CS 300 Data Structures
Problem Set #3 Constructor and Destructors

1. Like constructors, can there be more than one destructor in a class?

2. What is the output of the following program?

```
#include <iostream>
using namespace std;
class A{
      private:
          int x;
      public:
          A(int _x){
             x = _x;
             cout<<"constructor... "<<x<<endl;
          }
          ~A(){
             cout<<"destructor... "<<x<<endl;
          }
};
int main(){
   A a(10);
   return 0;
}
```

3. What is the output of the following program?

```
#include <iostream>
using namespace std;
class A{
   private:
         int x;
   public:
         A(int _x){
            x = _x;
            cout<<"constructor... "<<x<<endl;
         }
         ~A(){
            cout<<"destructor... "<<x<<endl;
         }
};
int main(){
   A a1(10);
   A a2(20);
   return 0;
}
```

4. What is the output of the following program?

```
#include <iostream>
using namespace std;
class A{
      private:
          int x;
      public:
          A(int _x){
             x = _x;
             cout<<"constructor... "<<x<<endl;
          }
          ~A(){
             cout<<"destructor... "<<x<<endl;
          }
};
int main(){
   A a1(10);
   A a2(20);
   A *a3 = new A(100);
   return 0;
}
```

5. What is the output of the following program?

```
#include <iostream>
using namespace std;
class A{
      private:
          int x;
      public:
          A(int _x){
             x = _x;
             cout<<"constructor... "<<x<<endl;
          }
          ~A(){
             cout<<"destructor... "<<x<<endl;
          }
};
int main(){
   A a1(10);
   A a2(20);
   A *a3 = new A(100);
   delete a3;
   return 0;
}
```

6. What is the output of the following C++ program?

```
#include <iostream>
using namespace std;
class A{
      private:
          int *x;
      public:
          A(int _x){
             x = new int(_x);
             cout<<"allocating memory"<<endl;
          }
          ~A(){
             cout<<"freeing memory... "<<endl;
             delete x;
          }
};
int main(){
   A a1(10);
   A a2(20);
   return 0;
}
```

7. What is the output of the following C++ program?

```
#include <iostream>
using namespace std;
class A
{
    int id;
    static int count;
    public:
        A() {
           count++;
           id = count;
            cout << "constructor for id " << id << endl;
        }
        ~A() {
            cout << "destructor for id " << id << endl;
        }
};

int A::count = 0;

int main() {
    A a[3];
    return 0;
}
```