4.3) Let $ALL_{DFA} = \{\langle A \rangle \mid A \text{ is a DFA and } L(A) = \Sigma^*\}$.

Show that ALL_{DFA} is decidable

A DFA (Deterministic Finite Automaton) starts traveling, via arrows of the DFA, from the start state to the accept state and when it reaches an accept state, it accepts some string.

Consider the following details:

$ALL_{DFA} = \{(A) \mid A \text{ is a DFA and } L(A) = \Sigma^*\}$

Prove that ALL_{DFA} is decidable.

A is DFA that accepts every possible permutation and combination of its input string. Thus, its DFA has only a single state q_0, which is both initial and final state.

So, on executing the Turing machine 'T' on INPUT(A):

Mark the initial state of A.

Repeat until no new states gets marked:

The state that has any transition coming into it from any other already marked state will be marked.

Accept: when all the accept states are marked, otherwise Reject.