A Cut Property

What is a "cut"? Although many theorems are named after people's names, "cut" is not one of them. To understand the "cut property", we need to understand two basic concepts.

- First, in Graph theory, a "cut" is a partition of vertices in a "graph" into two disjoint subsets. Figure 11 illustrates a "cut", where `(B, A, E)` forms one subset, and `(C, D)` forms the other subset.
- Second, a crossing edge is an edge that connects a vertex in one set with a vertex in the other set. In Figure 11, `(B, C)`, `(A, C)`, `(A, D)`, `(E, D)` are all "crossing edges".
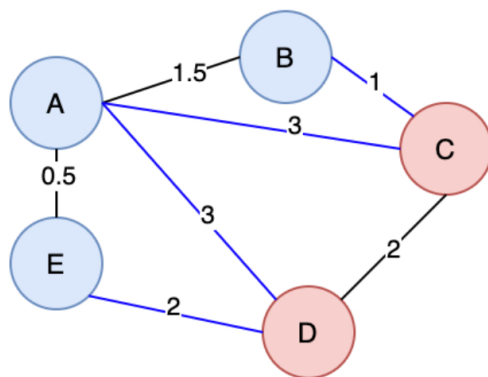

Figure 11. Graph with a cut

After knowing the basics of a graph cut, let's delve into the "cut property". The cut property provides theoretical support for Kruskal's algorithm and Prim's algorithm. So, what is the "cut property"? According to Wikipedia, the "cut property" refers to:

> For any cut `C` of the graph, if the weight of an edge `E` in the cut-set of `C` is strictly smaller than the weights of all other edges of the cut-set of `C`, then this edge belongs to all MSTs of the graph.

Proof of the Cut Property

In the following video, we'll explain and prove the "cut property".

PROOF OF THE CUT PROPERTY

▶ 02:24