$$(A_1, B_1)\&\&(A_2, B_2)$$

$$max(A_1 + A_2, A_1 + B_1) + B_2$$

$$= max(A_2, B_1) + A_1 + B_2$$

$$= A_2 + B_1 - min(A_2, B_1) + A_1 + B_2$$

$$= A_1 + A_2 + B_1 + B_2 - min(A_2, B_1)$$

$$(A_2, B_2)\&\&(A_1, B_1)$$

$$max(A_1 + A_2, A_2 + B_2) + B_1$$

$$= max(A_1, B_2) + A_2 + B_1$$

$$= A_1 + B_2 - min(A_1, B_2) + A_2 + B_1$$

$$= A_1 + A_2 + B_1 + B_2 - min(A_1, B_2)$$

$$(A_1, B_1)\&\&(A_2, B_2) \geq (A_2, B_2)\&\&(A_1, B_1)$$

$$-min(A_2, B_1) \geq -min(A_1, B_2)$$

$$min(A_1, B_2) \geq min(A_2, B_1)$$