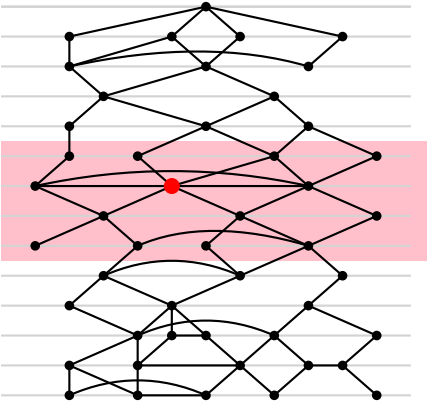
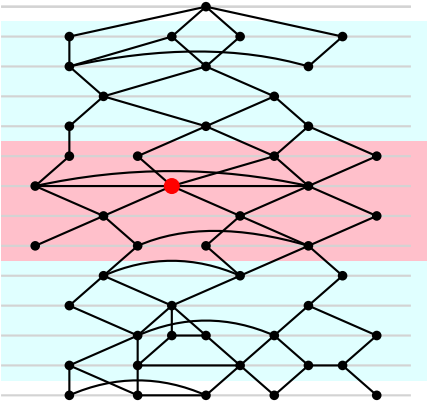


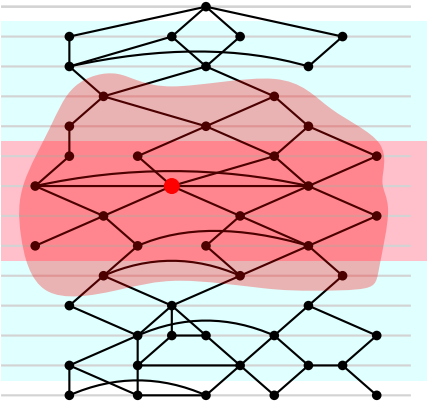
Deal with radius- $[\frac{1}{2}r, r]$ balls centered here



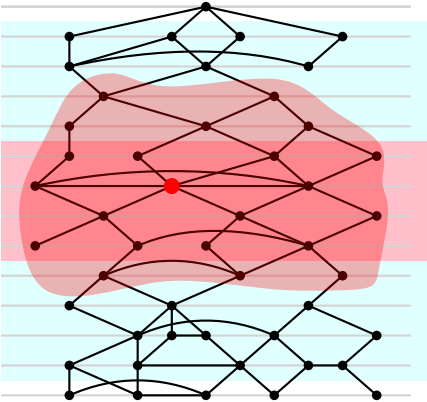
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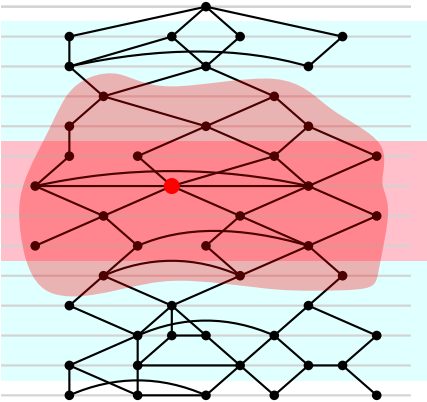
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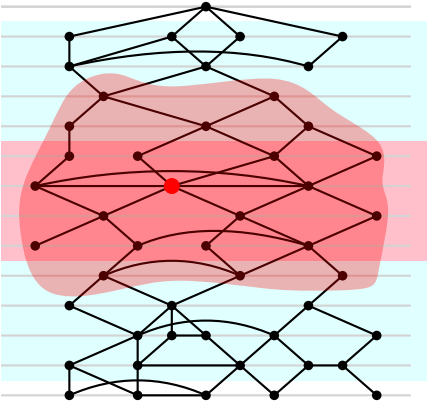
Deal with radius- $[\frac{1}{2}r, r]$ balls centered here



$3r$ layers have treewidth $O(r)$

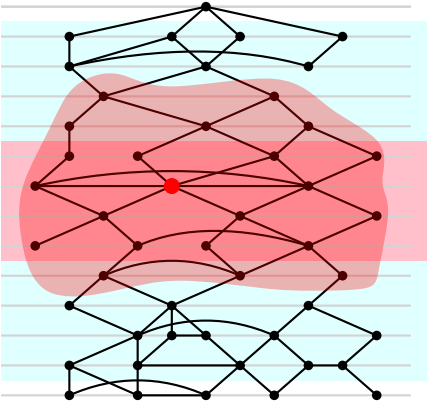


separate using $O(n'/\sqrt{n})$ vertices
into components of size $O(r\sqrt{n})$



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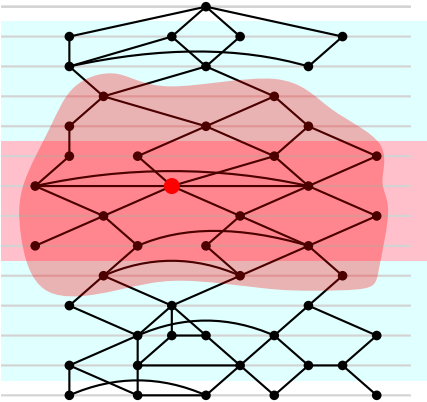
$$\sum n' \leq 3n, \text{ so } \sum O(n'/\sqrt{n}) = O(\sqrt{n})$$



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Repeat for $r = 1, 2, 4, 8, \dots, 2^{\lceil \log n \rceil}$



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Repeat for $r = 1, 2, 4, 8, \dots, 2^{\lceil \log n \rceil}$

QED