332:573 – Data Structures & Algorithms

Project Report

Improvements to Polynomial Multiplication Through Fast Fourier Transforms

By David Lambropoulos, Demetrios Lambropoulos

Professor Shantenu Jha
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Rutgers University
School of Engineering

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1 Introduction/Motivation

Polynomials are expressions built up of a combination of constants c and symbols called variables. Polynomials with a single indeterminate x can always be written in the form

$$a_n x^n + a_{n-1} x^{n-1} + ... + a_2 x^2 + a_1 x + a_0$$

where $a_0, ..., a_n$ are constants and x is the indeterminate variable. Polynomials can also be expressed in the following canonical form

$$\sum_{k=0}^{n} a_k x^k$$

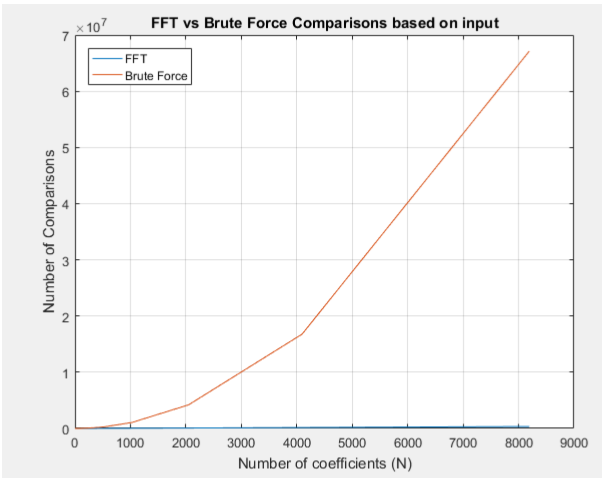
Each term in a polynomial is product of some constant called the coefficient of the term and indeterminate raised to a nonnegative integer power n (i.e.$n \in \mathbb{Z}^+$). Polynomials are used in many fields to represent problems or model behavior such as Chemistry, Physics, Economics, Social Scientists, Calculus, Numerical Analysis, etc.

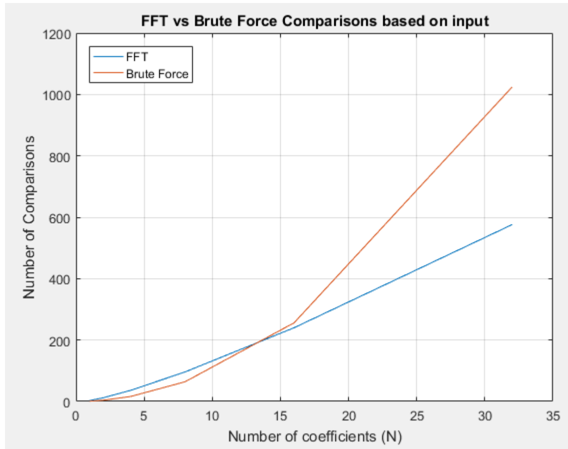
The way polynomials are multiplied is through a method called First, Outer, Inner, Last (FOIL)

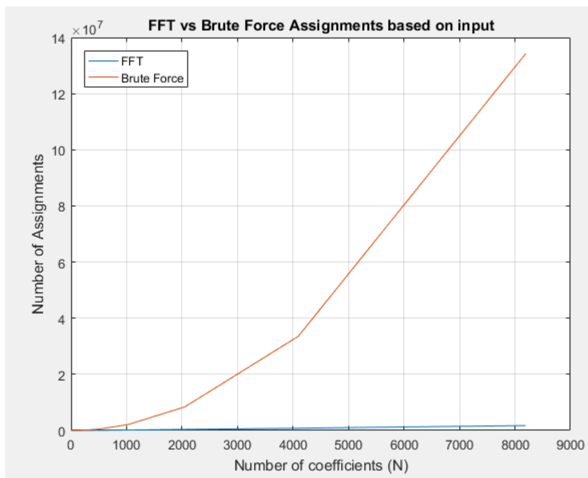
2 Algorithms/Theory

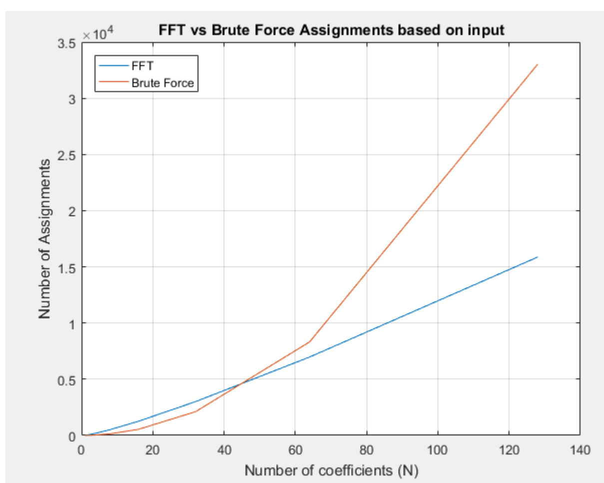
3 Experimental Setup

4 Results and Analysis









5 Discussion

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References

[1] "test," 2017. test.