Group Member Names:

Vincent Lee, Gustavo Necochea Aguayo, Emmett Lim, Andrew Arsenault

Algorithm 1 Pseudocode:

def in_place_selection_sort(U):
<unsorted zone> = u
<sorted zone> = empty
<swap_counter> = 0
while <unsorted zone> is not empty:
least_index = <index of smallest element in unsorted zone>
<swap u[least_index] to the end of the unsorted zone>
<remove the least element from the unsorted zone>
<add the least element to the sorted zone>
<swap_counter> = swap_counter + 1
return <swap_counter>

Proving Efficiency for Pseudocode:

Step 1: Label Variables

T(n) = Function to represent the logic of Algorithm 1
f(n) = informed guess about efficiency class of Algorithm 1

Step 2: Fill in Variables

T(n) = 2n
f(n) = n

Step 3: Prove T(n) ε f(n) using limits

$\lim_{n \to \infty} T(n)/f(n) = \lim_{n \to \infty} 2n/n$

$\lim_{n \to \infty} T(n)/f(n) = 2$

Which is non negative and constant with respect to n. Therefore 2n ε O(n)