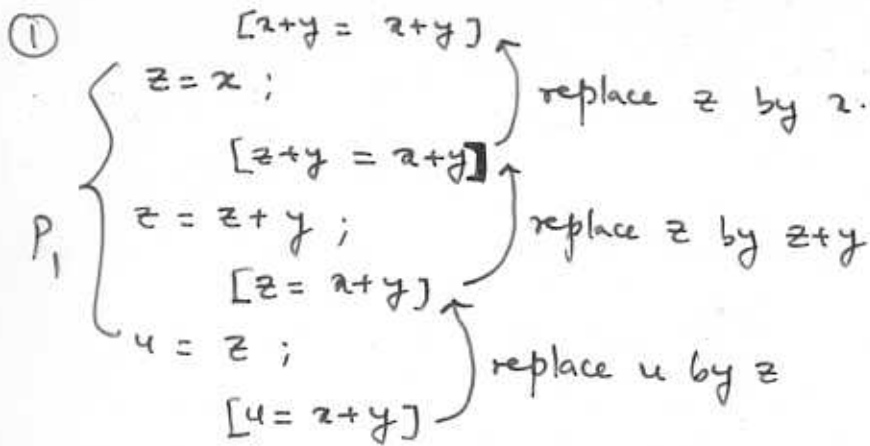
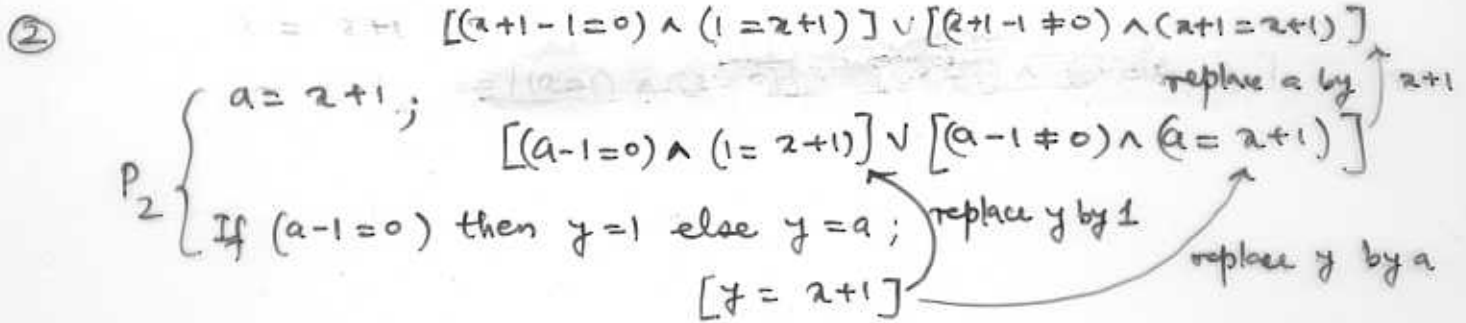


# Examples of "post-to-pre" Analysis

(40-1)



So, we obtain  $T \{P_1\} [u = z+y].$



precondition: can be simplified to:  $[a=0] \wedge [z=0] \vee [a \neq 0] \wedge T$   
 $\equiv (z=0) \vee (z \neq 0) \equiv T.$

Thus we obtain,  $T \{P_2\} [y = z+1].$

③ invariant for "If  $(z \neq 2)$  then  $z := z+1; y := y * z$ " ?

Guess:  $y = z!$

Verify:

$$[(z \neq 2) \wedge (y * (z+1) = z+1!)] \vee [(z=2) \wedge (y = z!)]$$

if  $(z \neq 2)$  then  $z := z+1; y := y * z$  replace y by  $y * z$  and z by  $z+1$ .  
 $[y = z!]$

precondition:  $[(z \neq 2) \wedge (y = z!)] \vee [(z=2) \wedge (y = z!)] \equiv [y = z!] \wedge \underbrace{[(z \neq 2) \vee (z=2)]}_T$   
 $\equiv [y = z!]$

So following holds:  $[y = z!] \{ \text{while } (z \neq 2) \text{ do } z := z+1; y := y * z \} [y = z!] \wedge [z = 2].$