

**Assignment 03**

Second Year BS (Honours) 2020-21

Course Title: Math Lab II (Fortran), Course Code: AMTH 250

Department of Applied Mathematics, University of Dhaka

Name:**Roll No:****Group:**

[Write a FORTRAN program to solve each of the following problems. Use files for input/output unless specified otherwise. Name the files and the code according to the assignment and problem no., e.g., for problem no. Y of assignment X, input & output file names must be 'inXqY.txt' and 'outXqY.txt' respectively.]

Day-1		
1.	Write a program that takes a positive integer $n \geq 2$ from the keyboard and reads an $n \times n$ matrix. Check whether it is symmetric or not.	[5]
2.	Find the 4×4 matrix $A = [a_{ij}]$ whose entries satisfy the stated conditions: (a) $a_{ij} = i + j$, (b) $a_{ij} = i^{j-1}$ and (c) $a_{ij} = \begin{cases} 1 & \text{if } i - j > 1 \\ -1 & \text{if } i - j < 1 \\ 0 & \text{otherwise} \end{cases}$. Use a subroutine subprogram for each section.	[10]
3.	Write a program that takes a positive integer $n \geq 3$ from the keyboard and reads two $n \times n$ matrices M and N (say) from a file. Then verify the equation $(MN)^T = N^T M^T$. Write subroutine subprograms to find the product of two matrices and the transpose of a matrix.	[15]

Day-2		
4.	Given a matrix $A = \begin{pmatrix} -1 & 0 & 3 \\ 2 & 3 & -2 \\ 0 & -1 & 2 \end{pmatrix}$, then write a program to find the inverse of A (if exist).	[15]
5.	Write a program to solve the following system of equations using the Gaussian elimination method. $2x - y + 3z + 4u = 9$ $x - 2z + 7u = 11$ $3x - 3y + z + 5u = 8$ $2x + y + 4z + 4u = 10$	[15]

