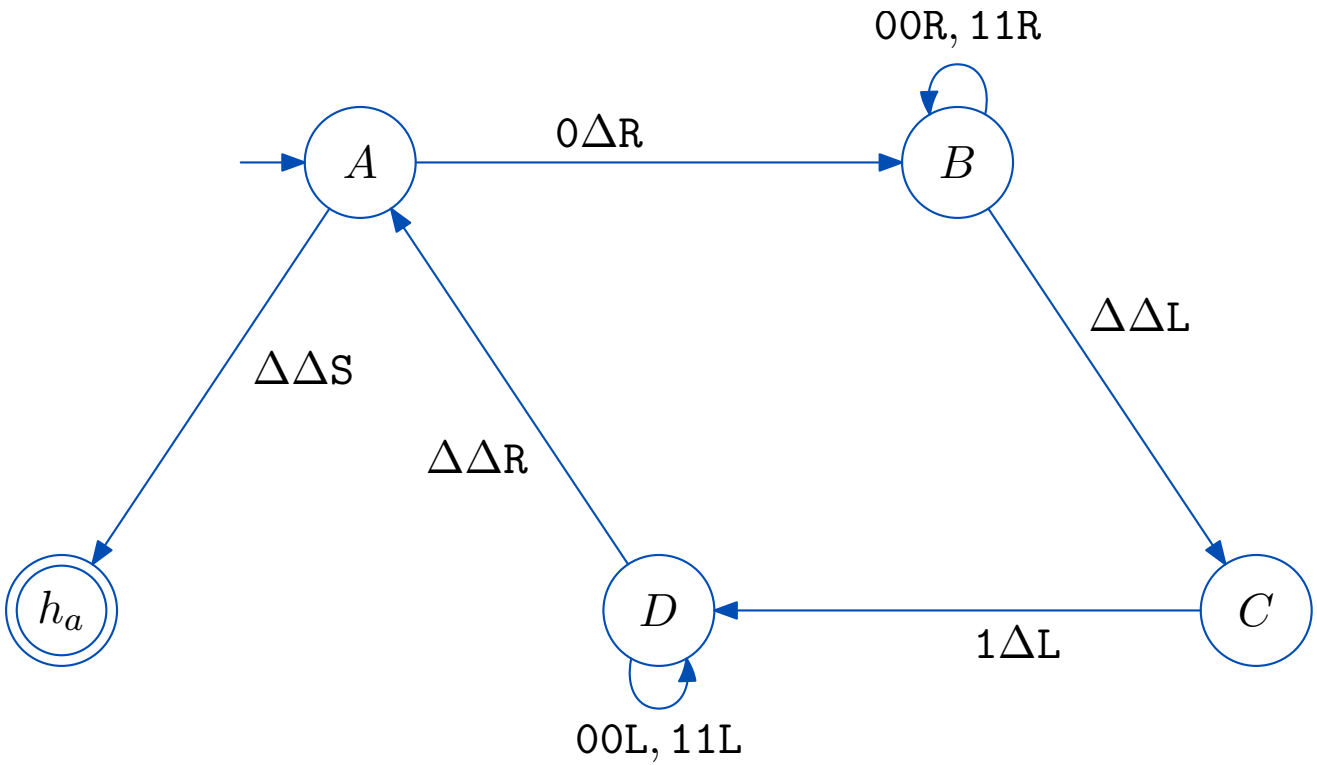
Example TM: 0^n1^n

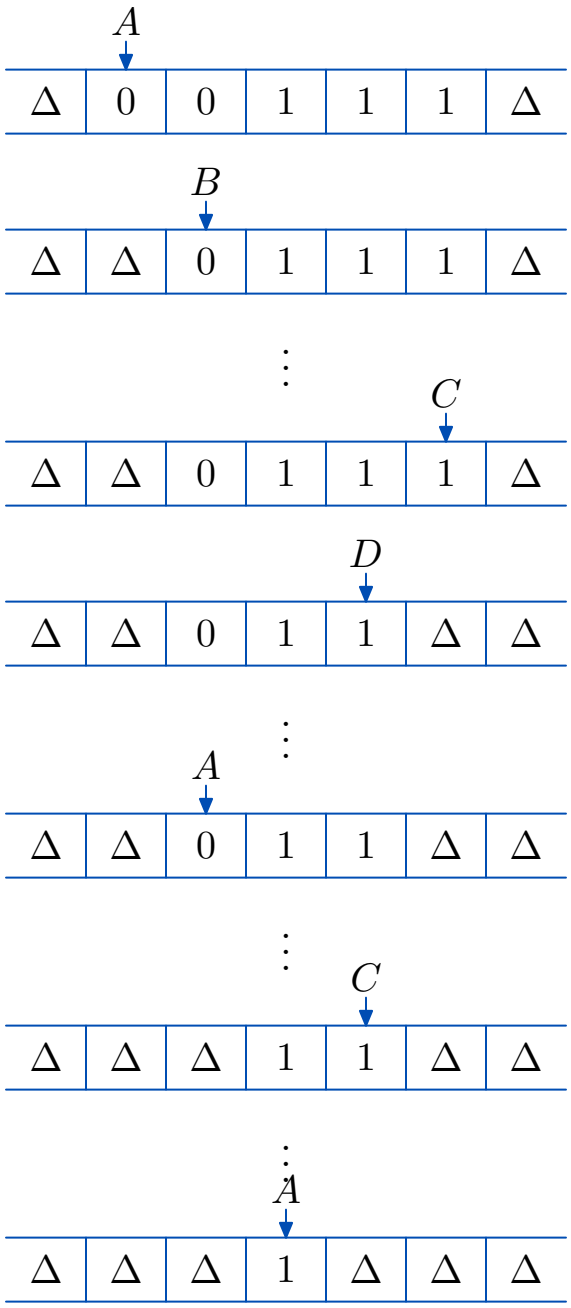
For a TM that accepts $\{ 0^n1^n \}$, pair off the 0's and 1's—repeatedly erase first 0 and last 1 until ε reached. In pseudocode:

(1) If HeadSymbol=0, then Write(Δ) else Reject.
(2) Move head right until HeadSymbol=Δ.
(3) Move head left.
(4) If HeadSymbol=1, then Write(Δ) else Reject.
(5) Move head left until HeadSymbol=Δ.
(6) Move head right.
(7) If HeadSymbol=Δ, then Accept.
(8) Goto (1).

Example Diagram: 0^n1^n



Here is what happens on input 00111...


A
Δ 0 0 1 1 1 Δ
B
Δ Δ 0 1 1 1 Δ
C
Δ Δ 0 1 1 1 Δ
D
Δ Δ 0 1 1 Δ Δ
A
Δ Δ 0 1 1 Δ Δ
C
Δ Δ Δ 1 1 Δ Δ
A
Δ Δ Δ 1 Δ Δ Δ

Reject