

Slides and Resources on NP-complete Problems

Search Problems

Reductions

- ✓

Video: Reductions

5 min
- ✓

Video: Showing NP-completeness

6 min
- ✓

Video: Independent Set to Vertex Cover

5 min
- ✓

Video: 3-SAT to Independent Set

14 min
- ▶

Video: SAT to 3-SAT

7 min
- ▶

Video: Circuit SAT to SAT

12 min
- ▶

Video: All of NP to Circuit SAT

5 min
- ▶

Video: Using SAT-solvers

14 min
- ✓

Reading: Minisat Installation Guide

10 min

End of Module Quiz

- ✓

Quiz: NP-complete Problems

6 questions

Programming Assignment

- ⌄

Programming Assignment: Programming Assignment 3

3h

✓

Congratulations! You passed!

TO PASS 60% or higher

Keep Learning

GRADE

100%

NP-complete Problems

NP-complete Problems

LATEST SUBMISSION GRADE

100%

✓

Submit your assignment

Try again

1. How many satisfying assignments does the following formula have?

1 / 1 point

$$(x_1 \vee \overline{x_2} \vee \overline{x_3})(x_1 \vee x_2)(\overline{x_1} \vee \overline{x_2})$$

✓

Receive grade

3

TO PASS 60% or higher

Grade

100%

View Feedback

We keep your highest score



Correct

That's right!



2. How many integer solutions does the following linear program have?

1 / 1 point

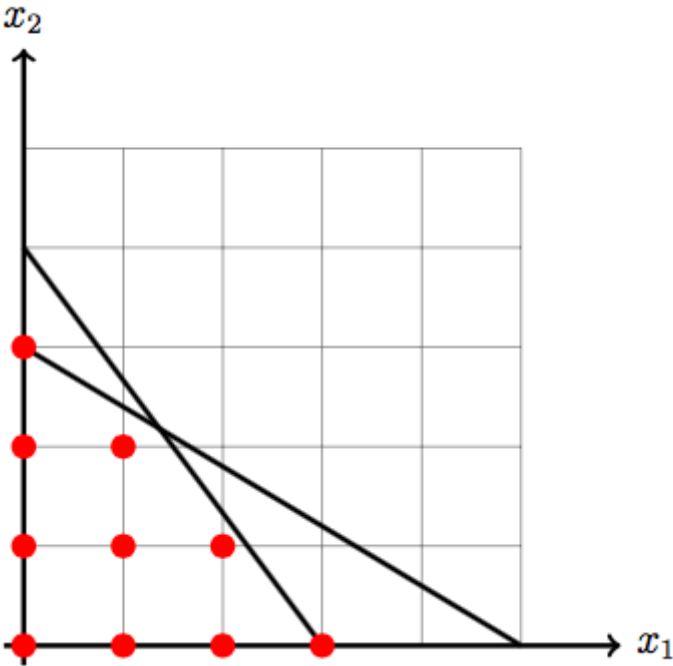
$$x_1 \geq 0, \quad x_2 \geq 0, \quad 4x_1 + 3x_2 \leq 12, \quad 3x_1 + 5x_2 \leq 15$$

10



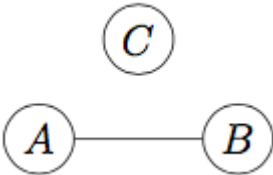
Correct

Right!



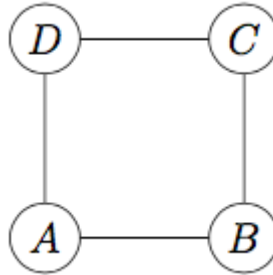
3. Consider the following graph:

1 / 1 point



It has 6 different independent sets: empty set, $\{A\}$, $\{B\}$, $\{C\}$, $\{A, C\}$, $\{B, C\}$.

How many different independent sets does the following graph have?



7



Correct

That's right! They are empty set, $\{A\}$, $\{B\}$, $\{C\}$, $\{D\}$, $\{A, C\}$, $\{B, D\}$.

4. In the 3-coloring problem, you are given an undirected graph and the goal is to assign one of three available colors to its vertices such that the ends of each edge of the graph receive different colors. This is clearly a search problem: given a graph and a coloring of its vertices, one can check in polynomial time whether there are only three different colors and that no edge is monochromatic. This problem is known to be NP-complete. Do we have a polynomial time algorithm for this problem?

1 / 1 point

☐ Yes, this problem can be solved in polynomial time.