Tyler
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Quiz 2 SS

b.)

$S' = S/I_2 \cup I_1$

$|S'|$ not smaller than $|S|$, and is also a valid set of non-overlapping intervals.

We will first start with the S that contains non-overlapping intervals. We will now remove I_2, thus the number of intervals within S' will become the $|S|-1$.

The above will still be a valid set of non-overlapping intervals.

If we now do exchange I_2 with I_1, the number of non-overlapping intervals within S' will become $|S|$.

This is still a valid set of non-overlapping intervals because any intervals that does not overlap with the interval of I_2, does not overlap with the interval of I_1, since I_1 is during the timeframe of I_2.

Since the overlap of (I_1) < overlap of (I_2) we are able to add another non-overlapping interval into our set, thus it is possible that $|S'| \geq |S|$, meaning it will never be smaller than S.