Extra Credit #4

Due: March 9, 2022 **Points:** 20

Let $L = (S_L, \leq_L)$ be a lattice. Define:

1. $S_{IL} = \{[a,b] \mid a,b \in S_L \wedge a \leq_L b\}$
2. $\leq_{IL} = \{([a_1,b_1],[a_2,b_2]) \mid a_1 \leq_L a_2 \wedge b_1 \leq_L b_2\}$
3. $lub_{IL}([a_1,b_1],[a_2,b_2]) = (lub_L(a_1,a_2), lub_L(b_1,b_2))$
4. $glb_{IL}([a_1,b_1],[a_2,b_2]) = (glb_L(a_1,a_2), glb_L(b_1,b_2))$

Prove that the structure $IL = (S_{IL}, \leq_{IL})$ is a lattice.