# Exercise 23.2-4

Main Idea:

Short version:

In a BFS, the final value $d[u]$ of node $u$ is the length of the shorstest path from the root $d[u] = \delta(s,u)$. Therefore, it is independent of the order with which the adj lists have the nodes. (Theorem 23.4).

Long version:

Induction on the depth $d[u]$.

Hypothesis: For the nodes of depth $d[u] = k$, the depth does not depend on the adj. list order.

1. Basis: for depth $= \emptyset$, root.
2. Hyp: for depth $= k$.
3. Prove: for depth $= k+1$.