Final Exam

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01/20/1999, 4:10 – 5:50pm

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1. (15%) Please output the following program.

```
#include <iostream.h>
class final_q1 {
   public:
      final_q1 (int val) { data = val;}
      int operator! (){ return data;}
      final_q1 &operator- () { data = -data;
                               return *this;}
    private:
      int data;
};
void main()
{
    final_q1 ex(10);
    cout << !ex << endl;
    cout << !(-ex) << endl;
    cout << !(-(-ex)) << endl;
}
```

2. (15%) Please output the following program.

```
#include <iostream.h>
#include <string.h>
class final_q2
{
   public:
      final_q2(const char* str);
     ~final_q2();
   private:
      char name[20];
};
final_q2::final_q2(const char* str)
{
    strncpy(name,str,20);
```

```
    cout << "Hello.. " << name << "\n";
}
final_q2::~final_q2()
{
   cout << "Bye.. " << name << "\n";
}
void func(int);
int money =10;
final_q2 obj("obj");
void main()
{
    final_q2 main_obj1("main_obj1");
    final_q2 *main_ptr;
    main_ptr = new final_q2("main_ptr");
    func(money);
    func(money);
    cout << "money = " << money << endl;
}
void func(int val)
{
   final_q2 func_obj1("func_obj1");
   static final_q2 func_obj2("func_obj2");
   final_q2 *func_ptr;
   static int count=val;
   int tmp = val;
   money += val;
   count += money+tmp;
   func_ptr = new final_q2("func_ptr");
   cout << "count = " << count << endl;
}
```

3. (15%) Please output the following program.

```
#include <iostream.h>
class final_q3
{
   public:
      int getdata() {return data;}
      final_q3() {data=5;}
```

```
        final_q3 (int val) {data=val;}
        final_q3 (const final_q3 & obj){data = 10;}
    private:
        int data;
};
void func1(final_q3 obj) ;
final_q3 func2();
int main ()
{
    final_q3 a_obj, b_obj(7);
    cout << "a_obj = " << a_obj.getdata() << endl;
    cout << "b_obj = " << b_obj.getdata() << endl;
    b_obj = a_obj;
    cout << "b_obj = " << b_obj.getdata() << endl;
    func1(a_obj);
    b_obj = func2();
    cout << "b_obj = " << b_obj.getdata() << endl;
    return 0;
}
void func1(final_q3 obj)
{
    cout << "obj = " << obj.getdata() << endl;
}
final_q3 func2()
{
    final_q3 c_obj(3);
    cout << "c_obj=" << c_obj.getdata() << endl;
    return c_obj;
}
```

4. (20%) What, if anything, is wrong with the following definitions? How would you fix those identified as wrong?

(a) Class Time {

```
    friend print(int, int, int) const;
    public:
        time (int hour = 0, int min = 0, int sec = 0);
        time ();
        void tim();
            ~time();
```

```
    void setTime (int, int, int);
    static int set_count();
    int getHour();
private:
    int hour;
    int min;
    int sec;
    char time_zone[20] = "Hong Kong";
        static int count = 0;
  }
(b) class final_init
 {
    public:
       final_init(int ii);
       ~final_init();
       static int set_si(int val);
    private:
       int i;
       char * iptr;
       const int ci;
       int &ri;
       static int si;
};
final_init::final_init(int ii)
{
    i=ii;
    ci=ii;
    ri=i;
    si=i;
      iptr = new char [ii];
 }
final_init::~final_init() { delete iptr;}

(c) class Date {
     int d, m, y;
   public:
      Date();
      int day() const {return d;}
```

```
    int month() const {return m;}
    int year () const;
    void f(const Date &);
    Date &add_year(int);
};
Date::Date() { d=0; m=0; y=0;}
int Date::year() {return y;}
void f(const Date &cd)
{
    int i=cd.year();
    cd.add_year(1);
 }
Date & Date::add_year(int n)
 {
    if (d==29&&m==2) {
          d=1;
          m=3;
     }
     y += n;
        return *this;
    }
```

5. (15%) Find all possible errors in each of the following program segments. If you find any, please indicate how to fix them.

(a) int * x, y;
    x = y;

(b) float *real_ptr;
    long *int_ptr;
    int_ptr = real_ptr;

(c) char s[] ="hi, how are you?";
    for (;*s != '\0'; s++) cout << *s << ' ';

(d) Account *ptrarray[10] = new Account[10];

(e) float x=3.14;
    float xref = &x;
    cout << xref << endl;

6. (20%) What do the following programs/program segments do?

(a) #include<iostream.h>

```
int mystery1(const char*, const char *);
void mystery2(const char*, const char *);
int main()
{
   char string1[80], string2[80];
   cout << "Enter two strings ";
   cin >> string 1 >> string2;
   mystery1(string1, string2) ;
   mystery2(string1, string2) ;
   return 0;
}
int mystery1 (const char *s1, const char *s2)
{
   for (; *sl!= '\0' && *s2 != '\0'; s1++, s2++)
      if (*s1 != *s2) return 0;
   return 1;
 }
void mystery2 (char *s1, const char *s2)
{
      while (*s1 != '\0') ++s1;
      for (;*s1=*s2;s1++, s2++);
   }
```

(b)
```
int mystery3(int v1, int v2)
   {
      if(v2 != 0) return mystery3(v2, v1%v2);
      return v1;
   }
```