78

*Finite State Machine Group & S*emigroue

V Q*ue*

*finite state machines & state its im*postora

*Ezplain feache*s

→ In Finite state machine the internal state of the machine alext, when machine seceive ilp & generate sequis oli. It consist of pains of func" namely machine

Funch & stute Funch (MAF) Machine funch is define as -

IXS01 & state funch is define as -

IXS where,

s- finite set of internal state.

I finite set of input symbol. 0 - finite set of output symbole

If you know what is the current state of the machine & what is current ile symbol then machine func gives olp & state func" gives what will be the next state of the machine.

Impostunt features of finite state machine - The behavious of such machine can be completely determine provided its ilf & state.

Q. In this machine finite state is also specified & denoted F.

*28l*elio

79

6

The table for machine func is called state table.

Qu*e Dorai finite state machine whose transistion* tab*l*e S\* is s*hown below.*

b

c

st a

So so si Sq Sa si S3 S2

si S2 si si si S2 so si

Here,

I= {a, b, c } s={S0, S1, S2, S3}

Here,

so

so

si

I= {0, 1} s={so, Si, So}

S2

S2

so

*281*12li, 80

sto 1 2

so si so s

Here,

I= {0, 1,2}

S

so

s={so, si, Sz}

so

si

so

Here,

I={a,b] & S={S0, S1, S2, S3}

S

S

S2

28/12/128

SI 0 Sos

1 S

2 S3

Here,

I= {0, 1, 2}

& s= {So, s,,S, Ss ?

52 % S3 so

5, si

so S2

2*9/12/1,* 82

Que co*nstruct state tsansition table of fi*nite stok

*machine whose diagtam is* -

Here,

S = {so,sp,$2.3

I={a,b}

so si si si S so

si se se

>

Here,

s={So, si , S2, S3 }

&

I= {0, 1}

83

*2912li2*

testate

Here,

&

s={So, S1, S2, S3 }

I= {a,b,c}

a so so si S2 S3 S3 S3

b

si si S3 S3

c. S2 sa si sz

*29/1*2/12.54

Here,

S=2. So, Si, S2, S3 7. & I = {0, 1, 2}

SIO 1 2

so so si S2 sis, a S3 S2 S2 si S3 S3 S3 so si

*29/*12/12

\* Language & Gaammer \*

ammes

e Define the following tems:

Laammes

A phadse stucweysammes G is defined by four tupple. G=(,S, Vok) where,

V - finite state of variable symbol. s - finite set of terminal symbol. Vo - starting symbol.

- paduction sel" on G.

3 Language

The set of all psoperly constucted sentence that can be paoduced using gammes G' is known as language.

© Desivation Tees

The desivation in a gammes can be sepsesented using trer such thee we called as desivation tree

©

Derivation

The sequence of substitution that produced a Tehce then that sequence is called desivation of the

sentence.

*29/12/1*2

(5*) Dinect desivability*

A s*ubstitution sel" 2-→y these* means *y result from x using one of the allowed producti*on *to replaced then that rel" is called disect desivability*

@

Gontext Free *Grommel (CF*)

If the left hand side of each production is a single non-tesminal symbol & right hand side.consist of one ne more symbol such grammes is known as context free grammes.

ex @ Describe prec*isely the Inquage 1*(a) produced by

the g*ramme 4* =(V, s, Voy >>

= { vode, 7 z 7

s={x,7,2} → Vox Ve

not for

17.4.3 terem

G={v, s, vo, } V = {vo, V, X, Y, Z }

S.-{X,Y,Z}

2/1/13 87

means that Ovoduction Divability,

Desivation

Tree -

Vo X. Vo Voxy V (vo=yvi) Vox Vyv (v=yv) Vo XY Y Z (viaz)

(G) = xy Y Z | 2 (G) = x/2]

duction is

e consist s context

soduced by

mer @ Describe precisely language 1) produced by the grammes.

C = (VS, vo, V= (vo, 0, b) s= (a, b)

Va,VO ' Nottinnal Voa

ob

}

G = { vos, vo, V = { vo, a, b } S = {a,b]

ex:14

Not terminal

No avo vo a.d

o ad L(a)= aa

| Vo-> VO

o ab l vo ab

T 4(a)-ab Desivation tee

ex. 3

s- a As a A -> Sbalssba

L(G)= aabbaa

Derivation tsee

Given

S a Asla A-> shA |ss|ba

SA AS

$ - ASAS TA=Sba) s —> dabas (s= a) s aabbas (A=ba) s - dabbda (s=)

L(G)= aabbaa

88

2/i113 89

ex

S

A- B

abba

alas bAR b/bs/aBB

L(a)= aabbabab

Given - s aBlba. A > qas bAA B blbs|aBB.

Desivation tee

S-> AB s -> ABB (B=aBB)

aabe (B=b) s gabbs.(B=bs)

s-> aabbas (s=QB) s aabbahs (B=bs) S aabbabab (s=GB)

s – dabbabab (8=b) L(Q)=aabbabab

*21.1118* 90

er.

E - EHE

E EE E-> I I alble

L(Q)=a+b\*c

E E E E

E E

EXE → E+E\*E) → I HE\*E) + I + (I\*E) > I+ (I\*) a + (b\*c)

HH

(E= E\*E)

(E=I) (E=I) (E=I) (I=a/b/C)

(a)=a+b\*C

pervation tree

*3/11*13 91

er

*let ç*= (1, 5, 10, 1)

V = (vo, vi) s = (a, b)

Vobro Voan

Vob. \* - a VO vb vi

6 Vohlo

*Vo*> bave (Yo=awi) Vo bad (v=a)

12(a)= baa

Descsibe

(9)

let,

G=(v, s, Vo, i) @ Vobo V = (vo, v - No> bb (=b) |L)=bb]

S = (a, b) -1 Volvo

Vobavi (vo-avi) Vo > bac Vo (Vi=avo)

Vo baab (Vo=b) 3 Vobro [ 4(a) = baab

Vobava (vo= uv) VOJ Vo-> babv, 6 Vo baba (VFR) 11 (9)= baba

*3/1/*13

6 obvo

Vobb vo Vobbay Vobbaa

14(a)=bbaa

ex:

$ OBB B - 05/15/0

- L(a) = 0104

*= 010000*

>

Given -

S B

OBB

Os 150

is

s

o

S OBB s-> OISB s-> 010 BBB

> odoo BB S-> DIODDB S 010000

in

u

n

2(a)= 010000

93

ez

S-AAA

A

as/bs/a

Given

S-> CAA A as bola

S->AA S->das A S->ada AAA

->daddAA

-

aaddaa > agadda

S

1(6)= adddad

S->GAR S-> absa S-> abaAAA s-abda AA $-abada A

s-abdaaa L(G)= abaaaa

3

S-ARR Sada s > ada

3/1113 94

S- AAA

S=> CASA s- aaaAAA s> aadaAA S adoabs A saaddha AAA S-> aaaahaa AA

S- aaaabada s aadabaaaa L(G)= daadhaaaa

Det? A non-e*mpty set is said to be f*orm a groupit

in 'a' *then is define binary operation such that*

*following is satisfied.*

VAGUE

a. b E G then a bea D a, b, cea then ao(boc) = (aob) oc (Associative

prop. ) in aerea= a + *a eG (I*dentity prop.)

a Eg, a leg then doa = a a-e Inverse prope

w*here eis identit*y.

GuieZet q be a gro*up then f*or evezy a ég has unique

1*2 in* → *let, 4 be a group with identity element'e*'.

I let a EG Supposen dy *be the in*verse of a