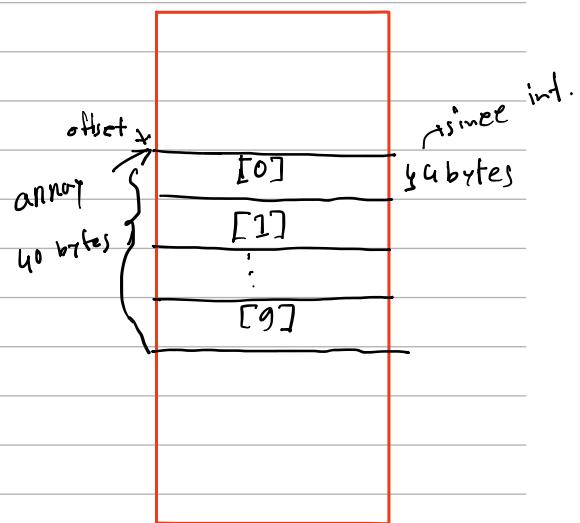


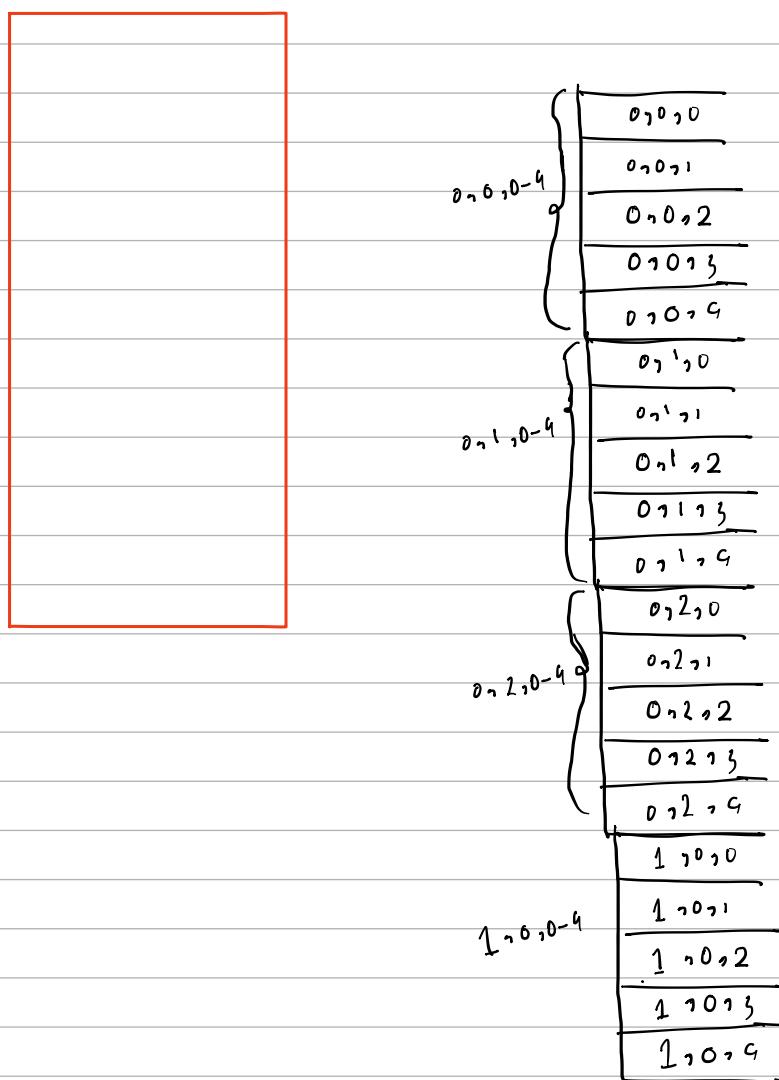
Array Addressing:

int array [10]



Float cube [2][3][5]

↑ now it is stored in RAM is decided by compiler.



slot no for $k = \text{cube}[x][y][z]$

$$x \times 3 \times 5 + y \times 5 + z \rightarrow z \text{ increases after every slot.}$$

↙ ↘
 x increases y increases
 after 15 slots after 5 slots

now we can store $i = x \times 3 \times 5 + y \times 5 + z$

$k = \text{cube}[i] \rightarrow$ equivalent to $\text{cube}[x][y][z]$

thus we can translate from 3 dimensional
to 1 dimensional.

```

S → id = E ; { gen( top.get(id.lexeme) '==' E.addr); }
| L = E ; { gen( L.addr.base '==' L.addr '==' E.addr); }

E → E1 + E2 { E.addr = new Temp(); gen(E.addr '==' E1.addr '+' E2.addr); }
| id { E.addr = top.get(id.lexeme); }
| L { E.addr = new Temp(); gen(E.addr '==' L.array.base '==' L.addr); }

L → id [ E ] { L.array = top.get(id.lexeme);
L.type = L.array.type.elem;
L.addr = new Temp();
gen(L.addr '==' E.addr '==' L.type.width); }

| L1 [ E ] { L.array = L1.array;
L.type = L1.type.elem;
t = new Temp();
L.addr = new Temp();
gen(t '==' E.addr '==' L.type.width);
gen(L.addr '==' L1.addr '==' t); }

```

int cube [10][20][30]; ↑ array declaration
array (10, array (20, array (30, int)))

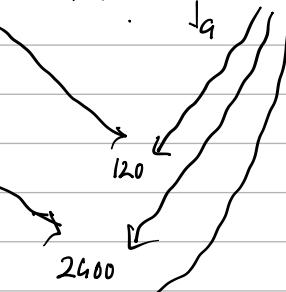
$a = \text{cube}[w+k][v][k+e];$

array (10, array (20, array (30, int)))

a_3

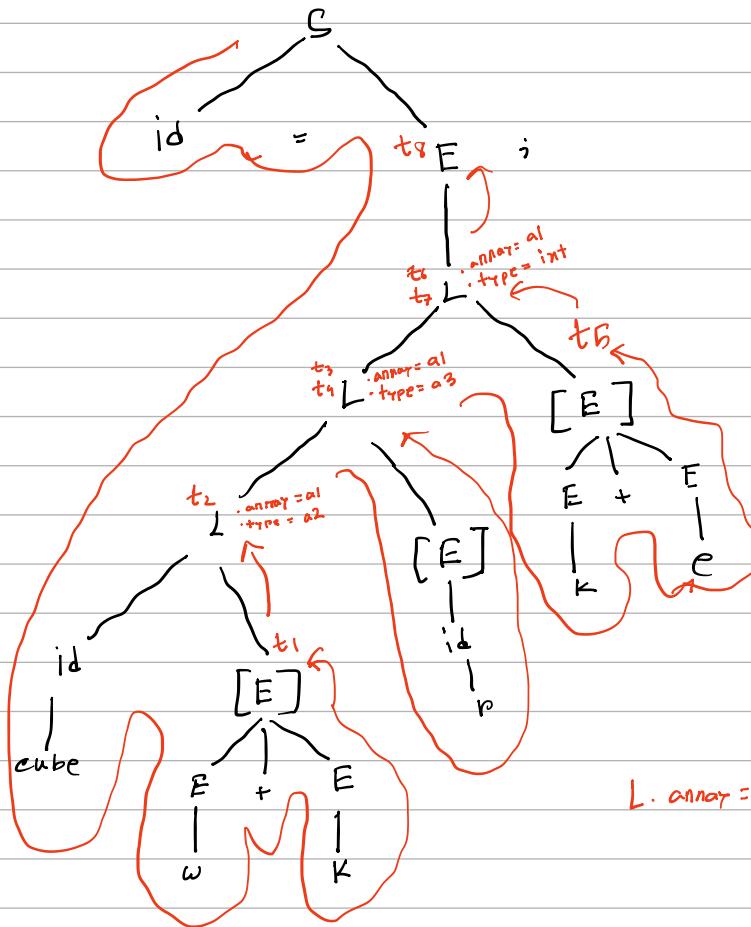
a_2

a_1



width

Loadness \rightarrow is the offset,
where we are going



$\text{cube}[i]$
base address offset

$L.\text{array} = \text{top.get(id, lexeme)}$
the whole row of the
symbol table.

$L.\text{type} = L.\text{array.type, elem}$
type \Rightarrow element

whole now \Rightarrow type (2400)
or elem (120)

$L.\text{array, base}$

offset in the
symbol table which
is the beginning
address of the variable \rightarrow cube

$$t_1 = w+k$$

$$t_2 = t_1 * 2400$$

$$t_3 = r * 120$$

$$\xrightarrow{\text{Loadness}} t_4 = t_2 + t_3$$

$$t_5 = k + e$$

$$t_6 = t_5 * 9$$

$$t_7 = t_4 + t_6 \longrightarrow t_7 = (w+k) * 2400 + r * 120 + (k+e) * 9$$

$$t_8 = \text{cube}[t_7]$$

$$x = t_8$$