Homework 3

Foundations of Algorithms

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1. Electronic Submission
2. Consider the following inputs:

Since and

So,

search (<2, 4, 6>, 8) = searchHelp (<2, 4, 6>, 8; 0, 2) 0 2 1

= searchHelp (<2, 4, 6>, 8; 1, 2) 1 2 1

= searchHelp (<2, 4, 6>, 8; 1, 2) 1 2 1

= searchHelp (<2, 4, 6>, 8; 1, 2) 1 2 1

= … . . .

= … . . .

Since the values of , and are the same in every iteration after the first iteration this will lead into an infinite loop.

1. a. ,

The ten sums are

The seven products are

The final Matrix elements are: -

The final matrix is: -

b. The functional pseudo code is as follows: -

Output C

c.

d.

e. Given that:

Assuming

Substituting

Hence

f. Assuming

Now, we must extend original matrices to matrices by adding

zeros for the Strassen's algorithm to work on next matrix.

To remove all the zeroes we need

Since it implies that .

Therefore the runtime becomes is

g. The three multiplications are

The complex number is then achieved by



a. For every even there exists a such that

since

For every odd there exists a such that +1

since +1

Hence for every

b. For every even there exists a such that

since

For every odd there exists a such that +1

since

Hence for every

c. Let . Prove that .

So,

d. Proof: -

Observe:

Assume for,

From 4c. we know that

Suppose for any and

e.

Since

f.

5.Electronic Submission

6.Electronice Submissions