University of Maryland
Baltimore County

CMSC 202 – Computer Science II

Spring 2005

Mid-Term Exam

Sections 0201 – 0206

Lecture Hours: Monday – Wednesday 5:30 PM – 6:45 PM

Exam Date: Wednesday 3/16/05

Exam Duration: 5:30 PM – 6:45 PM

Instructor: Sa'ad Raouf

Name:	
SSN:	
Score:	
Section: (Circle your Section Number below)	

Section	TA	Day	Time	Room
0201	J. Shopf, A. Ferucci	Monday	7:30 - 8:20pm	ECS 104 A
0202	J. Shopf, V. Puttagunta	Wednesday	7:30 - 8:20pm	ECS 104 A
0203	J. Shopf, A. Ferucci	Monday	8:30 - 9:20pm	ECS 104 A
0204	J. Shopf, V. Puttagunta	Wednesday	11:00 - 11:50am	ECS 104 A
0205	J. Shopf, A. Ferucci	Monday	2:00 - 2:50pm	ECS 104 A
0206	J. Shopf, V. Puttagunta	Wednesday	2:00 - 2:50pm	ECS 104 A

Notes:
1. This exam is a closed book, and a closed notes exam.
2. All answers are to be written on the enclosed exam sheets. Scratch sheets are not allowed. If necessary, you can use the back of the exam sheets.
3. You will need to present your Photo ID when handing in the exam. No exceptions.
4. Please hand in your exam with your section number circled. If your section number is not circled, your exam will not be graded.

1) (2 points each) Write True or False in the TRUE/FALSE column:

		TRUE/FALSE
a)	The function string::c_str() converts a string object into a pointer to a null-terminated character array ("C-style string")	
b)	Thanks to C++, I can now specify an array size at run time, as the following code illustrates: **int n;** **cin >> n;** **int grades[n];**	
c)	The following code will output 46 **double someDouble = 45.978;** **cout << static_cast < int > (someDouble) ;**	
d)	The following vector declaration causes the default constructor for the Student class to be invoked: vector <Student> myStudents;	
e)	Arrays are evil.	
f)	Mr. Raouf said during the lecture to not bother with calling the close() function for any input/output streams, since the operating system will close the stream for you.	
g)	Given a class that has a function called output(), and given that 10 instances of the class were created, then 10 instances of the output() function are also created, one instance for each object created.	
h)	A static data member of a class is considered a "global" data member for all objects of the class	
i)	Mr. Raouf said during the lecture that virtual destructors are a good idea	
j)	Public class member functions can be called from outside of the class	

2. **(4 points)** Given the following **global** declarations. Indicate if the declaration follows good programming principles or not.

- const double RATE = 6.9;
- const double kRate = 6.9;
- bool Server::m_nowOpen = true;
- double tax = 34.9;

3. *(3 points)* Given the code below, write **one single** C++ statement such that fullName becomes *Jefferson, Tom C.*

```
string  firstName  = "Tom";
string  lastName   = " Jefferson";
char    middle = 'C';
string  fullName;
```

Answer:

4. **(2 points)** Given the declaration below, write the C++ statement (in Romanian) that would open the following ofstream in append mode to the file "output.dat""
```
              ofstream outStream;
```
Answer:

5. **(1 points)** Write the C++ statement that would output an integer variable called zip in a field width of at least 5 columns with leading zeros.
Answer:

6. **(4 points)** Write the following:
- declaration to create a vector of vector of Student class called myStudents
- Assuming that the Student class has the necessary overloaded stream insertion operator, write the statement that would output the 5th cell of the 3rd vector in myStudents

   Answer:

7. **(6 points)** Write the C++ function with the appropriate function header, including preconditions, and post conditions, to initialize a vector of integers to an integer value. The function will be called as follows:

   Initialize (someVector, value);

   where someVector is the vector to be initialized, and value is the initialization value.

   Answer:

8. **(5 points)** Given the following function prototype:

    void ShowVolume(int length, int width = 1, int height = 1);

    Indicate which of the following calls are syntactically valid, or not. If the call is valid, show the values of length, width, and height:

    - ShowVolume(4, 6, 2);
    - ShowVolume(4);
    - ShowVolume();

    Answer:

9. **(5 points)** Given the following function prototype for a class accessor called GetDayOfYear, explain the significance of each **const** listed below:

    const DayOfYear & Vacation::GetDayOfYear ( ) const;

    Answer:

10. **(5 points)** Suppose we want to overload the operator* to take 2 strings, and return a string that contains the set of **unique** characters that are common in both strings. Write the function prototype to overload the operator * as a non member function.

Answer:

11. **(5 points)** Now write the function for the previous question ☺.

Hint:
string::find (char ch) returns the constant string::npos if a character is not found in a string. Example would be:

if (someString.find('a') == string::npos)

The above if statement would be true if the character 'a' is not found in someString.

Answer:

12. **(5 points)** Explain how to handle zombie objects.
    Answer:

13. **(5 points)** Given that Toy is a user defined data type, explain each of the following statements:

    - Toy myToy();
    - Toy myToy;

    Answer:

Given the following:

```
class CBook{
        public:
                CBook( int nrPages, string title, string genre );
                int GetNrPages( void );
                string GetTitle( void );
                string GetGenre( void );
        private:
                int m_nrPages;
                string m_title;
                string m_genre;
};


class CLibrary{
        public:
                CLibrary( vector< CBook > books );
                int GetNrBooks( void );
                int GetNrBooks( string genre );
                void Add( CBook book );
                void Delete( CBook book );
                vector < CBook > GetBooks( void );
        private:
                int m_nrBooks;
                vector < CBook > m_stacks;
};
```

14. **(10 points)** Rewrite the definition of the CLibrary class, using const and reference to const where applicable.

Answer:

15. **(10 points)** Write the code for the CBook and the CLibrary constructors, using the member initialization lists only.
Answer:

16. **(10 points)** Overload the stream insertion operator for the CBook class as a friend function such that each private data item in the CBook class is printed on a separate line, with an appropriate title:

Write the function prototype (in the CBook class)here:

Write the function definition here:

17. **(2 points)** Spell check on "Sa'ad Raouf" inBlackboard produces what?

Answer: