Fall Semester 15, Dr. Punch. Exam #2 (11/12), form 2 A

Last name (printed): 

First name (printed): 

Directions:

a) DO NOT OPEN YOUR EXAM BOOKLET UNTIL YOU HAVE BEEN TOLD TO BEGIN.

b) You have 80 minutes to complete the exam (10:20-11:40)

c) This exam booklet contains 30 multiple choice questions, each weighted equally (5 points). **5, double-sided, pages total**

d) You may use one 8.5" x 11" note sheet during the exam. No other reference materials or calculating devices may be used during the examination.

e) Questions will not be interpreted during the examination.

f) You should choose the single best alternative for each question, even if you believe that a question is ambiguous or contains a typographic error.

g) Please fill in the requested information at the top of this exam booklet.

h) Use a #2 pencil to encode any information on the OMR form.

i) Please encode the following on the OMR form:
   - Last name and first initial
   - MSU PID
   - Exam form (see the title of this page)

j) Please sign the OMR form.

k) Only answers recorded on your OMR form will be counted for credit.

l) Completely erase any responses on the OMR form that you wish to delete.

m) You must turn in this exam booklet and the OMR form when you have completed the exam. When leaving, please be courteous to those still taking the exam.

Good luck.

**Timing tip.** A rate of 2.5 minutes per multiple choice problem leaves 5 minutes to go over any parts of the exam you might have skipped.
#include<iostream>
using std::cout; using std::endl; using std::boolalpha;
#include<vector>
using std::vector;
#include<string>
using std::string;
#include<numeric>
using std::accumulate;
#include<algorithm>
using std::sort;

void fn1 (vector<string> &v, string s){
    v.push_back(s);
    sort(v.begin(), v.end());
}

long fn2(vector<string> &v, char c){
    long cnt = 0;
    for (auto i = v.begin(); i != v.end(); i++){
        for (auto elem : *i){
            if (elem == c)
                cnt++;
        }
    }
    return cnt;
}

string fn3(vector<string> v){
    string s = "";
    return accumulate(v.begin()+1, v.end()-1, s);
}

int main(){
    cout << boolalpha;
    vector<string> v_s = {"mom", "dad", "bro"};
    fn1(v_s, "sis");
    cout << v_s.size() << endl; // Line 3
    cout << v_s[0] << endl; // Line 4
    cout << fn2(v_s, 'o') << endl; // Line 5
    cout << fn3(v_s) << endl; // Line 6
}
1) What type is i on Line 1 of Figure 1?
   a) vector
   b) vector<string>
   c) vector::iterator
   d) long
   e) None of the above.

2) What type is elem on Line 2 of Figure 1?
   a) char
   b) vector<string>
   c) vector::iterator
   d) vector
   e) None of the above.

3) What output is produced by Line 3 in Figure 1?
   a) 4
   b) 3
   c) 2
   d) 1
   e) None of the above.

4) What output is produced by Line 4 in Figure 1?
   a) bro
   b) mom
   c) dad
   d) sis
   e) None of the above.

5) What output is produced by Line 5 in Figure 1?
   a) 1
   b) 2
   c) 3
   d) 4
   e) None of the above.

6) What output is produced by Line 6 in Figure 1?
   a) dad
   b) mom
   c) dadmom
   d) brodad
   e) None of the above.
7) What is a difference between a C++ struct and a C++ class?
   a) only a struct can have public data members
   b) only a class can have private function members
   c) no difference, they are synonyms
   d) All of the above
   e) None of the above
8) Which of the following is not a method of vector?
   a) front
   b) back
   c) push_front
   d) push_back
   e) None of the above
9) Which of the following is true about a variable \( m \) of type \( \text{map}<\text{string}, \text{long}> \)?
   a) \( m \) is not a sequence
   b) \( m["abc"] = 2 \) assigns the value 2 to the key "abc"
   c) \( \text{cout} \ll m \) is not a legal operation.
   d) All of the above.
   e) None of the above.
10) What is meaning of the keyword \text{auto} \ in a type declaration?
    a) Its variable's type must be derivable at compile time.
    b) Does in fact set the type of an auto-ed variable
    c) cannot be used as the type of a function declaration
    d) All of the above
    e) None of the above
11) Which of the following are true about a C++ lambda?
    a) It is an anonymous function (a function without a name)
    b) Can be used in generic algorithms that require a function
    c) Is primarily used as a "one time" function
    d) All of the above
    e) None of the above
12) Which of the following are true about STL iterators?
    a) they act as pointers
    b) you cannot use them in conjunction with an STL container
    c) there is only one type in all of the STL
    d) All of the above
    e) None of the above
13) What does \text{explicit} \ mean in a constructor declaration?
    a) the constructor will not be used/available in this class
    b) that constructor is explicitly defined elsewhere
    c) that C++ is prevented from using this constructor in an implicit conversion
    d) it is one of the basic types of constructor, like default, copy, etc.
    e) None of the above
For the program in Figure 2, what type is `i` in Line 1.

a) long  
b) map<string, long>  
c) map<string, long>::iterator  
d) map::iterator  
e) None of the above
15) For Line 2 in Figure 2, which of the following is an equivalent expression for i->first
   a) i.first
   b) (*i).first
   c) first
   d) *i
   e) None of the above

16) For the program in Figure 2, what type is i in Line 3.
   a) long
   b) map<string, long>
   c) map<string, long>::iterator
   d) map::iterator
   e) None of the above

17) For the program in Figure 2, what type is j in Line 4.
   a) long
   b) map<string, long>
   c) map<string, long>::iterator
   d) map::iterator
   e) None of the above

18) For the program in Figure 2, give the output of Line 5.
   a) 6
   b) 7
   c) 8
   d) 9
   e) None of the above

19) For the program in Figure 2, give the output of Line 6.
   a) 6
   b) 15
   c) 24
   d) 45
   e) None of the above
20) For the program in Figure 3, give the output of Line 1?
   a) 1.2
   b) 5.6
   c) 6.8
   d) 13.6
   e) None of the above

21) For the program in Figure 3, give the output of Line 2?
   a) Freddie
   b) freddie
   c) FREDDIE
   d) "" (the empty string)
   e) None of the above

Figure 3
22) For the program in Figure 3, give the output of Line 3?
   a) Freddie
   b) freddie
   c) FREDDIE
   d) "" (the empty string)
   e) None of the above
23) For the program in Figure 3, give the output of Line 4?
   a) 1.2
   b) 2.4
   c) 6.8
   d) 13.6
   e) None of the above
24) For the program in Figure 3, give the output of Line 5?
   a) 0
   b) 1
   c) 2
   d) 3
   e) None of the above
```cpp
#include<iiostream>
using std::cout; using std::endl;
#include<vector>
using std::vector;
#include<string>
using std::string;
#include<algorithm>
using std::copy;
#include<numeric>
using std::accumulate;
#include<iterator>
using std::back_inserter;
#include<sstream>
using std::ostringstream;

struct AStruct{
    vector<long> v;
    long val;
};

long fn1 (AStruct &a, long my_l) {
    a.val = my_l;
    for(int i = 0; i < my_l; i++) // be Careful!!!
        a.v.push_back(i + my_l);
}

void fn2 (AStruct a, vector<long> &v_l) {
    copy(a.v.begin(), a.v.end(), back_inserter(v_l));
}

string fn3 (AStruct a) {
    ostringstream oss;
    oss << a.val << ":" << a.v.front() << ":" << a.v.back();
    return oss.str();
}

long fn4 (AStruct a) {
    return accumulate(a.v.begin(), a.v.end(), a.val); // be Careful!!!
}

int main () {
    AStruct my_a;
    vector<long> v1;
    vector<long> v2={1,2,3};
    fn1(my_a, 4);
    cout << my_a.v.size() << endl; // Line 1
    fn2(my_a, v1);
    cout << v1[3] << endl; // Line 2
    fn2(my_a, v2);
    cout << v2[3] << endl; // Line 3
    cout << fn3(my_a) << endl; // Line 4
    cout << fn4(my_a) << endl; // Line 5
}
```

Figure 4
25) For the program in Figure 4, what value is printed by Line 1?
   a) 2
   b) 3
   c) 4
   d) 5
   e) None of the above

26) For the program in Figure 4, what value is printed by Line 2?
   a) 2
   b) 3
   c) 4
   d) 5
   e) None of the above

27) For the program in Figure 4, what value is printed by Line 3?
   a) 2
   b) 3
   c) 4
   d) 5
   e) None of the above

28) For the program in Figure 4, what value is printed by Line 4?
   a) 4:4–8
   b) 5:5–9
   c) 4:0–4
   d) 5:0–5
   e) None of the above

29) For the program in Figure 4, what value is printed by Line 5?
   a) 6
   b) 22
   c) 34
   d) 10
   e) None of the above

30) Which of the following is the correct meaning for the & in the parameter list of fn1?
   a) yields the address of the vector v_1
   b) that v_1 is a reference parameter
   c) yields the logical and of v_1
   d) that v_1 cannot be modified
   e) None of the above