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https://github.com/HubertRadom/EvolutionaryComputation/tree/main/lab4

Problem description:
In this problem we have to use candidate moves (defined as n vertices closest to the given vertex in the solution) in order to improve time complexity of the steepest method (two-edge exchange).

Pseudocode:

1. Generate a random solution S of size len(vertices) // 2
2. Generate candidate moves for vertices in solution S
3. While improvement is possible
    a. For each vertex n1 in all vertices:
        i. For each vertex n2 in candidate moves for n1
            1. Check a delta for a move deleting an edge before
            2. Check a delta for a move deleting an edge after
            3. If delta is better than all previous ones then save its information
    b. if best delta is 0 then break and return a new solution after changes as no improvement is further possible
    c. if best delta is not 0 then make necessary changes to the solution S and continue

All the results presented in the table below concern the steepest method with a random starting solution(200 runs).

	Average	Minimum	Maximum	Time (seconds)
C-previous	73964	69195	80862	335
C-candidate	73785	72725	75394	41
D-previous	72446	65599	79318	336
D-candidate	75059	73638	76754	40

Conclusions:
Using candidate moves yielded results with lower variability(lower range between minimum and maximum) but the average is identical to the one for regular steepest or at least very close to it. The time improvement for both datasets is around 8 fold, which lowers down the execution of 200 runs to less than a minute.