第一部分 笔试

I．Read the following programs：（20 scores）

1．What does the following program output? (5 scores)

class MyClass

{

public:

MyClass( int n )

{

number=n;

cout<<"The constructor is called: number="<<number<<endl;

};

MyClass(MyClass &other)

{

number=other.number;

cout<<"The copy constructor is called: number="<<number<<endl;

};

private:

int number;

};

MyClass fun(MyClass p)

{

MyClass t(p);

return t;

}

int main()

{

MyClass t1(10),t2(20);

MyClass t3(t1);

MyClass t4=fun(t2);

return 0;

}

2．What does the following program print? ( 4 scores)

2. What does the following program output? (5 scores)

class A{

public:

virtual void func1(){ cout << "A::func1." << endl; func2( ); }

void func2(){ cout << "A::func2." << endl; func3( ); }

virtual void func3(){ cout << "A::func3." << endl; }

~A(){cout << "A dtor." << endl; }

};

class B : public A{

public:

void func2(){ cout << "B::func2." << endl; }

virtual void func3(){ cout << "B::func3." << endl; }

~B(){cout << "B dtor." << endl; }

};

int main()

{

A \*p= new B; p->func1(); delete p;

return 0;

}

3．What does the following program output? (5 scores)

#include <iostream>

#include <string>

using namespace std;

class MyExcept{

public:

MyExcept() {}

~MyExcept(){}

const char \*showReason() const

{return "MyExcept occured";}

};

class A

{ public:

A() {cout<<"Constructor for A"<<endl;}

~A(){cout<<"Desconstructor for A"<<endl;}

};

void function3()

{ A a;

cout << "in function3" << endl;

cout<<"throwing exception"<<endl;

throw MyExcept();

cout<<"exit function3"<<endl;

}

void function2()

{ cout << "in function2" << endl;

try

{throw 0;}

catch (int)

{cout<<"Catch an int error"<<endl;

function3();

}

cout << "exit function2" << endl;

}

void function1()

{ cout << "in function1" << endl;

function2();

cout << "exit function1" << endl;

}

int main()

{ try {

function1();

}catch(MyExcept &e)

{ cout<<"catch an exception: ";

cout<<e.showReason()<<endl;

}

cout<<"Return to main function"<<endl;

return 0;

}

4、What does the following program output? (5 scores)

# include <iostream>

using namespace std;

class TeacherID

{ public:

TeacherID(int id =0 ) : value(id)

{ cout <<" Teacher id is "<<value<<" , "; }

void setValue(int id)

{ value = id;

cout <<" Set Teacher id " << value << endl;

}

int getValue() const

{ cout <<" Get Teacher id ";

return value;

}

protected:

int value;

};

class Teacher

{ public:

Teacher(int id =0 ) : ptr(new TeacherID(id))

{ cout <<" Teacher "<<id<<endl; }

void setValue(int id)

{ ptr->setValue(id); }

int getValue() const

{ return ptr->getValue(); }

~Teacher()

{ delete ptr; }

private:

TeacherID \* ptr;

};

int main()

{ Teacher A(35), B;

cout << A.getValue() <<endl;

B.setValue(21);

cout << B.getValue() << endl;

return 0;

}

II．Fill in the blanks in each of the following to complete the programs. （20 score）

A program output is below, and complete the code:

(21,32)

(16,29)

51,62

(16,29)

#include <iostream>

using std::cout;

using namespace std;

using std::endl;

class A {

public:

A(\_\_\_\_ 1\_\_\_\_\_) {\_\_\_\_ 2\_\_\_\_\_ }

void move(int x, int y) {a+=x;b+=y;}

void show() {cout <<"("<<a<<","<<b<<")"<<endl;}

private:

int a,b;

};

class B:public A {

public:

B(int i,int j,int k, int l): \_\_ \_\_ 3\_\_\_ \_\_{}

void fun() {move(3,5);}

void f1() {A::show();}

void show() {cout <<x<<","<<y<<endl;}

private:

int x,y;

};

int main() {

A a(21,32);

\_\_\_\_ 4\_\_\_\_\_

B b(13,24,51,62);

b.fun();

\_\_\_\_ 5\_\_\_\_\_

b.show();

b.f1();

return 0;

}

2. Complete the class defination

Class MyClass

{

public:

MyClass(){x=0;}

\_\_\_\_\_\_ 6\_\_\_\_\_\_\_\_\_int GetNum(\_\_\_\_\_\_ 7\_\_\_\_\_\_\_\_\_my);

private:

int x;

};

int GetNum(\_\_\_\_\_\_ 7\_\_\_\_\_\_\_\_\_my)

{

Return \_\_\_\_\_ 8\_\_\_\_\_\_\_\_;

}

3. The result of this program is :10, complete the code to get the result.

#include <iostream>

using std::cout;

using std::endl;

class MyClass

{

pub1ic:

\_\_\_\_\_\_9\_\_\_\_\_\_\_\_\_//Set the value of X

\_\_\_\_\_\_10\_\_\_\_\_\_\_\_ //Get the value of X

private:

int x;

};

void main()

{

Myclass my(10);

cout<<my.GetNum()<<endl;

}

III．Write programs according to the requests（60 score）

1．(15 scores)

Write a program to read data from the file named source.txt , then change all the lower case letters to upper case letters and write them to the file name target.txt. For example, there are “Hello, world!” in file source.txt, you should write “HELLO, WORLD!” to the file target.txt.

2．(15 scores)

Define a class Date, include some private member, such as year, month, and day. It should implement some basic functions, such as add some days to certain date, and subtract some days to certain date, calculate the difference between two dates.

3. (15 scores)

Define a class template called Vector. The template can instantiate a vector of any element type.

Overload several essential operators in the form of function templates including:

1) Overloaded >> and << operators: to enable input and output of a vector, respectively.

2) Overloaded +、-、\* and = operators: to enable addition, subtraction, multiplication and

assignment of two vectors. Their calculation formulas are shown as follows:

X + Y = ( x1 + y1 , x2 + y2 , x3 + y3 )

X - Y = ( x1 - y1 , x2 - y2 , x3 - y3 )

X \* Y = ( x1 \* y1 , x2 \* y2 , x3 \* y3)

Implement both class definition and main function to complete the correct output.

Notice:

a) Main function should demonstrate the instantiation of a vector of int elements (class

Vector<int>) and a vector of double elements (class Vector<double>).

b) Use dynamic memory allocation technique in class definition.

In the calculation, the situation that the length of two vectors are different (for example: X= (x1, x2, x3, x4, x5), Y= (y1, y2, y3)) should be considered. You may use zero to complement the shorter one (for example: Y= (y1, y2, y3, 0, 0), vice versa).

template < typename T >

class Vector

{

….

private:

T \*ptr; // pointer to first element of Vector

int len; // pointer-based Vector length

};

Output：

Input the length of Int Vector A

5

Input the elements of Int Vector A

1 2 3 4 5

Input the length of Int Vector B

3

Input the elements of Int Vector B

6 7 8

A=(1,2,3,4,5)

B=(6,7,8)

A+B=(1,2,3,4,5)+ (6,7,8)=(7,9,11,4,5)

A-B=(1,2,3,4,5)- (6,7,8)=(-5,-5,-5,4,5)

A\*B=(1,2,3,4,5)\* (6,7,8)=(6,14,24,0,0)

Input the length of Double Vector C

2

Input the elements of Double Vector C

3.1 5.2

Input the length of Double Vector D

3

Input the elements of Double Vector D

1.2 2.3 3.4

C=(3.1, 5.2)

D=(1.2, 2.3, 3.4)

C+D=(3.1, 5.2)+ (1.2, 2.3, 3.4)=(4.3, 7.5, 3.4)

C-D=(3.1, 5.2)- (1.2, 2.3, 3.4)=(1.9, 2.9, -3.4)

C\*D=(3.1, 5.2)\* (1.2, 2.3, 3.4)=(3.72, 11.96, 0)

4. (15 score)

All employees of a small company can be classified into “Salesman”, “Technician” and

“Manager”.

Salary of Salesman = base salary + amount of sales \* commissionRate\* level factor(等级).

Salary of Technician = base salary + working hours \* payment per hour \* level factor.

Salary of Manager = Salary of Technician + stock(股份).

Design an inheritance hierarchy to define all employees. Define “baseSalary” as static data member in the base class. Define the following functions to implement polymorphism:

1) Funtion salary(): to calculate the salary of an employee.

2) Function display(): to display all information of an employee such as id, name, levFactor(∈(1,2)), commissionRate(∈(0,1)) and salary.

Tips:

Main function is given as follows.

int main()

{

vector < Employee\* > e(6);

e[0] = new Salesman( 1001, "Donald", 1.1, 0.04, 10000 );

e[1] = new Salesman( 1002, "Vivian", 1.05, 0.06, 7000 );

e[2] = new Technician( 1003, "Chris", 1.3, 15, 60 );

e[3] = new Technician( 1004, "Cindy", 1.2, 18, 40 );

e[4] = new Manager( 1005, "Michael", 1.5, 18, 70, 8000 );

e[5] = new Manager( 1006, "Leonardo", 1.3, 18, 60, 3000 );

for( size\_t i=0; i<e.size(); i++) {

e[i] -> salary();

e[i] -> display();

}

for( size\_t i=0; i<e.size(); i++ ) {

delete e[i];

}

return 0;

}

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{

public:

MyClass( int n )

{

number=n;

cout<<"The constructor is called: number="<<number<<endl;

};

MyClass(MyClass &other)

{

number=other.number;

cout<<"The copy constructor is called: number="<<number<<endl;

};

private:

int number;

};

MyClass fun(MyClass p)

{

MyClass t(p);

return t;

}

int main()

{

MyClass t1(10),t2(20);

MyClass t3(t1);

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2．What does the following program print? ( 4 scores)

2. What does the following program output? (5 scores)

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class B : public A{

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~B(){cout << "B dtor." << endl; }

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int main()

{

A \*p= new B; p->func1(); delete p;

return 0;

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3．What does the following program output? (5 scores)

#include <iostream>

#include <string>

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class MyExcept{

public:

MyExcept() {}

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const char \*showReason() const

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cout<<"throwing exception"<<endl;

throw MyExcept();

cout<<"exit function3"<<endl;

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{cout<<"Catch an int error"<<endl;

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void function1()

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4、What does the following program output? (5 scores)

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class TeacherID

{ public:

TeacherID(int id =0 ) : value(id)

{ cout <<" Teacher id is "<<value<<" , "; }

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}

int getValue() const

{ cout <<" Get Teacher id ";

return value;

}

protected:

int value;

};

class Teacher

{ public:

Teacher(int id =0 ) : ptr(new TeacherID(id))

{ cout <<" Teacher "<<id<<endl; }

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{ ptr->setValue(id); }

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int main()

{ Teacher A(35), B;

cout << A.getValue() <<endl;

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void move(int x, int y) {a+=x;b+=y;}

void show() {cout <<"("<<a<<","<<b<<")"<<endl;}

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private:

int x;

};

int GetNum(\_\_\_\_\_\_ 7\_\_\_\_\_\_\_\_\_my)

{

Return \_\_\_\_\_ 8\_\_\_\_\_\_\_\_;

}

3. The result of this program is :10, complete the code to get the result.

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int x;

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void main()

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Myclass my(10);

cout<<my.GetNum()<<endl;

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Input the elements of Int Vector A

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Input the length of Int Vector B

3

Input the elements of Int Vector B

6 7 8

A=(1,2,3,4,5)

B=(6,7,8)

A+B=(1,2,3,4,5)+ (6,7,8)=(7,9,11,4,5)

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A\*B=(1,2,3,4,5)\* (6,7,8)=(6,14,24,0,0)

Input the length of Double Vector C

2

Input the elements of Double Vector C

3.1 5.2

Input the length of Double Vector D

3

Input the elements of Double Vector D

1.2 2.3 3.4

C=(3.1, 5.2)

D=(1.2, 2.3, 3.4)

C+D=(3.1, 5.2)+ (1.2, 2.3, 3.4)=(4.3, 7.5, 3.4)

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for( size\_t i=0; i<e.size(); i++) {

e[i] -> salary();

e[i] -> display();

}

for( size\_t i=0; i<e.size(); i++ ) {

delete e[i];

}

return 0;

}