$WP(\textbf{a := a+1; b:= a/2}, b \geq 0)$ **(ejercicio 2.a de la práctica)**

$WP(\textbf{a := a+1; b:= a/2}, b \geq 0) \equiv WP(\textbf{a := a+1}, WP(\textbf{b := a/2}, b \geq 0)$ — *Axioma 3*

$WP(\textbf{b := a/2}, b \geq 0) \equiv def(a/2) \wedge_L (b \geq 0)^b_{a/2}$ — *Axioma 1*
$def(a/2) \wedge_L Q^b_{a/2} \equiv \{True \wedge_L a/2 \geq 0\} \equiv \{a \geq 0\}$ — *Definiciones*

$WP(\textbf{a := a+1}, a \geq 0) \equiv def(a+1) \wedge_L (a \geq 0)^a_{a+1}$ — *Axioma 1*
$def(a+1) \wedge_L (a \geq 0)^a_{a+1} \equiv \{True \wedge_L a+1 \geq 0\} \equiv \boxed{\{a \geq -1\}}$ — *Definiciones*

$WP(\textbf{A[i] := A[i-1]}, (\forall j : \mathbb{Z})(0 \leq j < |A| \rightarrow_L A[j] \geq 0))$

$WP(\textbf{A[i] := A[i-1]}, (\forall j : \mathbb{Z})(0 \leq j < |A| \rightarrow_L A[j] \geq 0)) \equiv$
$WP(\textbf{A := setAt(A, i, A[i-1])}, (\forall j : \mathbb{Z})(0 \leq j < |A| \rightarrow_L A[j] \geq 0)) \equiv$ — *Reemplazo por setAt()*
$def(setAt(A, i, A[i-1]) \wedge_L Q^A_{setAt(A,i,A[i-1])}$ — *Axioma 1*

$def(setAt(A, i, A[i-1]) \equiv (def(A) \wedge def(i) \wedge def(A[i-1])) \wedge_L 0 \leq i < |A| \equiv$
$(True \wedge True \wedge 0 \leq i-1 < |A|) \wedge_L 0 \leq i < |A| \equiv 1 \leq i < |A|+1 \wedge_L 0 \leq i < |A| \equiv 1 \leq i < |A|$

$Q^A_{setAt(A,i,A[i-q])} \equiv (\forall j : \mathbb{Z})(0 \leq j < |A|) \rightarrow_L setAt(A, i, A[i-1])[j] \geq 0) \equiv$
$(\forall j : \mathbb{Z})(0 \leq j < |A|) \rightarrow_L (i = j \wedge A[i-1] \geq 0) \vee (i \neq j \wedge A[j] \geq 0)$

Como $i \neq j \wedge A[j] \geq 0$ implica $i = j \wedge A[i-1] \geq 0$ podemos simplificar a

$(\forall j : \mathbb{Z})(0 \leq j < |A| \wedge i \neq j) \rightarrow_L A[j] \geq 0$

Juntando todo tenemos

$WP(\textbf{A[i] := A[i-1]}, (\forall j : \mathbb{Z})(0 \leq j < |A| \rightarrow_L A[j] \geq 0)) \equiv$
$\boxed{1 \leq i < |A| \wedge_L (\forall j : \mathbb{Z})(0 \leq j < |A| \wedge i \neq j) \rightarrow_L A[j] \geq 0}$

Ejercicio 4.a

$S \equiv \textbf{if}(a < 0)\ b := a\ \textbf{else}\ b := -a\ \textbf{endif}$
$Q \equiv (b = -|a|)$

$WP(S, b = -|a|) \equiv$ — *Axioma 4*
$def(a < 0) \wedge_L ((a < 0 \wedge WP(\textbf{b := a}, b = -|a|)) \vee (a \geq 0 \wedge WP(\textbf{b := -a}, b = -|a|))) \equiv$
$True \wedge_L ((a < 0 \wedge a = -|a|) \vee (a \geq 0 \wedge a = -|a|)) \equiv$ — *Axioma 1*
$((a < 0 \wedge a = a) \vee (a \geq 0 \wedge a = -a)) \equiv \boxed{True}$ — *Siguiendo la lógica*