$n = 1 :$

we only have one answer $sum = |s[1] - h[1]|$

$n > 1 :$

first sort array s and h in ascending order

$s = [s_1, s_2, \ldots, s_n]$

$h = [h_1, h_2, \ldots, h_n]$

after sorting we have $s_a < s_b, h_a < h_b \ (a < b)$

Upon applying the algorithm, we have $sum = \sum_{i=1}^{n} |s[i] - h[i]|$

Proving by contradiction

Assume we can find a pair $|s_a - h_b| + |s_b - h_a| \ (a < b)$ to lower the sum

Which means $|s_a - h_a| + |s_b - h_b| \geq |s_a - h_b| + |s_b - h_a|$

$s_b - s_a = X, \ X \geq 0$

$h_b - h_a = Y, \ Y \geq 0$

$|s_a - h_a| + |s_b - h_b| = |s_a - h_a| + |s_a - h_a + X - Y|$

$|s_a - h_b| + |s_b - h_a| = |s_a - h_a - Y| + |s_a + X - h_a|$

if $s_a \geq h_a$

$|s_a - h_a| + |s_b - h_b| = s_a - h_a + |s_a - h_a + X - Y|$

$|s_a - h_b| + |s_b - h_a| = s_a - h_a + X + |s_a - h_a - Y|$

since $X + |s_a - h_a - Y| \geq |s_a - h_a + X - Y|$

Therefore $|s_a - h_a| + |s_b - h_b| \leq |s_a - h_b| + |s_b - h_a|$

which contradict with our assumption $|s_a - h_a| + |s_b - h_b| \geq |s_a - h_b| + |s_b - h_a|$

if $s_a < h_a$

$|s_a - h_a| + |s_b - h_b| = h_a - s_a + |s_a - h_a + X - Y|$

$|s_a - h_b| + |s_b - h_a| = h_a - s_a + X + |s_a - h_a - Y|$

since $X + |s_a - h_a - Y| \geq |s_a - h_a + X - Y|$

Therefore $|s_a - h_a| + |s_b - h_b| \leq |s_a - h_b| + |s_b - h_a|$

which contradict with our assumption $|s_a - h_a| + |s_b - h_b| \geq |s_a - h_b| + |s_b - h_a|$

Thus, changing any pair $s[i]$ and $h[i]$ from sorted arrays will make the sum same or bigger