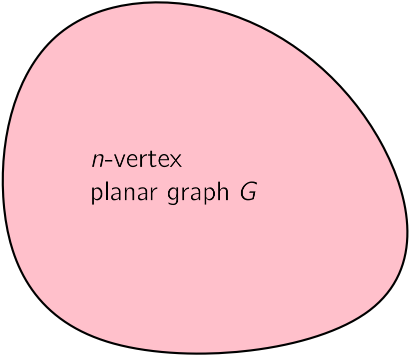
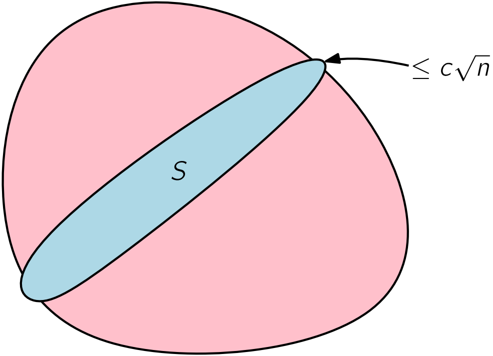
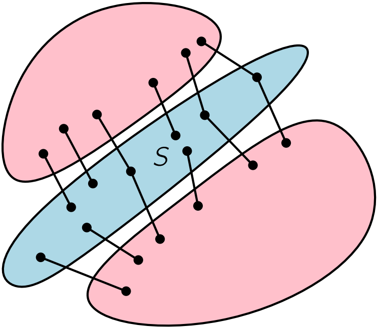
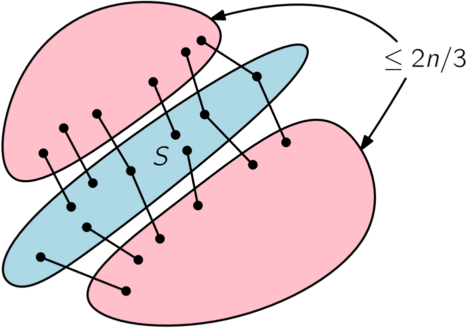

n-vertex
planar graph G

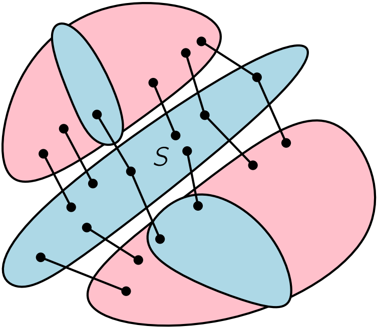


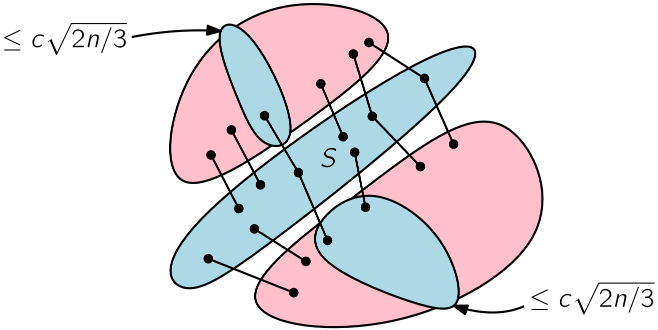
S
$\leq c\sqrt{n}$


S

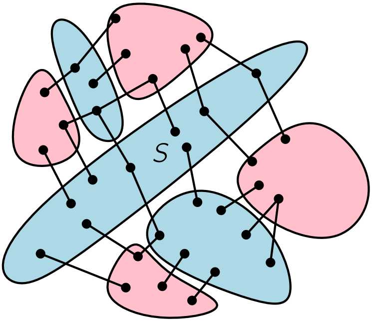


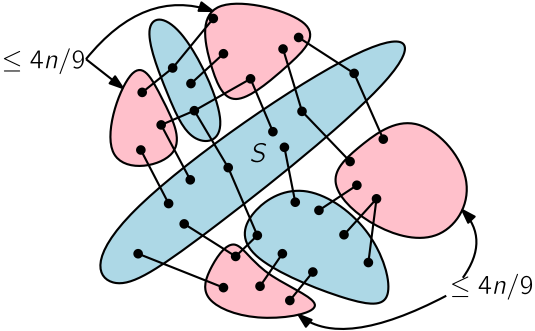
$\leq 2n/3$
S


S

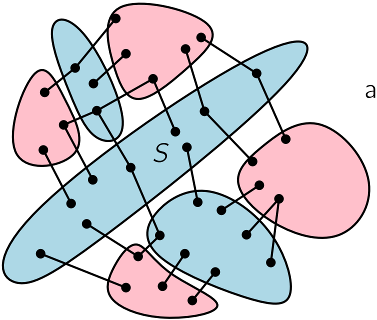


$\leq c\sqrt{2n/3}$
S
$\leq c\sqrt{2n/3}$

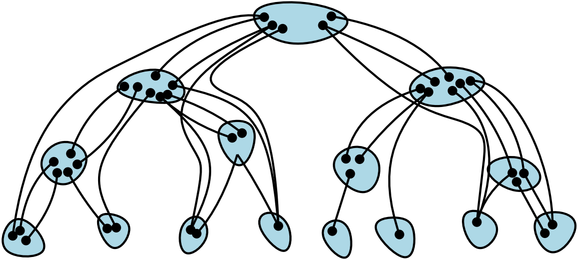

S



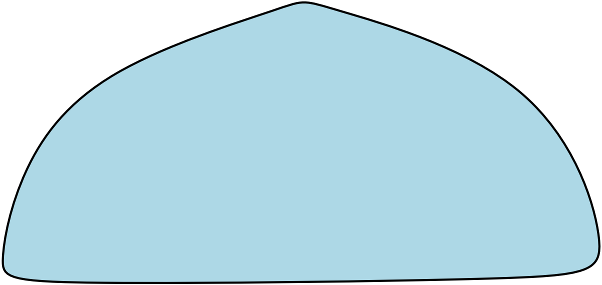
≤ 4n/9
S
≤ 4n/9



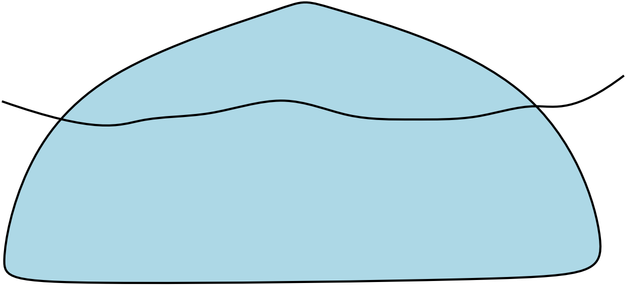
and so on...



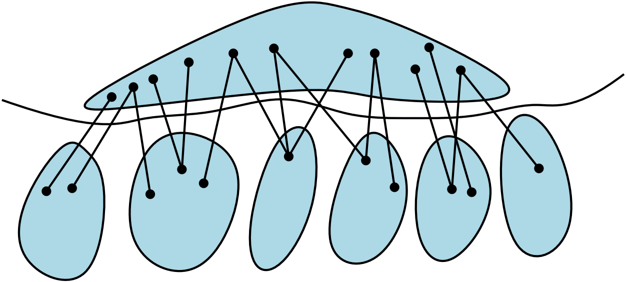
separator “tree”

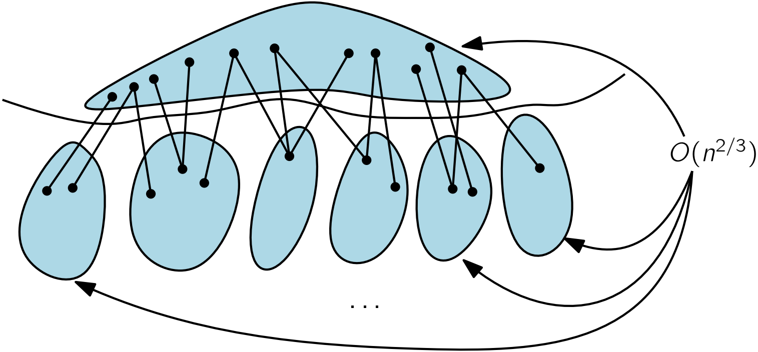


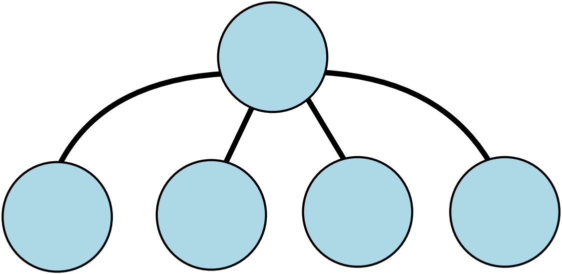
separator “tree”

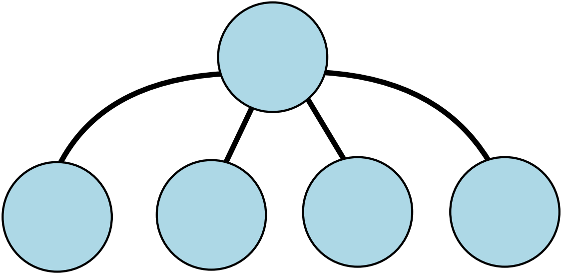


separator “tree”

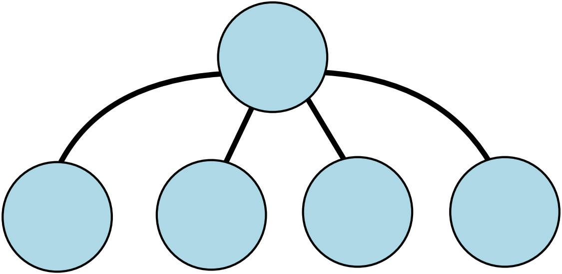



$O(n^{2/3})$
. . .

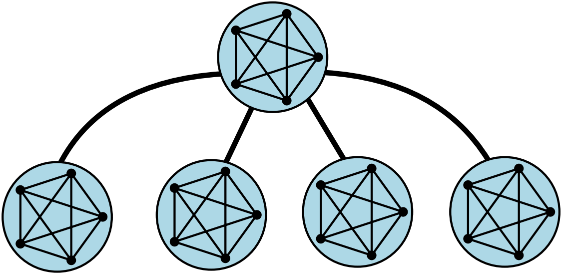




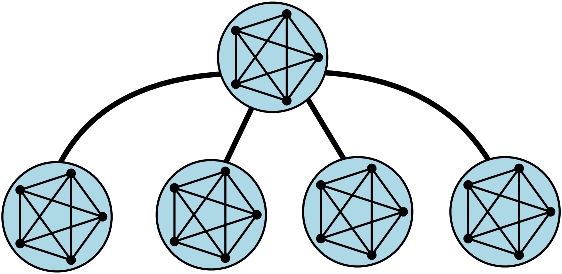
G has a star partition of width $O(n^{2/3})$



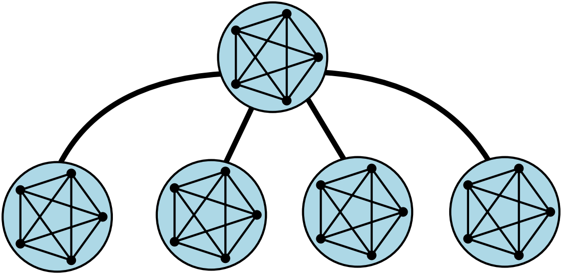
G has a vertex partition $\mathcal{P}$ into sets of size $O(n^{2/3})$ s.t. $G/\mathcal{P}$ is a star



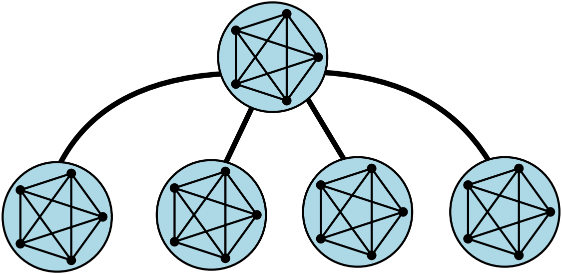
$G \subseteq S \boxtimes K_{O(n^{2/3})}$ where S is a star



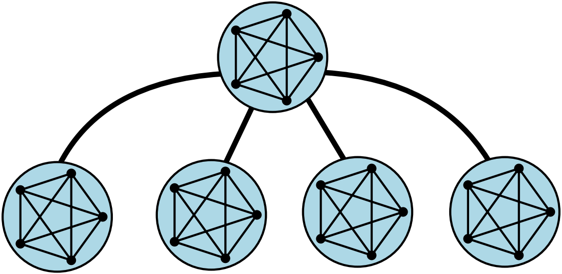
$G \subseteq S \boxtimes K_{O(n^{2/3})}$ where S is a star



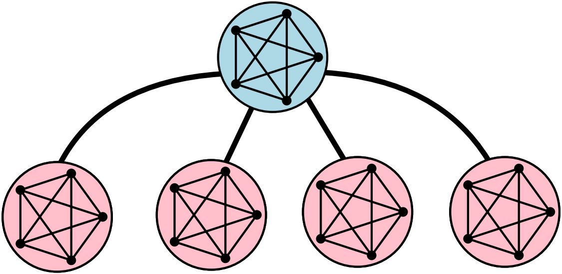
$G \subseteq S \boxtimes K_{O(n^{2/3})}$ where S is a star



What can we do with parts of size $\tilde{O}(\sqrt{n})$?



Bad News (Linial-Matousek-Sheffet-Tardos 2008): There exists planar G such that every 2-coloring of G has a monochromatic component of size $\Omega(n^{2/3})$



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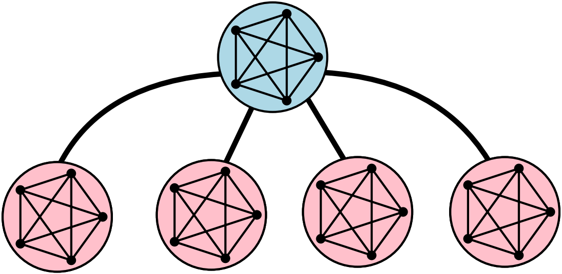
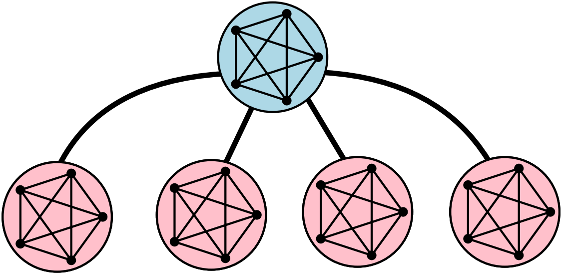


Bad News (Linial-Matousek-Sheffet-Tardos 2008): There exists planar G such that every 2-coloring of G has a monochromatic component of size $\Omega(n^{2/3})$

$G \subseteq H \boxtimes K_{o(n^{2/3})} \Rightarrow H$ is not 2-colorable.



Bad News (Linial-Matousek-Sheffet-Tardos 2008): There exists planar G such that every 2-coloring of G has a monochromatic component of size $\Omega(n^{2/3})$

$G \subseteq H \boxtimes K_{o(n^{2/3})} \Rightarrow H$ is not 2-colorable $\Rightarrow H$ is not a tree.