Advanced Analysis of Algorithms

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- 1. Cook's theorem. Variables, Clauses, literals, CNF.
- 2. Steps to show a problem is **NPC**:
 - (a) Show that it is in **NP**. Mostly easy. Sometimes difficult.
 - (b) Start with a good, **NP-complete** problem, say $\mathbf{P_1}$,
 - (c) Find a suitable, polynomial-time transducer function f.
 - (d) Reduce $\mathbf{P_1}$ to our problem, using f.
- 3. Reductions order problems by difficulty. $B \leq A$ means algorithm for A solves B. Is A really a different way of looking at B?
- 4. Mention SAT, 3SAT, CircuitSAT, 0/1 Integer Programming.
- 5. HornSAT. NAE3SAT (half).
- 6. Independent set, Clique, Vertex-Cover.