First Part:

- cnf - formula ϕ with m variable and c clauses.
- Let N be the NFA with $O(cm)$ states that accepts all non satisfying assignments, represented as Boolean staring of length m in polynomial time.
- N can be constructed as follows :

On input ϕ,

(i) Pick one of the c clauses as nondeterministic $(via \in -transitions)$

(ii) Reads the input of length m.

(iii) Accept the input if it does not satisfy the clause

(iv) Otherwise reject.

- NFA-N all inputs length m states and c clauses, so total states as $O(cm)$ states.
- Polynomial time computed for N.
- If at all any one non-satisfying assignment x then nondeterministic automata accepts that x. Then some clause from N is not satisfying.
- So, N accepts all the non-satisfying assignments of ϕ.

Second Part:

Now we have to show that NFAs can be done in polynomial time.

- Reducible NFA can be solved the polynomial time.
- Construct non satisfying assignment for NFA N as input 3cnf formula m clauses in ϕ of polynomial time algorithm.
- If any binary strings in NFA N accept $\Leftrightarrow \phi$ is not satisfiable.
- Now run the NFA N reducing the algorithm to produce a new $NFA\ N'$.
- If N' contains exactly one state and accepts all binary strings, reject ϕ.
- Otherwise, accept ϕ.
- This will results in polynomial – time algorithm for $3SAT$ and hence $P = NP$.