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.

```
class A {
  string  name;
public:
  A(string name) : name(name)
  {cout << "Constructor : "
        << name << endl; }

  ~A() {cout << "Destructor : "
             << name << endl; }
};
```

```
void f() {
  cout << "Function started\n";
  A   a1("a1");
  A * a2 = new A("a2");
  delete  a2;
  cout << "Function finished\n";
}

A  a3("a3"); // Global
```

```
int main() {
  cout << "Main started\n";
  A  a4("a4");
  f();
  A * a5 = new A("a5");
  delete  a5;
  cout << "Main finished\n";
  return 0;
}
```

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();
}
```