Input Size	Iterative time(milliseconds)	Recursive time(milliseconds)	Iterative Operations	Recursive Operations
1	0	0	3	3
2	0	0	24	39
4	0	1	192	345
8	0	3	1536	2703
16	0	10	12288	20073
32	4	38	98304	145119
64	5	138	786432	1034265
128	5	1033	6291456	7313583
256	50	4503	50331648	51489993
512	368	33551	402653184	361609599
1024	4818	228239	3221225472	2535985785

The above table displays the statistics of iterative and recursive algorithms for sizes of 2^n varying from 1 to 1024 of our code execution. To calculate the total operations, we count multiplication as equivalent to performing addition two times.

Hardware specification of the machine on which the code was run:

RAM : 8GB

Processor: Intel(R) Core(TM) i5-4210U CPU @ 1.70GHz

CPU Type : 64Bit Windows Operating system

How to conduct an experiment to compare two algorithms.

The code that is written compares Strassens' recursive multiplication algorithm and iterative multiplication algorithm. In this code, we run both the algorithms for various input and measure the number of operations (addition and multiplication) performed & time taken by each of the algorithms.

By measuring the number of operations performed by each of the algorithm, we make the analysis independent of the machine on which the analysis was done. This is because, for a given algorithm all the machines perform the same number of operations.

It is also important to specify the hardware configuration (RAM, processor,64 or 32 bit CPU) while performing the experiment as the time taken varies with different hardware of the machines used.

In the attached code, we run the algorithm for the following input sizes and we found that strassens multiplication did lesser operations for input size 512*512.

However, the time taken by strassens was much higher than iterative method. This could be because of the overhead incurred by the recursive calls (which was not accounted for in the equation).

How to run the code?

Copy Main.java and Matrix.java to the same location.

Compile the java files using the command:

$javac Main.java Matrix.java

Run the Main.java file using the below command.

$java Main

The program will output run time values, number of operations performed etc for values of n from 1 to 1024.