Lab Session n. 2: report

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1 Introduction

In this report I will provide the results I achieved with greedy algorithms: in each section I will synthetically explain the main idea of the algorithms.
I implemented an hierarchy of classes to manage WLP in single-source, multi-source and single-source-random. The general idea is to fill the `[Stores, Warehouses]` table choosing greedily from pairs `(s, w)` sorted by some ranking-label attached.

2 Technical aspects

The machine used has:

CPU: Intel i5-8250U @ 3.40 GHz

RAM: 8 GB

Operating System: Linux Fedora 33

Tests were done with 3 minutes runtime (command `timeout 180`).
Sources are compiled through `make` with `C++17`.

3 Assignment 2

Single-source algorithm: the sorting is "static" in the sense that, once sorted, the pairs are chosen in that order and the stores are fully-assigned.

Multi-source algorithm: the main difference is the rank-function; in this version of the problem I keep a rank attached to each pair `(s, w)` which has both a static and a dynamic factor; at each step, once a pair is chosen and assigned, the rank of the other pairs are updated w.r.t. the dynamic factor; to speed-up this update, all pairs are maintained in a priority queue (implemented as a binary min-heap) with the capability of changing the priority of a selected

item.

Both algorithms runs in a matter of seconds. `wlp-3000.dzn` is solved in multi-source in 6.4 seconds on the current machine.

Instance	Single-source	Multi-source
wlp-1	**1931**	**1931**
wlp-2	**1891**	**1891**
wlp-3	**4553**	4553
wlp-4	4766	4556
wlp-5	3567	3564
wlp-6	4135	**4108**
wlp-7	4472	4338
wlp-8	5621	5316
wlp-9	8856	8093
wlp-10	9417	9138
wlp-12	6178	4982
wlp-15	16090	15901
wlp-20	10936	9985
wlp-30	13550	12599
wlp-50	17321	16667
wlp-100	23492	22147
wlp-300	47940	43349
wlp-1000	120458	107690
wlp-3000	241363	210472

4 Assignment 3

The only difference w.r.t. single-source is the use of random tiebreak implemented in the `Next()` method.

Instance	Single-source random (10 runs)
wlp-1	**1931**
wlp-2	**1891**
wlp-3	**4553**
wlp-4	4766
wlp-5	3567
wlp-6	**4108**
wlp-7	4472
wlp-8	5140
wlp-9	8760
wlp-10	9417
wlp-12	6178
wlp-15	15901
wlp-20	10754
wlp-30	13535
wlp-50	17321
wlp-100	23501
wlp-300	47688
wlp-1000	120115
wlp-3000	240544