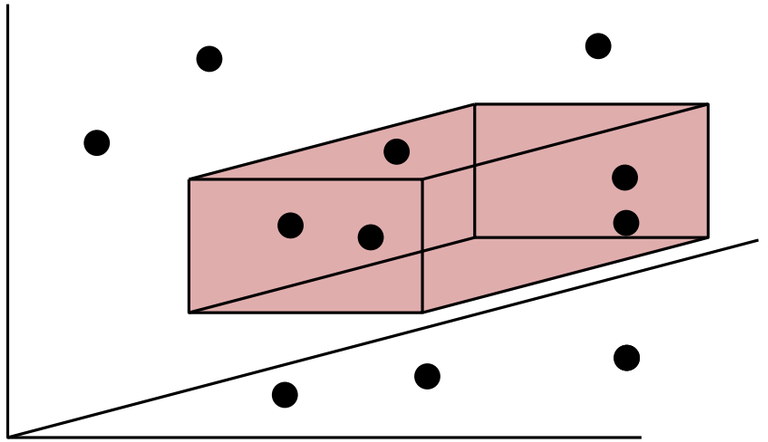
Range Searching

Problem:

Given n points in $\mathbb{R}^d$, store them s.t. we can report all k points in a axis parallel query box.



Results:

We report in $O(q(n) + k)$ time, where $q(n)$ is

	1D	2D		dD	
		Today	Friday	Today	Friday
Space					
Query					

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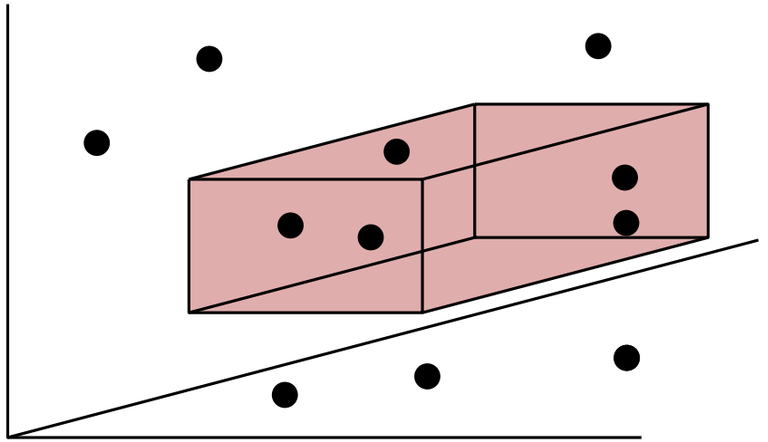

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We report in $O(q(n) + k)$ time, where $q(n)$ is

	1D	2D		dD	
		Today	Friday	Today	Friday
Space	$O(n)$				
Query	$O(\log n)$				

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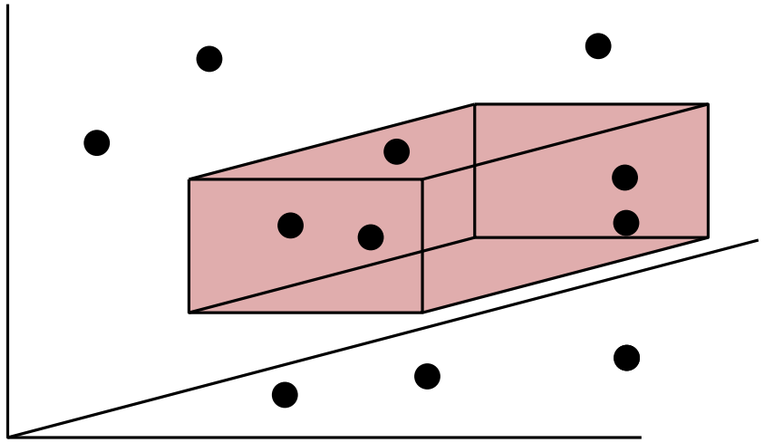

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We report in $O(q(n) + k)$ time, where $q(n)$ is

	1D	2D		dD	
		Today	Friday	Today	Friday
Space	$O(n)$	$O(n)$		$O(n)$	
Query	$O(\log n)$	$O(\sqrt{n})$		$O(n^{1-\frac{1}{d}})$	

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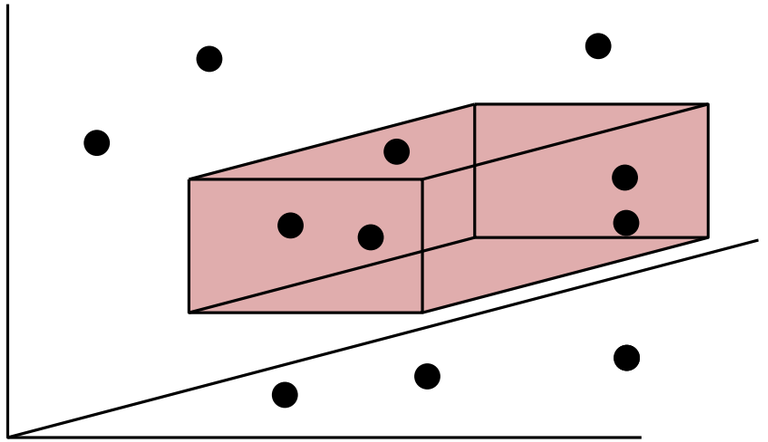
Given n points in $\mathbb{R}^d$, store them s.t. we can report all k points in a axis parallel query box.



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We report in $O(q(n) + k)$ time, where $q(n)$ is

	1D	2D		dD	
		Today	Friday	Today	Friday
Space	$O(n)$	$O(n)$	$O(n \log n)$	$O(n)$	
Query	$O(\log n)$	$O(\sqrt{n})$	$O(\log^2 n)$	$O(n^{1-\frac{1}{d}})$	

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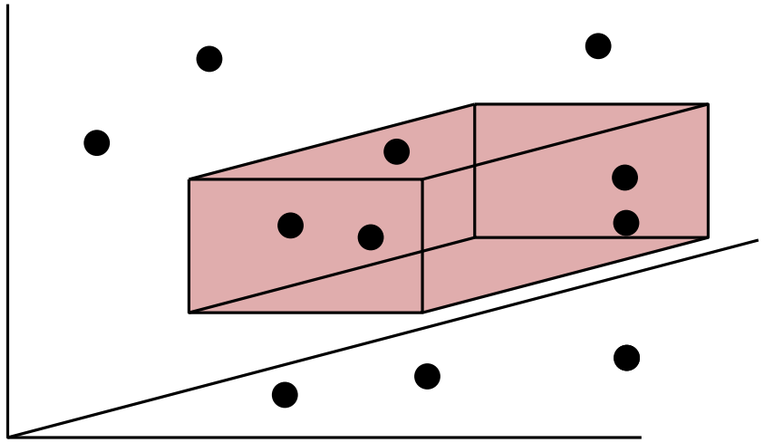

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		Today	Friday	Today	Friday
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Query	$O(\log n)$	$O(\sqrt{n})$	$O(\log n)$	$O(n^{1-\frac{1}{d}})$	

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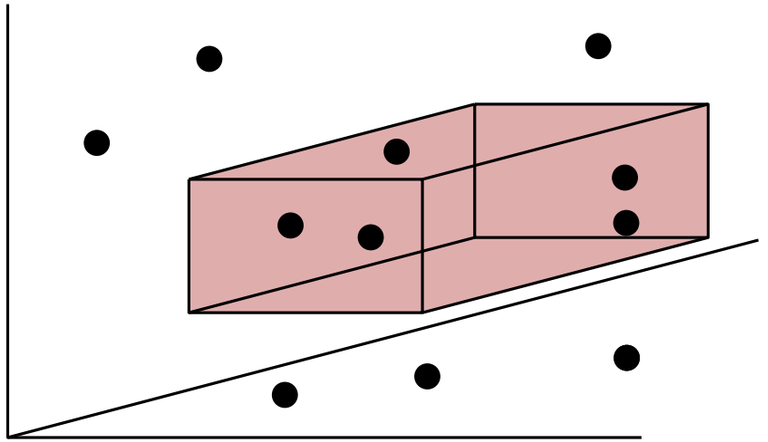

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We report in $O(q(n) + k)$ time, where $q(n)$ is

	1D	2D		dD	
		Today	Friday	Today	Friday
Space	$O(n)$	$O(n)$	$O(n \log n)$	$O(n)$	$O(n \log^{d-1} n)$
Query	$O(\log n)$	$O(\sqrt{n})$	$O(\log n)$	$O(n^{1-\frac{1}{d}})$	$O(\log^{d-1} n)$

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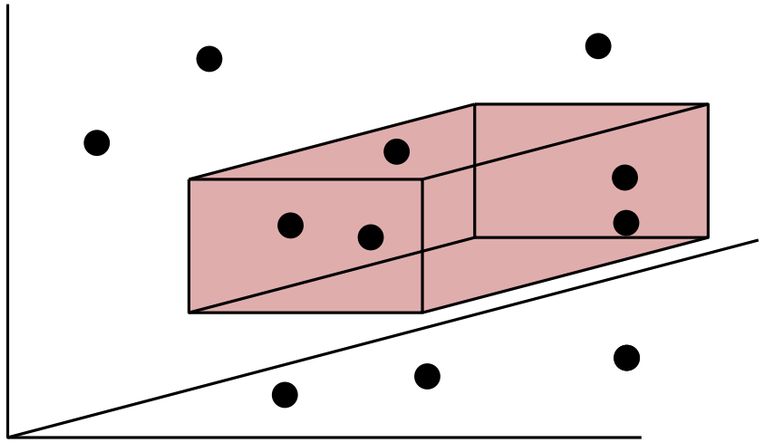

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		Today	Friday	Today	Friday
Space	$O(n)$	$O(n)$	$O(n \log n)$	$O(n)$	$O(n \log^{d-1} n)$
Query	$O(\log n)$	$O(\sqrt{n})$	$O(\log n)$	$O(n^{1-\frac{1}{d}})$	$O(\log^{d-1} n)$

Optimal	
Space	$\Theta(n \frac{\log n}{\log \log n})$
Query	$O(\log n)$

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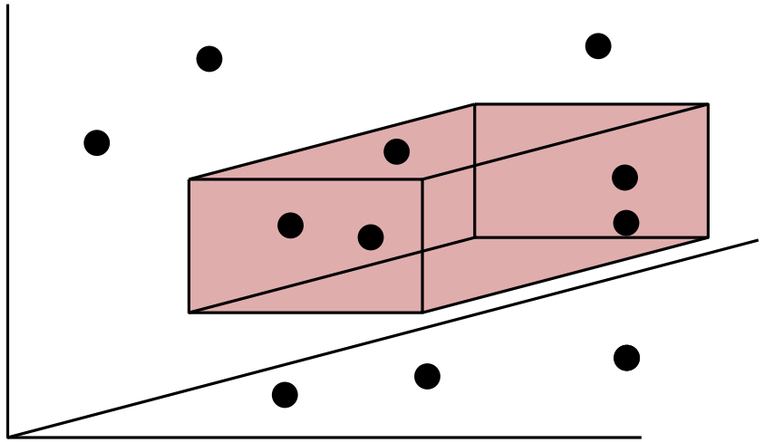

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		Today	Friday	Today	Friday
Space	$O(n)$	$O(n)$	$O(n \log n)$	$O(n)$	$O(n \log^{d-1} n)$
Query	$O(\log n)$	$O(\sqrt{n})$	$O(\log n)$	$O(n^{1-\frac{1}{d}})$	$O(\log^{d-1} n)$

Optimal			
Space	$\Theta(n \frac{\log n}{\log \log n})$	$O(n(\frac{\log n}{\log \log n})^{d-1})$	$O(n \log^d n)$
Query	$O(\log n)$	$O(\log^{d-1} n)$	$O(\log^{d-2} n)$