SDT Part-3

Complete Course on Compiler Design

Subbarao Lingamgunta • Lesson 16 • Sept 5, 2023

$S \rightarrow AB \{ pf(2) \}$

$S \rightarrow AS \{ pf(1) \}$

$A \rightarrow a \{ pf(3) \}$

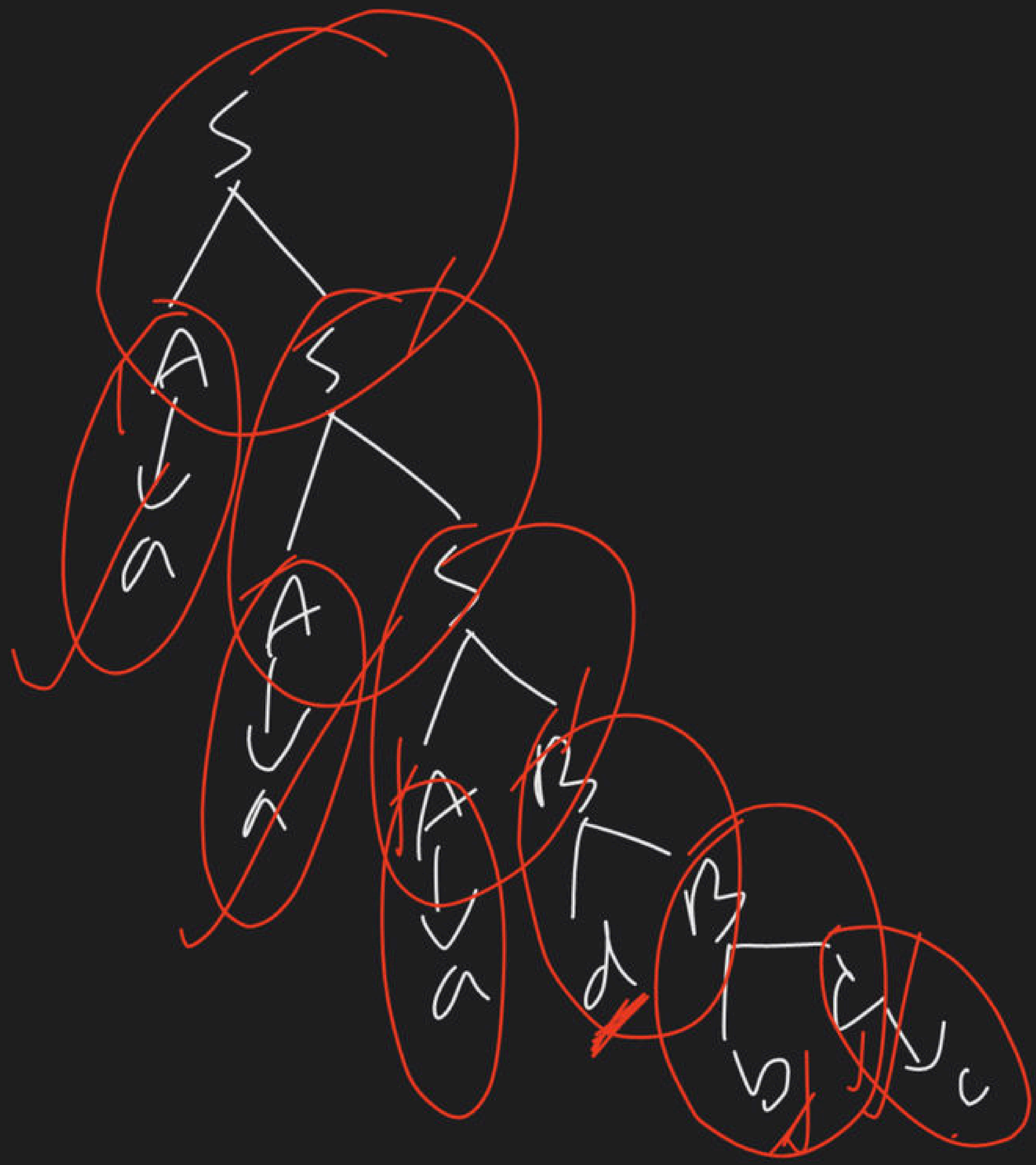
$B \rightarrow bC \{ pf(4) \}$

$B \rightarrow dB \{ pf(5) \}$

$C \rightarrow c \{ pf(6) \}$

i/p: aaadbc

3 3 3 6 4 5 2 1 1



Consider SDT to count no. of reductions needed to execute the given A.E?

i/p: $2+3*4$

o/p: 8

$E \rightarrow E_1 + T \{ E.nr = E_1.nr + T.nr + 1 \}$ pd(E.nr)

$\quad | \; T \{ E.nr = T.nr + 1 \}$

$T \rightarrow T_1 * F \{ T.nr = T_1.nr + F.nr + 1 \}$

$\quad | \; F \{ T.nr = F.nr + 1 \}$

$F \rightarrow id \{ F.nr = 1 \}$

nr

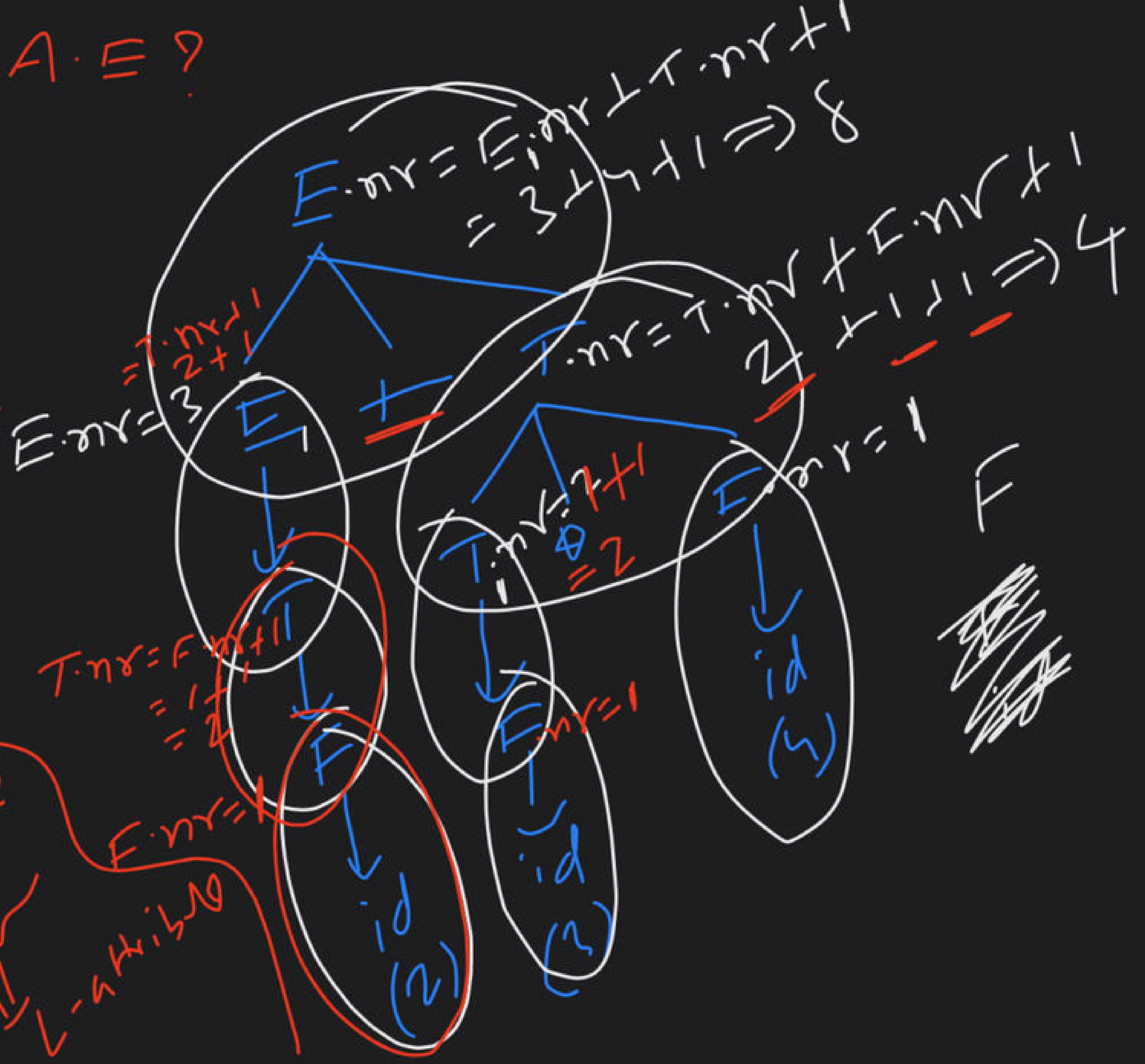
Syn-attribute

⇓

S-attr

⇓

L-attribute



$S \rightarrow SA \mid a \mid b$

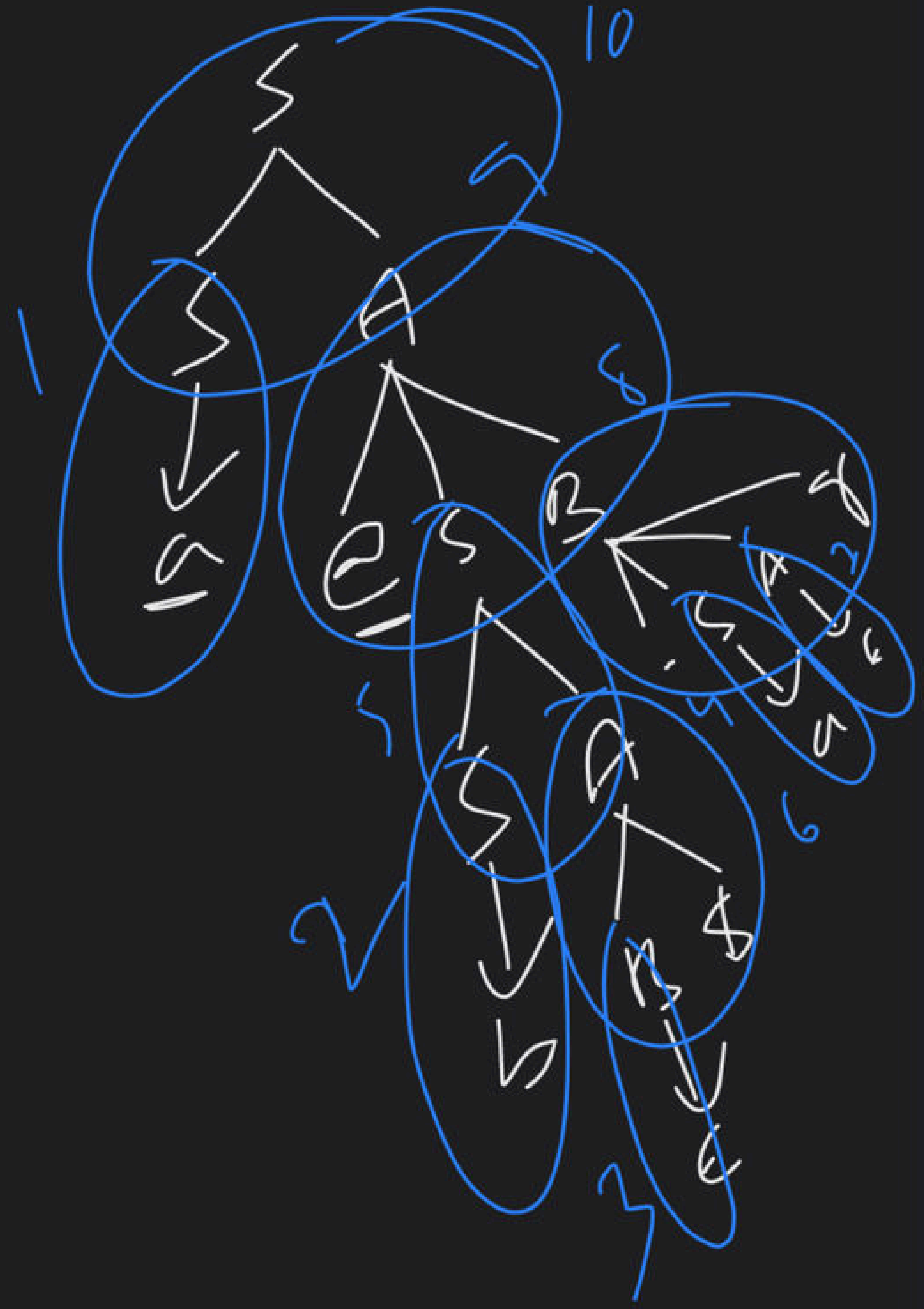
$A \rightarrow @SB \mid B\$ \mid \epsilon$

$B \rightarrow .SAg \mid \epsilon$

Count no. of reductions needed using BUP to parse string

a@b$.ag

10



$S \rightarrow ATE \mid g \mid \epsilon$

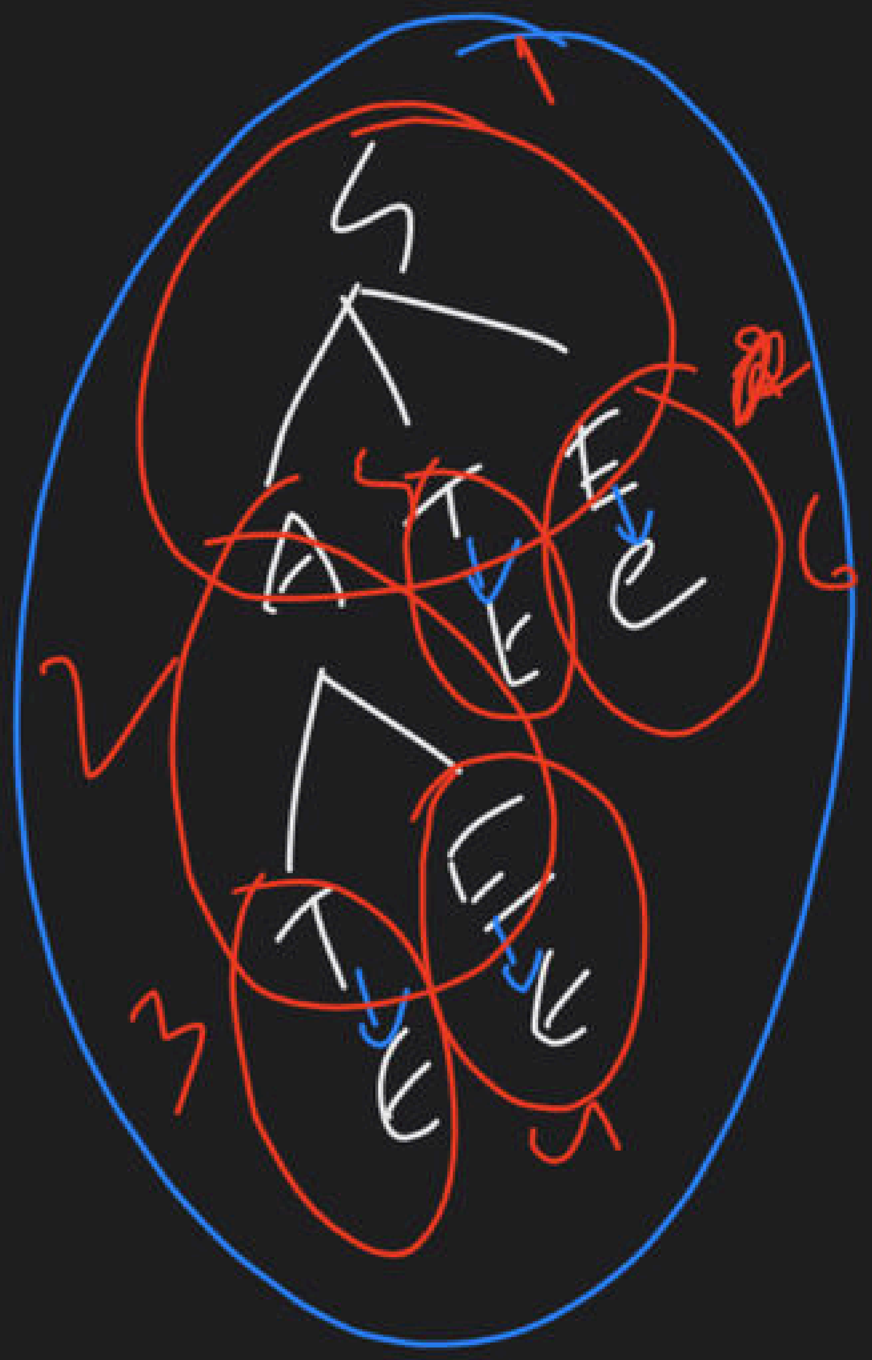
$A \rightarrow TE \mid a \mid \epsilon$

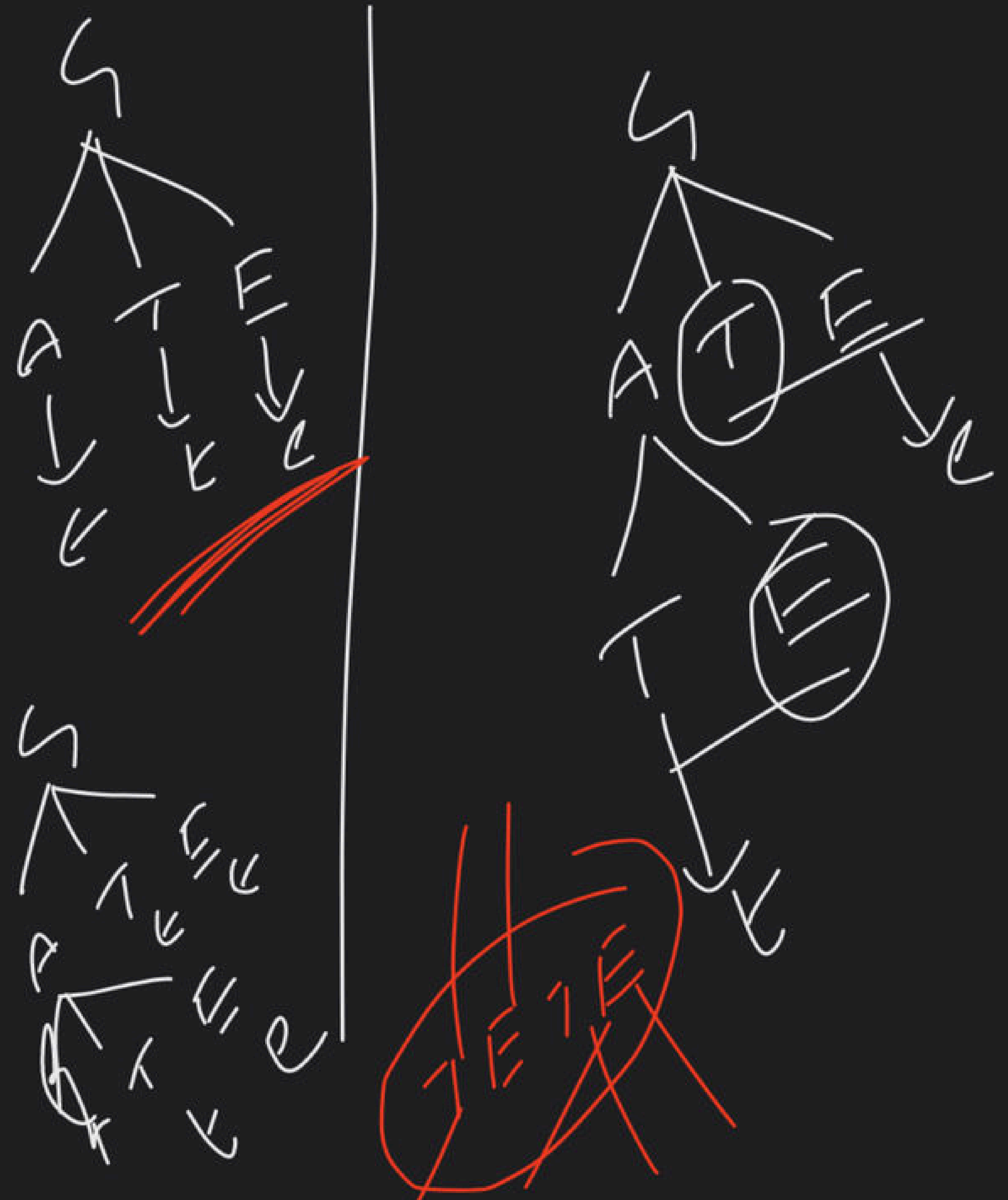
$T \rightarrow t \mid \epsilon$

$E \rightarrow e \mid \epsilon$

i/p : te

No. of PT possible?





SDT ?

$E \rightarrow TR\ \{pf(\phi)\}$

$R \rightarrow +T\ \{pf(\phi)\}\ R\ \{pf(+)\}$

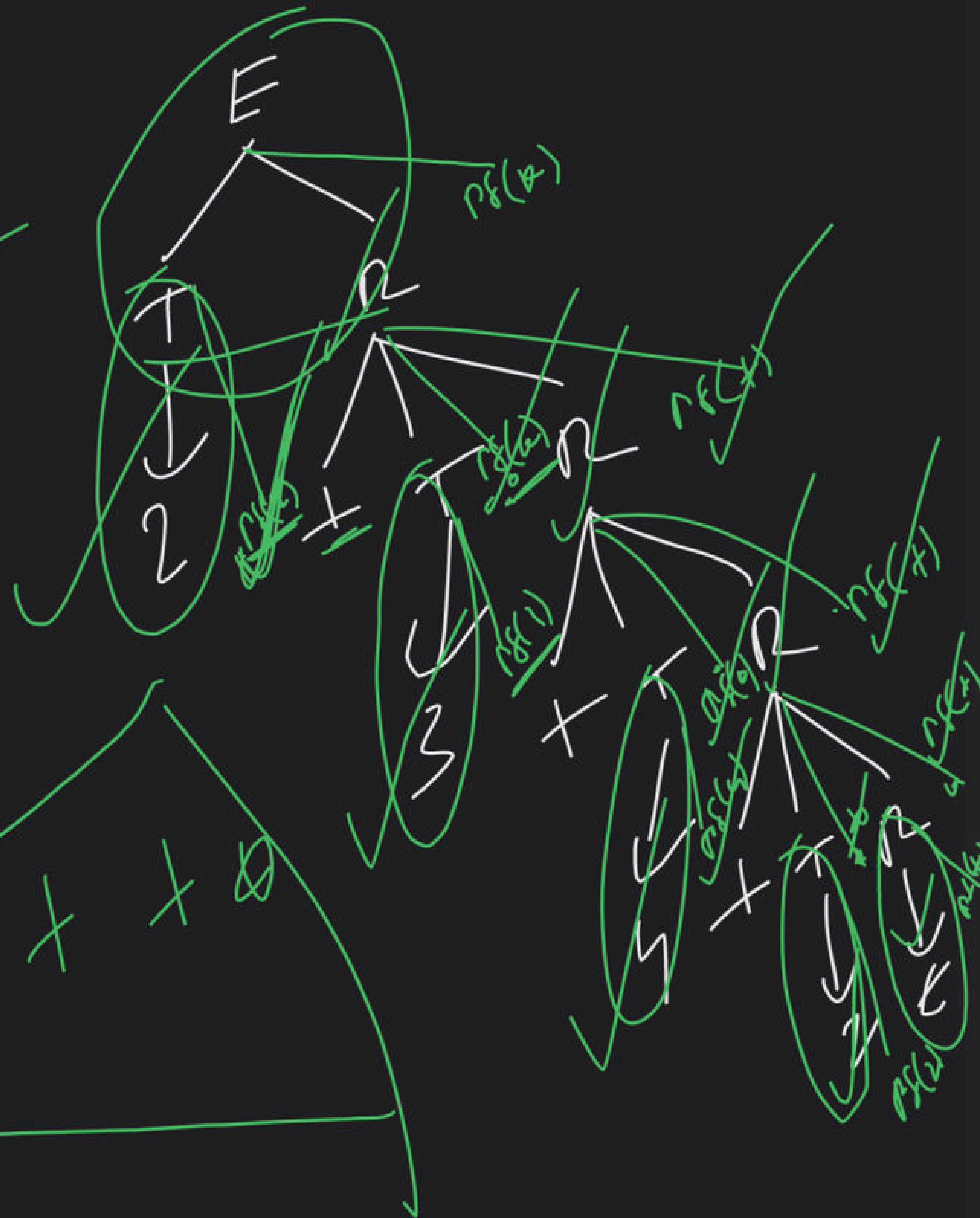
$\quad\mid \epsilon\ \{pf(+)\}$

$T \rightarrow num\ \{pf(num)\}$

~~L-attr ⇓ S-attr~~

i/p: 2+3+4+2

o/p: 2 3 ϕ 4 ϕ 2 ϕ + + + ϕ



L-attributed
$\Downarrow$
~~S attributed~~

SDT

$E \rightarrow T\{pf(\theta)\}R$

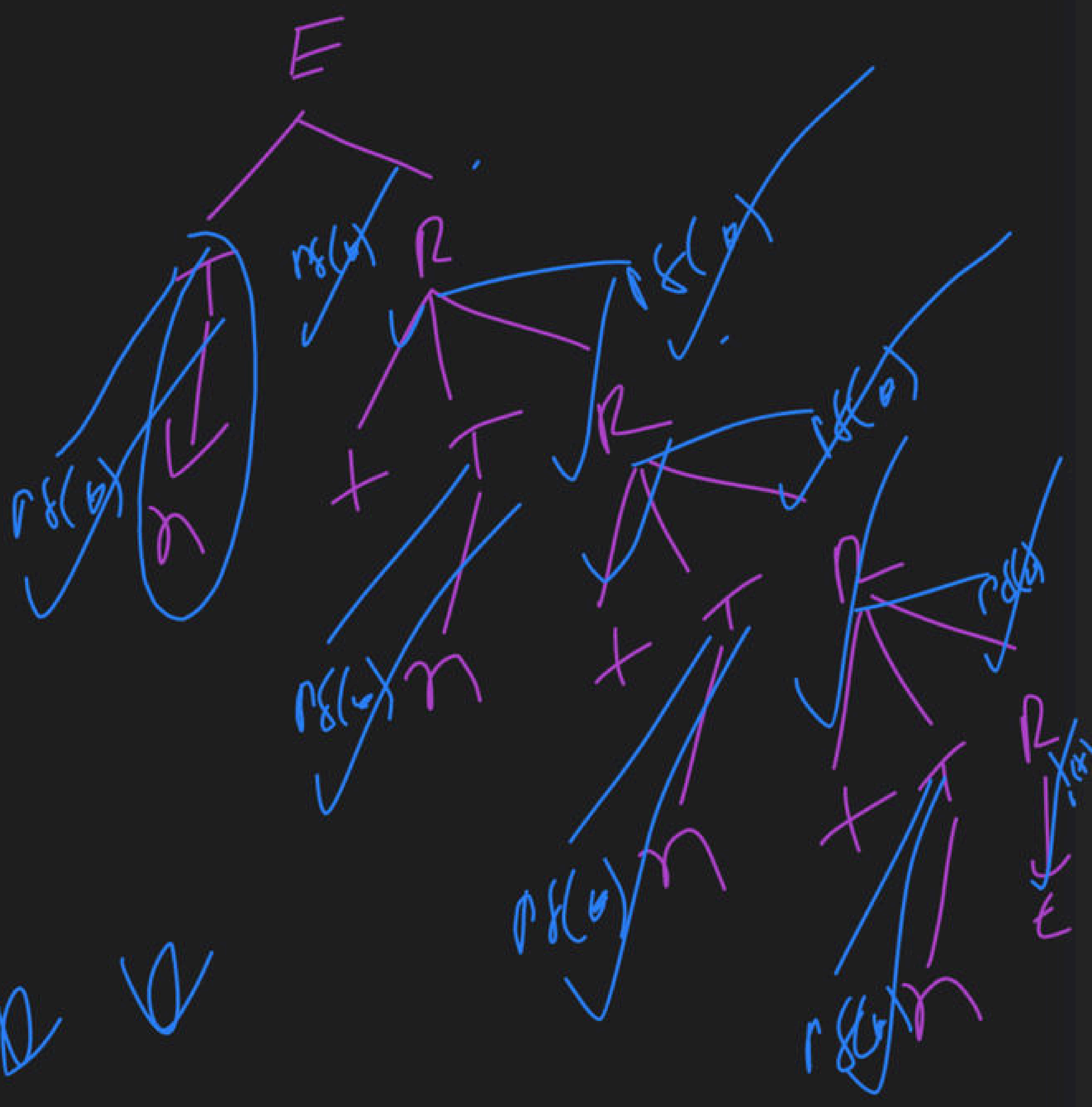
$R \rightarrow +TR\{pf(\theta)\}$

$\quad | \ \epsilon \{pf(+)\}$

$T \rightarrow \{pf(\theta)\}\text{num}$

i/p: 2+3+4+5

o/p:



GIW

a LMDT

b RMDT

c DT

a, b, c?

$\boxed{a = b = c}$

SDT

$S \rightarrow E \{ pf(E) \} R$

$R \rightarrow + T \{ pf(+) \} R$

$\quad | \; \epsilon \{ pf(+) \}$

$T \rightarrow num \{ pf(num) \}$

$\Longrightarrow$

$S \rightarrow E M R$

$M \rightarrow \epsilon \{ pf(E) \}$

$R \rightarrow + T M_1 R$

$M_1 \rightarrow \epsilon \{ pf(+) \}$

$R \rightarrow \epsilon \{ pf(+) \}$

$T \rightarrow num \{ pf(num) \}$

i/p :	111.111	101.110	111.101	1011
o/p :	7.875	5.75	7.625	11

$S \rightarrow L_1 . L_1 = \left\{ \begin{array}{l} S.DV = L_1.DV + \dfrac{L_2.DV}{2^{L_2.nb}} \\ pf(S.DV) \end{array} \right\}$

$\quad | \; L \; \{ S.DV = L.DV \}$

$L \rightarrow L_1 B \left\{ \begin{array}{l} L.DV = 2 * L_1.DV + B.DV \\ L.nb = L_1.nb + B.nb \end{array} \right\}$

$\quad | \; B \left\{ \begin{array}{l} L.DV = B.DV \\ L.nb = B.nb \end{array} \right\}$

$B \rightarrow 1 \left\{ \begin{array}{l} B.nb = 1 \\ B.DV = 1 \end{array} \right\}$

$\quad | \; 0 \left\{ \begin{array}{l} B.nb = 1 \\ B.DV = 0 \end{array} \right\}$

$L_1.DV = 2 * L_1.DV + B.DV$

$= 2*2 + 1$

$= 5$

$L.nb = L_1.nb + B.nb \Rightarrow 2 + 1 = 3$

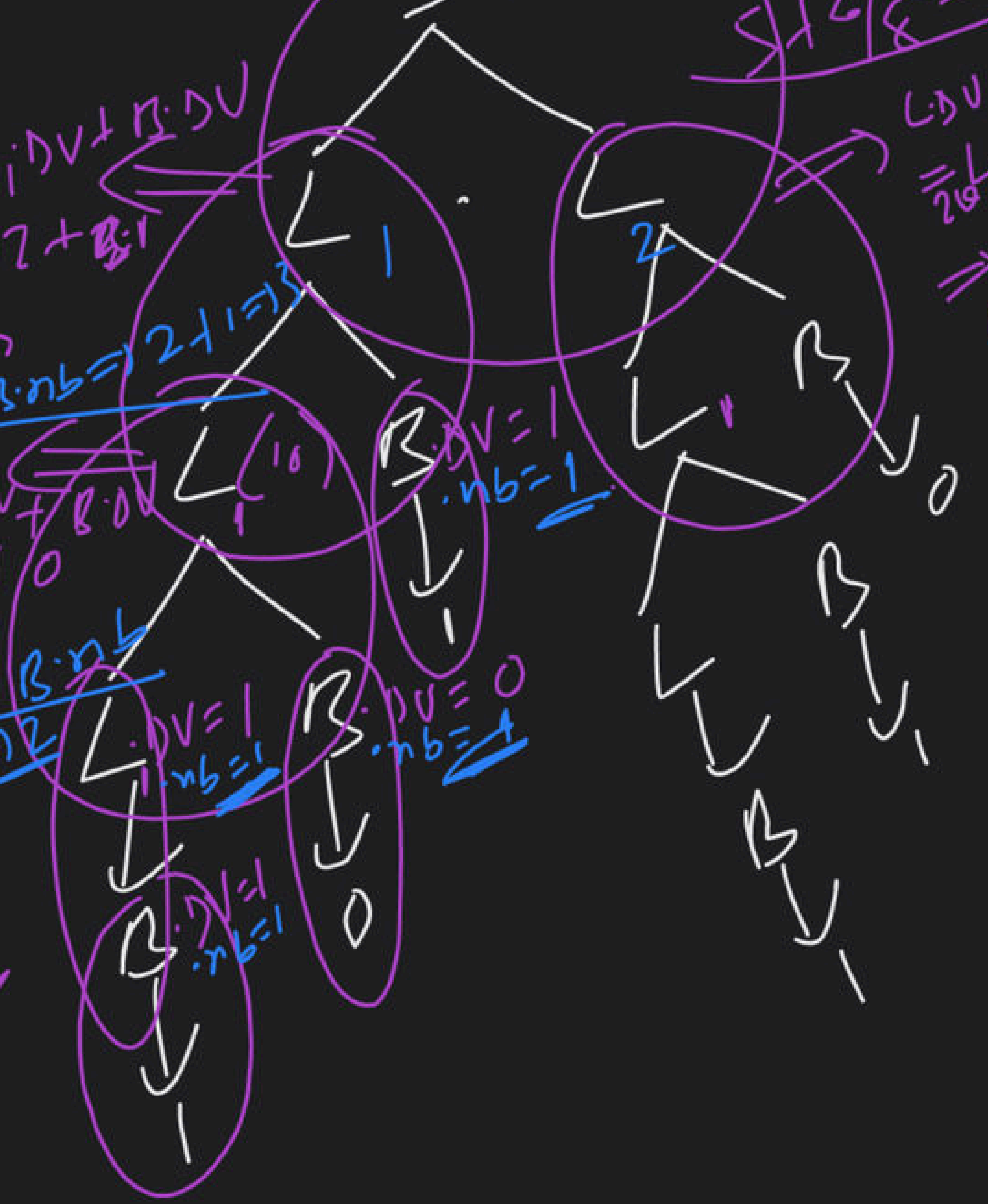
$L.DV = 2 * L_1.DV + B.DV$

$= 2*1 + 0$

$= 2$

$L.nb = L_1.nb + B.nb = 1 + 1 = 2$

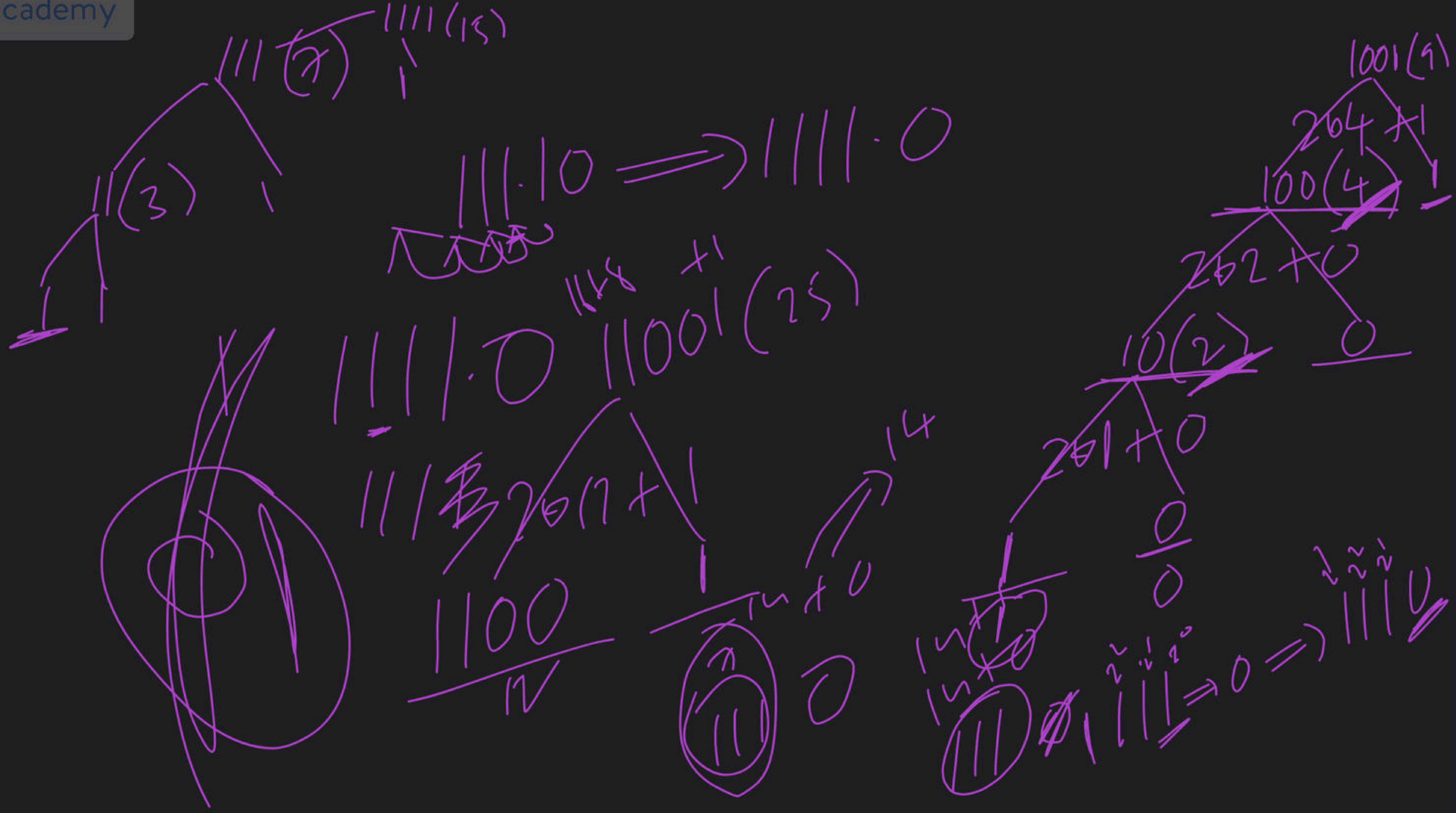
$\dfrac{6}{2^3} = \dfrac{6}{8} = 0.75$



$S.DV \Rightarrow 5 + \dfrac{6}{2^3} = 5 + 6/8 \Rightarrow 5.75$

$L.DV = 2 * L_1.DV + B.DV \Rightarrow 6$

$L.nb = 3$


1111 (15)
111 (7)
11 (3)
111.10 ⇒ 1111.0
1111.0
1001 (9)
100 (4)
10 (2)
11001 (25)
1100
12
14
2·1+0
2·2+0
2·4+1
1111
111

$.101$

0.5

0.125

0.625

$101 \Rightarrow 5/2^3$

$\Rightarrow 5/8$

$\Rightarrow 0.625$

$011\,(3)$

$2 \times 01 + 1$

$01\,(1)$

$2 \times 00 + 1$

0

0