Integer multiplication in time $O(n \log n)$
DD2467 Individual Project in TCS

Marcus Östling

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1 Project plan

The purpose of this project is to a implement the algorithm presented in the paper "Integer multiplication in time $O(n \log n)$" by David Harvey and Joris van der Hoeven, and then compare it to a simple integer multiplication using a FFT in one dimension.

1.1 Decide on parameters (week 51)

The new algorithm have a couple on parameters that I have to decide on. These parameters will be chosen so that it is possible to run the algorithms on 8 GB of ram. Input sizes, output size, intermediate results and some space for the OS as well.

1.2 Implement simple FFT multiplication (week 52)

Implement a simple FFT integer multiplication, imiliar to Schönhage-Strassen,. Given two integers, split them up into coefficients for a polynomial, use FFT, apply pointwise multiplication, inverse FFT back into one integer.

1.3 Implement new algorithm (week 1-3)

This algorithm is inspired by Schönhage-Strassen: Given two integers, split them up into coefficients for a polynomial, use the algorithm given by the paper, convert back into one integer.

1.4 Run algorithms and compare (week 4)

Run both algorithms on the same inputs, up to large integer (size will be decided during week 51), and measure their run-times.

1.5 Run algorithms and compare (week 5-6)

All results should be done and I will write a complete report for the project.