

4)

Melih Kurtaran

24186

$$L_1 = \{w \in (a+b+c+d)^* \mid w = a^n b^m c^n d^m, n, m > 0\}$$

I have a two-tape TM starts at $(s, \#w, \#w)$

TM	Condition	Next TM
$> R_{3a, \#}^1 R_{3c, \#}^2$	$(\sigma_1 = a) \wedge (\sigma_2 = c)$	A
	else	h_{NO}
$A = R^1 R^2$	$(\sigma_1 = a) \wedge (\sigma_2 = c)$	A
	$(\sigma_1 = b) \wedge (\sigma_2 = d)$	B
	else	h_{NO}
$B = R^1 R^2$	$(\sigma_1 = b) \wedge (\sigma_2 = d)$	B
	$(\sigma_1 = \#) \wedge (\sigma_2 = \#)$	h_{YES}
	else	h_{NO}