CSC236 Tutorial Exercises, Mar 2/3

Here are your tutorial sections:

<table>
<thead>
<tr>
<th>Surname</th>
<th>Time</th>
<th>Room</th>
<th>TA</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-K</td>
<td>Thursday 6-7pm</td>
<td>BA2145</td>
<td>Ethan</td>
</tr>
<tr>
<td>L-R</td>
<td>Thursday 6-7pm</td>
<td>BA2155</td>
<td>Zach</td>
</tr>
<tr>
<td>S-Z</td>
<td>Thursday 6-7pm</td>
<td>BA2175</td>
<td>Ekanh</td>
</tr>
<tr>
<td>A-H</td>
<td>Friday 11am-12pm</td>
<td>UC85</td>
<td>Wen</td>
</tr>
<tr>
<td>I-R</td>
<td>Friday 11am-12pm</td>
<td>UC87</td>
<td>Zach</td>
</tr>
<tr>
<td>S-Z</td>
<td>Friday 11am-12pm</td>
<td>UC144</td>
<td>Ryan</td>
</tr>
</tbody>
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These exercises are to give you practice proving correctness of recursive algorithms.

1. A non-empty array \( A \) with integer entries has the property that no odd number occurs at a lower index than an even number. Consider the following algorithm for finding the highest index of an even element between indices \( b \) and \( e \), inclusive, or \( b-1 \) if \( A \) has no elements that are even numbers.

\[
\text{recHighestEven}(A, b, e):
\]

\[
\text{if } b == e:
\]

\[
\text{if } A[b] \% 2 == 0: \text{ return } b
\]

\[
\text{else: return } b - 1
\]

\[
\text{else:}
\]

\[
\text{m = (b + e) } // 2
\]

\[
\text{if } A[m+1] \% 2 == 1:
\]

\[
\text{return recHighestEven}(A, b, m)
\]

\[
\text{else:}
\]

\[
\text{return recHighestEven}(A, m+1, e)
\]

(a) State preconditions and postconditions for this algorithm.

(b) Prove the algorithm is correct by showing that (preconditions) \( \rightarrow \) (termination \( \land \) postconditions).