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CSE E'

CAT - I

Theory of computation

Assignment - 3

1) $L = a^n b^n c^n \quad n \geq 1$

$n = 3$

aaabbbccc Δ

AaabbbCcc Δ

AAabbCcc Δ

AAABbCcc Δ

AAaBbbCcc Δ

AAaBbbCcc Δ

AAaBBbCcc Δ

AAABBbCcc Δ

AAaBBbCCc Δ

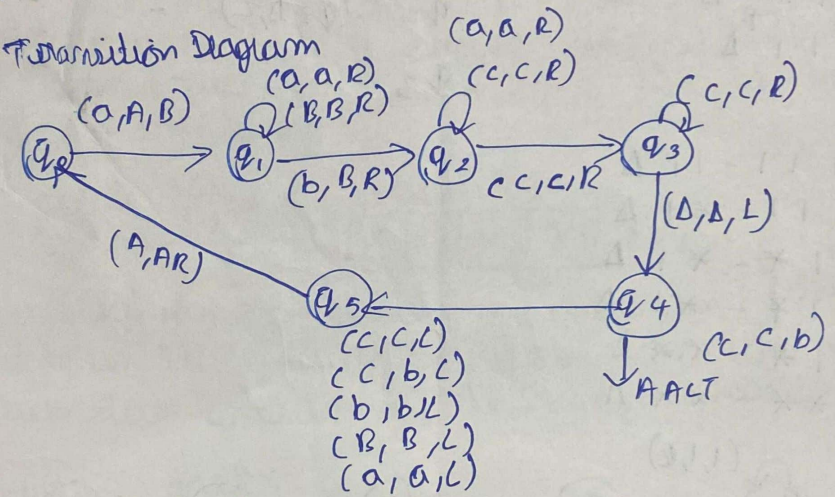
AAABBbCCc Δ

AAaBBbCCC Δ

AAABBbCCC Δ

AAABBBCCC Δ

Transition Diagram



Transition table

	a	A	b	B	C	C
q_0	(q_1, A, R)	-	-	-	-	-
q_1	(q_1, a, R)	-	(q_2, B, R)	(q_1, B, R)		
q_2	-	-	(q_2, b, R)	-	(q_2, c, R)	(q_2, c, R)
q_3	$\Delta = (q_4, \Delta, L)$				(q_2, c, R)	
q_4					(halt, c, b)	
q_5	(q_5, a, L)	(q_0, A, R)	(q_5, b, L)	(q_5, c, L)		(q_5, c, L)

#	1	1	1	1	1	1	$	. . .
Δ	Δ	Δ	Δ	Δ	1	1	Δ	. . . .
Δ	1	1	1	1	Δ	Δ	Δ	. . . .

subroutine:

* some tasks need to be performed repeatedly which can be done using subroutine
* The subroutine also called function
* The set of states in the subroutine has one start state another state namely the return state
* The subroutine of turning machine perform some task similarly

Checking symbols.

* the checking of symbols in an effective way of recognizing the language By turning machine
* The symbol which is read is marked by a special character
* This method is used by turning machine for the languages that contain repeated strings and to compare length of 2 strings.

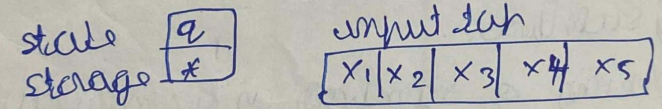
Programming Techniques for Turing machine

There are four different techniques used to construct an efficient turing machine which functions as a powerful computer.

* Storage in state
* Multiple tracks
* Subroutines
* Checking of symbols

Storage in state

* The finite control is used to hold some amount of information and it stores information in pair of element such as current state and symbol scanned By the tape head



* This type of turing machine can be designed to store in state with only data from the input
* Each state contains as its storage internally.

→ Multiple tracks

* The finite control contain the state and its storage and input tape contains multiple tracks
* input type is divided into multiple tracks.
* The turing no-equivalent to is the input placed in the first track which is surrounded.

2.

111 + 11 Δ

111 + 11 Δ

1 1 1 + 1 1 Δ

1 1 1 + 1 1 Δ

1 1 1 + 1 1 Δ

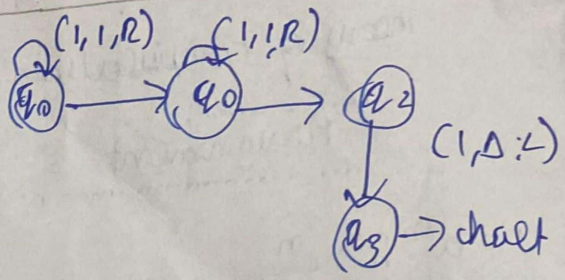
1 1 1 1 1 1 Δ

1 1 1 1 1 1 Δ

1 1 1 1 1 1 Δ

1 1 1 1 1 1 Δ

1 1 1 1 1 Δ



Transition table

	1	+	Δ
q_0	$(q_0, 1, R)$	$(q_1, 1, R)$	–
q_1	$(q_1, 1, R)$	–	(q_2, Δ, L)
q_2	(q_3, Δ, L)	–	–
q_3	–	–	–

3)

1 1 1 1 - 1 1 Δ

1 1 1 1 - * 1 Δ

1 1 1 * - * 1 Δ

1 1 1 * - * 1 Δ

1 1 1 * - * * Δ

1 1 * * - * * Δ