COEN 244 (Winter 2025) - Assignment 4

Deadline: April 11 by 11:59PM
Type: Group Assignment
Graduate Attribute Problem Analysis

Important notes:

- Please add the name and student ID of both partners of a group in each file.
- Please make sure that you submit both the .h and .cpp files for each class.
- All submissions must be done through Moodle.
- Assignments sent by email won't be corrected. No late submission policy.

Question 1 [50 points]:

Create a class that represents a two-dimensional integer matrix.

Overload the operators:

- Square Bracket []: Used to access individual elements of the 2D array.
- Assignment Operator (=): Used to copy arrays
- Addition (+): Can be used element-wise for matrix addition if arrays of the same size.
- Subtraction (-): For element-wise subtraction (if arrays of the same size).
- Equality (==): Compares elements in the array for equality.
- Inequality (!=): Checks if elements are not equal.

Question 2 [50 points]:

Write a function that reads from a sequential file called: 'config.txt' (an example of which is shown below). The function should read the file, one record at a time. Each record has exactly 3 fields. The first field (call it: dType) contains the string: int, float or char. The second field (call it: dSize) contains an integer number. This integer is equal to the number of elements in the third field. The third field (call it: dSeq) contains a dSize number of dType elements (e.g. 12 integers, as shown below). Define a class DataStorage with the following data members,

```
int *iPtr;
float *fPtr;
char *cPtr;
```

Each record will be stored in an object of the DataStorage class. Create an array of objects of this class to store all the records in the file as shown below,

```
DataStorage *dsPtr = new DataStorage[no_of_records]
```

We note that the number of records in the file is unknown and needs to be determined.

In any object two of the pointer data members will be initialized to zero and the third will point to a dynamically allocated array. For example, the data members of the object for record one will have the following values,

```
iPtr = new int[dSize];
fPtr = 0;
cPtr = 0;
```

Write a test program that demonstrates the functionality of your code.

Sample file:

	Field I	Field II	Field III
Record I	int	12	1 9 1 8 1 6 3 4 3 9 7 0
Record II	float	2	5.30 56.31
Record III	char	6	h a y K o z
Record IV	float	3	5.55 22.41 10.11