**15CSE402 Structure and Interpretation of Computer Programs**

**Problem 2**

Your task is to write a set of procedures that manipulate matrices. You may like to consider the following sub-tasks as the manipulations.

1. Create a matrix of given order (*m* x *n*)
2. Add, subtract and multiply two given matrices
3. Transpose a given matrix
4. Find the determinant of a given matrix
5. Extract the diagonal elements of a given matrix
6. Identify the lower and upper triangular matrix
7. Find the rank of a given matrix and
8. Find the inverse of a given matrix.

Interestingly, *matrix* package in *math* library provides facilities to realize a good number of manipulations above. *You are not supposed to use the package*. However, **your task is to come up with your own abstraction using lists to realize the above matrix manipulations.** The quality of your solutions is accessed by

1. The data abstraction you have designed to realize matrices
2. The procedural abstractions you have designed to realize the manipulations listed above
3. The effectiveness of your abstractions to handle fringe or boundary cases.