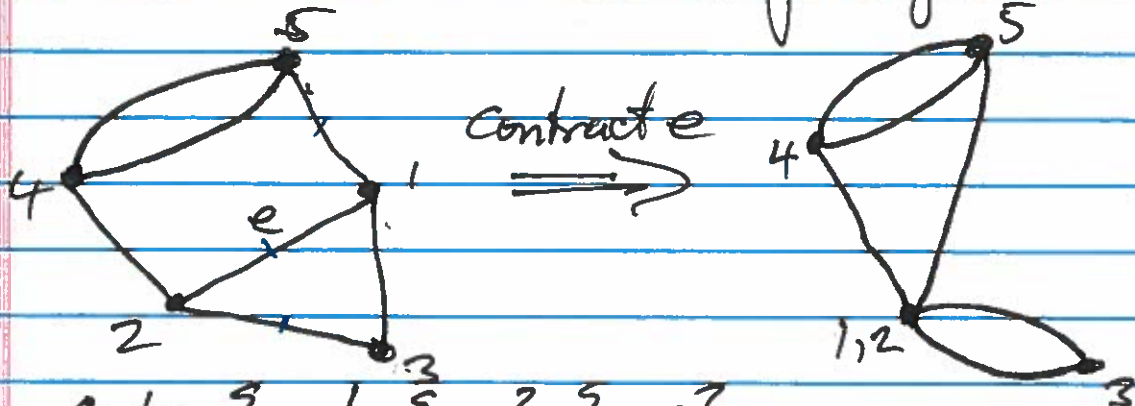


Another probabilistic algorithm:
 Min-Cut Algorithm (Karger 1993):

Let G be an undirected multigraph. (Multiple edges could connect the same pair $\{u, v\}$ of vertices.) A cut is a set of edges whose removal disconnects G : $\exists u, v$ such that there is no path from u to v .



Cut: $\{1,5\}, \{1,2\}, \{2,3\}$

A min-cut is a cut of minimum cardinality.

Min-cut: $\{1,5\}, \{2,4\}$.

Application: Suppose you have a large communication network. A min-cut is the smallest number of communication links that can fail and yet communication is disrupted.

Karger's algorithm:

1. Pick an edge $\in u, v$ randomly and uniformly and contract it by merging u and v . Retain multiple edges but remove any edge that was between u and v .
2. Repeat step 1 until only 2 vertices remain. Output the set of edges between them as a min-cut of the original graph.

