Exam 1 😭

*This is a cover page*

*There is nothing important on here*

*Please stop reading!*

*Oh no, you’ve read too much*

*They will never stop looking for your now*

*The…*

*ALIENS*

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Write a class called **Matrix** separated into **header** (prototype) and **implementations**. (Write it as though it is in two separate files)

**Matrix** should contain the following data members:  
 A 2D array of char which hold the actual data.  
 Integers representing the number of rows/cols in the matrix.

**Matrix** should contain the following methods:  
 **Constructor:** The matrix constructor should accept a number of rows  
 and a number of columns as arguments. It should then  
 initialize the variables inside the matrix. Chars  
 in the matrix should start out as a single blank  
 space: ‘ ’  
 **Destructor:** The matrix destructor should free any memory  
 allocated by pointers during construction.  
 **Print:** The print method should return nothing and should  
 print every item in the matrix in a visually  
 intuitive way. (Printed as a grid)  
 **Getter:** A getter method will return the value at a provided  
 location in the matrix. It should accept a row and  
 column.  
 **Setter:**  A setter method will change the value at a provided  
 location in the matrix. It should accept a row,  
 column, and character to set the value to.

*But Jeremy, I’m really smart and can do all this easily? What can I do to make it better?* Okay, okay, smart italics text student, for bonus points, restrict what values are used in the Matrix. (Bonus cannot raise grade above 100%)

**Bonus:** The purpose of private/public variables and using getters/setters is so that we can restrict how variables are used. Restrict the class **Matrix** such that it can only contain alphabetic, uppercase chars OR an empty space. Do not print an error message if the user tries to use an invalid char, just do nothing.

**Bonus Hint:** Variables of type char can be compared using less than/greater than.  
//Example of comparing chars  
char x = ‘X’;  
cout << (x < ‘Z’); // Prints 1  
cout << (x < ‘A’); // Prints 0

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**Explain** “scope” briefly, especially as it pertains to classes. Why are methods inside of classes able to use data members without having them passed in?

**Object Oriented Programming** is a programming paradigm which specifies that:

1. Classes should contain methods that affect their data members
2. Operations should be grouped with the data that they operate on
3. Programmers should emphasize the production of object code over libraries

**Explain** the what the scope resolution operator :: does.

**Model** the data members from your class as they exist after  
 construction but before destruction.  
   
 Don’t worry about what  
 classes might look like in memory. Model the data members as  
 you would variables outside of a class.  
   
 For this question, assume the user created a matrix with 3 rows  
 and 2 columns.

**Key Terms Reference**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| call | definition | identifier | header | body |
| return type | arguments | void | prototype | overload |

The prototypes of methods are the same as the prototypes of functions with one exception. The constructor and destructor do not have  
a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The file which contains a class’ member variables and method prototypes is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When separating classes into two files, I put the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of each method in the .cpp file.

To \_\_\_\_\_\_\_\_\_\_\_\_\_\_ a constructor/method/function is to create another function with the same name but different parameters.

C:\Users\jeremy.glebe\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\7BCD2E5B.tmp  
The highlighted code is a function's \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C:\Users\jeremy.glebe\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\C81DB421.tmp  
The highlighted items in code are the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the function call.