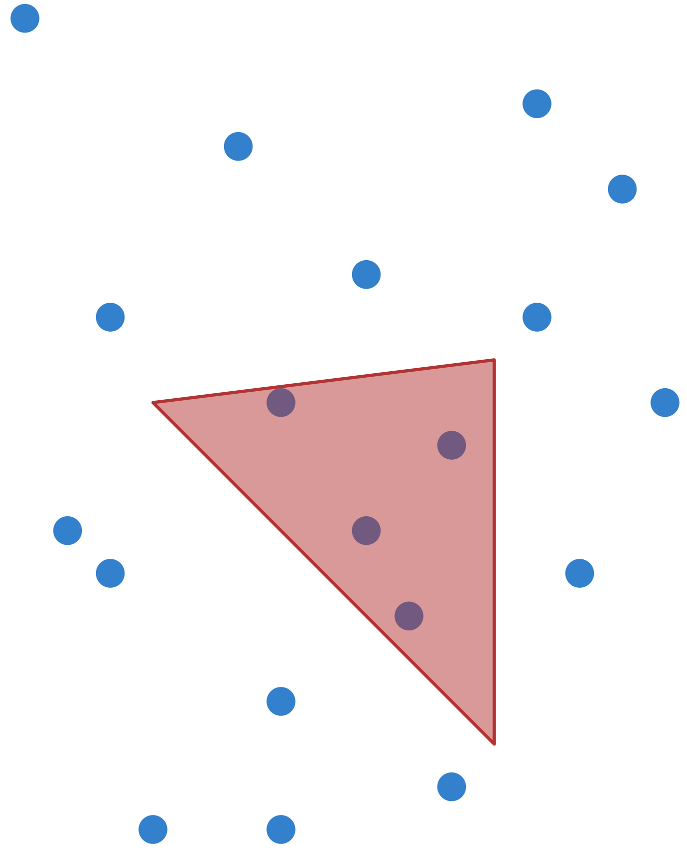
Simplex Range Searching

Given a set of n points P in $\mathbb{R}^2$. Store them in a data structure s.t. we can efficiently report the (number of) points from P that lie in a query triangle Q



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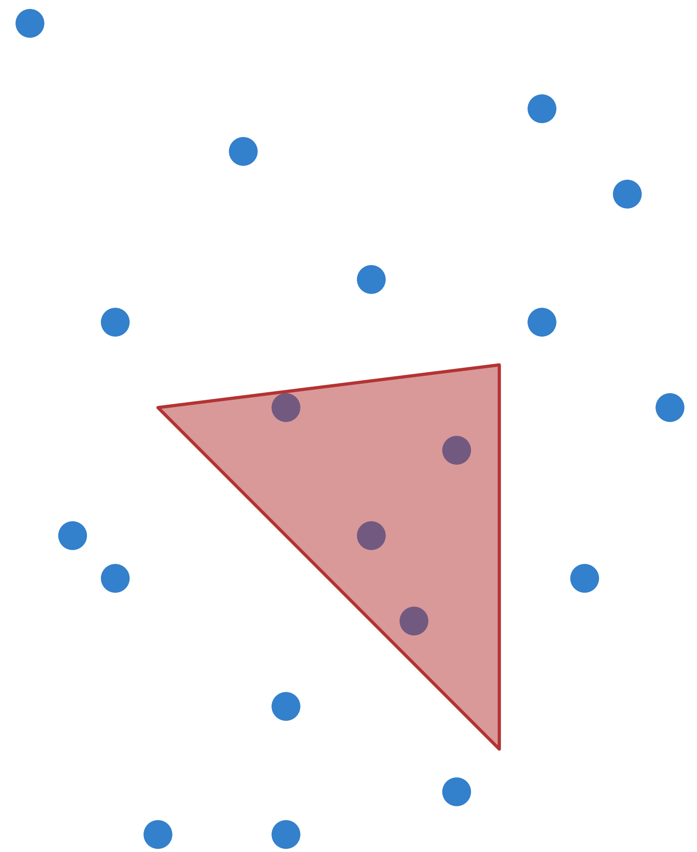

	Space Uage	Query time
Partition Tree	$O(n)$	$O(n^{1/2+\varepsilon})$
Cutting Tree	$O(n^{2+\varepsilon})$	$O(\log^3 n)$

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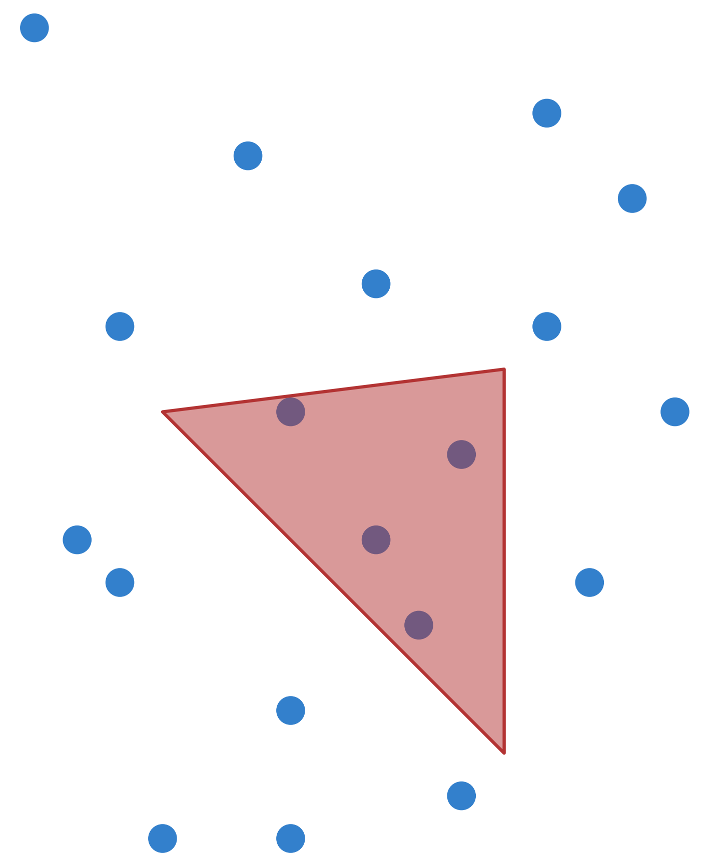

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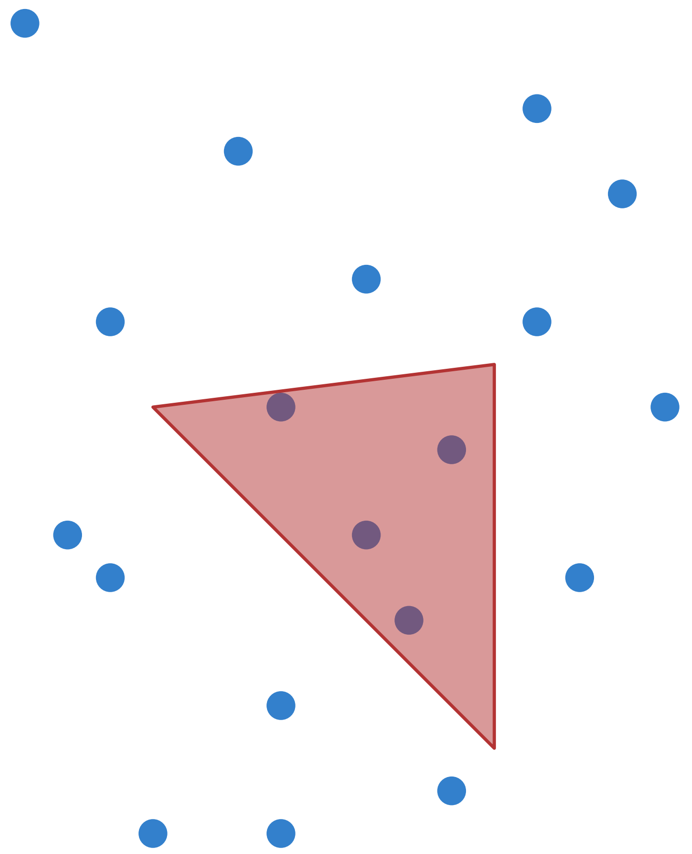

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Combination	$O(s)$	$O(n^{1+\varepsilon}/s^{1/2})$

for any $s \in [n, n^2]$

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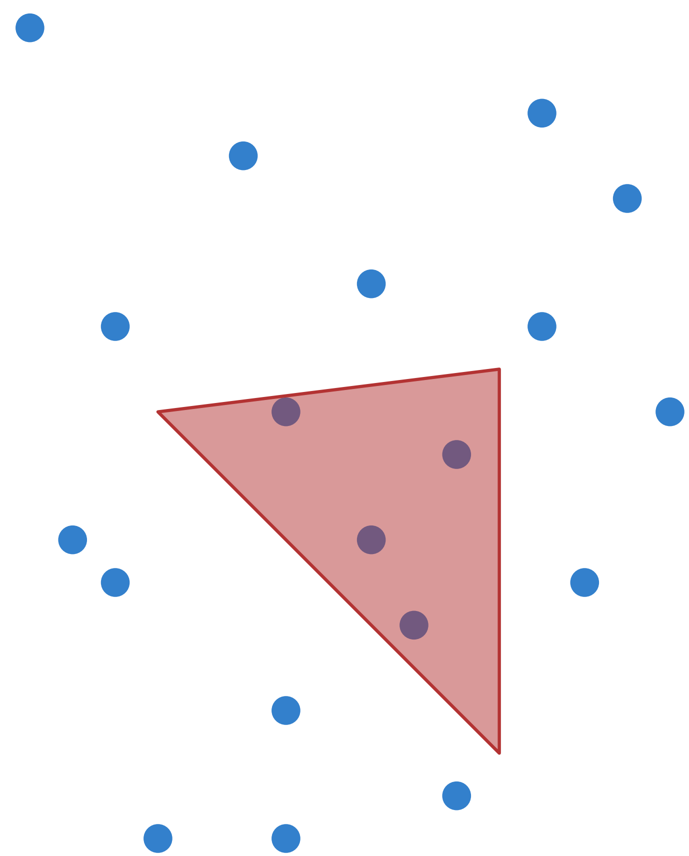

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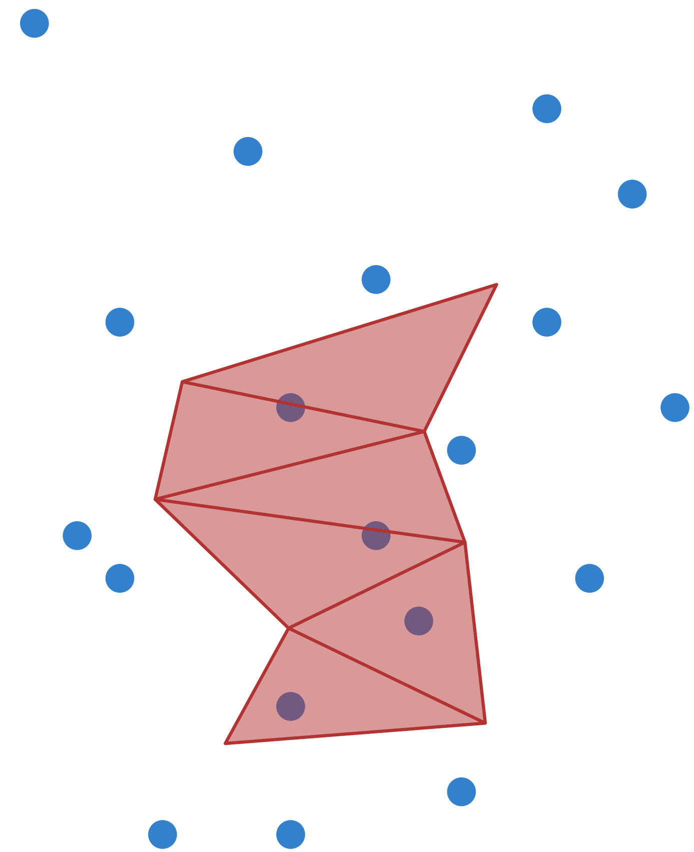
What if Q is an arbitrary polygon of $O(1)$ complexity?



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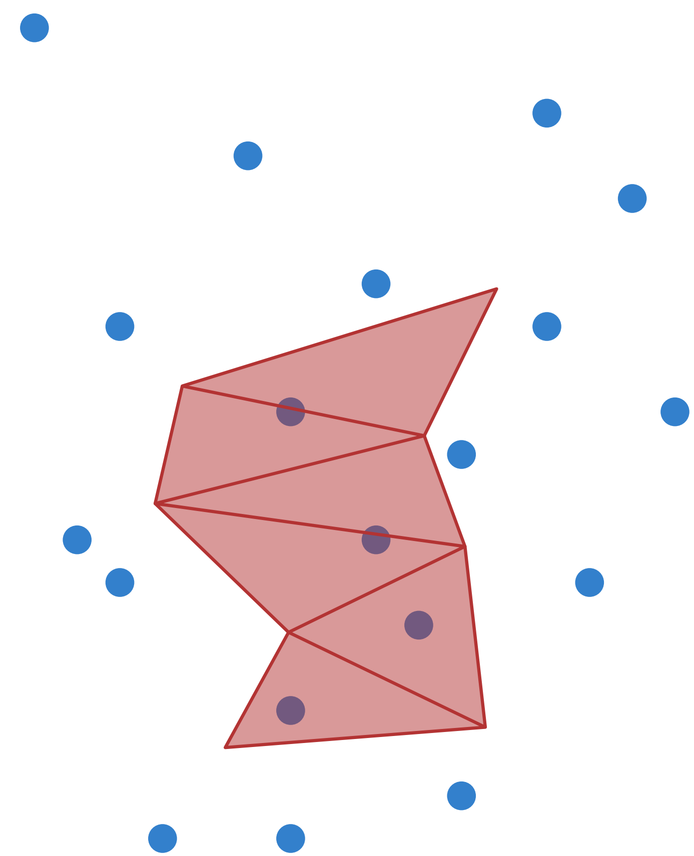
Triangulate Q and query with each triangle



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