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A DFA (Deterministic Finite Automaton) starts travelling, 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 a 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**.