

CS222: Assignment 8 - Strassen's matrix multiplication

1. Submission deadline: Sunday, 18 April at 11:59 pm.
2. Take N to be a large enough natural number.
3. Follow good coding practices to gain more marks.
4. No copying among the students or from the Internet or any other source.
5. The assignment can be submitted in groups of size ≤ 3 .
6. Submit a `.cpp` file and a `.pdf` file that contains, for each n ,
the time taken for the matrix multiplication function, $n^{\log 7}$, and their ratio.
7. Write the names and roll numbers of the students at the top of each file.
8. The files should be called
`strassen_firstRollNumber_secondRollNumber_thirdRollNumber.cpp`,
`strassen_firstRollNumber_secondRollNumber_thirdRollNumber.pdf`,
9. Harsimran Singh is the TA for this assignment.

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1. (15 points) Write a function which, on an input of two $n \times n$ matrices, outputs their product using Strassen's method. Call this function for **random** 0 – 1 matrices ¹ of size $n = 2^k$, $k \in [1, N]$.

Keep a record of the running time of each call. Compare it with $n^{\log 7}$. I.e. output the running time for n , $n^{\log 7}$, and the ratio of both these values for n .

¹A 0 – 1 matrix is a matrix where the entries are allowed to be 0 or 1.