NP#3

7. T & F, CNF

a) $(A \vee \bar{B})(B \vee \bar{C})(\bar{A} \vee C)$

b) 2-CNF a var occurs twice

$(A \vee B)(B \vee \bar{C})(\bar{A} \vee C)(B \vee \bar{C})(A \vee C)$

c) $(A \vee B \vee C)(A \vee B \vee \bar{C})(A \vee \bar{B} \vee C)(\bar{A} \vee B \vee \bar{C})$

$(A \vee B \vee \bar{D})(\bar{A} \vee B \vee \bar{D})(A \vee \bar{B} \vee D)(\bar{A} \vee B \vee D)$

$(A \vee C \vee D)(A \vee C \vee \bar{D})(\bar{A} \vee C \vee D)(\bar{A} \vee \bar{C} \vee D)$

$(B \vee C \vee D)(B \vee \bar{C} \vee D)(\bar{B} \vee C \vee D)(\bar{B} \vee \bar{C} \vee \bar{D})$

A, D = False,
B, C = TRUE

$\Rightarrow$ TRUE

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$n \Rightarrow (A/v./\wedge)$ $n=200$

8.

a) If the formula is satisfiable,
at least one set of values to the boolean
is required which makes the set TRUE

Time : $O(2^n)$ $2^1 \to 2^2 \to 2^3$

b) To prove you are right $\Rightarrow$ UNSATISFIABLE

ONLY TIME YOU SHOW ME, Therefore
We are only showing the false values in the
boolean formula.

Time : $O(n^2)$

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(SAT)

a) Boolean circuit → satisfiabity

We make true as 1 false as 0, now it is binary

To make the program tell the difference of (SAT)

we inclue the addition and minus into our algorithm

(e.g) ~~T+T = 1~~ ~~T−T =~~

+ is and

− is or

* is negative/not

T+T = T

1−1

T−T = 0

F−T = T

With the algorithm I can tell the

results from the addition and minus and the produce

the reason I didnt illustrate my algorithm is because

it is not said in the question itself to write one.

b) $O(m)$ How fast determine satifiable?

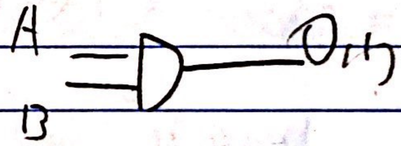
Number of input & output

No. gates.

Since circuit can be done in linear time $O(m)$

with size X, we have $O(X)$ in linear time

e.g $A \wedge B \Rightarrow O(1)$



With the implementation depending on gates & circuits

the size of n will be conducted in same time

$O(n)$

c) $O(m^r)$

$T: \Rightarrow O(m^r)$