Design and Analysis of Algorithms

8.4 NP-Completeness

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8.3.2

- MaxClique: A clique in a graph is a set of nodes S such that every node in S is connected to every other node in S.
- Given a graph, what is the largest clique that it contains?
- Show that MaxClique is NP-hard by reducing 3SAT to MaxClique.
- 3SAT$\rightarrow MC$

1. 3SAT is NP-Complete 2. 3SAT reduces to MaxClique in a similar way to 2SAT reduces to 3SAT.

$(x \vee y \vee y \vee z \vee ...) \wedge (x \vee y \vee y \vee z \vee ...) \wedge (x \vee y \vee y \vee z \vee ...)$

I'm really blanking on this. What I think we would do is break out 3SAT into groups of $\vee$ statements $(x \vee y \vee y \vee z \vee A)(x \vee y \vee y \vee z \vee A) \vee (x \vee y \vee y) \vee (z \vee A)$

Is this conversion polynomial time? Yes Is getting the solution back polynomial? Yes If there is a solution to SAT3 is there a solution to MC? Vica versa?