Lecture #6 Data flow.

- $C(x, s, in)$ = value of x before s
- $C(x, s, out)$ = value of x after s

Rule 1: if $C(x, P_i, out) = *$ for any i

then $C(x, s, in) = *$

Rule 2: $C(x, P_i, out) = c$ &

$C(x, P_j, out) = d$ &

$d \neq c$

then $C(x, S, in) = *$

Rule 3: if $\forall i, C(x, P_i, out) = c$ or #

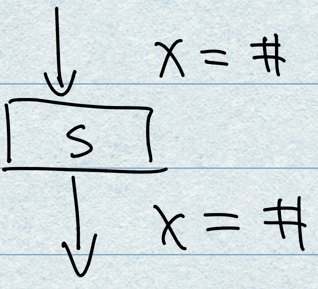
then $C(x, s, in) = c$

Rule 4: if $\forall i$, $C(x, P_i, out) = \#$

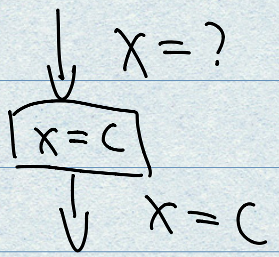
then $C(x, S, in) = \#$

$\uparrow \quad C(x, P_i, out) \longrightarrow C(x, S, in)$

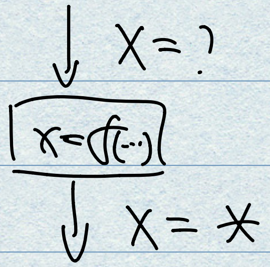
Rule 5.



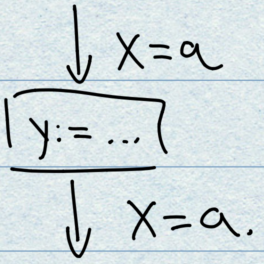
Rule 6.



Rule 7.



Rule 8.



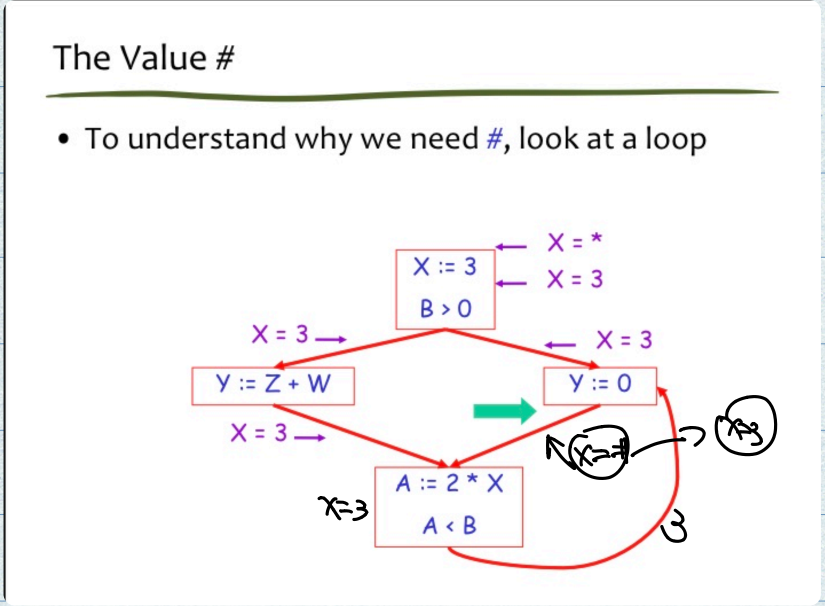
$X \neq Y$.

An Algorithm:

1. for every entry s to the program set $C(s, x, in) = *$

2. Set $C(s, x, in) = C(s, x, out) = \#$ everywhere else

3. Repeat until all points satisfy 1-8.



The Value

- To understand why we need #, look at a loop

Dynamic dispatch: get type

→ get method/ property.

Ordering.

$*$ is the greatest, # is the least.

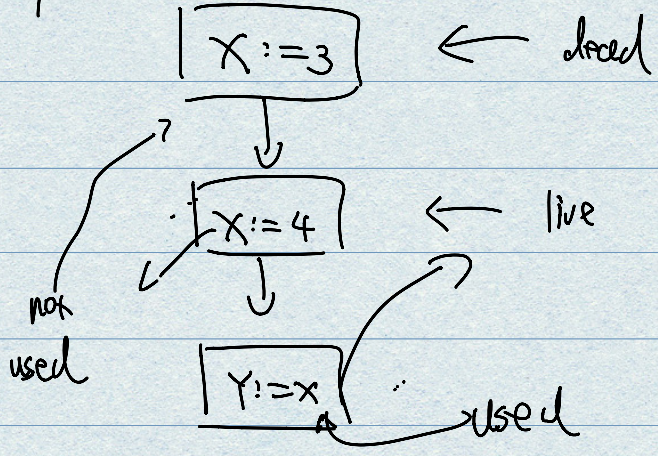
the lub be the least-upper-bound.

Rule 1-4 →

$C(x, s, in)$

$= \text{lub}\{ C(p, x, out) \mid p \text{ is a predecessor of } s \}$

Liveness Analysis.



live merged with live

→ live.