**NUST, School of Electrical Engineering and Computer Sciences**

**BSCS-5C**

**CS-213 Advanced Programming**

**Lab No. 01**

**Development and Analysis of Matrix Multiplication Algorithms**

**15th September, 2016**

**Reg. No. 124494**

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**Introduction:**

There are different ways to multiply two matrices. One can either use normal iterative way, Karat Suba or Strassen method to do this. There are other ways to perform this multiplication. But this lab will cover first two ways from above mentioned Algorithms. Also this lab will demand us to use GitHub, and post our code in it.

***Approach, Running and Analysis:***

**Understanding of Lab Tasks:**

In this lab, we understood the working, function and time complexity of Matrix Multiplication methods. At first we perform multiplication by using traditional iterative method and then Strassen method. Then this lab requires us to understand how to use GitHub. What is the purpose of uploading our code on GitHub? And why it is the basic necessity in practical coding life.

**Understanding of Lab Approach:**

In Task No. 01, only 3 loops are used, due to which time complexity of this is . Approach to solve this problem was simply using 3 loops.

In Task No. 02, 7 steps are involved due to which, function becomes:

.

The purpose of this idea is to reduce the number of calls to 7. This method divides matrices into sub matrices into size N/2 X N/2. As expressed in code.

By Master Method, this comes out to be i.e. . Its time complexity is slightly less than , but it is usually not preferred. In this method we have to remember following steps:

* AHED
* Diagonals
* Last CR
* First CR

**Code:**

Code is in .cpp files