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
- ☑ 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

Meeting with advisors

Week 5 (18.11. - 24.11)

- ☑ Clean up of Sat to Clique
- ☑ Definition of Directed Hamilton Cycle
- ☑ Definition of Vertex Cover $\propto$ Directed Hamilton Cycle
- ☒ Proof of Vertex Cover $\propto$ Directed Hamilton Cycle
- ☒ Maybe Algorithm

Week 6 +7(25.11. - 8.12.)

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