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_____学号_____姓名_____任课教师_____

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 *zPtr;
	int z[5] = {1, 2, 3, 4, 5};
	
	zPtr = ++z;
		(2)	class student　{
			　　int marks;　　};
			student s1;
			student s2 = 2;

(3)	int f(const int x, int y){
	　x += y;
	　return x;
	}
		(4)	class C {
			　int& c;
			public:
			　C( ) { c = 0; }
			};

(5)	namespace mySpace1{
	　　float　x;
	}
	namespace mySpace2{
	　　int i;
	　　float　x;
	};
	using mySapce::x=1;
		(6)	template <class T> class myTemp {
			public:
			　void m();
			　// ……
			};
			void myTemp :: m()
			{
			　/* m's body */
			}

引用本身无错

缺少模板类参数列表

void myTemp<int/char>::m

未说明命名空间，但即使说了也不对

using mySpace1::x=1; 不对！

using mySpace::x; 对√

(7)

```
class MyClass {
private:
   int x;
public:
   MyClass(int val) : x(val)
     {   }
   void set(int i) { x = i;}
   int get() {return x;}
};
int main() {
   const MyClass foo(10);
   foo.set(20);
   return 0;
}
```

(8)

```
class BC {
public:
   BC(int a) { x = a; z = -1; }
   BC(int a1, int a2) {
     x= a1; z = a2;    }
private:
   int x, z;
};
class DC : public BC {
public:
   DC(int a) { y = a;}
private:
   int y;
};
```

(9)

```
#include <iostream>
using namespace std;
int main() {
   try {    int a = 9;
            throw a;      }
   catch (...)
   {   /* …… */      }
   catch (int k)
   {   /*…… */      }
   return 0;
}
```

(10)

```
class CArray {
public:
   void CArray(int i)  {
      length = i;
      buffer = new char[length];
   }
   ~CArray(){delete [] buffer;}
private:
   int length;
   char *buffer;
};
```

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

1. (6 points)

```
#include <iostream>
using namespace std;
int main( ){
      int a[] = {10,30,50,40,20};
      int *p = a;
      for(int i = 0; i < 5; i++)
         cout << *p++ << "\t";
      cout << endl;
      int &r = a[2];
```

*p++ = *(p++)　地址+1

(*p)++　数值加1

4个空格

10　30　50　40　20

10　30　15　40　20

```
    r = r + 5;
    for(int i = 0; i < 5; i++)
        cout << a[i] << "\t";
    return 1;
}
```

2. (6 points)

```
#include <iostream>
using namespace std;
void foo() {
    static int a = 1;
    int b = 0;
    cout << a++ << '\t' << ++b << endl;
}
int main() {
    for(int i = 0; i < 3; ++i )
        foo();
    return 0;
}
```

3. (6 points)

```
#include <iostream>
using namespace std;
class A {
    int v;
public:
    A() { cout << "A1" << endl; }
    A(int v ) {
        this->v = v;    cout << "A2, v=" << this->v << endl;
    }
};
int main(){
    A a1[2];
    A a2[2] = {5,10};
    A *p = new A[2];
    return 0;
}
```

4. (6 points)

```
#include <iostream>
using namespace std;
class B{
public:
      virtual void foo(){ cout << "Base::foo()\n"; }
 };
class C:public B{
 public:
        void foo() {cout << "Derived::foo()\n"; }
 };
int main() {
    C c;
    B b, &p = c;
    c.foo();
    b.foo();
    p.foo();
    return 0;
}
```

D
B
D

5. (6 points)

```
#include<iostream>
using namespace std;
class A{
      double x, y;
      static int cnt;
public:
      A(double a = 0, double b = 0) : x(a), y(b){ cnt++; }
      ~A(){ cnt--;   cout << "~A(): " << cnt << endl;   }
      void print(){
          cout << "Object: (" << x << "," << y << ")\t";
          cout << "number of A: " << cnt << endl;
      }
};
int A::cnt = 0;
int main(){
      A a;
      A *p = new A(1.5);
```

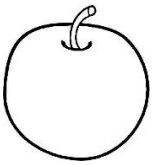
Object : (1.5, 0) number of A: 2
~A() : 1
Object : (0, 0) number of A: 1.
~A() : 0

```
    p->print();
    delete p;
    a.print();
    return 0;
}
```

class fruit { }
class apple : public fruit { }
class grape : public fruit { }
class banana : public fruit { }
class Animal { }
class elephant : public animal { }

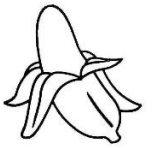
Part III Object-Oriented Analyzing and Designing (30 points)

1. From following pictures, please analyze and design the class and class Hierarchies. (15 points)

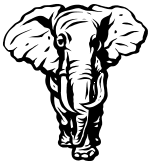


Apple

Grape

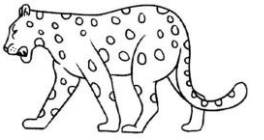


Banana



Elephant

Pigeon



Leopard

2. Please define a class ***Book*** and its data members and member functions according to the following description. Don't implement any member functions.

(1) Each book has a title, one or more authors, and an international standard book number (ISBN).

(2) Class ***Book*** has two constructor:

(a) the first should be a default constructor,

(b) the second should take two arguments: the title and the ISBN.

(3) The authors can be added one by one.

(4) For the title and ISBN of a ***Book***, a "***set***" function and a "***get***" function are required. Each "***set***" function updates the corresponding data member to a new value through its parameters, and each "***get***" function returns the value of the corresponding data member to caller.

Part IV Programming (20 points)

1. Define and implement a class named ***Integer*** according to the main

function and the output given in comments.

```
int  main()
{
        Integer  a(2),   b=a, c;
        a.print("a=");     // a=2
        b.print("b=");     // b=2
        c.print();          // 0

        c = b + 1;
        b.print("b=");     // b=2
        c.print("c=");     // c=3

        c = a - c;
        a.print("a=");     // a=2
        c.print("c=");     // c=-1

        c *= b;
        c.print("Finally, c="); // Finally, c=-2
        return 0;
}
```

2. Given a class :

```
class Sequence {
   protected: int number;
   public:
        Sequence(int v) : number(v) { }
        virtual void action(){}
        virtual int getNumber() { return number ; }
};
```

According to the main function and the output below, please define and implement class ***Increment***, ***Square***, and ***Decrement***, they are direct derived(sub) classes of ***Sequence***. Don't modify the class ***Sequence***.

```
int main( )
{
   Increment   inc(1); Square pow(2); Decrement dec(9);
   Sequence * ptrs[3];
   ptrs[0] = &inc;      ptrs[1] = &pow;     ptrs[2] = &dec;
```

```
        for( int i = 0; i < 3; i++ )    {
            for( int k = 1; k <= 5; ++ k ) {
                cout << ptrs[i]->getNumber() << "\t";
                ptrs[i] -> action();
            }
            cout << endl;
        }
        return 0;
    }
```

The output is:

```
1     2     3     4     5
2     4     16    256   65536
9     8     7     6     5
```

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

(1)	class C{
	　int x;
	　void setx(int a) { /* … */}
	};
	void main() {
	　C c1;
	　c1.setx(3);
	}
		(2)	class Student　{
			//…
			public:
			　void Student();
			　~ Student();
			};

(3)	class BC {
	　int x;
	public:
	　BC(int xx = 0) { x = xx; }
	};
	class DC : public BC {
	　char c;
	　DC(int x1, char c1) {
	　x = x1;
	　c = c1;
	　}
	};
		(4)	class C {
			　int sz;
			public:
			　friend C operator+ (const C&, const C&);
			　// …
			};
			C C::operator+ (const C& c1, const C& c2){
			　cout << c1.sz;
			　// ….
			}

(5)	class C {
	public:
	　void m() {/* … */}
	　static void s() {/* … */}
	};
	void　main() {
	　C c1;
	　c1.m();
	　C::m();
	　c1.s();
	　C::s();
	}
		(6)	template <class T, int i> class Array {
			　int sz;
			public:
			　Array():sz(i) { }
			　// ……
			};
			void f(int x)
			{
			　Array<int, x> ay;
			}

Part II　Write the following programs' output.

1.

```
#include <iostream>
using namespace std;
int main() {
    int i = 1;
    while(i <= 6) {
        i++;
        if(i % 3 != 1) continue;
        else cout << i << " ";
    }
}
```

4 7

2.

```
enum TorF { F, T=48 };
int cvt (char c)    { cout << "1:";
        return c; }
int cvt (int    c)    { cout << "2:";
        return c; }
int cvt (TorF v)    { cout << "3:";
        return (v==T)? 1 : 0; }
int    main()    {
       cout << cvt(char(48) ) << endl;
       cout << cvt(T) << endl;
       cout << cvt( !true ) << endl;
       return 0;
}
```

1:48
3:1
2:0

3.

```
#include <iostream>
using namespace std;
void add1(int a1)    {    a1++; }
void add2(int& a2) {    a2++; }
void add3(int* a3)    { (*a3)++; }
int main() {
      int t1=2, t2=2, *t3=&t2, t4=t2, &t5=t2;
      add1(t1) ;    add2(t2);    add3(t3);
      add3(&t4);       add2(t5);
      cout<<t1<<" "<<t2<<" "<<*t3<<" "<<t4<<" "<<t5<<endl;
      return 0;
}
```

2 5 5 3 5

4.

```
#include <iostream>
using namespace std;
class B {
public:
      void m()       {    cout << " B::m" << endl;    }
```

```
    virtual void f ( )      {   cout << " B::f " << endl;   }
};
class D: public B {
public:
    void m()      {   cout << " D::m" << endl;   }
    void f ( )    {   cout << " D::f " << endl;   }
};
int main() {      B *p[2];
    p[0] = new D;          p[1] = new B;
    for(int i = 0; i <= 1; i++) { p[i]->m();      p[i]->f(); }
    return 0;
}
```

B::m
D::f
B::m
B::f

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

1. From following pictures, please analyze and design the class and class Hierarchies. (15 points)

《图略》

2. (15 points)

Define a class named ***Point*** which can express the position of any point in a plane coordinate(坐标) system. A ***Point*** object contains two private data member: ***x*** which holds the horizontal coordinate, ***y*** which holds the vertical coordinate. This class should have such public operations:

a) a default constructor that set the coordinate to (0,0);
b) a constructor that takes two integer, which initializes the x and y;
c) an overloaded operator "+=" which moves the point to another position;
d) some member functions to re-set or get each of two data members.

Part IV Programming (20 points)

1. (10 points)

Define and implement a class "***MyString***" according to the main() and the output in comments.

```
int main()
{
```

```
    MyString  s1("0123456789"),  s2(5),  s3;
      s1.display();              // Output: [0123456789]
      s2.display();              // Output(5 spaces between []) : [     ]
      s3.display();              // Output(no space between []): []
    s3 = s1;
      s1.display();              // Output: [0123456789]
      s3.display();              // Output: [0123456789]
    s2 = s1 + 3;
      s1.display();              // Output: [0123456789]
      s2.display();              // Output: [3456789]
    s3 = ++++s2;
      s2.display();              // Output: [56789]
      s3.display();              // Output: [56789]
    return 0;
}
```

2. (10 points) According to the main function and the output below, implement a class hierarchy with ***fighter*** as the base class and ***Warrior*** is a derived class from ***fighter***.

```
int main()
{   fighter * objs[2];
    objs[0] = new fighter("Harry");
    Warrior Stallone("Stallone", objs[0]);
    objs[1] = &Stallone;
    cout << "Test the class famliy:" << endl;
    for(int i=0; i<2; i++) {
        objs[i] -> outTitle();
        cout<< "----   "<< i+1<<"   ----\n";
        objs[i] -> hello();
    }
    cout << "This is the end." << endl;
    delete objs[0];
    return 0;
}
```

The output of this program is:

```
Test the class famliy:
We are fighters.
----  1  ----
Harry is a fighter.
We are fighters.
----  2  ----
Stallone is a stronger warrior than Harry.
This is the end.
```

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____学号_____姓名_____任课教师_____

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)
```
float* ptr = new float[20];
for (int i = 0; i < 20; i++)
    ptr[i] = i+2;
delete ptr;
```

(2)
```
namespace myspace{
    void do() { /* … */}
    int temp;
}
using namespace myspace;
using namespace myspace:temp;
```

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

(4)
```
class Student  {
//…
public:
  void Student();
  ~ Student();
};
```

(5)
```
class BC {
    int x;
public:
    BC(int xx = 0) { x = xx; }
};
class DC : public BC {
 char c;
    DC(int x1, char c1) {
        x = x1;
      c = c1;
    }
};
```

(6)
```
class C {
 int sz;
public:
 friend C operator+ (const C&, const C&);
 // …
};
C C::operator+ (const C& c1, const C& c2){
 cout << c1.sz;
    // ….
}
```

(7)
```
class B {
public:
```

(8)
```
class Animal {
public:
```

```
    B(int a=10, float y)
      {  i=a; z=y;  }
  private:
        int i;
    float z;
  };
```

```
    virtual void f()=0;
};
void f(){
Animal b;
}
```

(9)
```
class C {
public:
 void m() {/* … */}
 static void s() {/* … */}
};
void  main() {
 C c1;
 c1.m();
 C::m();
   c1.s();
 C::s();
}
```

(10)
```
template <class T, int i> class Array {
 int sz;
public:
   Array():sz(i) { }
   // ……
};
void f(int x)
{
 Array<int, x> ay;
}
```

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

1. (6 points)

```
#include <iostream>
using namespace std;
void main() {
int i = 1;
while(i <= 15) {
i++;
if(i % 3 != 1) continue;

        else cout << i << " ";

       }
}
```

4 7 10 13 16

2. (6 points)

```
#include <iostream>
using namespace std;
class IntNumber{
  int  value;
public:
  IntNumber(int value){this->value = value;}
  IntNumber& operator*=(int v){ value *= v; return *this;}
  friend void operator << (ostream& outf, IntNumber& n){ outf << n.value << endl;}
};
template<class T> const char* cmp(T a,  T b)  { return "<T>CMP"; }
const char* cmp(IntNumber a, IntNumber b)   { return "<IntNumber>cmp";  }
const char* cmp(IntNumber a,  int b)        { return "<IntNumber, int>cmp";  }
int main()  {
  IntNumber a(1), b(2);
      b *=10;
      cout << "b=" << b;
  cout << cmp(a, b) << endl;
  cout << cmp(a, 0) << endl;
  cout << cmp(1, 0) << endl;
```

b=20

<int Number> cmp

<IntNumber, int> cmp

<T> cmp

```
    return 0;
}
```

3. (6 points)

```
#include <iostream>
using namespace std;
void add1(int a1) {

        a1++;
}
void add2(int& a2) {

        a2++;
}
void add3(int* a3) {

        (*a3)++;
}
int main() {

        int t1=2, t2=2, *t3=&t2, t4=t2, &t5=t2;
   add1(t1) ;add2(t2); add3(t3); add3(&t4); add2(t5);

        cout<<t1<<" "<<t2<<" "<<*t3<<" "<<t4<<" "<<t5<<endl;

        return 0;
}
```

2 5 5 3 5

4. (6 points)

```
#include <iostream>
using namespace std;
class B {
public:
   void m()    {  cout << " B::m" << endl;  }
};
class D: public B {
public:
   void m()    {  cout << " D::m" << endl;  }
};
int main() {
   B *p[2];
   p[0] = new D;
   p[1] = new B;
   for(int i = 0; i <= 1; i++)
      p[i]->m();
   return 0;
}
```

B::m
B::m

5. (6 points)

```
#include <iostream>
using namespace std;
class C{
   int value;
public:
   C(int v) : value(v) { }
   bool operator< ( C& b ) {
      if( value < b.value )  return true;
      return false;
   }
   int getValue( ) { return value; }
};
double getMin(double a, double b) {
   cout << "getMin(double, double) is invocated!\t";
```

```
  if( a < b ) return a;
  return b;
}
C getMin(C& a,  C& b) {
  cout << "getMin(C&, C&) is invocated!\t";
  if( a < b ) return a;
  return b;
}
C getMin(C a,  C b)  {
  cout << "getMin(C, C) is invocated!\t";
  if( a < b ) return a;
  return b;
}
int main( )  {
  C c1(-9), c2(90);
  cout << getMin(10, 99) << endl;
  cout << getMin(1.2, 2.3) << endl;
  cout << getMin(10, 2.3) << endl;
  cout << getMin(c1, 2).getValue() << endl;
  return 0;
}
```

get Min(double, double) → 99
get Min(double, double) → 2.3
get Min(double, double) → 10
get Min(C, C) → -9

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

1 . From following pictures, please analyze and design the class and class Hierarchies. (15 points)

class 运动项目 { };
class 水上项目 : public 运动项目 { }
class 陆地项目 : public 运动项目 { }
class 游泳 : public 水上项目 { }.

2. (15 points)

Define a class named ***Point*** which can express the position of any point in a plane coordinate(坐标) system. A ***Point*** object contains two private data member: ***x*** which holds the horizontal coordinate, ***y*** which holds the vertical coordinate. This class should have such public operations:

a) a default constructor that set the coordinate to (0,0);

b) a constructor that takes two integer, which initializes the x and y;

c) an overloaded operator "+=" which moves the point to another position;

d) some member functions to re-set or get each of two data members.

Point & operator +=(const Point & p);

Part IV Programming (20 points)

1. (10 points)

Define and implement a class "***MyString***" according to the main() and the output in comments.

```
int main()
{
 MyString  s1("0123456789"),  s2(5),  s3;
   s1.display();          // Output: [0123456789]
   s2.display();          // Output(5 spaces between []) : [     ]
   s3.display();          // Output(no space between []): []
 s3 = s1;
   s1.display();          // Output: [0123456789]
   s3.display();          // Output: [0123456789]
 s2 = s1 + 3;
   s1.display();          // Output: [0123456789]
   s2.display();          // Output: [3456789]
 s3 = ++++s2;
```

```
  s2.display();          // Output: [56789]
  s3.display();          // Output: [56789]
 return 0;
}
```

2. (10 points)

According to the main function and the output below, implement a class hierarchy with ***fighter*** as the base class and ***Warrior*** is a derived class from ***fighter***.

```
int main()
{  fighter * objs[2];

    objs[0] = new fighter("Harry");
Warrior Stallone("Stallone", objs[0]);
objs[1] = &Stallone;
```

```
    cout << "== Test the class famliy ==" << endl;
    for(int i=0; i<2; i++) {
      objs[i] -> outTitle();
      cout << "----  " << i+1 << "  ----" << endl;
      objs[i] -> hello();
    }
    cout << "==This is the end." << endl;
    delete objs[0];
    return 0;
      }
```

The output of this program is:

```
    == Test the class famliy ==
    We are fighters.
    ----  1  ----
    Harry is a fighter.
    We are fighters.
    ----  2  ----
    Stallone is a stronger warrior than Harry.
    ==This is the end.
```