

EHB354E - SAMPLE MIDTERM EXAM

Books, notes, electronic devices closed. Duration is 90 minutes.

QUESTION 1) [30 points] Write screen outputs when the following program is run.

<pre>class A { string name; public: A(string name) : name(name) {cout << "Constructor : " << name << endl; } ~A() {cout << "Destructor : " << name << endl; } };</pre>	<pre>void f() { cout << "Function started\n"; A a1("a1"); A * a2 = new A("a2"); delete a2; cout << "Function finished\n"; } A a3("a3"); // Global</pre>	<pre>int main() { cout << "Main started\n"; A a4("a4"); f(); A * a5 = new A("a5"); delete a5; cout << "Main finished\n"; return 0; }</pre>
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QUESTION 2) [45 points] Write a C++ program to do followings.

BOOK class: Define a class named Book with members below. All data and function members are public.

- book_name : string
- Parameterized constructor : Takes a book name as parameter, assigns to member data.

BORROW class: Define a class named Borrow which is publicly inherited from the Book class.

Write the member data and functions below (all are public).

- student_name : string
- Parameterized constructor : Takes a Book object and a student name as parameters, assigns them to member datas.
Constructor prototype: Borrow(Book B, string student_name);
- void print() function : Function should display all datas of the Borrow class on screen.

MAIN program: In main program, do the followings.

- Define the Book object variable B1, with book name "Book1" as constructor parameter.
- Define the Borrow object variable Bor1, with B1 object and student name "Student1" as constructor parameters.
- Call print() function of Bor1 object.

QUESTION 3) [25 points] Write the nonmember overloaded operator function whose prototype is given as :
string operator (const string & Word, int N);*

Function takes a string object (Word) and the number of repeats (N) as parameters.

Function should append the given Word string N times, and then should return the resulting string.

Example usage:

```
string X = "Abc";
cout << X*4 << endl;
```

should print "AbcAbcAbcAbc" on screen.

SAMPLE MIDTERM ANSWERS

ANSWER 1) [30 points]

```
Constructor : a3
Main started
Constructor : a4
Function started
Constructor : a1
Constructor : a2
Destructor :a2
Function finished
Destructor :a1
Constructor : a5
Destructor :a5
Main finished
Destructor :a4
Destructor :a3
```

ANSWER 3) [25 points]

```
#include <iostream>
using namespace std;

string operator* (const string & Word, int N)
{
    string result;

    for (int i=1; i<=N; i++)
        result = result + Word;
    // Calling the built-in + operator of string class

    return result;
}

int main()
{
    string X = "Abc";
    cout << X*4 << endl;
}
```

ANSWER 2) [45 points]

```
#include <iostream>
using namespace std;

class Book
{
public:
    string bname;
    Book (string bname) : bname(bname) {}
};

class Borrow : public Book
{
public:
    string sname;
    Borrow (Book B, string sname) : Book(B), sname(sname) {}
    void print()
    {
        cout << "Borrowing information : \n";
        cout << "Book name : " << bname << endl;
        cout << "Student name : " << sname << endl;
    }
};

int main() {
    Book B1("Book1");
    Borrow Bor1(B1, "Student1");
    Bor1.print();
}
```