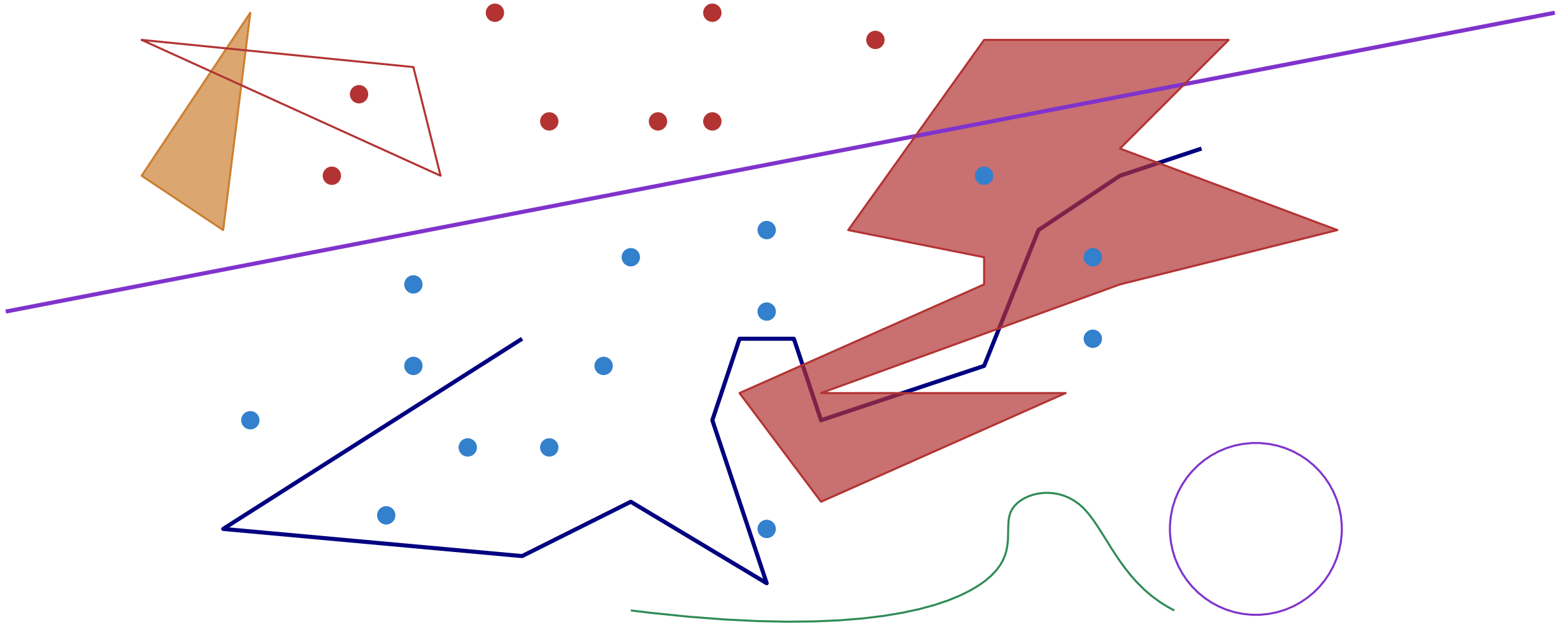


Geometric Algorithms

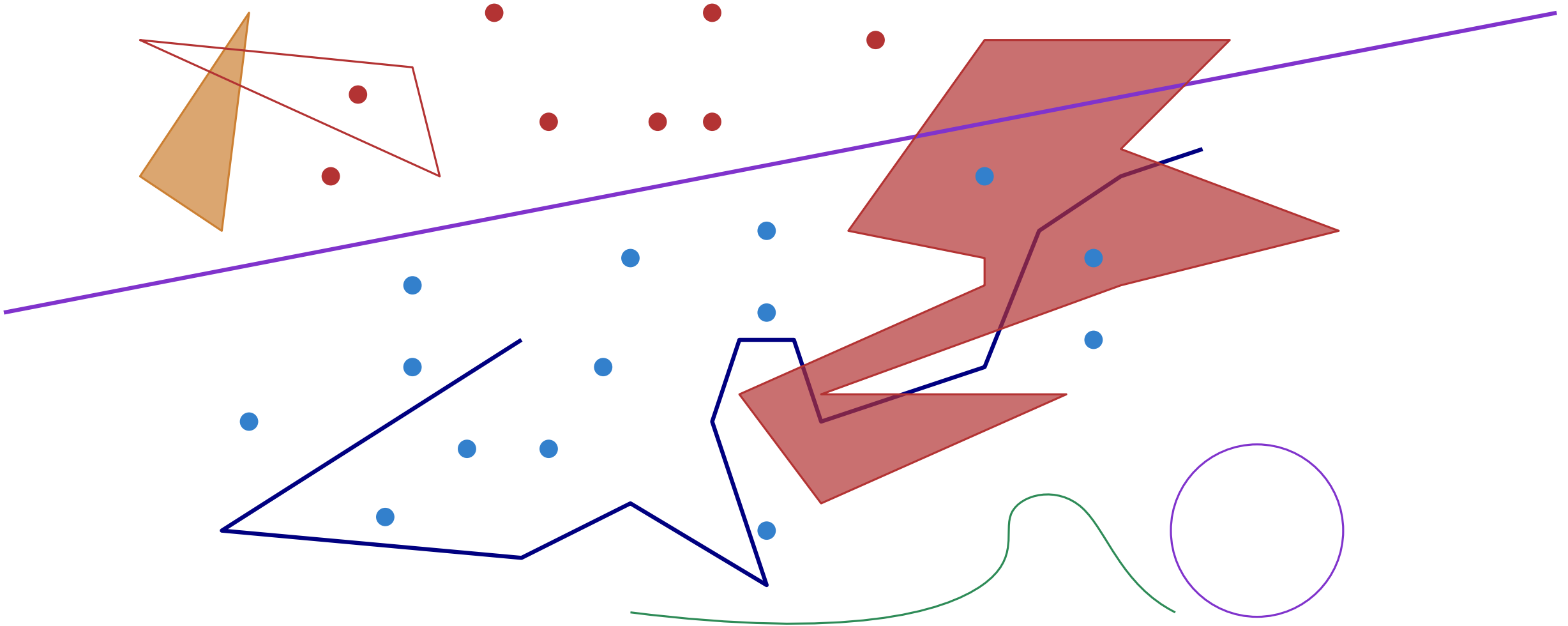
Frank Staals

What & Why?



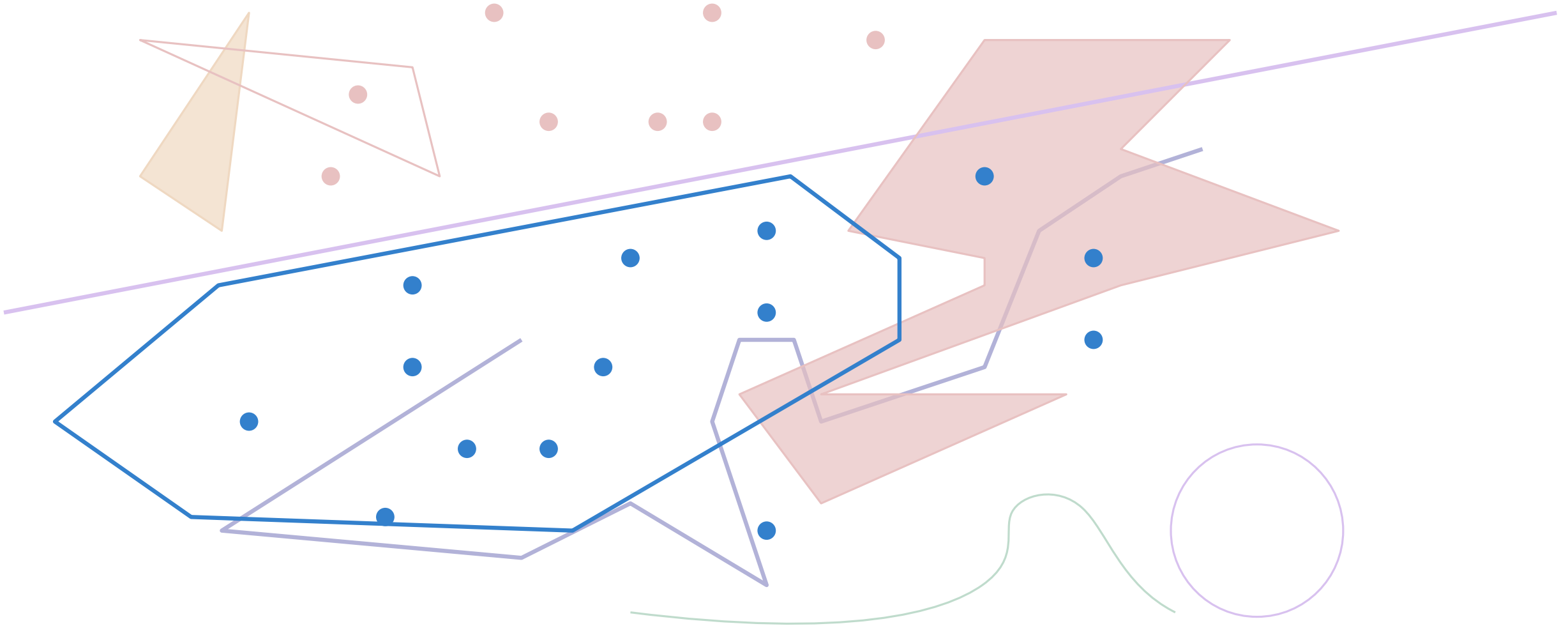
What & Why?

Geometric Algorithms: Algorithms involving **geometric objects**.
e.g. points, lines, triangles, disks (balls), planes, polygons



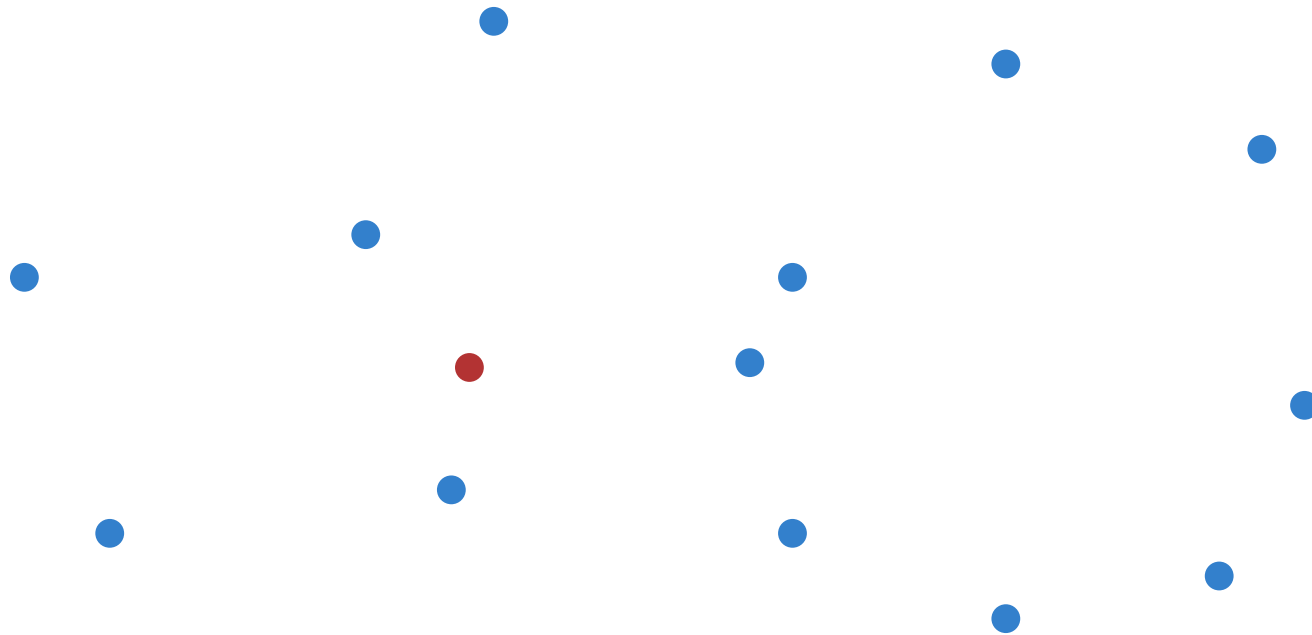
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An example

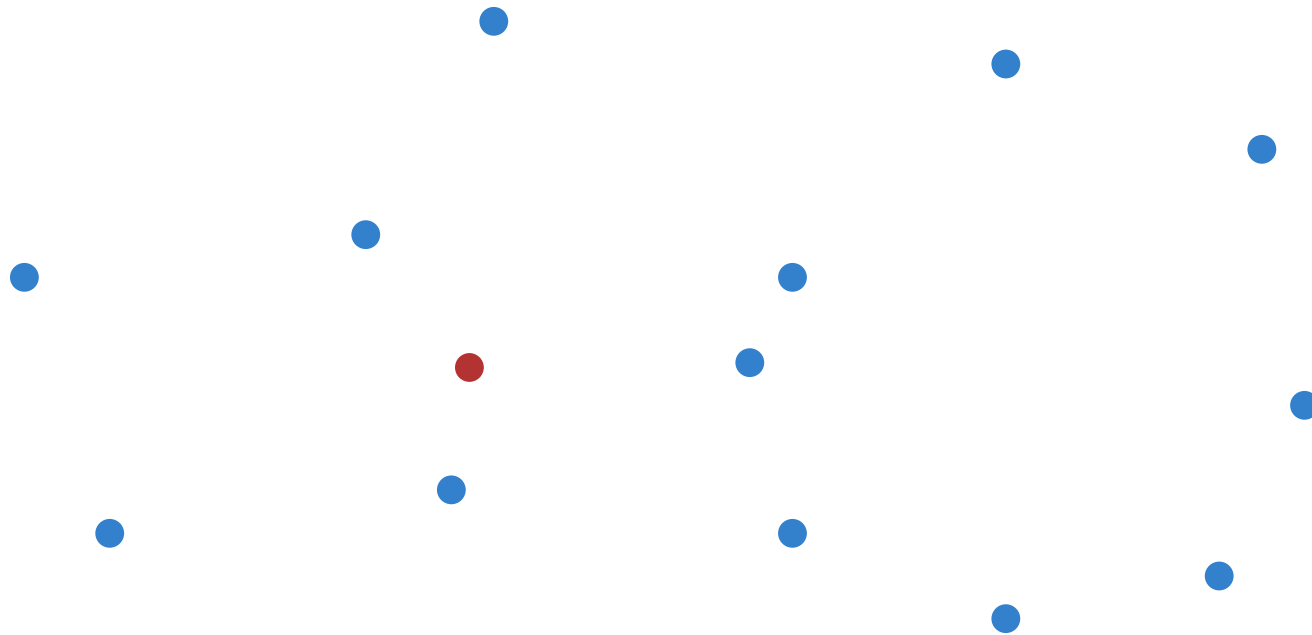
Problem Store the locations P of post offices s.t. we can quickly find the post office closest to a query point q ?



An example

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Naive Go through all n points $P \implies$ running time $\Theta(n)$

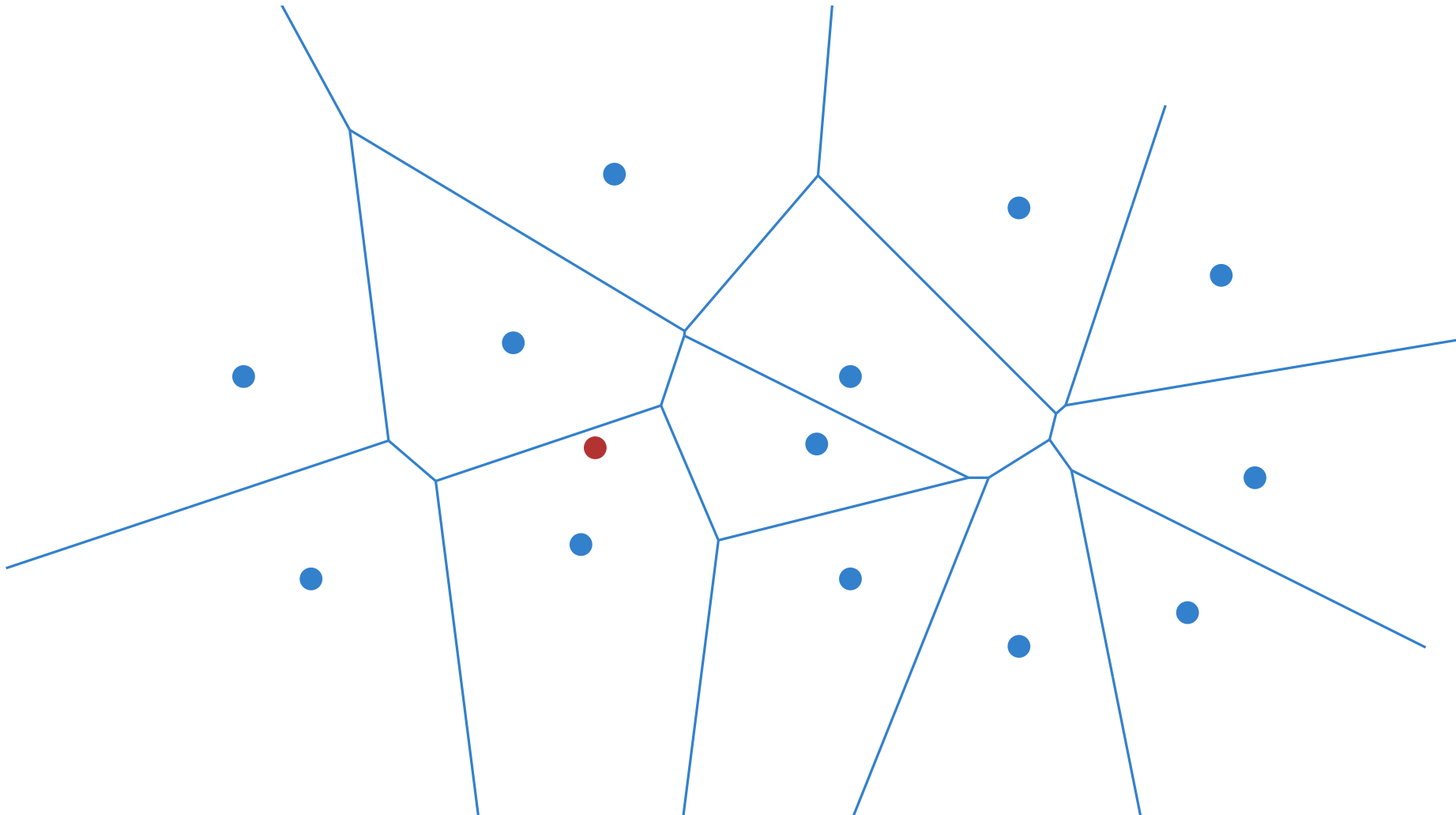


An example

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Solution

1. Build an **Voronoi diagram** of P
2. preprocess it for point location queries



An example

Problem Store the locations P of post offices s.t. we can quickly find the post office closest to a query point q ?

Solution 1. Build an **Voronoi diagram** of P
2. preprocess it for point location queries $\Rightarrow O(\log n)$ time queries

