西 安 电 子 科 技 大 学

考试时间 120 分钟

试　　题

题号	一	二	三	四	总分
分数					

1. 考试形式：闭卷； 2. 本试卷共 四 大题，满分 100 分。

班级 58 学号 2100910023 姓名 刘遥 任课教师 宋着笨

Part I　There is one error in each code paragraph. Find out the error and write down the error statement on your answer sheet. (20 points)

(1)

```
int f(const int x, int y){
    int temp ;
    x += y;
    return x;
}
```

x是常量，不可被修改

(2)

```
int f(double x, int i = 0, char c);
void g(){
    cout << f(23.5, 10) << endl;
}
```

默认值参数在参数列表最右边

(3)

```
namespace a{
    float   x;
}
namespace b{
    int i;
    float   x;
};
using namespace a::x=1;
```

先声明名称空间再赋值

(4)

```
class C {
    friend C operator+ (const C&, const C&);
    /* …… */
};
C C::operator+ (const C& c1, const C& c2)
{   /* …… */   }
```

全局函数作友元，在函数的定义处不用加"C::"的限定符

(5)

```
class Base{
public:
    virtual void f( ){ }
    virtual int g( ) =0;
};
void f(){
    Base a;
}
```

纯虚函数无参数，无返回值

抽象类不能实例化对象

(6)

```
class C{
    int x;
    void setx(int a) { /* … */}
};
void f() {
    C c1;
    c1.setx(3);
}
```

没有访问权限限定符默认为private，setx是私有成员函数，不能在类外被调用

(7)

```
template <class T, int x>
class Array {
public:
   void m();
   // ……
};

void f() {
   int a;
   Array<double, a> ar;
}
```

模板参数只能是"class"或"typename"

必须是常量

(8)

```
class Base {
protected:
   int x;
public:
   Base(int xx){ x = xx; }
};
class Sub : public Base {
   char c;
   Sub(int x1, char c1) {
    x = x1; c = c1;}
};
```

构造函数不能被声明为私有

基类缺少默认构造函数

(9)

```
class C {
public:
   void m() {/* … */}
   static void s() {/* … */}
};
void   f() {
   C c1;
   c1.m();
   C::m();
   c1.s();
   C::s();
}
```

非静态成员函数不能使用类限定符来访问

(10)

```
class Parent {
   int x;
public:
   int a;
   int b;
};
class Son: public Parent {
public:
   int f () const {
      int c = a+b;
      return x;
   }
};
```

没有访问权限

Part II　Write the following programs' output. (30 points)

1. (6 points)

```
#include <iostream>
using namespace std;
void func(int x, int& y, int *jia){
    y *= x + 2;
    *jia = x + y;
}
int main( ){
   int i = 10, j = 4, x1 = 1;
   func(i, j, &x1);
   cout << i << "," << j << "," << x1 << endl;
   return 0;
}
```

y = 12×4 = 48

jia = 10 + 48 = 58

10, 48, 58

2. (6 points)

```
#include <iostream>
using namespace std;
class Point {
private:
      int x, y;
public:
       Point(int i, int j) { x = i;    y = j; }
       void Print() { cout << '(' << x << ','<< y << ')' << endl; }
       void operator += (Point p) { x += p.x; y += p.y; }
       void operator -= (Point p) { x -= p.x; y -= p.y; }
};
int main() {
     Point P1(9, 8), P2(4, 6);
     P1.Print();
     P2.Print();
     P1 += P2;
     P1.Print();
     P2 -= P1;
     P2.Print();
     return 0;
}
```

(9,8)
(4,6)
(13,14)
(-9,-8)

3. (6 points)-

```
#include <iostream>
using namespace std;
class A {
   static int obj_count;
public:
   A()      { obj_count++; }
   ~A()    { obj_count--; }
   int get_num_of_objects()    { return obj_count; }
};
int A::obj_count = 0;
A a;
int main() {
   A    b, *p, *q;
   p = new A;
```

cnt = 1
cnt=2
cnt=3

```
    q = new A[5];
    cout << a. get_num_of_objects() << '\t';
    delete []q;
    cout << p->get_num_of_objects() << '\t';
    for(int i = 0; i < 2; i++)    {
        A c;
        cout << c.get_num_of_objects() << '\t';
    }
    delete p;
    cout << b.get_num_of_objects() << endl;
    return 0;
}
```

cnt = 8

8 3 4 4 2

4. (6 points)

```
#include <iostream>
using namespace std;
int main() {
        try {
                int a = 9;
                throw a;
                float f = 0.5F;
                throw f;
        }
        catch (float k) {
                cout << "Exception occured here -- float!\n";
        }
        catch (int k) {
                cout << "Exception occured here -- int!\n";
        }
        cout << "Succeed!\n";
        return 0;
}
```

Exception occured here --int!

Succeed!

5. (6 points)

```
#include <iostream>
using namespace std;
class BASE{
protected:
```

```
    int id;
public:
    BASE() : id(0) {}
    int    update(int n)    { id += n; return id; }
    virtual void hello(){ cout << "BASE" << endl; }
};
class DERIVED : public BASE {
public:
    DERIVED () { id = 1;}
    int update(int n) { id += 2*n; return id;}
    void hello() { cout << "DERIVED " << endl; }
};
int main ()    {
    BASE* objs[2];
    objs[0] = new BASE();       objs[1] = new DERIVED ();
    for(int i=0; i<2; i++) {
        objs[i]->hello();
        cout << objs[i]->update(10) << endl;
    }
    return 0;
}
```

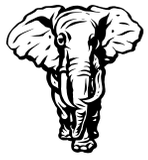
BASE
10
DERIVED
~~24~~ 11

Part III Object-Oriented Analyzing and Designing (30 points)

1. (15 points)

From following named pictures, please analyze and design the class hierarchies.






Eagle Telephone Elephant Television Shark Camera

2. (15 points)

Please define a class **DoubleValue** that wraps*(包装)* a value of primitive type ***double*** and satisfies the following requirements:

(1) it has a default constructor which sets the value to 0.0;

(2) it has a constructor with one argument of type ***double*** that is wrapped;

(3) by overloading the operator "==", it can compare ***this*** object against another

specified **DoubleValue** object, and return true if and only if both DoubleValue represent the same double value;
(4) it can return a string representation of the wrapped double value;
(5) it can return the value of this DoubleValue as an ***int*** type after a narrowing primitive conversion.

Part IV Programming (20 points)

1. (10 points)

Implement a class ***Integer*** that can substitute the basic **int** type in C++. The interfaces of the class ***Integer*** SHOULD output the messages or input data shown in the following program's comments.

```
#include <iostream>
using namespace std;
int main() {
   Integer    a, b = 10, c(b);
   cout << "a=" << a << endl;        // Display:    a=0
   cout << "b=" << b << endl;        // Display:    b=10
   cout << "c=" << c << endl;        // Display:    c=10
   cin >> c;                         // input 2 from keyboard
   cout << "c=" << c << endl;        // Display: c=2
   c = b + 90;
   cout << "b=" << b << " c=" << c << endl;      // Display: b=10 c=100
   a = b - 100;
   cout << "a=" << a << " b=" << b << endl;      // Display: a=-90 b=10
   c = a / b;
   cout << "a=" << a << " b=" << b << " c=" << c    << endl;
   //Display: a=-90 b=10 c=-9
   c = b *= a;
   cout << "a=" << a << " b=" << b << " c=" << c << endl;
   //Display: a=-90 b=-900 c=-900
   return 0;
}
```

Hint: Operator "<<" and ">>" can be overloaded as followings：

```
ostream& operator<< ( ostream& out,    Integer& I ){
      out << I.value;        return out;
}
```

```
istream&    operator>> ( istream& in , Integer& I)    {
      in >> I.value;  return in;
}
```

2. (10 points)

According to the main function and the output below, implement a class hierarchy with ***Sequence*** as the base class with a method *print* which output the value of a data member named *number*. Derived classes are ***Increment***, ***Power***, and ***Decrement***.

```
int main() {
      Sequence *spi = new Increment(2);
      Sequence *spp = new Power(3);
      Sequence *spd = new Decrement(4);
      for(int i = 0; i < 3; i++) {
            spi->print();
            spp->print();
            spd->print();
            cout<<endl;
      }
      return 0;
}
```

Output:

```
2         3         4
3         9         3
4         81        2
Press any key to continue
```

```
class Sequence {
  private:
    int number;
  public:
Virtual void print() {
    cout << this->number
         << endl;
  }
  Sequence() : number(0) {}
  Sequence(int val) : number(val)
  {}
```

```
class Increment : public Sequence {
  private:
    int number;
  public:
    void print() {
      cout << this->number++ << '\t';
    }
    Increment(int val) : Number(val) {}
```

```
class Decrement : public Sequence {
  private:
    int number;
  public:
    void print() {
      cout << this->number-- << '\t';
    }
    Increment(int val) : Number(val) {}
```

```
class Decrement : public Sequence {
  private:
    int number;
  public:
    void print() {
      cout << this->number << '\t';
      number = number * number;
    }
    Increment(int val) : Number(val) {}
```

Part III

1.

```
class Animal {}
class Machine {}
class Eagle : public Animal {}
class Telephone : public Machine {}
class Elephant : public Animal {}
class Television : public Machine {}
class Shark : public Animal {}
class Camera : public Camera {}
```

2.

```
class DoubleValue {
  private :
     double value;
  public :
     DoubleValue() : value(0.0) {}
     DoubleValue(double val) : value(val) {}
     bool operator==(DoubleValue& other) {
         if( value == other.value)
              return true;
          return false
      }
    string str() {
         return to-string(Value);
    }
    int int_value() {
```

```
    return (int) value;
}
```

Part IV Programming

1.

```
class Integer {
  friend ostream& operator<<(_ _ _);
  friend istream& operator>>(_ _);

  private:
    int value;
  public:
    Integer() : value(0) {}
  void  Integer(int val) : value(val) {}

    Integer(Integer& other) {
      value = other.value;
    }
                          const Integer& other
  Integer operator+(          ) {
```

```
        value += value;
        return *this;
    }
Integer operator-(const Integer& other) {
        value -= other.value;
        return *this
    }
Integer operator/(const Integer& other) {
    return Integer(vaule/other.value);
}
Integer operator*=(_____) {
        value *= other.value;
    return *this
}
```

类外定义 << 的函数体