

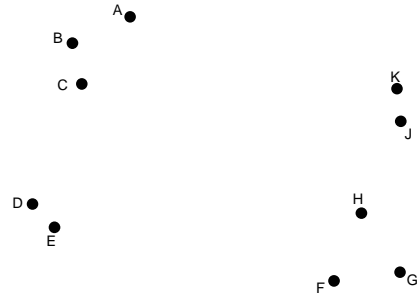
Well-Separated Pairwise Decomposition for Statistical Computation

The Auton Lab
Carnegie Mellon University

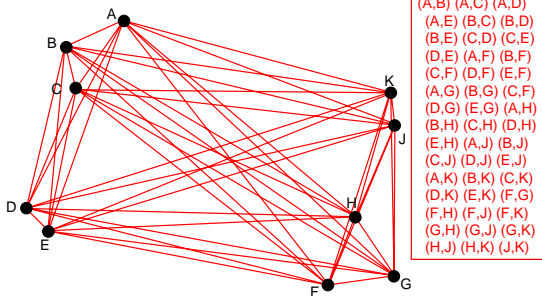


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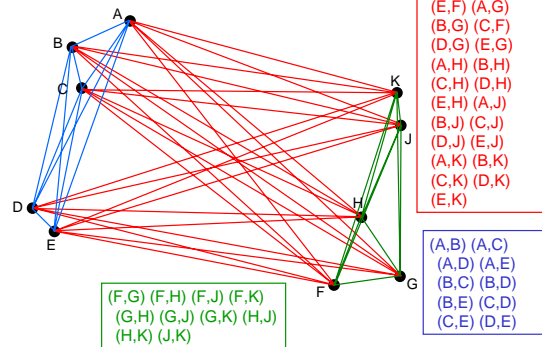
A set of points in Euclidian space



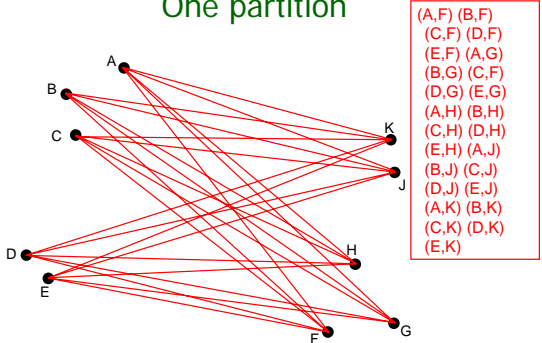
A set of pairs in Euclidian space



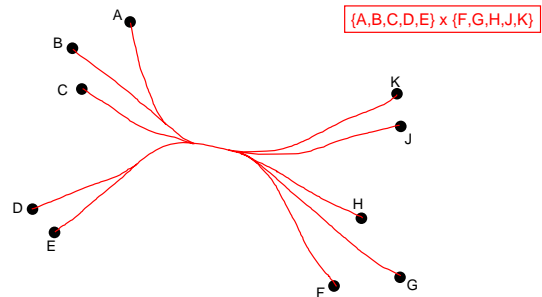
A partitioning of pairs

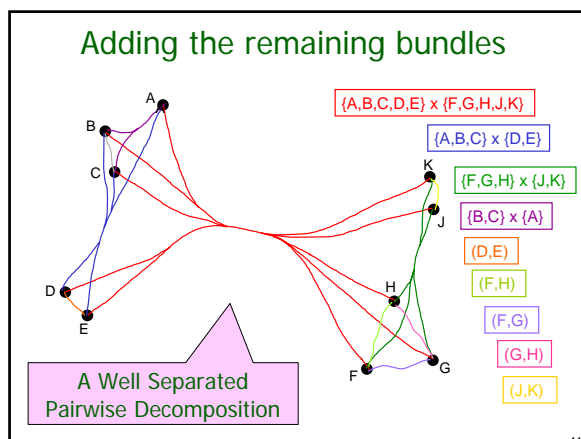
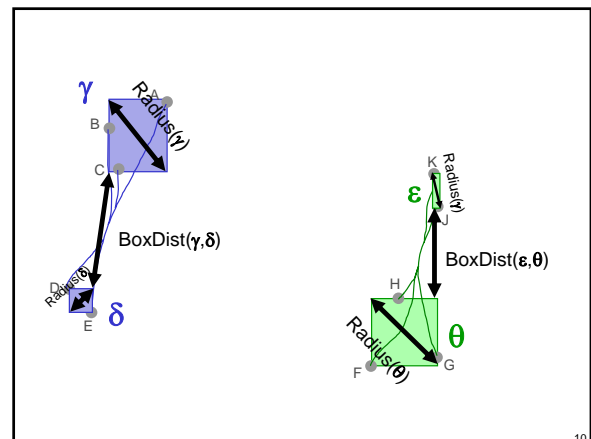
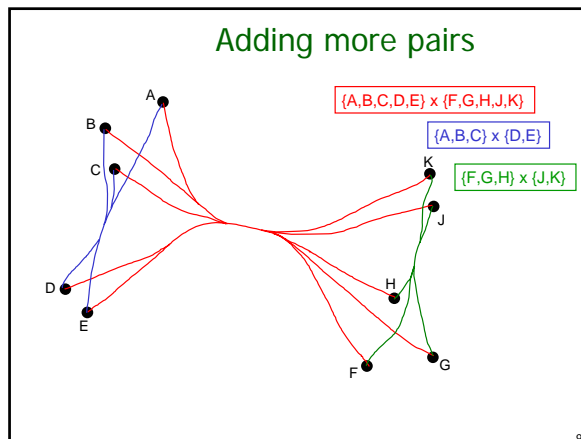
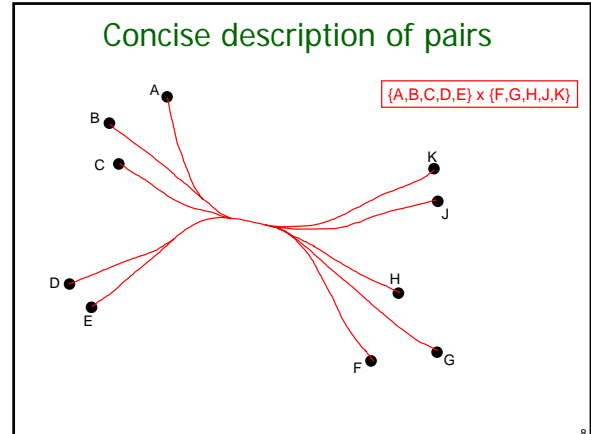
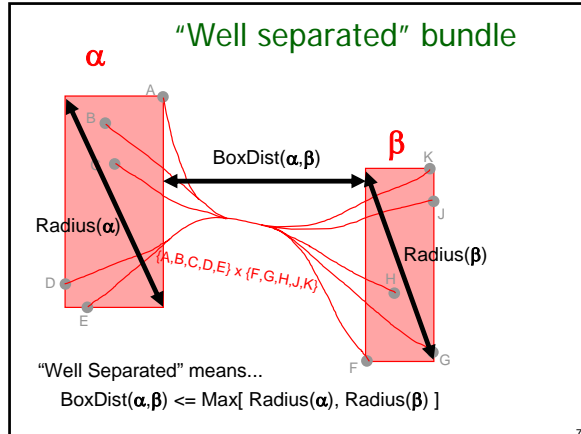


One partition



Concise description of pairs





WSPD Facts

Assume there are n points...

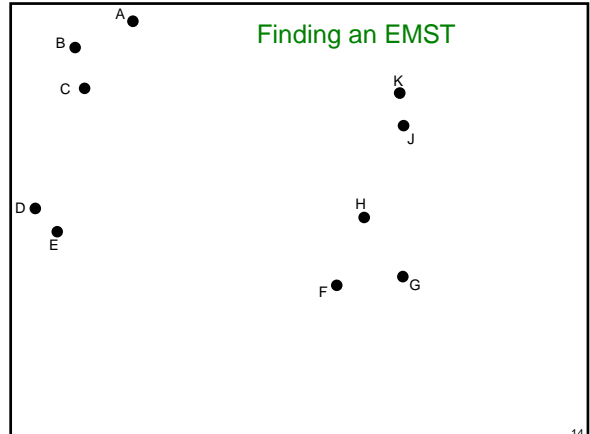
- The WSPD takes time $O(n \log n)$ to build
- You can represent all $O(n^2)$ edges with only $O(n)$ well-separated bundles

Using a WSPD

- Euclidian Minimum Spanning Trees: WSPDs are the best method

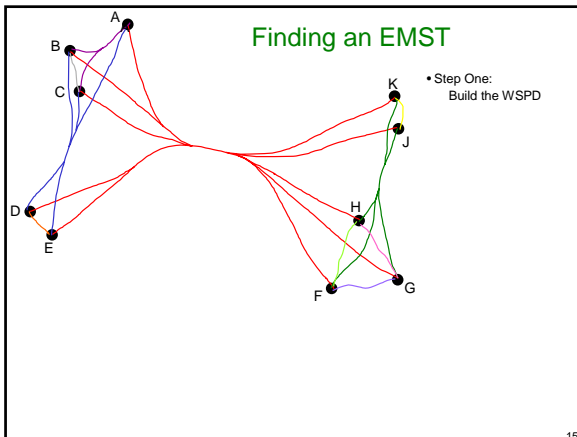
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Finding an EMST



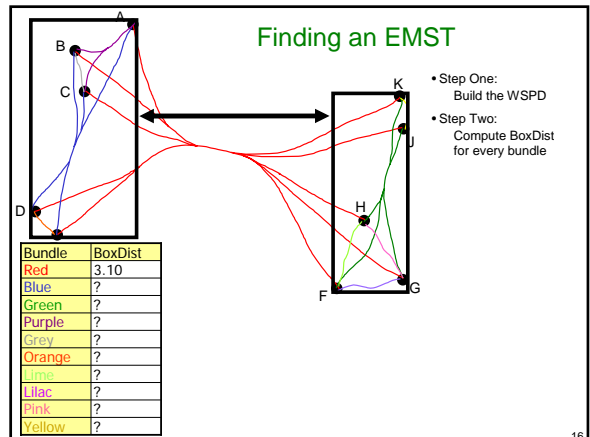
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Finding an EMST



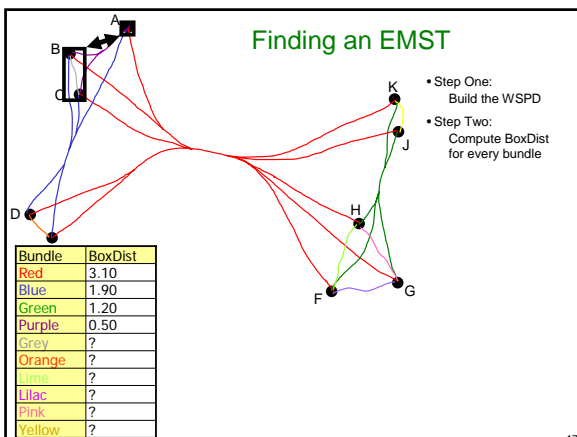
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Finding an EMST



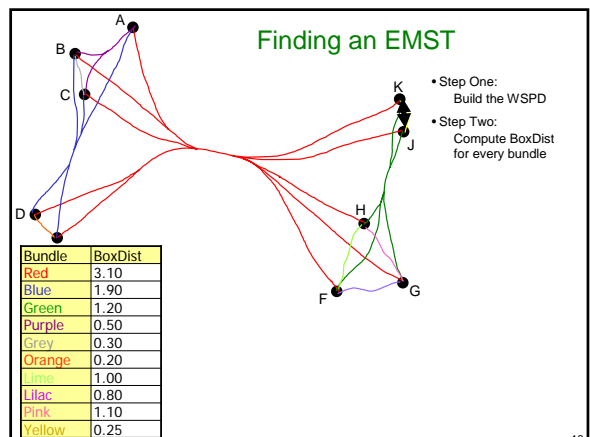
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Finding an EMST



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Finding an EMST



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