Plan for project "Specification and Verification"

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1 Aim

- CNF-SAT $\propto$ Clique
- Clique $\propto$ Vertex Cover
- 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
- 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.) Write problem definitions in Isabelle

Week 2 (28.10. - 3.11.) Proof of CNF-SAT $\propto$ Clique

Week 3 (4.11. - 10.11.) Proof of Clique $\propto$ Vertex Cover

Week 4 + 5 (11.11. - 24.11.) Proof of Vertex Cover $\propto$ Directed Hamilton Cycle

Week 6 (25.11. - 1.12.) Proof of Directed Hamilton Cycle $\propto$ Undirected Hamilton Cycle

Week 7 (2.12. - 8.12.) Buffer

Week 8+9 (9.12. - 22.12.) Polynomial Time of CNF-SAT $\propto$ Clique

Week W.1+W.2+10 (23.12. - 12.1.) Polynomial Time of Clique $\propto$ Vertex Cover, Vertex Cover $\propto$ Directed Hamilton Cycle

Week 11 (13.1. - 19.1.) Polynomial Time of Directed Hamilton Cycle $\propto$ Undirected Hamilton Cycle

Week 12+13+14 (20.1. - 9.2.) Buffer and maybe clean up

I will try to keep this document up to date. If something takes too long, I may also decide to skit Directed Hamilton Cycle $\propto$ Undirected Hamilton Cycle.

3 Links

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