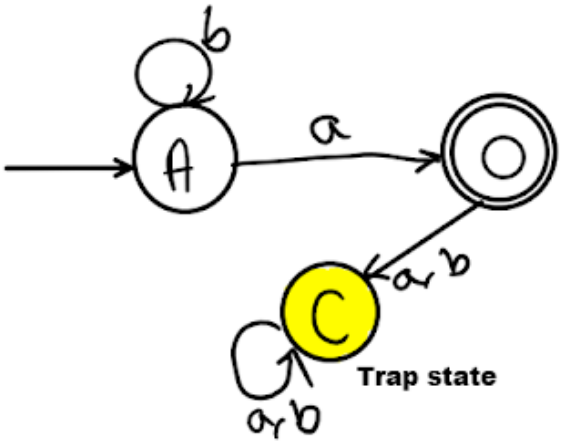
RGPV PYQ 2010

A trap state, which may also be called non-halting or absorbing state, is a state from which a finite automaton (FA) or pushdown automaton (PDA) cannot transit. In the event that an FA or PDA goes to a trap state, it stays there forever and hence making the machine halt. Error conditions or simplifying the automaton design are some of the reasons why trap states are often used.

> *If a transition leads to a state from which it can never escape. such a state is called a trap state. Trap state is also known as Dead state.*

Trap-state example:

- In DFA below, state C is a trap state.
- From C no input is going to another state.



Some properties of trap states include:

1. Trap states are non-halting: Once an FA or PDA enters a trap state, it remains in that state indefinitely.

2. Trap states are absorbing: Once an FA or PDA enters a trap state, it cannot transition to any other state.

3. Trap states can represent error conditions: Trap states can be used to represent error conditions, such as encountering an invalid input symbol or reaching a contradictory state.

4. Trap states can simplify the design of automata: Trap states can be used to simplify the design of automata by eliminating transitions that would lead to error conditions or complex behavior.

References:

- Introduction to the Theory of Computation" by Michael Sipser.

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