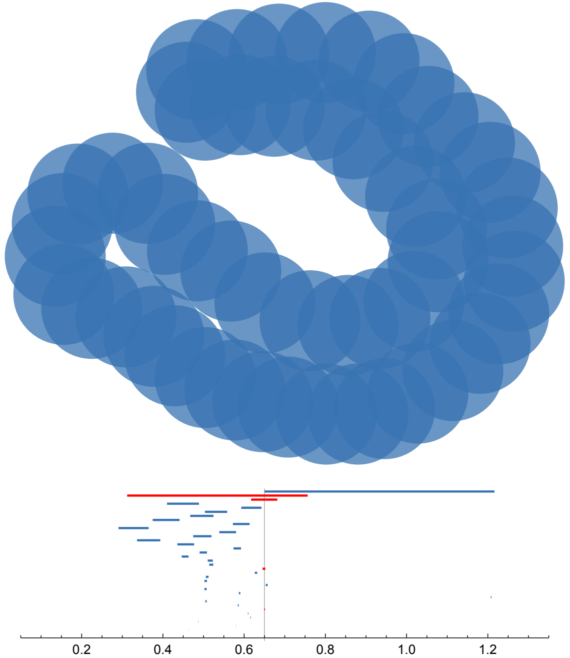
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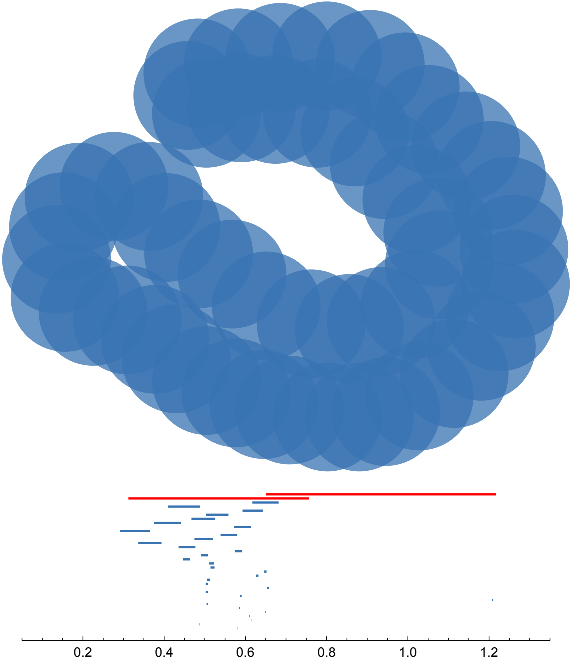
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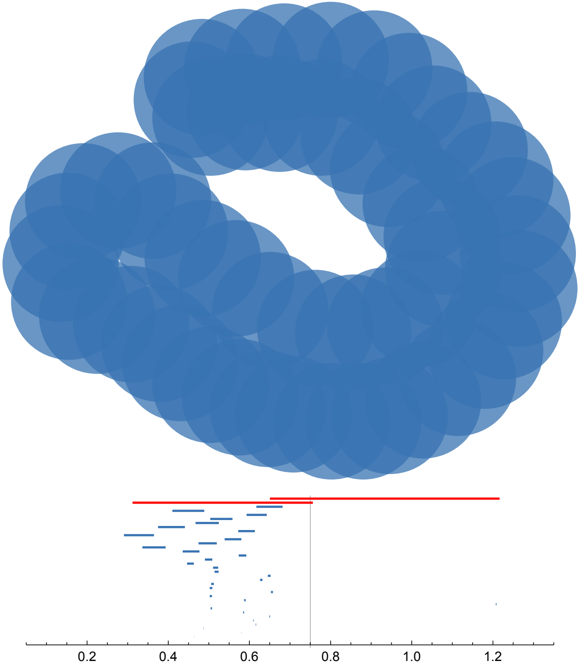
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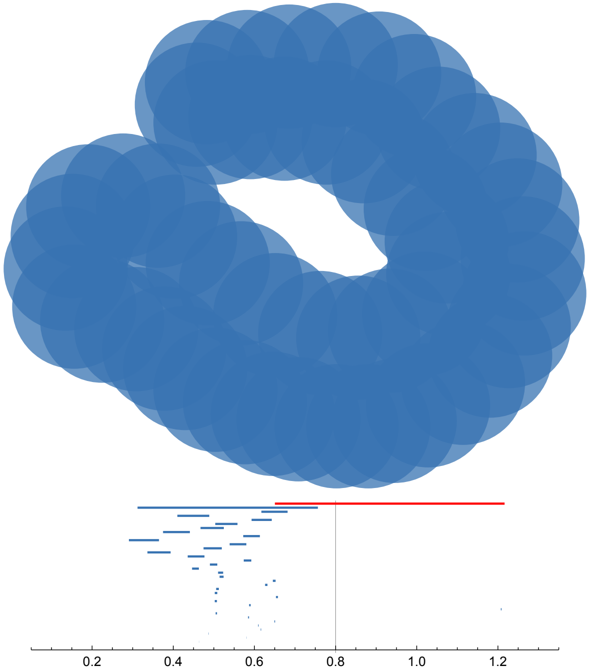

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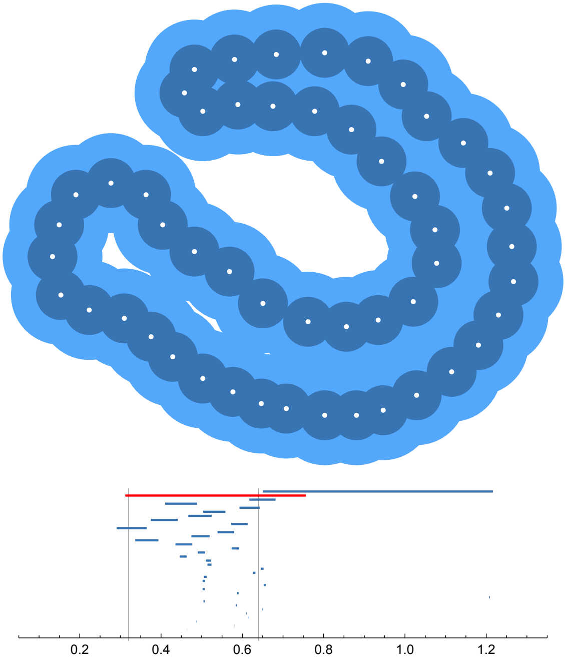
1.0
1.2


0.2
0.4
0.6
0.8
1.0
1.2

0.2
0.4
0.6
0.8
1.0
1.2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0.4
0.6
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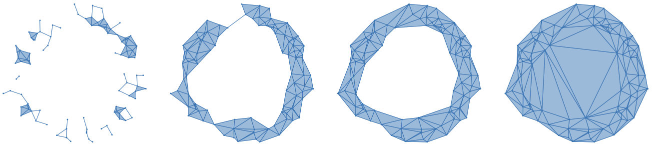
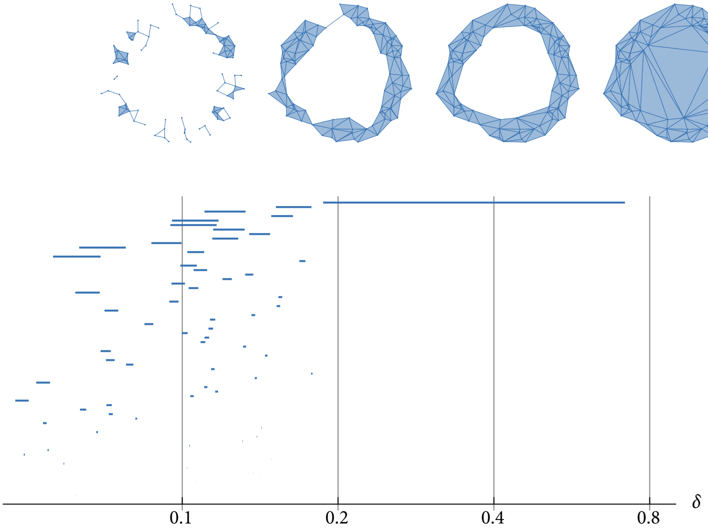
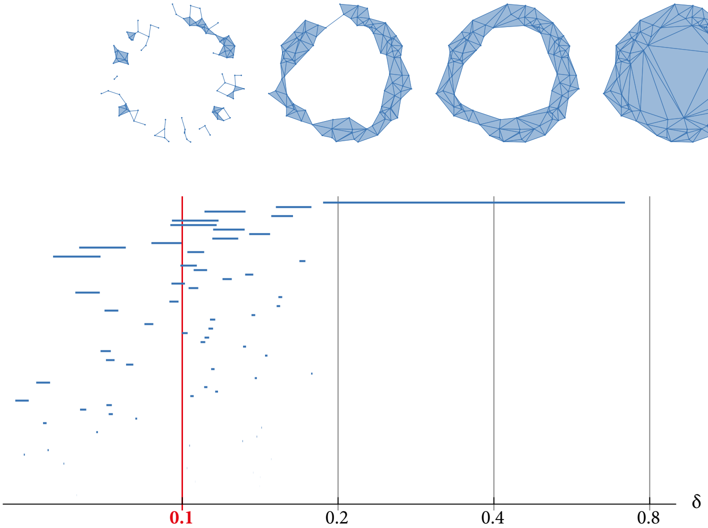
1.0
1.2




δ
0.1
0.2
0.4
0.8


δ
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0.2
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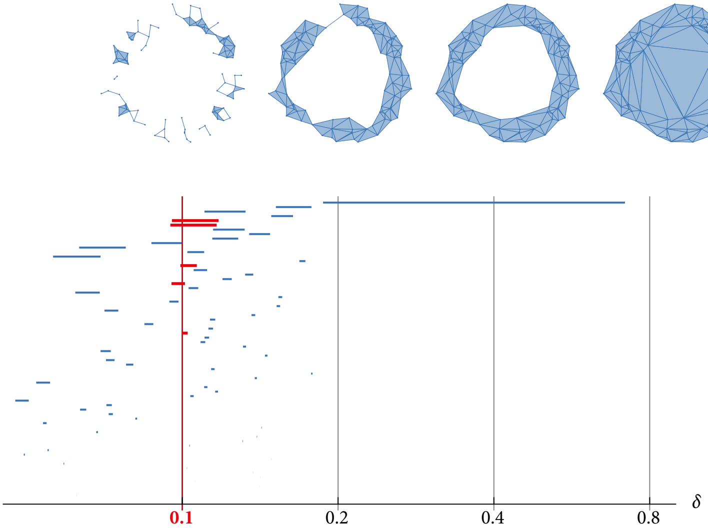
δ
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0.2
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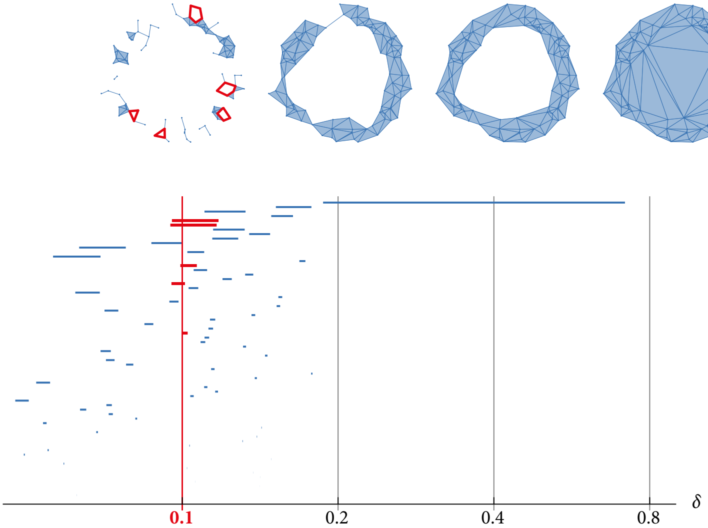
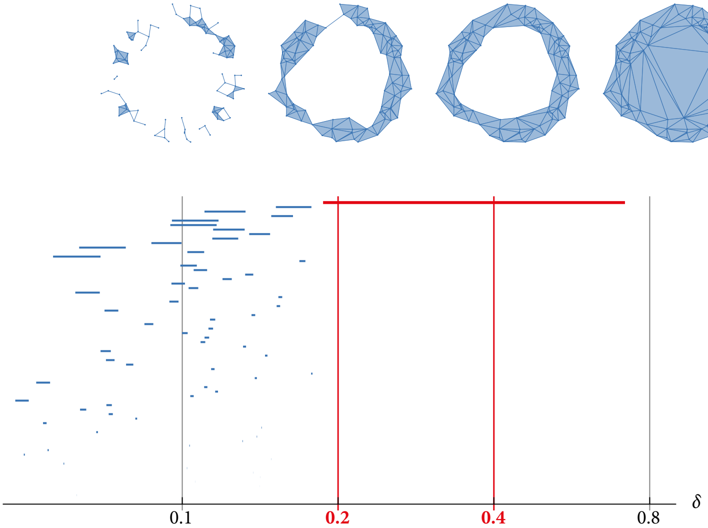
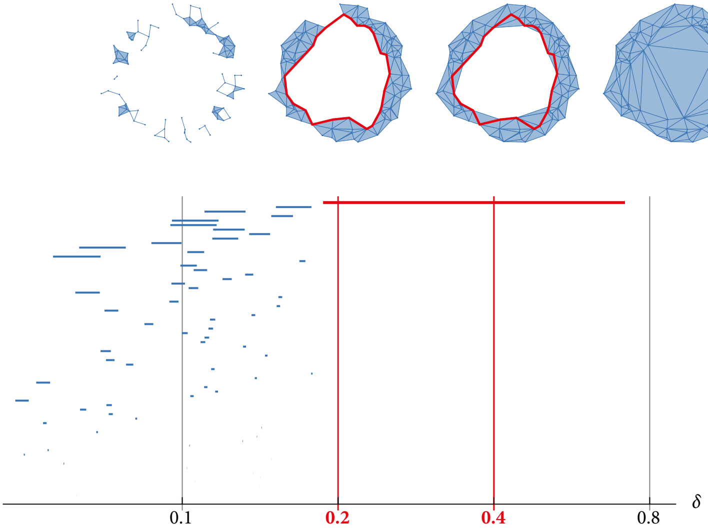
0.8



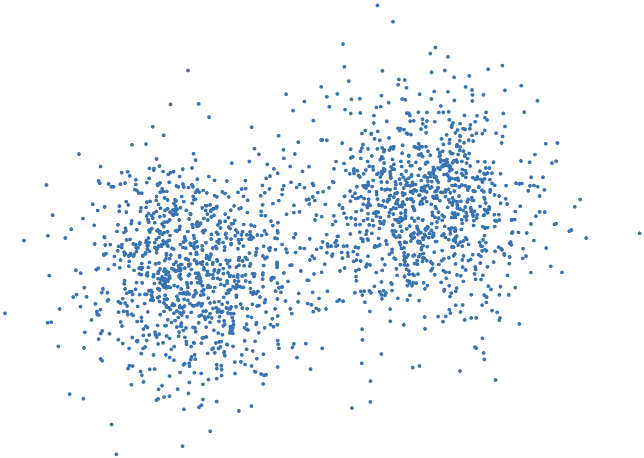
δ
0.1
0.2
0.4
0.8

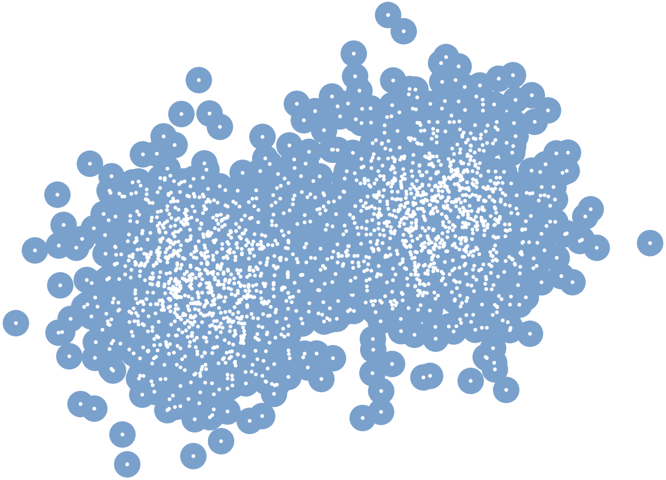


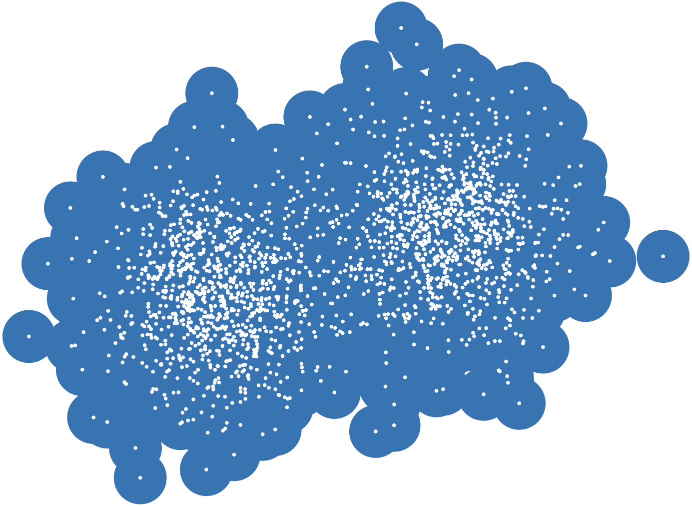
0.1
0.2
0.4
0.8
δ

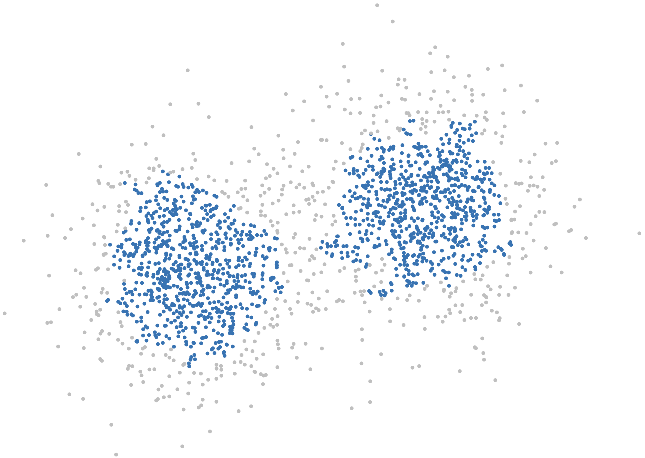

δ
0.1
0.2
0.4
0.8

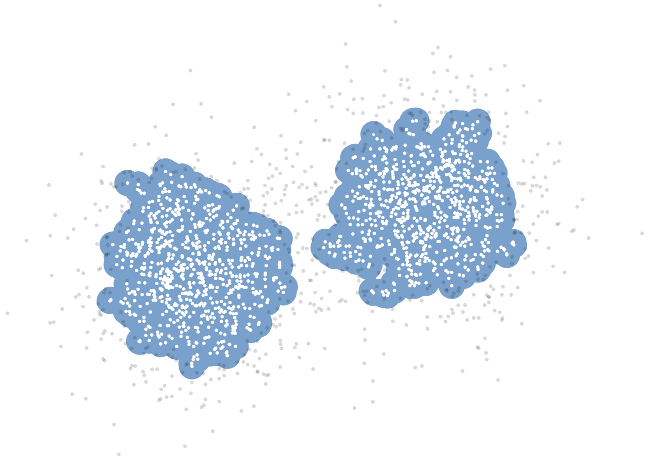
$$V_1 \longrightarrow V_2 \longrightarrow V_3 \longrightarrow V_4$$

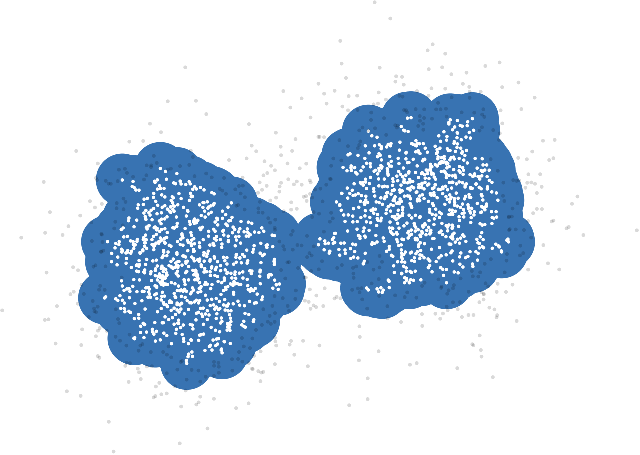


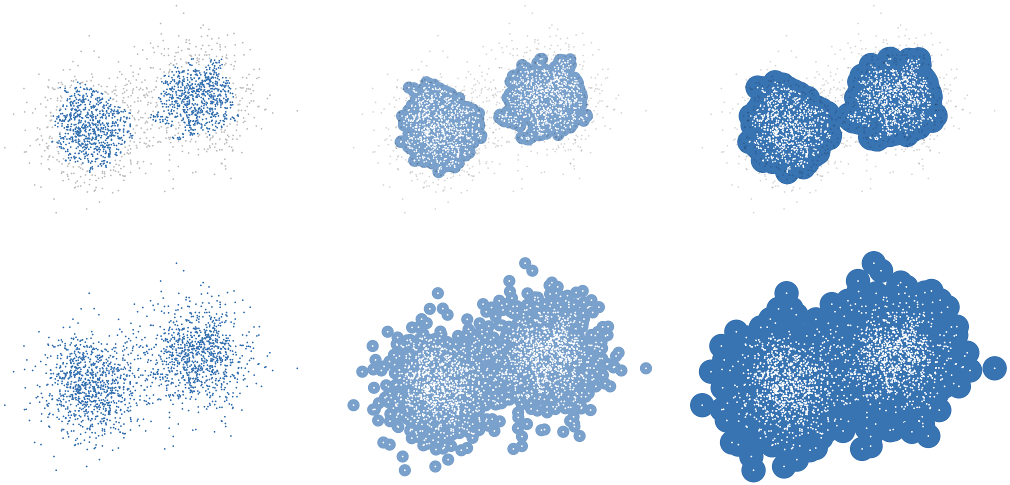












Two-parameter persistence with surjections

$$\begin{tikzcd}
V_{0,0} \arrow[r, two heads] \arrow[d] & V_{1,0} \arrow[r, two heads] \arrow[d] & V_{2,0} \arrow[d] \\
V_{0,1} \arrow[r, two heads] & V_{1,1} \arrow[r, two heads] & V_{2,1}
\end{tikzcd}$$

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V_{0,1} \arrow[r, two heads] & V_{1,1} \arrow[r, two heads] & V_{2,1}
\end{tikzcd}$$

Does the special structure simplify the picture?

Two-parameter persistence with surjections

$$
\begin{tikzcd}
V_{0,0} \arrow[r, two heads] \arrow[d] & V_{1,0} \arrow[r, two heads] \arrow[d] & V_{2,0} \arrow[d] \\
V_{0,1} \arrow[r, two heads] & V_{1,1} \arrow[r, two heads] & V_{2,1}
\end{tikzcd}
$$

Does the special structure simplify the picture?

Theorem (B., Botnan, Oppermann, Steen 2020, Adv. Math.)

The representation theory of $m \times n$ grids with surjective horizontal maps is just as hard as that of general $m \times (n-1)$ grids.

How common are complicated 2-parameter diagrams?

Theorem (B., Scoccola 2022)

Almost every diagram with the shape of an $m \times n$ grid is indecomposable.

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Theorem (B., Scoccola 2022)

Almost every diagram with the shape of an $m \times n$ grid is indecomposable.

- *Given a diagram, there is an indecomposable one arbitrarily close.*
- *Given an indecomposable diagram, any diagram nearby (within distance $\delta > 0$) is almost indecomposable (has an indecomposable piece and an ϵ-small piece).*