

获得的答案

NP –complete: A language B is NP – complete if it satisfies two conditions.

1. B is in NP and
2. Every A in NP is polynomial time reducible to B .

1. $DOUBLE - SAT \in NP$

NTM N can decide double – SAT as follows:

$N =$ " on input a Boolean formula ϕ :

1. Non-deterministically guess two Boolean assignments t_1 and t_2 which are different from each other.
2. If both t_1 and t_2 satisfies ϕ then accept
3. Otherwise, reject.

Thus, we construct a **NTM N** to decide Double – SAT .

Hence, $DOUBLE - SAT \in NP$.

2. $SAT \leq_p DOUBLE - SAT$

- The function f which maps an instance ϕ of SAT to an instance ϕ' of $DOUBLE - SAT$ work as follows:

$$\phi' = \phi \wedge (x_1 \vee x_2)$$

- Where x_1 and x_2 are new variables. They do not occur in ϕ .
- This reduction is certainly polynomial time.
- If ϕ is unsatisfiable, certainly ϕ' is also unsatisfiable. Because we have only conducted an additional term.
- But if ϕ has some satisfying assignments t , then ϕ' has at least three satisfying assignments, corresponding to the 3 different ways of extending t to the new variables x_1 and x_2 .

Thus, the $DOUBLE - SAT$ is NP - complete.