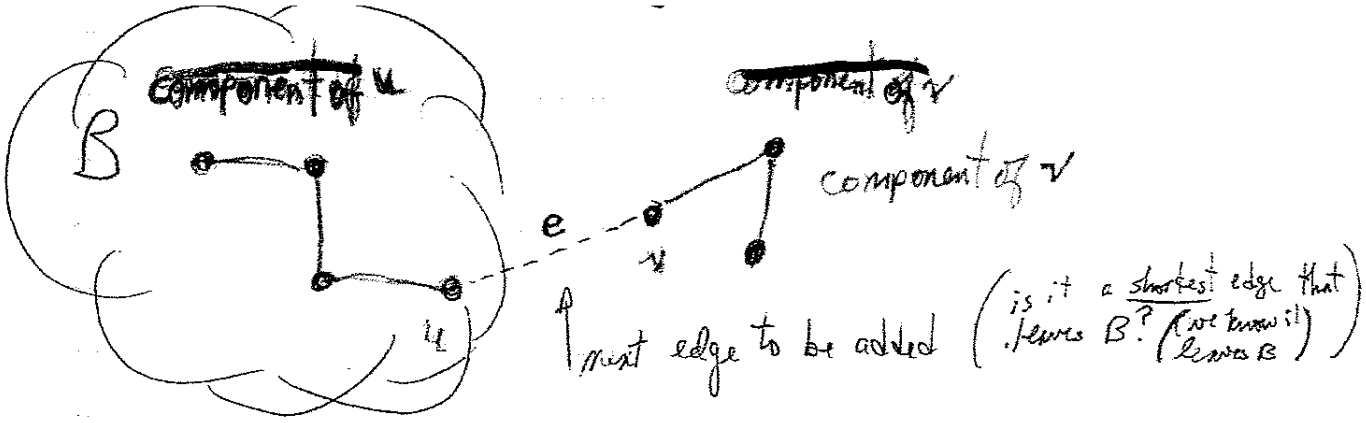

if e' is a shorter edge than e, it was processed by Kruskal's alg earlier, so either e' is in T (and does not leave B), or e' was rejected because it joined two nodes x y that were in the same component. Now that the alg has proceeded further x and y are still in the same component of what is now the graph on T (although there may now be more nodes than before in the component — due to merges). Anyway e' does not leave its component in that case, so it does not leave B.

components only get to form larger components.

∴ No edge "shorter" than e leaves B. i.e. e is a shortest edge that leaves B. ∴ $T \cup \{e\}$ is promising.

So Kruskal's algorithm keeps T promising at all times. At the end T consists of a promising set of $n-1$ edges of $G = \langle N, E \rangle$. So T is contained in the edge set of a min cost spanning tree U. That edge set itself has $n-1$ elements, so $T = U$, and ∴ T is the edge set of a min cost spanning tree.