OBJECT-ORIENTED PROGRAMMING

2nd Homework Assignment

Due on: Monday, July 24, 2006 17:00 am

You will implement five classes, namely CTriangularMatrix, CLowerTriangularMatrix, CLowerTriangularMatrix, *CDiagonalMatrix*, and CUnitMatrix. The relationship between these classes is given below:



A matrix is called **upper-triangular** if it is in the following form

 $U_{ij} = \begin{cases} a_{i,j} & ;i \le j \\ 0 & ;i > j \end{cases}$ written explicitly as $\begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ 0 & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \dots & a_{nn} \end{bmatrix}$

A matrix is called **lower-triangular** if it is in the following form

$$U_{ij} = \begin{cases} a_{i,j} & ;i \ge j \\ 0 & ;i < j \end{cases}$$

written explicitly as

 $\begin{bmatrix} a_{11} & 0 & \dots & 0 \\ a_{21} & a_{22} & \dots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \dots & a_{nn} \end{bmatrix}$ A matrix is called **diagonal** if it is in the following form $U_{ij} = \begin{cases} a_{i,j} & ;i = j \\ 0 & ;i \neq j \end{cases}$ written explicitly as $\begin{bmatrix} a_{11} & 0 & \dots & 0 \\ 0 & a_{22} & \dots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \dots & a_{nn} \end{bmatrix}$

You will store upper-triangle, lower-triangle, and diagonal matrices in compact form such that only non-zero elements are represented.

Design the classes and decide on which members to override.

Before the submission make sure that g++ compiles the codes and the program runs smoothly. You should write a Makefile for the project.

How to submit:

- 1. Archive all files into a zip file named as *your_student_id.zip*
- 2. Use the following link to submit your homework. http://www.ce.itu.edu.tr/Members/kurt/blg332ehw2/assignment_submit_form

IMPORTANT

Academic dishonesty including but not limited to cheating, plagiarism, collaboration is unacceptable and subject to disciplinary actions. Any student found guilty will have grade F. Assignments are due in class on the due date. Late assignments will generally not be accepted. Any exception must be approved. Approved late assignments are subject to a grade penalty.