	d	assmate .	
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	Al. i) We define a PDA Mar follows
	M= ( 190, 9, 196, 10, 6, 6, 120, 196)
	whome I is defined by
	8/4/42/1/
	S( lo, a, zo) = {(lo, azo)}
	S( for b, a) = \(\left(\ell_1, \text{An})\right)
	d(801 b, b) = {(411 b
	1 ( tr b
	S(2, a, Zo) = { (2, azo)}
	819 10 b) = (q, aa)}
	8(9, 0, 5) = 1(8, 1)
	2(e, 6, a) = 2(e, a) }
	2(9, 6, 6) = (9, 5)}
	3(8, 5, a) = 18, a)
	8/8, b, b) = 2 80, bby
	S(8, po, V) = (40, V)
	d(q01 C, a) = (q01 a)
1	8(90,0,5) = (80,5)
	6(q, c, zot = 1 q, cz)
	S(40, E, 20) = { 96, 20}
C LINE C	

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uk	i) We define a PDA M as follows
Ŕ	
	M= ( ( 90, 9, 96 ), ( 9, 6, 6, 1 0, 5, 8, 20), 8, 90, 20, 1964)
	whom & is defined by
	& (qo, a, zo) = & (qo, azol)
	8 (q0, a, a) = 4 (q0, aa)7
	6 ( 9., b, a) = 4 (4 a, bats) }
	8 (40, 6, 70): {(90, 520)}
	3 (q0, b, d) = 1 (q0, bb) y
	S(90, a, b) = 1(90, ab)
	S(901 = ((9, 20))
	S (90, c, a) = 1(8, a)4
	8 (80, (, 5) = 1 (9, 5))
	8 (q, b, b) = 1 (q, n))
	6 (q, a, a) = 7 (q, n)y
	8 (q,, 1, 20) - 4 q, 20 y
_	

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iii) We define a PDA m os follows
M: 1 1 201 411 921 937 1 (a, b, c), (a, 5, c, 70), 1, 9. 170, 1864)

whore & is defined by

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$ \delta(q_0, a, z_0) = \langle (q_0, az_0) \rangle

\delta(q_0, a, a) = \langle (q_0, aa) \rangle

\delta(q_0, b, a) = \langle (q_0, b) \rangle

\delta(q_0, b, z_0) = \langle (q_0, z_0) \rangle

\delta(q_0, b, z_0) = \langle (q_0, bz_0) \rangle

\delta(q_0, b, z_0) = \langle (q_0, bz_0) \rangle

\delta(q_0, b, z_0) = \langle (q_0, bz_0) \rangle

\delta(q_0, b, z_0) = \langle (q_0, z_0) \rangle

\delta(q_0, z_0) = \langle (q_0, z_0) \rangle

\delta(q_0, z_0) = \langle (q_0, z_0) \rangle
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