

CS 350 Project: Design and Implement an ADT for Matrices

For this project you will design, implement in Python, and demonstrate an abstract data type (ADT) for matrices. Your design and implementation should provide an interface that fully separates the implementation from any code that uses the ADT. If the implementation were to change, code using your ADT should remain fully functional without any changes. Use Python's class mechanism to implement this ADT.

I'm assuming that you are already familiar with matrices (two dimensional tables of numbers), but will discuss them briefly in class. If you need additional help with the basic concepts, please come by and see me as soon as possible.

You have some latitude in what you choose to include or how you actually implement your design. Operations you'll what to code include:

Creation of matrices: initializing matrices including special cases such as zero matrices (all entries are zero) or identity matrices (square matrices in which all entries are zero except for one along the main diagonal).

Tests on matrices: equality of matrices, a test for identity matrices, and a test for zero matrices.

Retrieving information on matrices: number of rows and columns, individual items, rows, or columns, and displaying matrices.

Changing information in matrices: replacing individual items, etc.

Operations on matrices: matrix-matrix addition, matrix-scalar multiplication, and transpose. (Matrix-matrix multiplication, matrix inverses, and row reduction operations are for the ambitious.)

You should feel free to add to this list. Most of these operations should be very simple to write but this will take a little time and planning.

You are *strongly* encouraged to work in pairs on this project. Turn in one printed copy of your code and one complete demonstration of your code per team. You should also send me a copy of the source code as an email attachment. Each individual student should send me a brief email telling how long they worked on the project and describing any problems they encountered. The team project will be given one grade and both members will receive that grade.

Due: Friday, October 10 by the start of class. Counts as three assignments.