

Plan for practical course "Specification and Verification"

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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, 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 + 5 (11.11. - 17.11.)** Definition of Directed Hamilton Cycle, 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, Directed Hamilton Cycle \propto Undirected Hamilton Cycle, Proof
- **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 (27.1. - 2.2.)** ??
- **Week 12+13+14 (3.2. - 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