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CFG without unit production

s bbl alb B > bbla. A bblalb

*3. Eliminate all unit production from £FC.*

*$ +T/Om*an nobba till av ^ T → T \* F/

F → (5)la

21- It doesn't co*ntain*

e production

step\_? - *It contain unit production* soemove 27

I -> *IXFE* It contain w*ith puoducti*on ''soemove F by

production [F-> ())a] T->T\*F|Cola

$ -->S+T/T *It contain with peoduction 'T'so sem*ove I

*by production [T*>T\**F|*cs) la] s->S+T|T\*Fl(s)la?

CFG without unit pueduction -

IsS+T/T\*F / (s) la I T \* F/ (s) la

F (s) la

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solela

A aAaB) B bblb To acaa 10 --> badlabplaa

step 1- It does not contain epäoduction

step 2 - It contain unit production sn, semove it!

Cacaald It contain with production's so vemove B by

päoduction [D->badlabdaal Tic-acaabablabolaa

A →ADB It contain with production's so nemove B by

production (

B **bBlbl** A>Alb816

SA BIC It contain with production ASD semove a by

production LA maaabelb] s->aAn.lblb1bB blacaalbaplabblack IS AalbBlblacdalbad labolala!

FG without unit paoduction --

s umubBlblacad bad abd da A daal bblb

B bblb c ucaabadlabplaa

D bad abblad

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DESTE

2. E*liminate unit psoduction from the following* CF.

*S-> ABA*C A →*arle* B bble cd

ep16- *It contain e production so, xem*ove it.

Begiven

S ABAC/BAC/AAC/ABC/AC AC/Bolo

5 → ABACI BAC RAC ABC) Acheco

A aala В » bв |

cad

Step?

*It contain unit production so zemove it* -

S -*ABAC | BACLAASLaBcla*c Bcle

It contain *with production's so semove [ b*y

production and S ABAC BAC) ARCHABCTACTE

i without unit production -

S =ABABACAAL ABC ABCD

A aala B 3 b Blb ed

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SRB

A => DARTE B -belle

Step Is *It contain E production so, semove it*

AE Ion

B

E

I Gren

S->ABBIA A > CAAQA anla B - BBI b B) bBlb

It c*ontain unit production* so*emove i*t)

5 - *AB/BLA It contain with production B sosemove 'B' b*y

pr*oduction* B=>beelbell AB) bebola namiot

It contain with production 'a' sosemove 'a' by

psoduction A-dealaala S AB/6BB/ b BlblanAlanla

CFG without unit production -

SABIBB)bebasalo AAA Alda B bBB /bBb

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*S-13*

*S-09*

S-D.

S-02

\*\*\* C*HOM*SKY NO*RMAL FORM* (CNE)

*Que. Define chomsky normal form with suitable exampl*e

Any co*ntext free grammer without e production generated by a grammer in which all production of the fo*rm *A BL DE A 70* whese A,B &cae non terminal fa is terminal

is known as chomsky normal foun.

In CNE no of variable in sighthand side testsicted to maximum two non terminal & only one tes minal. A context free

grammer is in chomsky normal form if evesy production is of the

form ABE OS Ad.

3

6= Is, A, B}, 3a, 63, P, s)

Sb Al AB

A BARlasla

B *OBB/bs/b Obtain CNF from the context free gamm*es → Step 1: *There is no* e production

Step 2

:

There

is no renit production.

step 3: c*onvert variable, combination into chomsky normalf*om

\* S -> *E/*AB s BA

[ B+] given SBRT

S->OB

I Aa] given S→ AB

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s - BATAB

\*

rtion

minal

A LAAasla

A - AA

[ B->b] given A BAA

[ BA] (

ASA

A->as

A AS]

sicted to

the

A

SA Aslal

\*

B -> ABB bsb BUBB

[ A a given В-> ABB BSB

B -> his

BBS

( B

SB/Bslb

al forme

. Required INE

s > PA AB A RASI B SB/Bslb.

A

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*S*

*find the grammes in CNF equivalent to* -

s > *AbB A QRIR*

*B-belo*

*step 1*

*There is no e production*

*step 2. There is no wait psoduction*

Step 3: Convest var*iable combination i*nto *chom*sky normal

form \* S -> *RD*B

S =>ARBE *(2-0) given (B+b*) given put,

CAR

*D BB* s-col \* A ->Q*al*a

A->@R (A a) given AAA

AARIA

\*

(8->) given

B -->Bb B -> DB BBB BBBlb

1024

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En PASE

Requiad INF

A → Ana B BBI b

D-Bв

let q be the FQ genesating well form tosmuld of psaporitional calculus with predicated p8q. Find (NE.

s NS! s>supla step 1: There is no e production

Doma

Even

step 2

These is no unit production

step 3 - Convent vasiable combination into chomsky normal fom

o

put A NG an SAS

. \* sss]

put By [ 15→ BS>S]

put E > s->BSCS]

put →] 5 =>BSESD

put (E-BS

Fcs) 3EFD

put G> EF

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sGo

AS/Golpla

S

Required E*NE IS*

S AS/Golpla AN B [

EBS

FCs. G EF

*Que. Obtain chomsky normal form of the following* cf.

S*BB*

*A-QAR*E B → bBBLE

-> step 1

There is an E production so, semove it

AE ве. 5 → ABBIA

> UAAAAA la A URAI dala В — bвB) bв БB) В -> bвB| Бвь

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S-3 W*-09*

3-09

wm /13/13 *13*

W-08

\*S-0*5*

\*\*\* GREIBATCH NORMAL EORM (GNE

w-ot

Que. *Detine gresbatch 0203 mal form with suitable* examp*le*

*It each production in Gaeibatch normal form is of* t*he form A 70B ON A* . *whese Å Base non terminals and* a is a *terminal, then the grammer is in goeibatch 270 mmal form*..

*In GNE the leftmost symbol of sighthand side is* a*lways a terminal symbol Peach peoduction eithes contain tesminal* 02 start with tes*minal then the gravam*es is known as

Geeiba*tch Nesmal* form

for ex→ 1. S-*>ABA/AB/BA/A/*B

A Arla B b Blb

*The pisoduction s is producing not in GN*F to bring them in psopes fo*r seplace leading A*'s &B's *by thet*s production

s. *ABR/AB/BA/A/B*

*A->A*

& B B

Bb

A

a

s 2 QABAQBA*L APB) ab) bBR bal*anlal bolb

. Required a NF

SZA*BR ABE/DAB/QB) BRIT/Orla b*ell

Azorla B bBlb

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W*ac*olle www.dhakichiess.coPAGE

*Convert the following grammes into @NE.*

*5 -> AB* . A B.5lb

B - Sala

*The production s is producing not in GNF to brin*g *them in propes form seplace leading e'*s fb's *by theis product*ion

ont letters AB

In the

Ish B7 [Ab]

*Pro*duction, *the* leftmost lettes should be tesminale.ab

The prod*uction A is puoducing not in GN*E to bring them. 122\_A BS ps*opes for replace l*eading B by their production [B ]

2-BS *A-as* 1 A as/b.

The production B. is ps*educing 120+ i*n ane to bring them is proper for*m seplace leading* s by their psoduction

IsbB

Bb Balal

Req*uised GNE*

*5 -> bв* Aasib B Bala

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s → ABIGA B -> CBLAB

с — авь

Huction.

*The production is is producing not in one t*o bring them in pr*opes form Deplace leadi*ng a by LA-al

- AB

ing

their

The p»od*uction*s is puo*ducing not in th*e to being *them in popes, fom seplace leading c by [< 0B;*cb]

s-ав авья

The *production B is producing noti G*NF to bring them in propes for*m replace leading c by [C OB*, Zb]

3 => a*3B/b3l@!* [=>]

1

Req*uired GNF is* -

5*. OB/OBALA B OBB/B/B*

À - a Ć *--> QB/6*

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S-*09*

\*S-os

*\*\* USELE*SS SY*MBOL*

W-13

S-13

Q*ue. Define useless symbol. Find a CFQ with no useless* symbo eq*uivalent to -*

S ABICA B BC/AB

A > useless symboliso semove it c aBl6

Any psoduction in a *context free gran es producing a* singal teminal ax stas*t with tesminal in the form* of UNF) is known ds useless s*ymbol. They can be sem*ove by propes substitution *then we get a context free grammes with*out useless symbol

*$ → AB/CR* B BC/AB *Ad*

→ *AB/b*

Above CEO contain use*l*ess *symbola* so it can **be senove** by subs*tituti*ng (

A a

5 → *ab/ca B → BlaB* caBlb

*Above [F*G co*ntain useless symbol '*c' so i*t ca*n be remove by s*ubstituting c aB]*

[ cb /

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sa Bica a IsaBlaBalba

se*le*ss Symbol

Въвсав

B BAB|Bblab

3. [FG with no useless symbol

Is-zablababu B --> BUB|Bb/aB

oducing a INF) is *ibstitution* abole

S - ABC BC B ÁCICA A ->aplaudes o abib

t

.

e s*emove*

Above EFG c*ontain usel*ess s*ymbo*l 'A's it can be removes by substitutiog A>A

Aa 5-7 ABC | ABC | BC B → anclac)canca

Lcablb Above CFG contain useless symbol c so it can be semove by substituting otab

[cab s a Babaebla Bablakb. BablBb

B -> Qaab laablaablablaban banlabalba. .. CFG with no useless symbol -

S alablaasbl a Rab l'abb) RablBb B aablaablaablablaban banlabalba

be enove