MATH321 - Assignment 3

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1 Q1

1.1 Formal Definition

$Q = \{Q_0, Q_1, Q_2, Q_3, Q_4, Q_5, Q_6, Q_7\}$
$\Sigma = \{A, C, D, X, Y, Z\}$
$\Gamma = \{A, D, X, Y, Z\}$
δ : See below
$q_0 = Q_0$
$q_{accept} = \{Q_7\}$

δ	A	C	D	X	Y	Z
Q_0	(Q_1, X, R)				(Q_4, Y, R)	
Q_1	(Q_1, A, R)		(Q_2, Y, R)		(Q_1, Y, R)	
Q_2		(Q_3, Z, L)	(Q_2, D, R)			(Q_2, Z, R)
Q_3	(Q_3, A, L)		(Q_3, D, L)	(Q_0, X, R)	(Q_3, Y, L)	(Q_3, Z, L)
Q_4			(Q_5, Y, R)		(Q_4, Y, R)	(Q_7, Z, L)
Q_5		(Q_6, Z, L)	(Q_5, D, R)			(Q_5, Z, R)
Q_6			(Q_6, D, L)		(Q_4, Y, R)	(Q_6, Z, L)
Q_7						

Table 1: Transition Function Table

1.2 Configuration for 'AADDDCCCCCC'

q_0AADDDCCCCCC
Xq_1ADDDCCCCCC
XAq_1DDDCCCCCC
XAYq_2DDCCCCCC
XAYDq_2DCCCCCC
XAYDDq_2CCCCCC
XAYDq_3DZCCCCC
⋮
q_3XAYDDZCCCCC
Xq_0AYDDZCCCCC
XXq_1YDDZCCCCC
XXYq_1DDZCCCCC
XXYYq_2DZCCCCC
XXYYDq_2ZCCCCC
XXYYDZq_2CCCCC
XXYYDq_3ZZCCCC
⋮
Xq_3XYYDZZCCCC
XXq_0YYDZZCCCC
XXYq_4YDZZCCCC
XXYYq_4DZZCCCC
XXYYYq_5ZZCCCC
XXYYYZq_5ZCCCC
XXYYYZZq_5CCCC
XXYYYZq_6ZZCCC
XXYYYq_6ZZZCCC
XXYYq_6YZZZCCC
XXYYYq_4ZZZCCC
XXYYq_7YZZZCCC

1.3 Configuration for 'AAADDC'

q_0AAADDC	XAAq_3YDZ	XXAq_1YDZ
Xq_1AADDC	XAq_3AYDZ	XXAYq_1DZ
XAq_1ADDC	Xq_3AAYDZ	XXAYq_1DZ
XAAq_1DDC	q_3XAAYDZ	XXAYYq_2Z
XAAYq_2DC	Xq_0AAYDZ	XXAYYZq_2B
XAAYDq_2C	XXq_1AYDZ	

2 Q2

2.1 Turing Machine

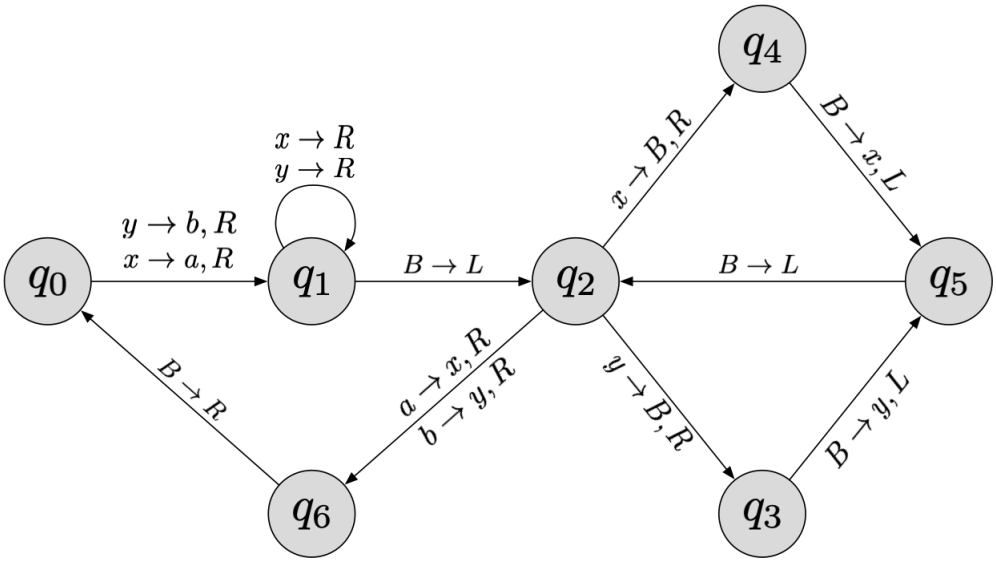

Figure 1: Turing Machine that puts blank symbol between each and every character in tape ($B \to L = B \to B, L$)