## Problem

Let ∑ = {0,1} and let

D = {wlw contains an equal number of occurrences of the substrings 01 and 10}

Thus 101 $\in$ D because 1010 contains two 10s and one 01. Show that D is a regular language.

## Step-by-step solution

**Step 1** of 2

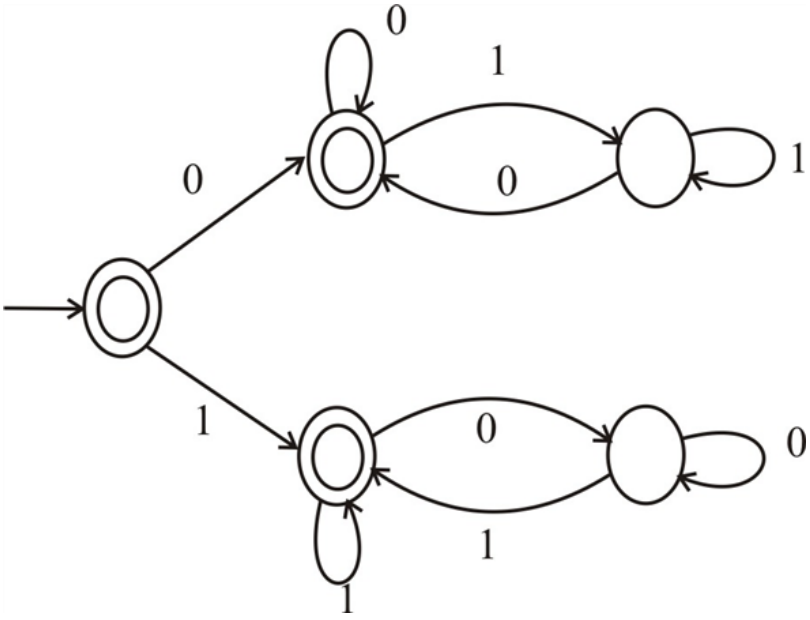
Given language is

$D = \{w \mid w \text{ contains an equal number of occurrences of the substring } 01 \text{ and } 10\}$ over the alphabet $\Sigma = \{0,1\}$

We have to prove that *D* is a regular language.

A language is regular if some DFA recognizes it.

The following DFA recognizes the language *D*.

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**Step 2** of 2

This DFA recognize the language *D*.

Thus *D* is regular

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