

Plan for practical course "Specification and Verification"

Sabine Rieder

1 Aim

- CNF-SAT \propto Clique
- Vertex Cover \propto Directed Hamilton Cycle (I'm not completely sure, that this will work. I could also try undirected Hamilton Cycle)
- Directed Hamilton Cycle \propto Undirected Hamilton Cycle

1.1 Also possible

- Vertex Cover \propto Feedback Node Set
- Clique \propto Vertex Cover
- Vertex Cover \propto Feedback Arc Set

2 Time schedule

ToDo: Formalize reduction, proof correctness, Write Algorithm and check time

Week 0 (14.10. - 20.10.)

- ☑ Set up of Git
- ☑ Write plan for project

Week 1 (21.10. - 27.10.)

- ☑ Problem definition of CNF-SAT and Clique
 - ☑ Definition of CNF-SAT \propto Clique
- Additional: Also changed the plan

Week 2 (28.10. - 3.11.)

- ☑ Proof of CNF-SAT \propto Clique

- ☐ Write Algorithm for CNF-SAT \propto Clique

Week 3 (4.11. - 10.11.)

- ☐ Polynomial Time of CNF-SAT \propto Clique

Week 4 (11.11. - 17.11.)

- ☐ Definition of Directed Hamilton Cycle
- ☐ Definition of Vertex Cover \propto Directed Hamilton Cycle

Week 5 (18.11. - 24.11)

- ☐ Proof of Vertex Cover \propto Directed Hamilton Cycle
- ☐ Maybe Algorithm

Week 6 +7(25.11. - 8.12.)

- ☐ Polynomial time for Vertex Cover \propto Directed Hamilton Cycle

Week 8 (9.12. - 15.12.)

- ☐ Buffer
- ☐ Talk to advisors

Week 9 (16.12. - 22.12.)

- ☐ Definition of Undirected Hamiltonian Cycle
- ☐ Definition of Directed Hamilton Cycle \propto Undirected Hamilton Cycle
- ☐ Proof of Directed Hamilton Cycle \propto Undirected Hamilton Cycle

Week W.1(23.12. - 29.12.)

- ☐ Polynomial Time of Directed Hamilton Cycle \propto Undirected Hamilton Cycle

Week W.2 (30.12. - 5.1.)

- ☐ ??

Week 10 (6.1. - 12.1.)

- ☐ ??

Week 11 (13.1. - 19.1.)

- ☐ ??

Week 12 (20.1. - 26.1.)

- ☐ ??

Week 13 + 14 (27.1. - 9.2.)

- ☐ Buffer and maybe clean up

I will try to keep this document up to date.

3 Links

- Github: <https://github.com/riedersa/poly-reductions>
- Wikipedia: https://en.wikipedia.org/wiki/Karp%27s_21_NP-complete_problems