Exercise 13-1 (c=1):

(1) Create an example where the optimal solution is always obtained by the greedy algorithm independent of the selection order of the shortest paths. (2) Create another example where $|I^*| \geq \sqrt{m}\ |I|$ always holds independent of the selection order of the shortest paths. (3) Create another example where $|I^*| > \sqrt{m}\ |I|$ holds depending on the selection order of the shortest paths.

Exercise 13-2 (c = 2):

(1) Create an example where the optimal solution is always obtained by the greedy algorithm (independent of the choice of the shortest paths: independent of a tie-breaking method).

(2) Create another example where the greedy algorithm solution $|I|$ is close to $|I^*|/(4m^{1/3}+1)$ depending on the choice of the shortest paths (i.e., depending on a tie-breaking method).