

Lesson 4: Implement a tabu search using ParadisEO

1 Example

The archive `paradiseo_practices_0208.tgz` installed on your computer contains a tabu search implemented using ParadisEO-MO (see `tabu_search` in the `build/lesson4` directory).

To run it, please go in `build/lesso4` and start the program `tabu_search` by giving one of the TSP instances located in `tsp/benchs`.

When entering `./tabu_search ../../tsp/benchs/berlin52.tsp`, you should end up with the following outputs:

```
>>> Loading [../../tsp/benchs/eil101.tsp]
> [From] -3347 101 84 20 57 71 92 19 59 10 30 55 27 63 36 26 18 21 46
>72 96 35 39 24 29 86 60 40 34 48 67 38 13 0 5 11 16 83 49 50 6 7 87
>1 53 90 74 52 58 15 8 95 25 68 61 70 65 45 33 79 23 62 4 37 91 85 78
>89 47 69 28 32 66 80 75 94 41 100 44 73 22 9 76 64 97 31 88 51 93 43
>2 3 14 56 99 12 82 81 42 17 54 98 77
>[To] -703 101 84 92 98 95 58
>91 36 97 90 99 41 86 96 94 12 93 5 88 17 51 68 0 49 76 75 27 26 100
>52 57 39 25 11 79 67 2 78 28 23 53 54 24 3 38 66 22 55 74 21 40 73
>71 20 72 1 56 14 42 13 43 37 85 15 60 4 59 82 83 16 44 45 7 81 6 47
>18 46 35 48 63 10 62 89 31 9 61 87 30 69 29 19 50 32 80 8 70 65 64
>34 33 77
```

The printed-out results show for the initial best solution and the final one :

- the length of the route
- the number of cities
- the route itself (notice that the city index starts from 0).

2 Study the tabu search dedicated components

Study the `tabu_search.cpp` file located in the `lesson4` directory using :

- the ParadisEO-MO API documentation available at :
<http://paradiseo.gforge.inria.fr/addon/paradiseo-mo/doc/index.html>
- the source files located in the `tsp/src/` directory

3 Customize the tabu search

Make a backup (copy) of the cpp file `tabu_search.cpp`. You can now modify the original `tabu_search.cpp` and use the existing makefiles to compile it.

Edit and modify the `tabu_search.cpp` file :

- Try to tune a few parameters of the tabu search.
- Change the initialization of the solution by modifying the file `route_init.cpp`.

To compile `tabu_search.cpp`, you should use the command `make` from `build/lesson4`.

Finally, test your modifications on several TSP instances (`berlin52`, `eil101` ...) and compare the results you get.