

**INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM 695 547**

**First Year B. Tech. - Assignment Sheet
MA122-Computer Programming and Applications**

31.03.2017

Maximum Marks: 10

Assignment Sheet 12

a. Define a class *Matrix* to represent a $n \times m$ matrix \mathbf{M} . Include the following members:

1. Private members

- i. number of rows n
- ii. number of columns m
- iii. the matrix \mathbf{M}

2. Member functions

- i. a default constructor
- ii. a constructor to initialize the matrix size and elements
- iii. a function to change its private members
- iv. a function to add two matrices and set the result in a third matrix
- v. a function to multiply two matrices and set the result in a third matrix
- vi. a function to calculate the exponential of a matrix: $\exp(\mathbf{M}) = \sum_{n=0}^{\infty} \frac{\mathbf{M}^n}{n!}$.
Assume that all the elements in the matrix \mathbf{M} are between 0 and 0.1.
- vii. a function *show_matrix* to display the matrix
- viii. a destructor.

Write a program to implement the above class. Ask the user to enter n, m and \mathbf{M} . Also ask the user to chose one of the operations. Call the function *show_matrix* to display the results from the *main* function.

Program submission:

Name the programs as XXXA12Y.cpp, where XXX is the last three digits of your student id and Y is program number. For example, if the student id is 'sc17b150' and your program number is 'a' then the file name should be 150A12a.cpp. Submit the programs using ftp to the server: 172.20.2.200