Authors:

Marek Szydłowski 136633

Wojciech Tomczak 145467

Link to the source code: https://github.com/Vosloo/evolutionary-computation-labs

```
TSPC:
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Hybrid Evolution Operator 1:
================================= Grade ====================================
Method:                          Hybrid Evolution Operator 1
Best run id:                     112
Best run cost:                   27050
Best run distance:               20856
Best run score:                  47906
Min score:                       47906
Avg score:                       48826
Max score:                       49303
============================================================================


Hybrid Evolution Operator 1 No Ls:
================================= Grade ====================================
Method:                          Hybrid Evolution Operator 1 No Ls
Best run id:                     180
Best run cost:                   28183
Best run distance:               20341
Best run score:                  48524
Min score:                       48524
Avg score:                       49812
Max score:                       50520
============================================================================


Hybrid Evolution Operator 2:
================================= Grade ====================================
Method:                          Hybrid Evolution Operator 2
Best run id:                     127
Best run cost:                   26525
Best run distance:               21052
Best run score:                  47577
Min score:                       47577
Avg score:                       48018
Max score:                       48449
============================================================================


Hybrid Evolution Operator 2 No Ls:
================================= Grade ====================================
Method:                          Hybrid Evolution Operator 2 No Ls
Best run id:                     160
Best run cost:                   27023
Best run distance:               20919
Best run score:                  47942
Min score:                       47942
Avg score:                       48450
Max score:                       49033
============================================================================



TSPD:
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Hybrid Evolution Operator 1:
================================= Grade ====================================
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Method:                          Hybrid Evolution Operator 1
Best run id:                     179
Best run cost:                   25050
Best run distance:               19583
Best run score:                  44633
Min score:                       44633
Avg score:                       45603
Max score:                       46525
==============================================================================

Hybrid Evolution Operator 1 No Ls:
================================= Grade ====================================
Method:                          Hybrid Evolution Operator 1 No Ls
Best run id:                     134
Best run cost:                   24849
Best run distance:               21257
Best run score:                  46106
Min score:                       46106
Avg score:                       46642
Max score:                       47657
==============================================================================

Hybrid Evolution Operator 2:
================================= Grade ====================================
Method:                          Hybrid Evolution Operator 2
Best run id:                     45
Best run cost:                   24097
Best run distance:               19647
Best run score:                  43744
Min score:                       43744
Avg score:                       44704
Max score:                       45444
==============================================================================

Hybrid Evolution Operator 2 No Ls:
================================= Grade ====================================
Method:                          Hybrid Evolution Operator 2 No Ls
Best run id:                     150
Best run cost:                   24164
Best run distance:               19904
Best run score:                  44068
Min score:                       44068
Avg score:                       44912
Max score:                       45548
==============================================================================
```
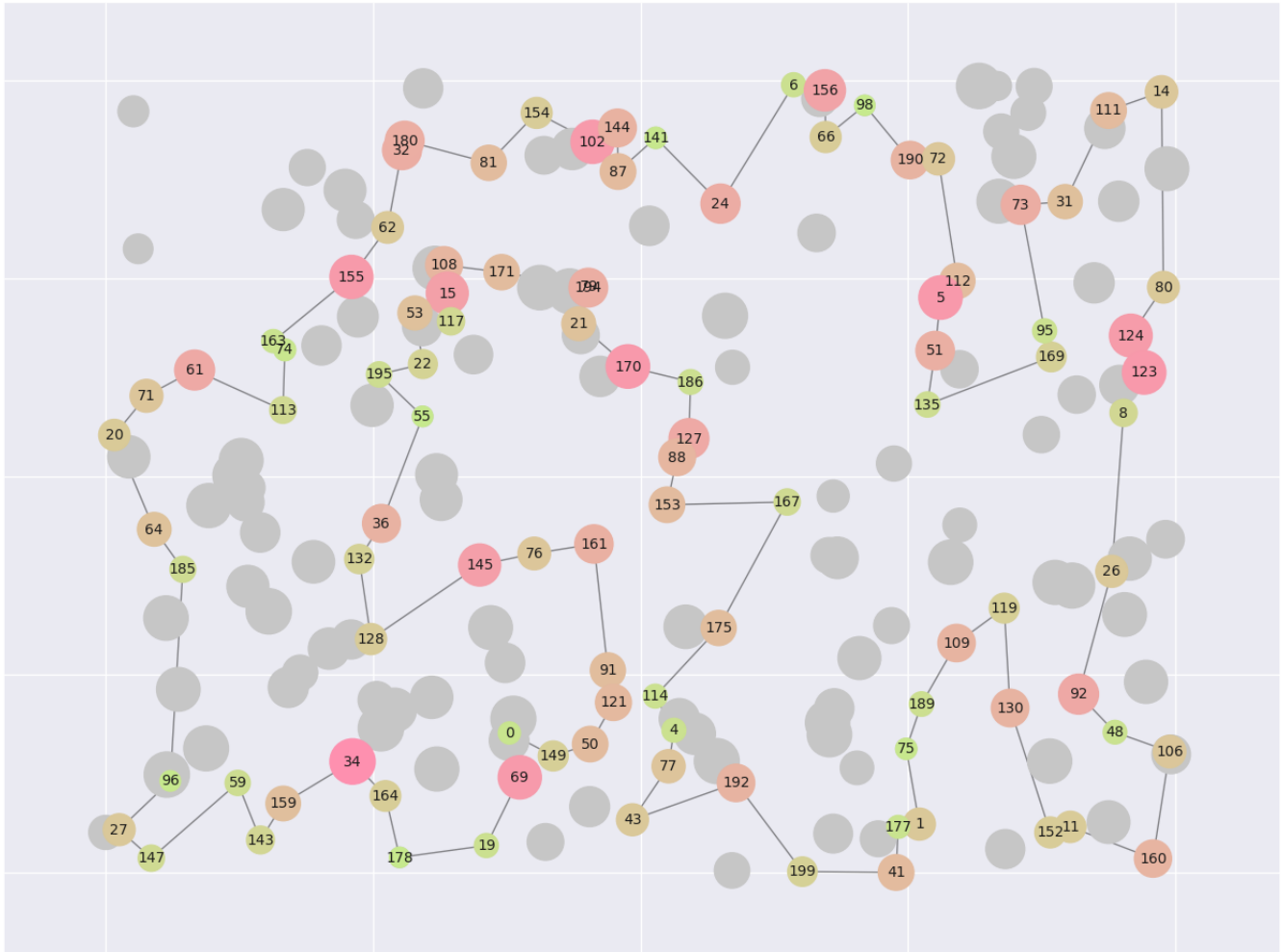
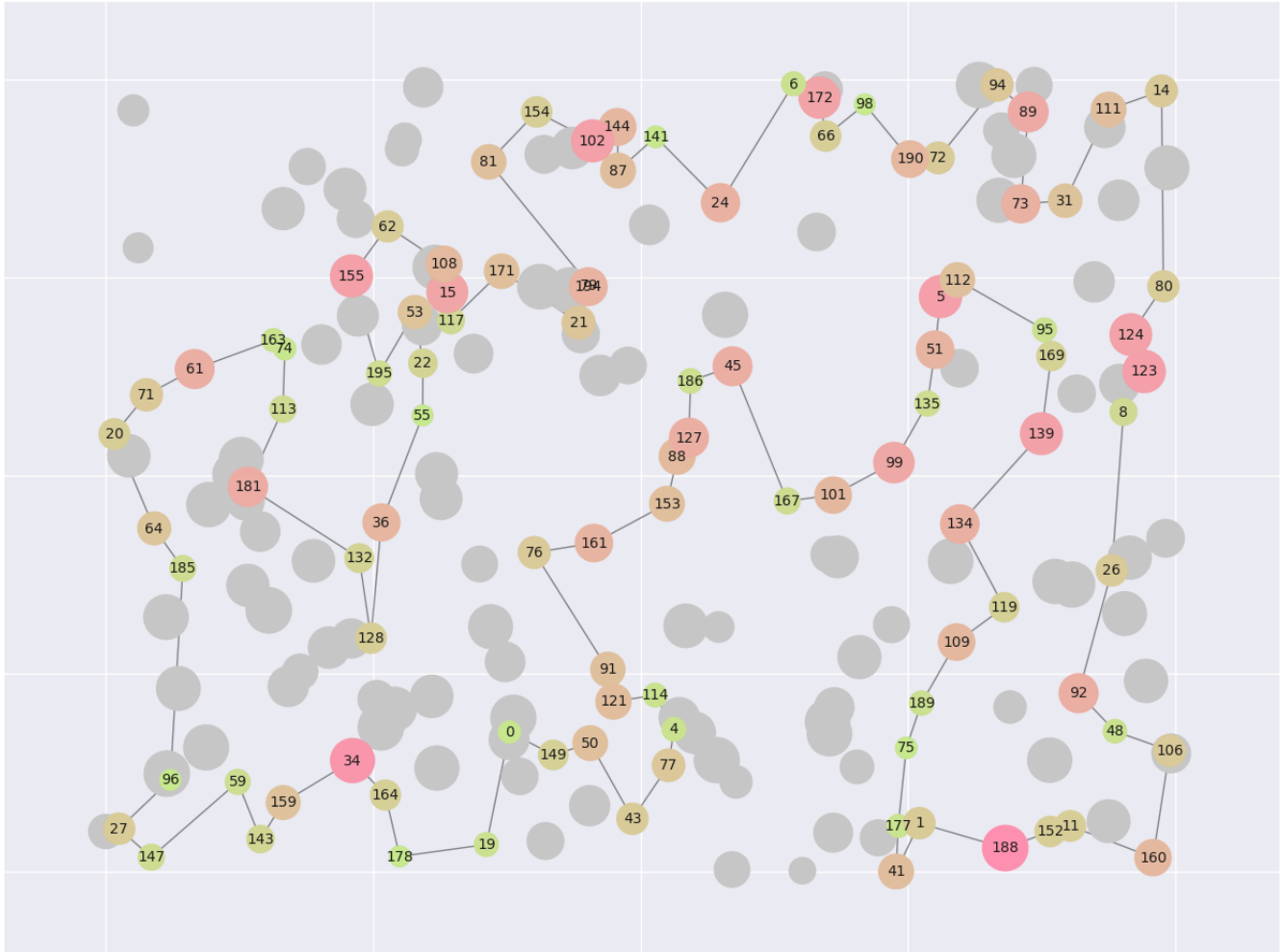TSPC - Hybrid Evolution Operator 1 method
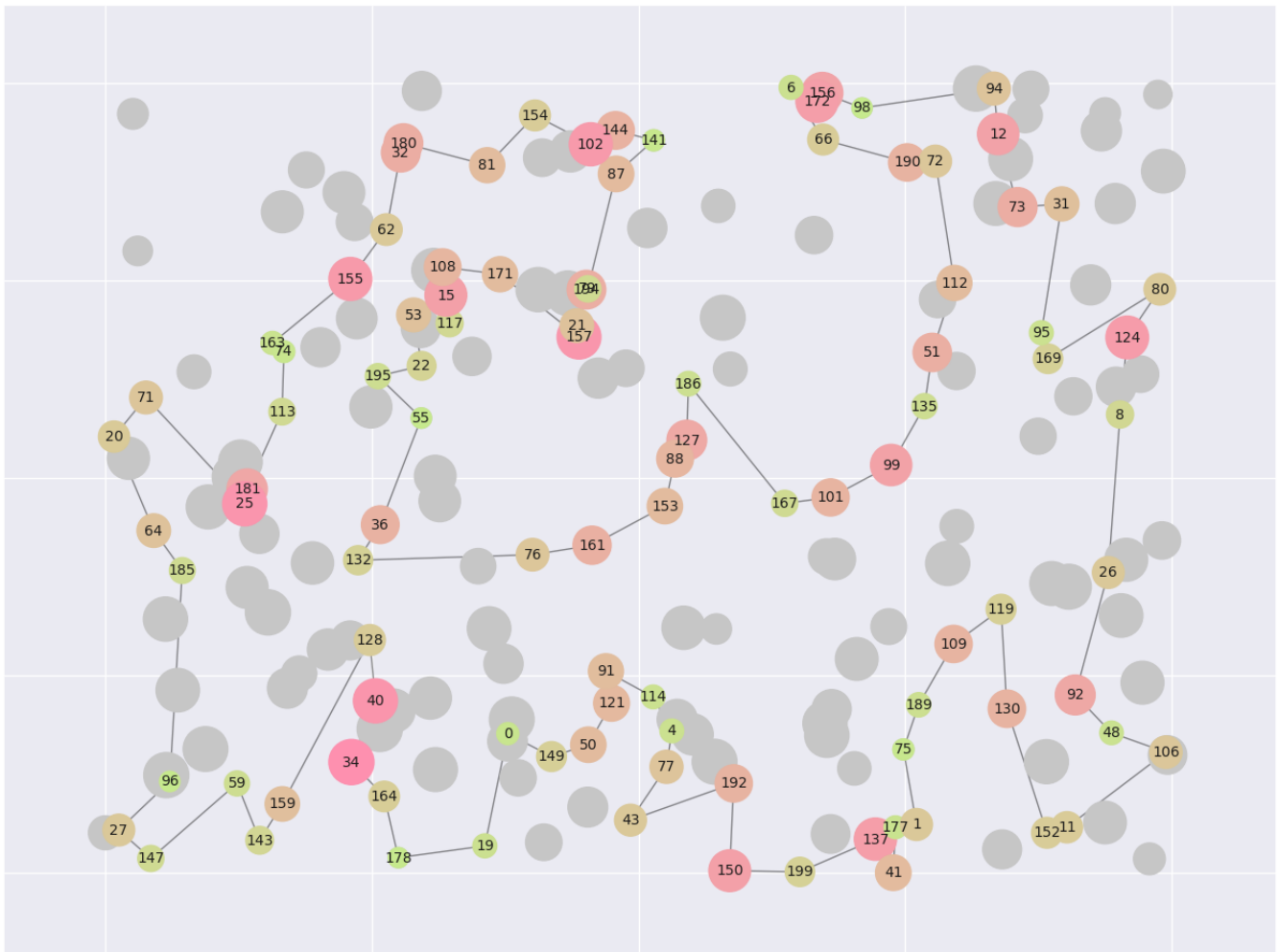
TSPC - Hybrid Evolution Operator 1 No Ls method
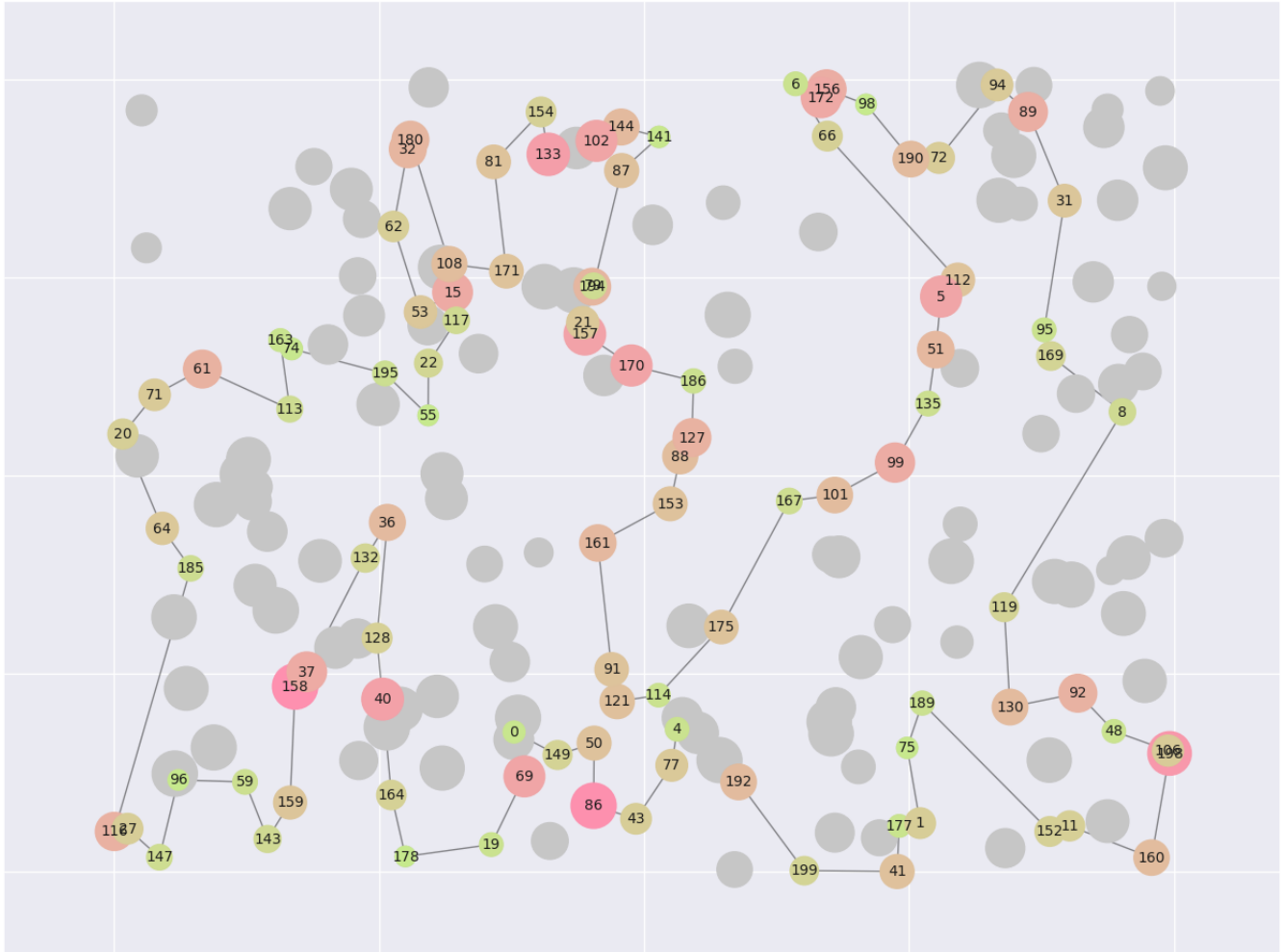
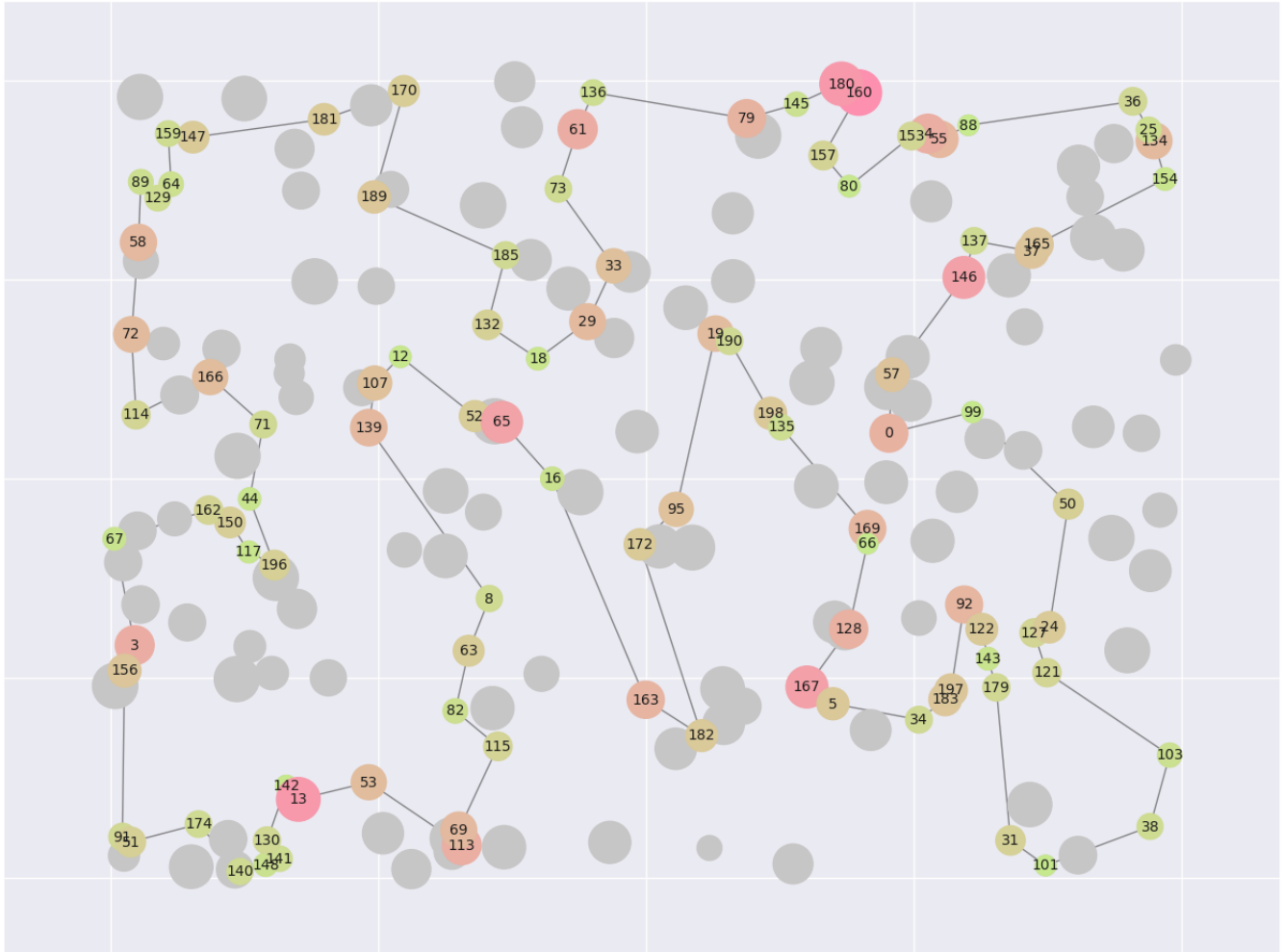# TSPC - Hybrid Evolution Operator 2 method
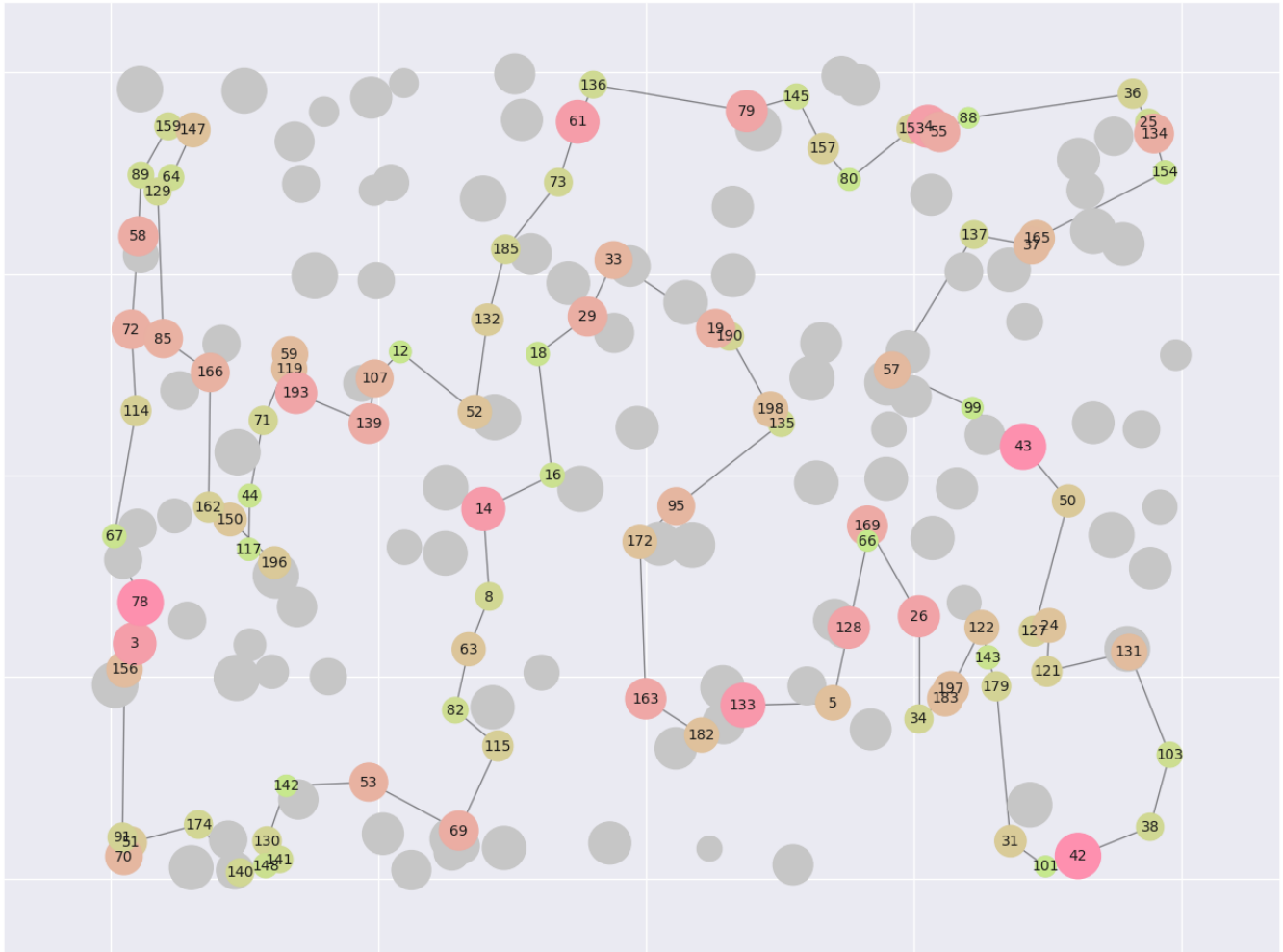
TSPC - Hybrid Evolution Operator 2 No Ls method

TSPD - Hybrid Evolution Operator 1 method

TSPD - Hybrid Evolution Operator 1 No Ls method

TSPD - Hybrid Evolution Operator 2 method

TSPD - Hybrid Evolution Operator 2 No Ls method

TSPC	Method	Average Score	Min Score	Max Score	Total runtime	Per run runtime
0	Local Search Lsn No Ls	49564	47052	51975	2101.7	105.085
1	Local Search Lsn With Ls	47686	47129	48957	2103.94	105.197
2	Hybrid Evolution Operator 2	48018	47577	48449	2101.94	105.097
3	Local Search Iterative	48910	47897	50372	2100.97	105.049
4	Hybrid Evolution Operator 1	48826	47906	49303	2106.1	105.305
5	Hybrid Evolution Operator 2 No Ls	48450	47942	49033	2101.58	105.079
6	Hybrid Evolution Operator 1 No Ls	49812	48524	50520	2100.63	105.032
7	Local Search Msls	59333	58530	60368	2100.66	105.033

TSPD	Method	Average Score	Min Score	Max Score	Total runtime	Per run runtime
0	Local Search Lsn With Ls	44278	43354	45480	2103.04	105.152
1	Hybrid Evolution Operator 2	44704	43744	45444	2101.62	105.081
2	Local Search Iterative	45282	43880	46315	2101.02	105.051
3	Hybrid Evolution Operator 2 No Ls	44912	44068	45548	2101.3	105.065
4	Local Search Lsn No Ls	46693	44572	50372	2101.48	105.074
5	Hybrid Evolution Operator 1	45603	44633	46525	2106.4	105.32
6	Hybrid Evolution Operator 1 No Ls	46642	46106	47657	2101.43	105.071
7	Local Search Msls	57250	54743	58627	2042.32	102.116

Summary:

Parameters:

- no iterations: 20
- iteration runtime limit: 105s
- population size: 20
- operator 2 repair heuristic: greedy regret heuristic
  - k regret: 2
  - regret weight: [0.5, 0.5]

No premature convergence was observed. For the comparison, results are merged with the ones from the previous labs (lab-6 and lab-7). While Hybrid Evolution Methods have scored worse than Local Search LSN (no LS) and on par with Local Search Iterative (no LS) in terms of the best solution found, their average score is much better. In TSPC within Hybrid Evolution Methods, the best results were achieved by HAE Operator 2 (LS) with others performing worse within range of 1000 in both average and best score. In TSPD while retaining similar order of results (with exception of Operator 2 (no LS) amd Operator 1 (LS)), difference in scores widens to range of up to 3000 with relation to Operator 2 (LS).