1. In the list below, \( i \) passes of the selection sort algorithm have been completed, and the double bar separates the sorted part of the list from the unsorted part.

\[
\begin{array}{c|c}
\text{sorted} & \text{unsorted} \\
\hline
1 & \text{\ldots} \\
\end{array}
\]

(a) \textit{get\_index\_of\_smallest}(L, \( i \)) works by comparing pairs of items from the unsorted section. If there are \( n \) items in \( L \), when \textit{get\_index\_of\_smallest}(L, \( i \)) is executed, how many pairs of items are compared? (Your answer should be a formula involving \( n \) and \( i \)).

\[ n = \text{len}(L) \]

(b) For function \textit{get\_index\_of\_smallest}(L, \( i \)), is there a worst case and a best case?

No! Same \# of comparisons, regardless of properties of the list.

(c) In terms of the number of items in the unsorted section, does \textit{get\_index\_of\_smallest} have constant running time, linear running time, quadratic running time, or some other running time?

(a) constant \quad (b) linear \quad (c) quadratic \quad (d) something else

(d) In function \textit{selection\_sort}, the first time that function \textit{get\_index\_of\_smallest} is called, \( i \) is 0; the second time, \( i \) is 1; and so on. What value does \( i \) have the last time that function \textit{get\_index\_of\_smallest} is called?

\( n - 1 \)

(e) For the call \textit{selection\_sort}(L), write a formula expressing how many \textit{comparisons} are made during all the calls to \textit{get\_index\_of\_smallest}.

\[
\begin{align*}
i = 0 & \quad \rightarrow \quad n - 0 - 1 \quad \rightarrow \quad n - 1 \\
i = 1 & \quad \rightarrow \quad n - 1 - 1 \quad \rightarrow \quad n - 2 \\
i = 2 & \quad \rightarrow \quad n - 2 - 1 \quad \rightarrow \quad n - 3 \\
& \vdots \\
i = n - 2 & \quad \rightarrow \quad n - (n - 2) - 1 \quad \rightarrow \quad 1 \\
i = n - 1 & \quad \rightarrow \quad n - (n - 1) - 1 \quad \rightarrow \quad 0
\end{align*}
\]

\[ \sum \frac{n(n-1)}{2} \]

(f) In terms of the length of the list, does \textit{selection\_sort} have constant running time, linear running time, quadratic running time, or some other running time?

(a) constant \quad (b) linear \quad (c) quadratic \quad (d) something else