Project **Winter 2021/22**
Algorithm Engineering for hard problems **TU Berlin**
Nichterlein/Boehmer/Niedermeier **January 14, 2022**

5th Exercise Sheet

Weighted Cluster Editing I

Solver: February 14 **Handout:** February 15 **Presentation:** February 16

Task 1. Better Branch & Bound

Implement the better branching strategy presented in the 5th screencast.

Implement the LP lower bound presented in the 5th screencast. If you implemented an ILP formulation in the previous exercise, then you can easily adapt it by looking for a non-integer solution instead.

Task 2. Automatic Algorithm Configuration (only for 3-person teams)

Extend your implementation even further using SMAC (or a similar optimization tool) to find configurations for your program that work well with the provided data sets real-world and actionseq.

Hint: You might want to use the tool smac-validate (see SMAC documentation at `http://www.cs.ubc.ca/labs/beta/Projects/SMAC/`) to optimize your configurations via SMAC. (Do not use the benchmark script for this purpose.)

We recommend to also use the PAR10 (penalized average runtime) value of the running times: This is the mean over all running times where each unsolved instance is counted with ten times the time limit.

Task 3. Evaluation

Test the impact on running time and number of recursive steps of the tasks implemented one by one and compare them to some common baseline (such as your solver from Exercise 3).

Task 4. Presentation & Handout

Please submit a handout in which you tell us what you implemented and how you implemented it, and shortly depict your evaluation. As always, add a running time comparison of your submitted solver and the solver of the 3rd exercise.

As it is the final presentation, you have **15 min** to present your findings. It should start with a quick overview of the implemented features and contain a brief description of the most important design decisions in your program, and it should end with a short Conclusion and possibly a list of things that you would do next to improve your solver.