Problem 1
Derive the recurrence equation of the following sorting algorithm, providing a thorough explanation on the process used. Solve the equation using the Recursion-tree method.

RecSort(A, start, end){
    if (start == end){
        return A;
    }
    MinIndex = start;
    MinValue = A[start];
    for (i = start; i <= end; i++){
        if (MinValue < A[i]){  
            MinValue = A[i];
            MinIndex = i;
        }
    }
    App = A[start];
    A[start] = MinValue;
    A[MinIndex] = App;
    return RecSort(A, start+1, end);
}

Algorithms 2500 – Section 1A
Homework 1
Due date: 09/17/2014

Student: ________________________________

Grading criteria

<table>
<thead>
<tr>
<th>Category of assessment</th>
<th>1 - Inadequate</th>
<th>2 – Needs Improvement</th>
<th>3 - Adequate</th>
<th>4 - Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logic</td>
<td>The student’s argument fails to address the statement of the Problem.</td>
<td>The student understands what needs to be done, but cannot find adequate statements which would logically do the problem.</td>
<td>The student understands the statement of the problem but fails to complete the argument to form a correct solution.</td>
<td>The student provides a logically sound solution</td>
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<tr>
<td>Performance</td>
<td>0-5</td>
<td>5-6.5</td>
<td>6.5-8.5</td>
<td>8.5-10</td>
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<td>Problem 1</td>
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<td>Problem 2</td>
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Problem 2

Solve the following recurrence using the Master theorem and the Recursion-tree method. Provide a detailed explanation of the application of each method.

\[
T(n) = \begin{cases} 
11T\left(\frac{n}{11}\right) + \mathcal{O}(n) & \text{if } n > 1 \\
\mathcal{O}(1) & \text{if } n = 1
\end{cases}
\]