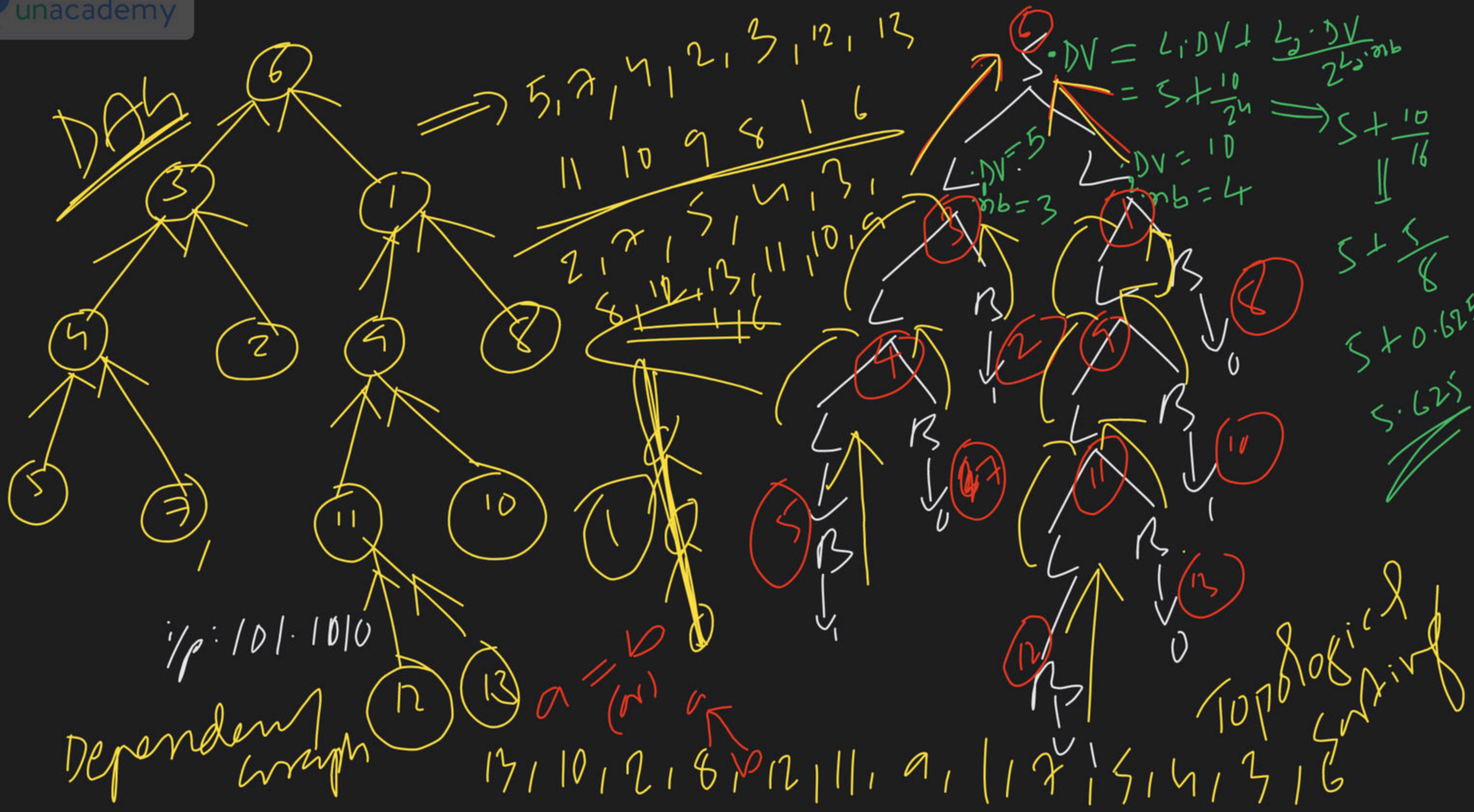
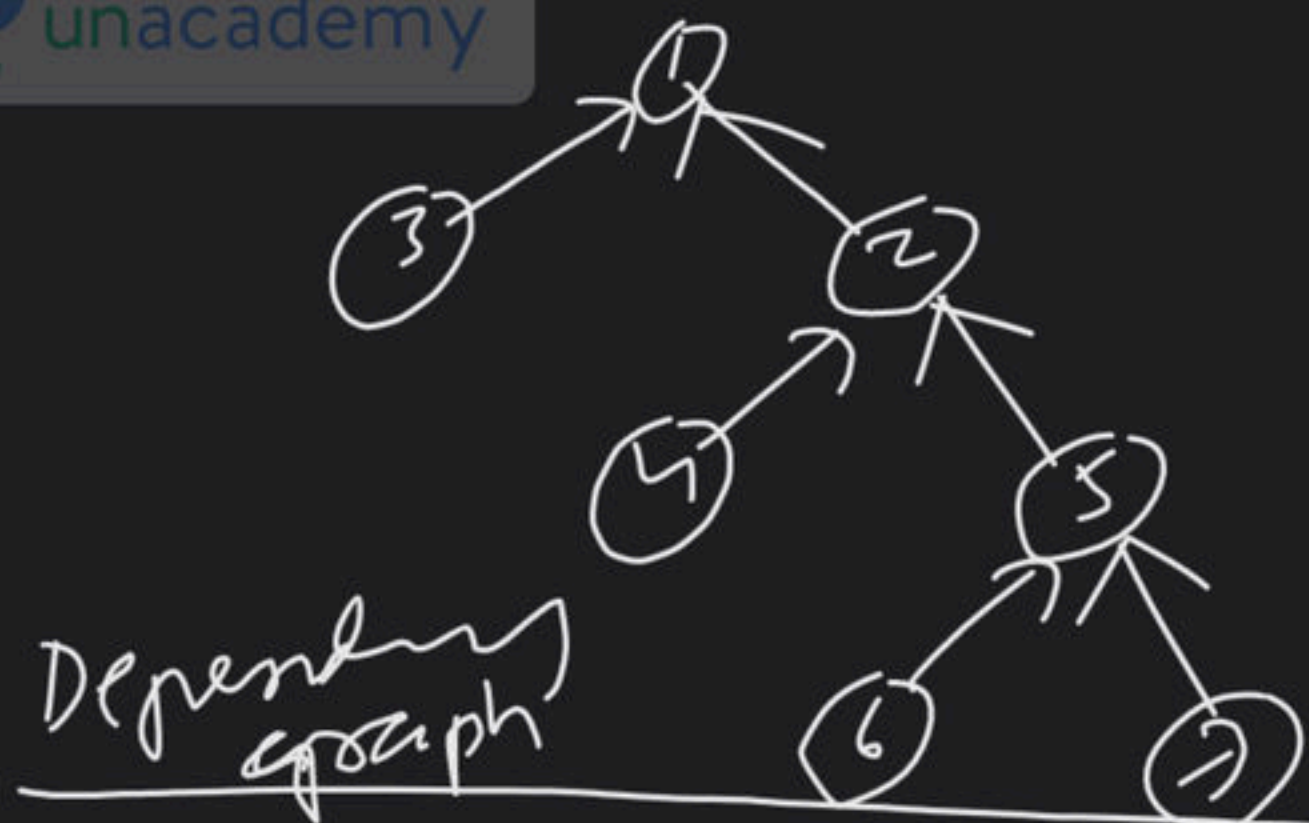


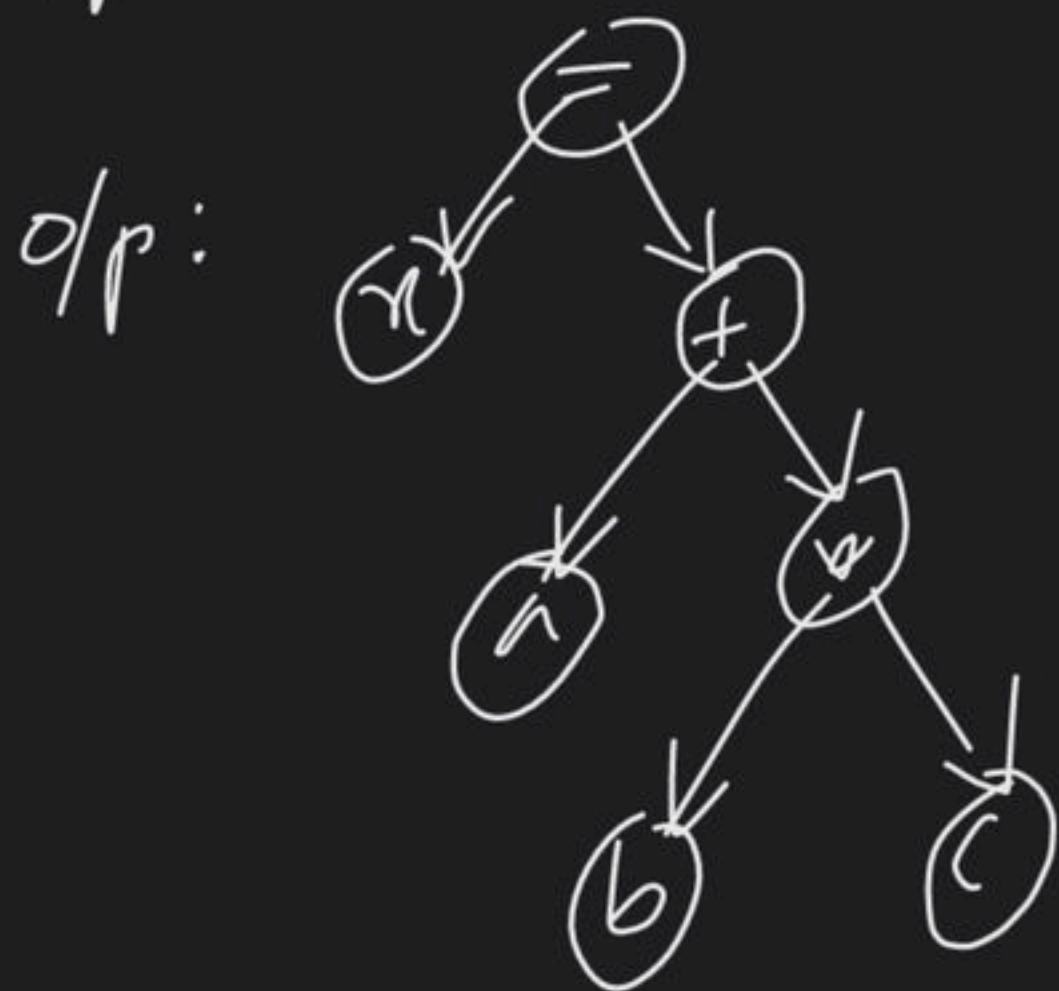
Intermediate Code Generation

Complete Course on Compiler Design





i/p: $x = a + b * c$



Syntax-Tree

~~6, 7, 5, 4, 3, 2, 1~~
~~3, 4, 6, 7, 5, 2, 1~~

$S \rightarrow F = E$

$E \rightarrow E_1 + T$

$T \rightarrow T_1 * F$

$T \rightarrow T_1 * F$

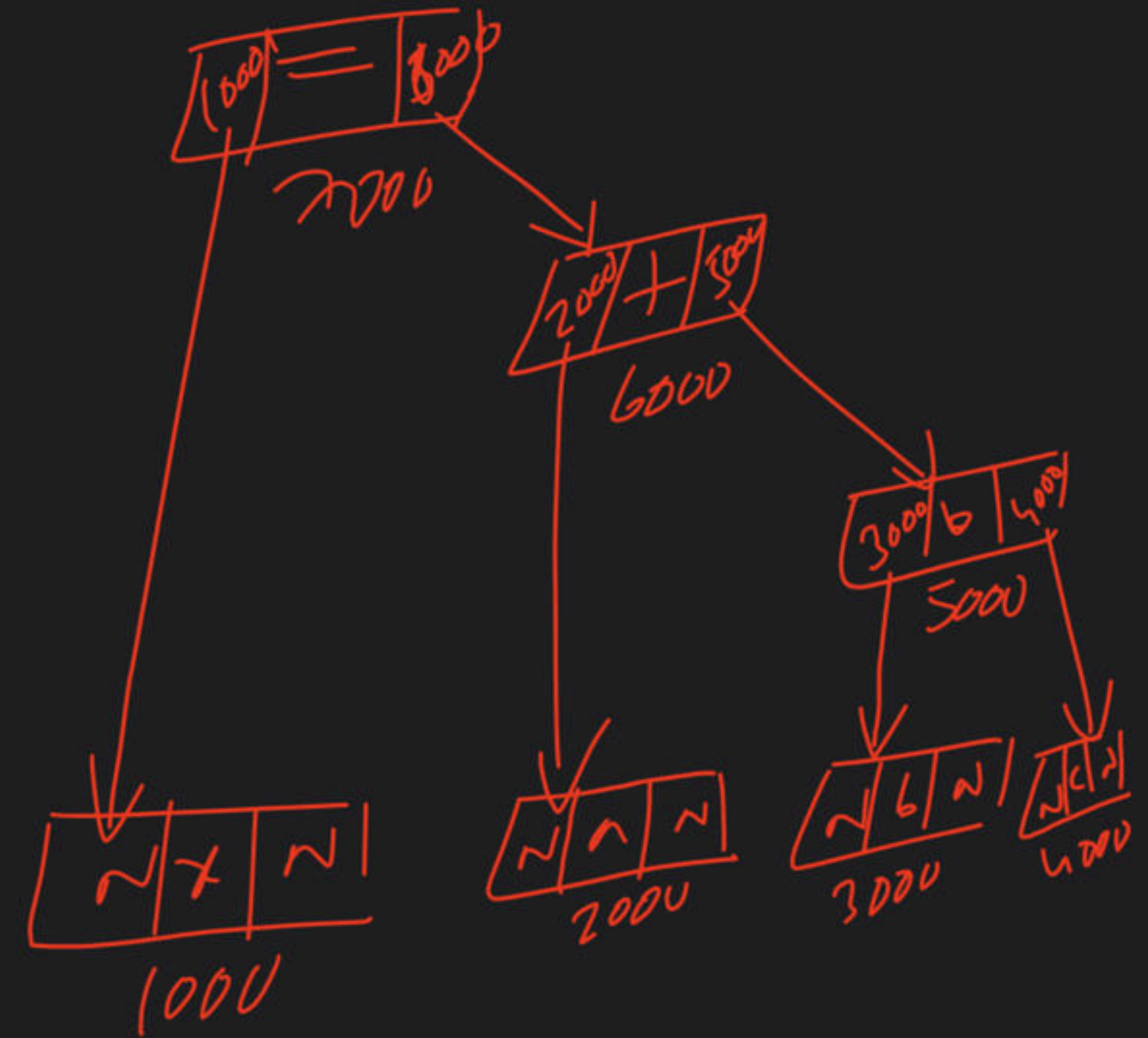
$F \rightarrow id$

$F \rightarrow id$

for it



Parse-Tree



ex Construct SDT to generate Intermediate code for the given A.P.

⇒ i/p: $x = a + b * c$

o/p: $t_1 = b * c$

$t_2 = a + t_1$

$x = t_2$

$S \rightarrow E = E$ $\left\{ \begin{array}{l} \text{gen}(F.val = E.val) \end{array} \right\}$

$E \rightarrow E_1 + T$ $\left\{ \begin{array}{l} E.val = \text{NewTemp} \\ \text{gen}(E.val = E_1.val + T.val) \end{array} \right\}$

$T \rightarrow T_1 * E$ $\left\{ \begin{array}{l} E.val = T_1.val \\ T.val = \text{NewTemp} \\ \text{gen}(T.val = T_1.val * E.val) \end{array} \right\}$

$T \rightarrow F$ $\left\{ \begin{array}{l} T.val = F.val \end{array} \right\}$

$F \rightarrow id$ $\left\{ \begin{array}{l} F.val = id \end{array} \right\}$



consider the following SDT

$$\begin{aligned}
 S &\rightarrow id = E \quad \left\{ \begin{array}{l} \text{gen}(id = E.val) \end{array} \right\} \\
 E &\rightarrow E_1 + E_2 \quad \left\{ \begin{array}{l} E.val = \text{newtemp}() \\ \text{gen}(E.val = E_1.val + E_2.val) \end{array} \right\} \\
 &\quad | id \quad \left\{ \begin{array}{l} E.val = \text{newtemp}() \\ \text{gen}(E.val = id) \end{array} \right\}
 \end{aligned}$$

i/p: $x = a + b + c$

o/p:

$t_1 = a$

$t_2 = b$

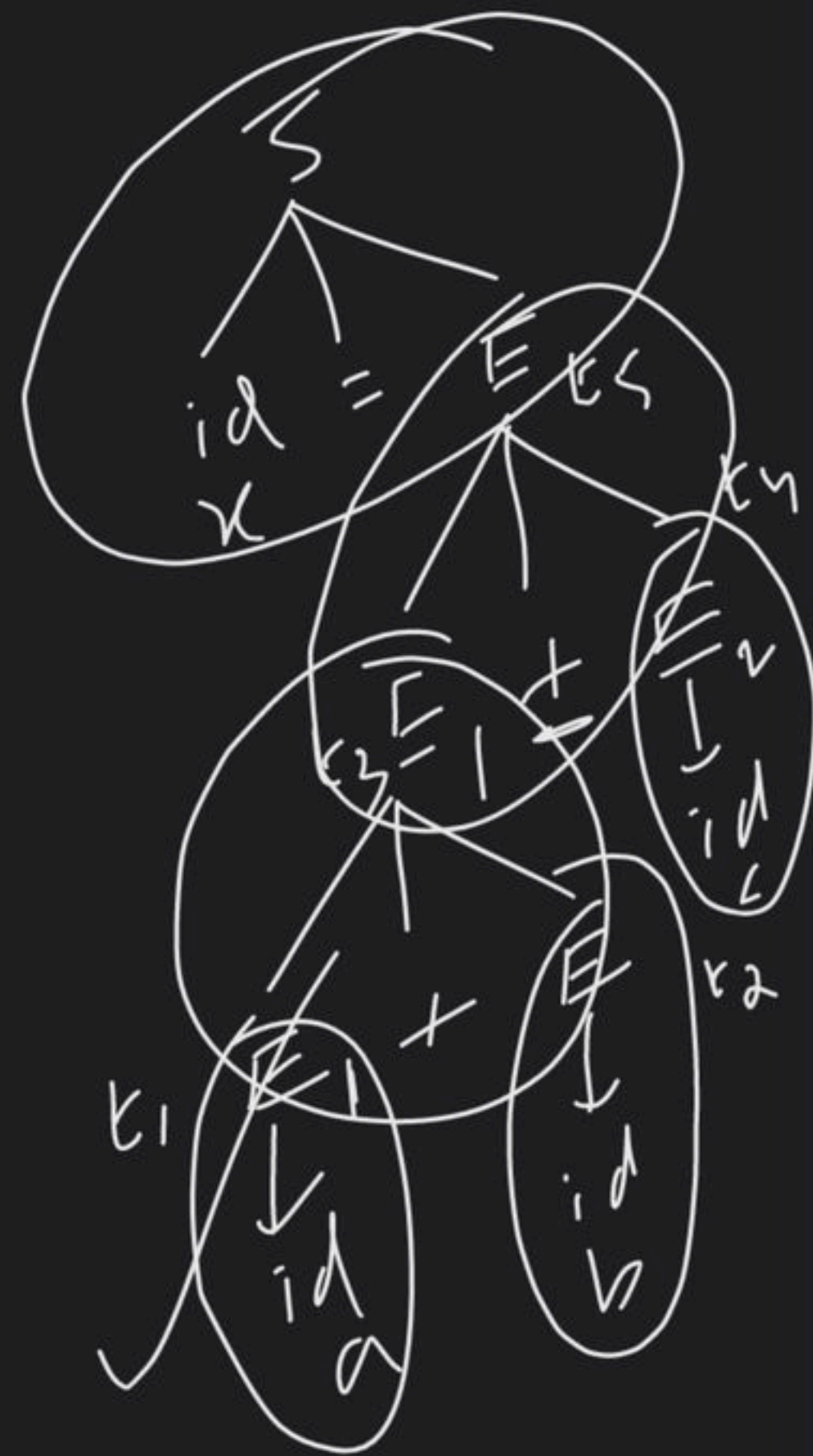
$t_3 = t_1 + t_2$

$t_4 = c$

$t_3 = t_3 + t_4$

$x = t_3$

(assume L to R associativity)



Construct SDT to store type information into Symbol table.

i/p: int x, y, z;

o/p:

S.N	V.T	V.N
1	int	z
2	int	y
3	int	x

Symbol Table.

$S \rightarrow D V ;$ $V.type = D.type$

$D \rightarrow \text{int} \{ D.type = \text{int} \}$
 $\quad \text{float} \{ D.type = \text{float} \}$
 $\quad \text{char} \{ D.type = \text{char} \}$

$V \rightarrow V_1 id \{ \text{add_type}(V.type, id) \}$
 $\quad \quad \quad V_1.type = V.type$
 $\quad \text{id} \{ \text{add_type}(V.type, id) \}$

