CS 124 Test 2 Spring 2008 Thursday, Feb 28

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ CWID: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Section: (circle one) 11:00 12:30 2:00

1. What changes are needed to the following Person.h file if it is going to be used in a multi-file project with other header files and several cpp files?

#include <iostream>

#include <string>

using namespace std;

class Person {

Weight weigh;

int height;

string name;

public:

Person();

Person(const Weight&, int, string);

friend ostream& operator<<(ostream&, const Person&);

friend istream& operator>>(istream&, Person&);

};

2. What is output by the following program?

#include <iostream>

using namespace std;

int main ( ) {

double \*p1, array[10];

p1 = array;

for (int j=0; j<10; ++j,p1++)

\*p1 = (double) j / (j+3);

p1 = array;

cout << \*p1 << endl;

cout << \*p1 + 3 << endl;

cout << \*(p1+3) << endl;

cout << \*(p1+6) << endl;

cout << \*(p1+9) << endl;

return 0;

}

3. Re-write using subscripts but no pointers.

#include <iostream>

using namespace std;

int main ( ) {

double \*p1, array[10];

p1 = array;

for (int j=0; j<10; ++j,p1++)

\*p1 = (double) j / (j+3);

p1 = array;

cout << \*p1 << endl;

cout << \*p1 + 3 << endl;

cout << \*(p1+3) << endl;

cout << \*(p1+6) << endl;

cout << \*(p1+9) << endl;

return 0;

}

4. What is output by the following program?

#include <iostream>

using namespace std;

int main(){

int \*p1;

double \*p2;

p1 = new int[7];

p2 = new double[3];

\*p2 = 11.5; p2++;

\*(p1+1) = 5;

\*p1 = 3;

\*p2 = 7.47;

p1++;

cout << \*p1 << " " << \*p2 << " " << \*(p1-1) << endl;

cout << p2[-1] << " " << \*p2 -2 << endl;

return 0;}

5. Write the definition of pop\_pop\_front( ) outside of the following MyVectorInt class declaration where the method removes the first two elements from the vector and returns the first element to the calling routine. If the vector is empty the method should return a 0. Additionally, if the difference between the capacity and the currentSize exceeds seven the vector should be dynamically downsized by five.

class MyVectorInt {

int currentSize, capacity, \*data;

public:

MyVectorInt( );

void push\_back(int);

int size(void) const;

int at(int a) const;

int pop\_pop\_front();

};

6. Discuss the output of the following program.

#include <iostream>

#include <set>

using namespace std;

int main( ) {

set<int> s;

set<int>::iterator si;

int x, y;

for (x=0; x<10000 ; ++x)

{ y = rand( ) % 100; s.insert(y);}

cout << s.size( )<< endl;

for (x=10; x<50; x=x+5) {

si = s.find(x);

if ( si != s.end( )) cout << "Y"; else cout << "N";}

cout << endl;

return 0;}

7. Discuss the output of the following program.

#include <iostream>

using namespace std;

int main( ) {

for (int a=0; ; ++a) {

double \*p1 = new double;

int \*p2 = new int[100];

if (a == 1000){ cout << "\*"; a = 0; }

}

cout << endl;

return 0;

}

8. What is the output of the following program?

#include <iostream>

#include <list>

using namespace std;

int main( ) {

list<int> s;

list<int>::iterator si;

list<int>::reverse\_iterator sr;

for (int a=1; a<=15; ++a){

if(a%2) s.push\_back(a);

else s.push\_front(a);}

for (si=s.begin(); si != s.end(); si++)

if(\*si%3) cout << \*si << " ";

cout << endl;

for (sr=s.rbegin(); sr != s.rend(); sr++)

if(\*sr%5) cout << \*sr-1 << " ";

cout << endl;

return 0;

}

9. A palindrome is a word or phrase that reads the same forwards and backwards such as “level” or “radar”. Complete the following program that makes use of a STL vector of characters, allows for the input of any number of characters (prompts the user for the number and then uses the number to control the input loop), then uses both forward and backward iterators to determine whether or not the vector contains a palindrome. An appropriate message should be displayed to the screen in either case.

#include <iostream>

#include <vector>

using namespace std;

int main( ) {

vector<char> s;

vector<char>::iterator si;

vector<char>::reverse\_iterator sr;

char ch;

int size;

bool flag = true;

cout << "How many characters do you wish to enter?";

cin >> size;

for (int a=1; a<=size; ++a){

cout << "enter a character:" << endl;

cin >> ch;

s.push\_back(ch);

}

return 0;

}

10. What is output by the following program?

#include <iostream>

using namespace std;

class MyVectorInt {

int currentSize, capacity, \*data;

public:

MyVectorInt( ): currentSize(0), capacity(5) {data = new int[5];}

void push\_back(int);

void pop\_back(void);

int getCap(){return capacity;}

int size(void) const { return currentSize; }

int at(int a) const {

if ( (a > -1) && (a < currentSize) ) return data[a];

else return 0;}

};

void MyVectorInt::pop\_back(void){

currentSize--;

if(capacity - currentSize >12){

capacity = capacity - 9;

int \*p = data;

data = new int[capacity];

for (int a=0; a < currentSize; a++)

data[a] = p[a];

delete [] p;

cout<<"capacity = "<<getCap()<<" ";

cout <<"size = "<<size()<<endl;}

}

void MyVectorInt::push\_back(int e) {

if (currentSize < capacity) {

data[currentSize] = e;

currentSize++;}

else{ capacity = capacity + 5;

int \*p = data;

data = new int[capacity];

for (int a=0; a<currentSize; a++)

data[a] = p[a];

delete [] p;

data[currentSize] = e;

currentSize++;}

}

int main ( ) {

MyVectorInt v;

for (int a=0; a<32; ++a) v.push\_back(a);

for (int b=0; b<27; ++b) v.pop\_back();

return 0;}