

Lab Assignment 8: CS2233

6th November, 2023

A **boolean** formula is called **CNF** (conjunctive normal form) if it is represented via **conjunction** (**boolean-AND**) of several clauses such that each clause is a **disjunction** (**boolean-OR**) of literals (variables or negation of variables). Following is an example of the CNF formula

$$(x_1 \vee \neg x_2 \vee x_3) \wedge (\neg x_1 \vee \neg x_3) \wedge (x_4 \vee x_5 \vee \neg x_2 \vee x_1).$$

Further, a **boolean** formula is called **2-CNF** if each clause consists of exactly two literals.

$$(x_1 \vee \neg x_2) \wedge (\neg x_1 \vee \neg x_3) \wedge (\neg x_1 \vee x_2).$$

A **boolean** formula is called **satisfiable** if there exists an assignment of the boolean variables that makes the formula evaluate to **True**.

Problem statement: Suppose a 2-CNF formula over n variables and m clauses is given as input, write a program that determines whether the formula is **satisfiable** or not. If the formula is **satisfiable**, then output the assignments of the variables that satisfy the formula. The running time of the algorithm should be polynomial in n, m .

Hint: Search 2-CNF is in P.