1 Semi-connected graphs

Do Exercise 22.5-7 (on p.557). To get full credit, your algorithm should run in time $O(V + E)$.

2 MST

Let $G$ be a connected, undirected graph, where the edge weights are all distinct. You are also given a specific edge $e$ in $G$. You want to find out whether $e$ is contained in some minimum spanning tree.

1. First prove that $e = (u, v)$ does not belong to any MST iff there is a path between $u$ and $v$ with edges all cheaper than $e$.

2. Give an $O(V+E)$ algorithm for this problem.

3 Shortest path

Do Exercise 24.3-8 (on p.601).