

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)	<pre>const int a; const int &refa = a;</pre>	(2)	<pre>int a = 1.05; int &refa = &a;</pre>
(3)	<pre>int a; int* p1=&a, p2; p2 = p1;</pre>	(4)	<pre>int a[2] = {3,7,8,6,2}; int *p = a+2;</pre>
(5)	<pre>struct Test5 { int e; Test5(int k):e(k){} // ... }; Test5 t;</pre>	(6)	<pre>class C6 { char *name; public: C6(); ~C6(char * nm); };</pre>
(7)	<pre>namespace usrSpace{ double a; extern int size = 100; void f(void); } using usrSpace::a = 1.0;</pre>	(8)	<pre>class C8 { int sz; public: friend int operator[] (const C8&, char); C8 operator+ (const C8&); // ... };</pre>
(9)	<pre>class C9{ int elem; public: void set(int a) { /* ... */ } }; int main() { C9 c9; c9.set(5); cout << c9.elem << endl; }</pre>	(10)	<pre>class C10{ string mem[100]; int idx; public: C10 () { /* ... */ } void print () { /* ... */ } }; void f(C10 c10){ C10::print(); }</pre>

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

1. (6 points)

```
#include <iostream>
#include<cstring>
int main() {
    const char *str[] = { "Monday", "Thursday", "Aug", "June", "Sep", "Alice" };
    int n = sizeof(str)/sizeof(const char *);
    for(int i = 0; i<n; ++i)
        std::cout << strlen(str[i]) << "\t";
    return 0;
}
```

2. (6 points)

```
#include <iostream>
int x = 1;
int& f(int x) {
    std::cout << "x = " << x << std::endl;
    {
        int x = 5;
        ::x += 2;
        std::cout << "x = " << x << std::endl;
    }
    return ::x;
}
int main() {
    f(2)++;
    std::cout << "x = " << x << std::endl;
    return 0;
}
```

3. (6 points)

```
#include <iostream>
using namespace std;
class Point {
public:
    Point(int i=0, int j=0):x(i), y(j) {}
    Point operator++(int) { ++x; ++y; }
    int operator- (Point p) { return ((x-p.x)*(x-p.x) + (y-p.y)*(y-p.y)); }
    friend ostream& operator<<(ostream& os, const Point& p);
private:
    int x, y;
};
```

```

ostream& operator<<(ostream& os, const Point& p){
    os << "("<< p.x << "," << p.y << ")" << endl;
    return os;
}

int main() {
    Point p0, p1(3,4);
    cout << p0;
    cout << p1;
    p0++;
    cout << p0;
    cout << p1 - p0 << endl;
    return 0;
}

```

4. (6 points)

```

#include <iostream>
using namespace std;
class Animal {
public:
    Animal(){ age = 1; cout << "Create " << age << endl;}
    ~Animal() { cout << "Delete\n"; }
    virtual void print() { cout << "Animal age: " << age << endl;}
    int getAge() const { return age; }
protected:
    int age;
};

class Cat:public Animal{
    int color;
public:
    Cat(int c=100):color(c){}
    void print() { cout << "Cat age: " << age << endl;}
    void setAge(int a) { cout << age << "-->" << a << endl; age = a; }
};

int main(){
    Animal amy;
    amy.print();

    Cat *p = new Cat;
    p->setAge(5);
    p->print();
    Animal *q = p;
    q->print();
    return 0;
}

```

5. (6 points)

```
#include <iostream>
#include <cstring>
using namespace std;

class IndexError{ };

class ARRAY{
    int msize;
    double *ptr;
public:
    ARRAY(int size) : msize(size)    {
        ptr = new double[size];
        memset(ptr, 0, size*sizeof(int));
        cout << "new double[" << size << "]\n";
    }
    ~ARRAY() { cout << "delete[]\n";    delete[] ptr; }
    double& at(int index);
};

double& ARRAY::at(int index)  {
    if(index<0|| index>=msize)  {
        throw IndexError();
    }
    cout << "ptr[" << index << "]" << endl;

    return ptr[index];
}

int main()  {
    ARRAY a(50);
    int n;

    n = 3;    // cin >> i;

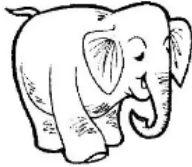
    try {
        for(int j=0;j<n;j++)
            a.at(j) = j+1;
    }
    catch(IndexError e)  {
        cout << "IndexError" << endl;    return 0;
    }

    return 0;
}
```

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

1. (15 points)

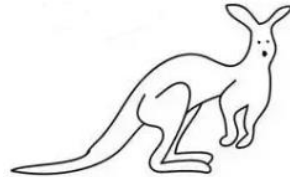
From following named pictures, please analyze and design the class hierarchies.



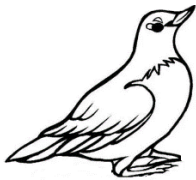
elephant (大象)



squirrel (松鼠)



kangaroo (袋鼠)



robin (知更鸟)



dove (鸽子)



sparrow (麻雀)

2. (15 points)

Define a class named **NumberStack** which represents a stack(LIFO) of real numbers. It should have some private data members that can hold current state of the stack. This class should have such public operations:

- (1) two constructors that initialize the data members. One should be a default constructor that has no argument, the other one should take one argument that indicates the capacity(容量) of the stack.
- (2) a destructor which releases any resource managed by the stack.
- (3) a function that insert a given real number into the stack.
- (4) a function that remove an element from the stack.
- (5) a function which checks whether the stack is empty.
- (6) a function which checks whether the stack is full.

Part IV Programming (20 points)

1. (10 points)

Implement the class **Student** and member functions according to the following codes.

```

class Student{
    string name; // name of the student
    int id;      // Identification number of the student
    int age;
public:
    Student(string nm, int sID, int age); // constructor
    Student(const Student& s);           // copy constructor
    Student& operator=(Student& s);      // overloading operator =
    void print() const;                 // print the information of Student object
    friend Student& operator++(Student& s); // increase the age by one
};

```

2. (10 points)

Please complete the class **Sub1** and class **Sub2** according to the following program and the output given in the comments.

```

class Base {
protected:
    int iBody;
public:
    virtual void printOn() = 0;
    Base(int i = 0) { iBody = i; }
};

```

```

class Sub1 : public Base {
    // ...
public:
    // ...
    Sub1(int i, char* s);
};

```

```

class Sub2 : public Base {
    // ...
public:
    // ...
    Sub2(int i, short s);
};

```

```
int main()
{
    Sub1 s1(999, "This is an object of Sub1");
    Sub2 s2(2022, 10);
    s1.printOn();      // output: 999: This is an object of Sub1
    s2.printOn();      // output: 10 and 2022

    return 0;
}
```