→ before we start seeing D we will do the tasks

$P \rightarrow \{ of = 0 ; tab = newTable(); \} D \{ p.table = tab \}$

$D \rightarrow \varepsilon$

$D \rightarrow T \; id \; ; \{ tab.insert(id.lexeme, \{T.type, T.width, of\}) \; of = of + T.width; \}$ (lexeme = key, {T.type, T.width, of} = value)

D_1

$T \rightarrow B$

$C \quad \{ T.type = C.type, T.width = C.width \}$

$B \rightarrow int \quad \{ t = int ; w = 4 \}$

$B \rightarrow float \quad \{ t = float, w = 8 \}$

$C \rightarrow [num]$

$C_1 \quad \{ C.type = array(num.value, C_1.type); \; C_1.width = num.value \times C_1.width; \}$

$T \rightarrow record \{ \{ ost.push(of); tst.push(tab); of = 0 ; tab = new Table(); \}$

D

$\} \quad \{ T.width = of ; T.type = tab ; of = ost.pop(); tab = tst.pop() \}$

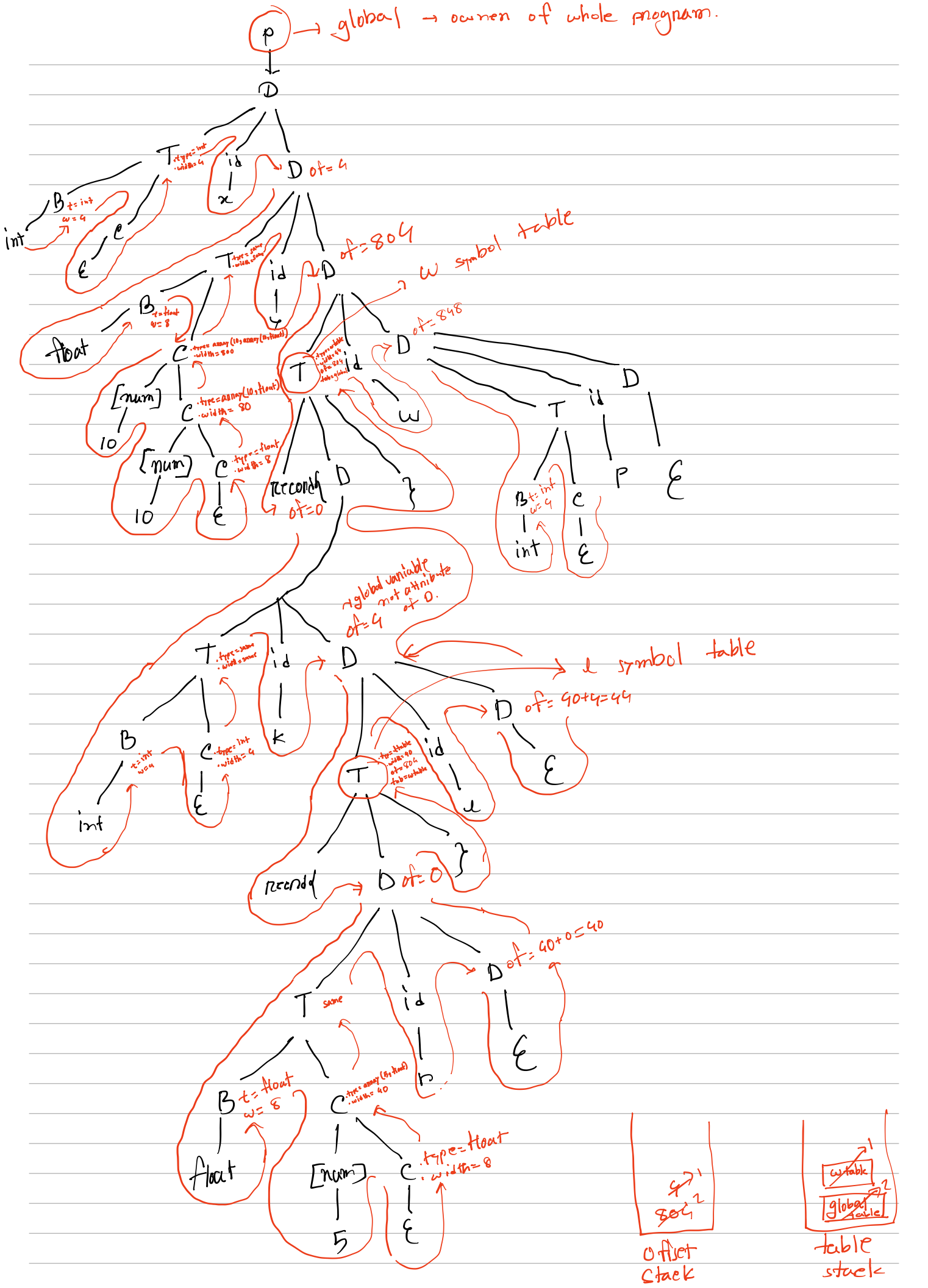
$C \rightarrow \varepsilon \quad \{ C.type = t, C.width = w \}$

Here x, y, w & p are in global scope.

k & l are part of w symbol table.

n will be in l symbol table.

```
int x ;
float [10][10] y ;
record {
    int k;
    record {
        float [5] n ;
    } l ;
} w ;
int p;
```


P → global → owner of whole program.
D
T type=int width=4
B t=int w=4
int
ε
id
x
D of=4
C type=array(10,array(20,float)) width=800
float
[num]
10
C type=array(10,float) width=80
C type=float width=8
ε
T type=float width=8
id
y
D of=804
w symbol table
T type=table width=0 of=824 table=global
id
w
D of=848
T
id
P
ε
record
D of=0
}
global variable not attribute of D.
of=4
k symbol table
D of=40+4=44
T type=table width=40 of=804 table=outable
id
t
record
D of=0
T same
id
b
D of=40+0=40
C type=array(5,float) width=40
[num]
5
C type=float width=8
offset stack
table stack
outtable
global table

To make symbol table we need to store type, width & offset for each entry & name is the key of the hashtable.

we need some global variables;

tab ← table: a hashtable for symbols

tst ← tabstack: For storing tables

of ← offset: An integer for tracking begining position for variables in memory

ost ← offsetStack: for storing offsets.

t ← type: for current variable type

w ← width: " " " width

tab

	type	width	offset
x	int	4	0
y	array(10, array(5, float))	800	4
w	wtable	44	804

w table

k	int	4	0
l	ltable	40	4

ltable

p	array(5, float)	40	0