SINTASSI DEI PROGRAMMI

Prog ::= Block

Block ::= { DecComlist }

DecComlist ::= Declist Comlist | Comlist

Declist ::= Dec | Dec Declist

Comlist ::= Com | Com Comlist

int y = 10;

Dec ::= Type Ide ; | Type Ide = Exp ;

int x;

con inizializzazione

Type ::= int | . . .

SEMANTICA DELLE DICHIARAZIONI

Dec ::= Type Ide ; | Type Ide = Exp ;

$$Sem_d : Dec \to P \to M \to P * M$$

x	l
	l'
	l''
	l'''

ρ

l	10

μ

```
int x = 10;
```

l locazione "LIBERA" in μ

succloc : M ⟶ loc

se succloc μ = l allora (μ l) = ⊥

l è libera in μ

$$Stm_d \quad Tx; \ell\,\mu = \ell\left[\frac{l}{x}\right]^{add},\ \mu\left[\frac{?}{l}\right]^{add}$$

dove $l = succloc\ \mu$

$$\mathrm{Sem}_d\ \top x = \ell\ ;\ \ell\ \mu = \ell\left[\frac{l}{x}\right]^{\mathrm{odd}},\ \underline{\mu\left[\frac{v}{l}\right]^{\mathrm{odd}}}$$

dove

$$l = \mathrm{succloc}\ \mu$$

$$\underline{v = \mathrm{Sem}_{\mathrm{exp}}\ \ell\ \ell\ \mu}$$

$$Sem_{dlist} : Declist \to P \to M \to P * M$$

$$Dlist ::= Dec \mid Dec\ Dlist$$

caso base •

$$Sem_{dlist}\ d\ \rho\ \mu = Sem_d\ d\ \rho\ \mu \qquad d \in Dec$$

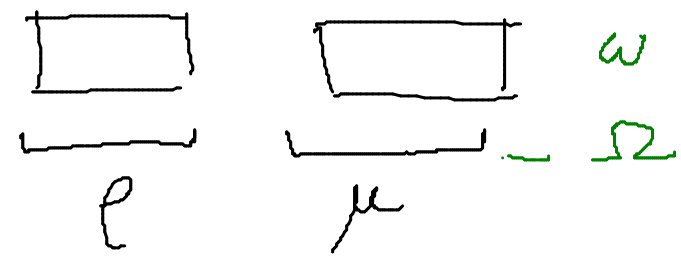
caso ricorsivo •

$$Sem_{dlist}\ d\ ds\ \rho\ \mu = Sem_{dlist}\ ds\ \rho'\ \mu'$$

dove $\langle \rho', \mu' \rangle = Sem_d\ d\ \rho\ \mu$

$$\underbrace{\texttt{int } x = 10;\ \texttt{int } y = x+2;}_{ds}$$

$d1$ $d2$



$$\text{Sem}_{dlist}\ ds\ \omega.\Omega\ \omega.\Omega$$

$$= \{\ 2^\circ \text{ caso di } \text{Sem}_{dlist}\ ,\ \underline{\text{Sem}_d\ d1\ \omega.\Omega\ \omega.\Omega = \langle \ell', \mu' \rangle}\ \}$$

$$\text{Sem}_{dlist}\ d2\ \ell'\ \mu'$$

$$= \{\ 1^\circ \text{ caso di } \text{Sem}_{dlist}\ \}$$

(*) $\underline{\text{Sem}_d\ d2\ \ell'\ \mu'}$

$$\text{Sem}_d\ \texttt{int } x = 10;\ \underline{\omega.\Omega}\ \underline{\omega.\Omega}$$

$$= \{\ \ell 1 = \text{succ to2}\ \omega.\Omega\ \}$$

$$< \underbrace{\omega\left[\tfrac{\ell_1}{x}\right]^{odd}.\Omega}_{\ell'},\ \underbrace{\omega\left[\tfrac{10}{\ell_1}\right]^{odd}.\Omega}_{\mu'} >$$

$$\mathrm{Sem}_{\mathcal{A}}\ \mathrm{int}(y) = x+2\ \underbrace{\omega\left[\frac{l1}{x}\right]^{\mathrm{add}}\cdot\Omega}_{\ell'}\ \underbrace{\omega\left[\frac{10}{l1}\right]^{\mathrm{add}}\cdot\Omega}_{\mu'}$$

$$= \left\{ \mathrm{Sem}_{\mathrm{exp}}\ x+2\ \ell'\mu' = 12\ ,\ l2 = \mathrm{succ}\mathrm{loc}\ \mu' \right\}$$

$$\ell'\left[\frac{l2}{y}\right]^{\mathrm{add}} = \left(\omega\left[\frac{l1}{x}\right]^{\mathrm{add}}\right)\left[\frac{l2}{y}\right]^{\mathrm{add}}\cdot\Omega$$

$$\mu'\left[\frac{12}{l2}\right]^{\mathrm{add}} = \left(\omega\left[\frac{10}{l1}\right]^{\mathrm{add}}\right)\left[\frac{12}{l2}\right]^{\mathrm{add}}\cdot\Omega$$

$$\left(\omega\left[\frac{l1}{x}\right]^{\mathrm{add}}\right)\left[\frac{l2}{y}\right]^{\mathrm{add}}\cdot\Omega\ ,\ \left(\omega\left[\frac{10}{l1}\right]^{\mathrm{add}}\right)\left[\frac{12}{l2}\right]^{\mathrm{add}}\cdot\Omega$$

Semi-dist int x = 10; int y = x+2; ω.Ω ω.Ω

= ℓ^{II}, μ^{II}

NOTAZIONE pag. SUCCESSIVA

$\omega\left[\begin{matrix} l1 \\ x \end{matrix}, \begin{matrix} l2 \\ y \end{matrix}\right]^{add}$

ω

Ω

y	l2
x	l1

ℓ^{II}

$\left(\omega\left[\begin{matrix} l1 \\ x \end{matrix}\right]^{add}\right)\left[\begin{matrix} l2 \\ y \end{matrix}\right]^{add}$

l2	12
l1	10

μ^{II}

NOTAZIONE

Dato un frame f

$$\left(f\left[\frac{b}{a}\right]^{odd}\right)\left[\frac{b'}{a'}\right]^{odd} =$$

$$f\left[\frac{b}{a}, \frac{b'}{a'}\right]^{odd}$$

se $a \neq a'$

COMANDI

Com ::= Ide = Exp ; | assegnamento

if (Exp) Com else Com | } condizionali

if (Exp) Com |

while (Exp) Com | iterazione

Block comando

Block ::= { DecComList }

ESEMPI

```
{  x = 10;
   y = 12;  z = x + y; }
```

blocco

```
if (x > y) z = x; else z = y;
```

if (Exp) Com else Com

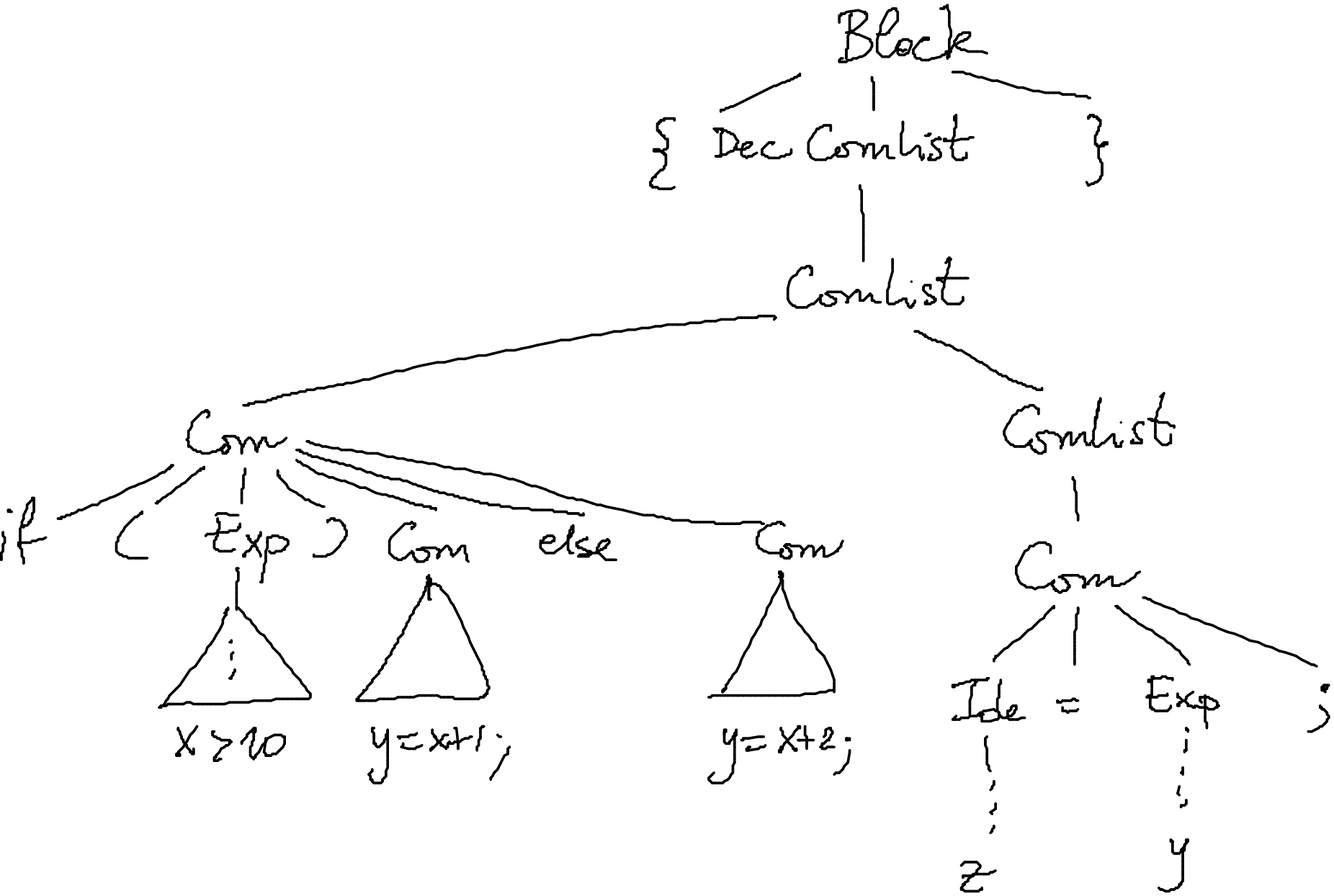
Com: Ide = Exp;

Com: Ide = Exp;

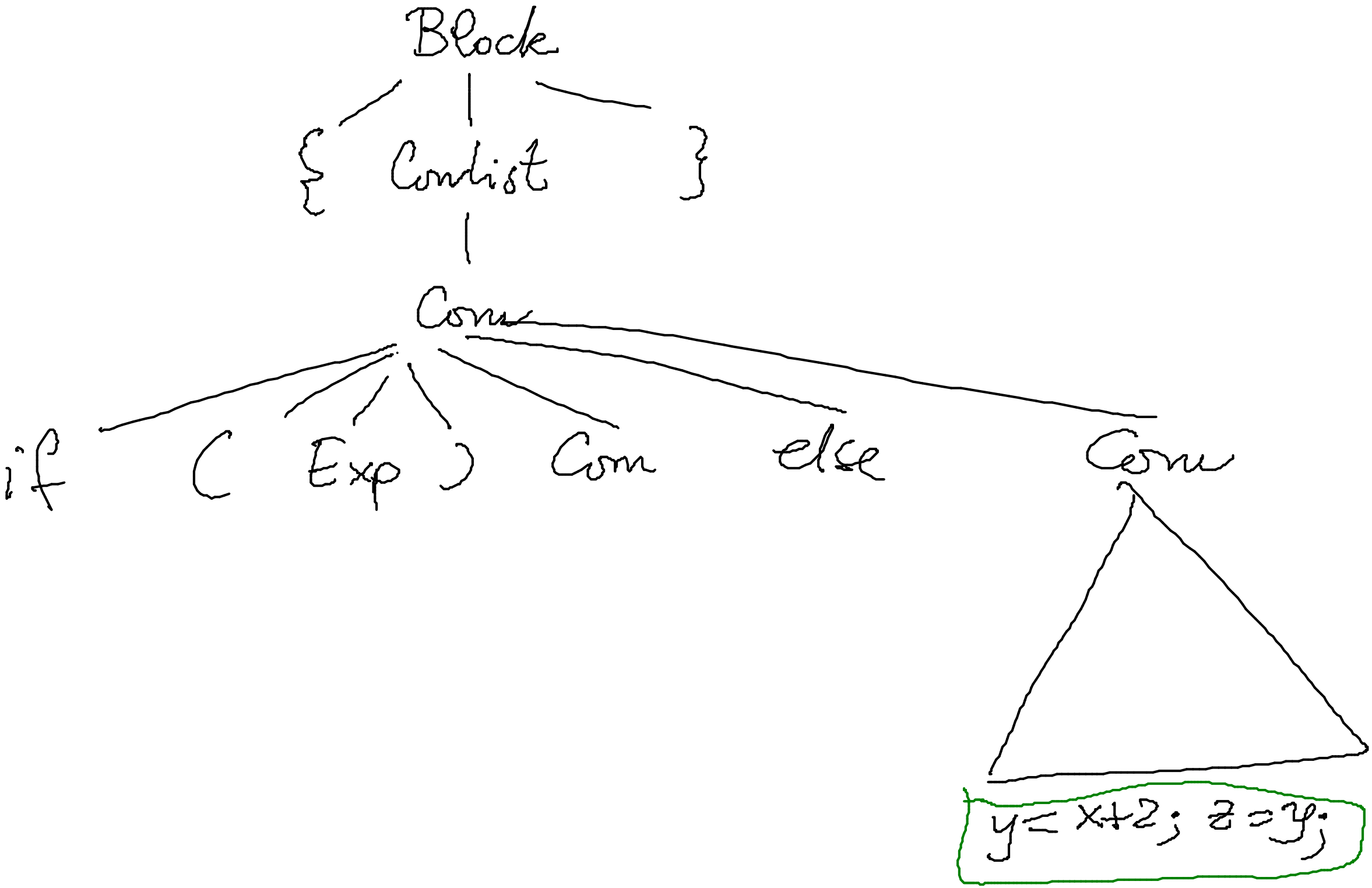
```
{ if (x>10) y=x+1; else y=x+2; z=y; }
```

{ Comlist } quanti comandi ci sono ?

- 1 3 voti
- 2 tanti voti
- 3 5 voti


Block
{
Dec
Comlist
}
Comlist
Com
Comlist
if
(
Exp
)
Com
else
Com
Com
X>10
y=x+1;
y=x+2;
Ide
=
Exp
;
z
y

Non esiste un albero di derivazione



Come faccio a eseguire una sequenza di comandi nel ramo then o nel ramo else di un condizionale ??

```
if (x>10) y=x+1; else {y=x+2; z=y;}
```

Altro esempio:

```
if (x>1) y=10; if (x>3) y=20; else y=30;
```

SEMANTICA COMANDI

$$Sem_c : Com \longrightarrow P \longrightarrow M \longrightarrow M$$

i comandi modificano solo la memoria

$$Sem_c \; c \; e \; \mu = \mu'$$

$$Sem_c \quad x = E; \quad \rho\,\mu = \mu\left[\frac{v}{\rho\, x}\right] \quad \underline{mod}$$

dove

$$v = Sem_{exp} \quad E \quad \rho\,\mu$$

$$\underline{\underline{l = \rho\, x}}$$

CONDIZIONALE

$$Sem_c\ \text{if}\ (E)\ C1\ \text{else}\ C2\ \rho\ \mu = Sem_c\ C1\ \rho\ \mu$$

$$\text{se}\ Sem_{exp}\ E\ \rho\ \mu \neq \emptyset\ (\Leftarrow \text{true})$$

$$Sem_c\ \text{if}\ (E)\ C1\ \text{else}\ C2\ \rho\ \mu = Sem_c\ C2\ \rho\ \mu$$

$$\text{se}\ Sem_{exp}\ E\ \rho\ \mu = \emptyset\ (\Leftarrow \text{false})$$

$$Sem_c\ (if\ (E)\ c)\ \rho\ \mu = Sem_c\ C\ \rho\ \mu$$

$$se\ Sem_{exp}\ E\ \rho\ \mu \neq \emptyset$$

$$Sem_c\ (if\ (E)\ C)\ \rho\ \mu = \mu$$

$$se\ Sem_{exp}\ E\ \rho\ \mu = \emptyset$$

guardia

corpo

ITERAZIONE

$$Sem_c\ \text{while}\ (E)\ C\ \rho\ \mu = \mu$$

se $Sem_{exp}\ E\ \rho\ \mu = \emptyset$

$$Sem_c\ \text{while}\ (E)\ C\ \rho\ \mu = \mu''$$

se $Sem_{exp}\ E\ \rho\ \mu \neq \emptyset$

$$Sem_c\ \underline{C}\ \rho\ \mu = \mu'$$

$$Sem_c\ \text{while}\ (E)\ C\ \rho\ \mu' = \mu''$$