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Design and Analysis of Algorithms (CSC311) - Spring 2017

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Tutorial 7 (Analysis of Algorithms) Thu. Apr. 20th, 2017

1. Consider the following recursive algorithm.

```
Algorithm 1 Min1(A[0..n-1]) \triangleright Input: An array A[0..n-1] of real numbers

1: if n=1 then
2: return A[0]
3: else
4: temp \leftarrow Min1(A[0..n-2])
5: if temp \leq A[n-1] then
6: return temp
7: else
8: return A[n-1]
9: end if
```

- (a) What does this algorithm compute?
- (b) Set up a recurrence relation for the algorithm's basic operation count and solve it.
- Consider another algorithm for solving the same previous problem which recursively divides an array into two halves.

```
Algorithm 2 \operatorname{Min2}(A[l..r]) \triangleright Input: An array A[0..n-1] of real numbers

1: if l = r then
2: return A[l]
3: else
4: temp1 \leftarrow \operatorname{Min2}(A[l..[(l+r)/2]])
5: temp2 \leftarrow \operatorname{Min2}(A[[(l+r)/2]+1..r])
6; if temp1 \leq temp2 then
7: return temp1
8: else
9: return temp2
10: end if
11: end if
```