Spring Semester, Dr. Punch. Exam #2 (03/28), form 2 B

Last name (printed): 

First name (printed): 

Directions:

a) DO NOT OPEN YOUR EXAM BOOKLET UNTIL YOU HAVE BEEN TOLD TO BEGIN.
b) You have 90 minutes to complete the exam (7:00pm – 8:30pm)
c) This exam booklet contains 30 multiple choice questions, each weighted equally (5 points). **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.
1) The C++ container map is ordered. Which of the following are true about map?
   a) Order is based on the keys of the elements
   b) The key must respond to the < operator
   c) The key is const
   d) All of the above
   e) None of the above
2) Which of the following are true about generic algorithms?
   a) They use iterators to work with a container
   b) They must be templated to work with the container type
   c) They are often not very efficient, but they are convenient.
   d) All of the above
   e) None of the above
3) Which of the following are true about a lambda function?
   a) It is a function automatically named lambda
   b) They are often used in conjunction with STL algorithms
   c) They do not require have a parameter list
   d) All of the above
   e) None of the above
4) Which of the following are true about C++ constructors?
   a) They cannot be defined inside of the struct.
   b) They return the newly made element of the struct type
   c) They can be overloaded for different argument lists
   d) All of the above
   e) None of the above
5) Which of the following are correct about struct methods?
   a) A method is part of a struct
   b) It is called in the context of an object using a dot call
   c) In calling a method the this pointer is assigned by the compiler
   d) All of the above
   e) None of the above
6) What is the meaning of cin.clear()?
   a) It removes all characters from the input stream.
   b) It undoes the last input operation
   c) It clears any errors, resets cin to be "good"
   d) It closes the cin stream
   e) None of the above
For the program in Figure 2, what type is `i` on Line 1.

a) `char`  
b) `map::iterator`  
c) `map<long,string>*`  
d) `string`  
e) None of the above

What output is produced by Line 2 in Figure 2?

a) `alan`  
b) `bill`  
c) `fred`  
d) `john`  
e) None of the above
9) What output is produced by Line 3 of Figure 2?
   a) alan
   b) bill
   c) fred
   d) john
   e) None of the above

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

11) What type is result on Line 5 in Figure 2?
    a) map<long, string>
    b) pair<long,string>
    c) long
    d) string
    e) None of the above

12) What output is produced by Line 6 of Figure 2?
    a) 4
    b) 3
    c) 2
    d) 1
    e) None of the above

13) What output is produced by Line 7 of Figure 2?
    a) 3:fred
    b) 1:bill
    c) 3:alan
    d) 2:fred
    e) None of the above
14) For the program in Figure 3, what type is var on Line 1.
   a) vector<long>
   b) string
   c) long
   d) char
   e) None of the above
15) What output is produced by Line 2 in Figure 3?
   a) 1
   b) 3
   c) 5
   d) 6
   e) None of the above

16) What output is produced by Line 3 of Figure 3?
   a) 0
   b) 1
   c) 2
   d) 3
   e) None of the above

17) For the program in Figure 3, what type is result on Line 4?
    a) vector<long>
    b) string
    c) long
    d) char
    e) None of the above

18) What output is produced by Line 5 of Figure 3?
    a) 0
    b) 1
    c) 2
    d) 3
    e) None of the above

19) What output is produced by Line 6 of Figure 3?
    a) 0
    b) 1
    c) 2
    d) 3
    e) None of the above
// let's assume I got the includes correct

```cpp
struct AStruct{
    vector<long> v = {1,2,3};
    long val = 3;

    AStruct()=default;
    AStruct(vector<long>v_param, long l_param) : v(v_param), val(l_param) {};

    long method1(long);
    void method2(vector<long>&);
};

long AStruct::method1(long my_l){
    int i;
    for(i = 0; i <= my_l; ++i)
        v.push_back(i + my_l);
    val = v.back();
    return i;
}

bool fn1(long lng){
    return lng <= 6;
}

void AStruct::method2 (vector<long> &v_l){
    copy_if(v_l.begin(), v_l.end(), back_inserter(v_l), fn1);
}

int main (){  
    AStruct my_a1;
    cout << my_a1.val << endl;  // Line 1
    AStruct my_a2({4,5,6},6);
    cout << my_a2.v[1] << endl;  // Line 2

    cout << my_a1.method1(3) << endl;  // Line 3
    cout << my_a1.v.back() << endl;  // Line 4

    vector<long> v_arg{5,6,7,8};
    my_a2.method2(v_arg);
    cout << v_arg.size() << endl;  // Line 5
}
```

**Figure 4**

20) For the program in Figure 4, what value is printed by Line 1?

a) 3  
b) 4  
c) 5  
d) 6  
e) None of the above
21) For the program in Figure 4, what value is printed by Line 2?
   a) 3
   b) 4
   c) 5
   d) 6
   e) None of the above

22) For the program in Figure 4, what value is printed by Line 3?
   a) 3
   b) 4
   c) 5
   d) 6
   e) None of the above

23) For the program in Figure 4, what value is printed by Line 4?
   a) 3
   b) 4
   c) 5
   d) 6
   e) None of the above

24) For the program in Figure 4, what value is printed by Line 5?
   a) 3
   b) 4
   c) 5
   d) 6
   e) None of the above
#include<iostream>
using std::cout; using std::endl;
#include<vector>
using std::vector;

int fn1(vector<long> &v1, vector<long> &v2){
    int result=0;
    while( v1.size() >= v2.size() ){
        v2.push_back( v1.back() );
        v1.pop_back();
        ++result;
    }
    return result;
}

long fn2(vector<long> &v){
    long lg = 0;
    for(auto i = v.begin(); i != v.end(); ++i){  // Line 1
        lg += *i;
    }
    v.push_back(lg);
    return lg;
}

int main(){
    vector<long> v1{1,2,3,4,5};
    vector<long> v2{6,7,8};
    cout << fn1(v1,v2) << endl;  // Line 2
    cout << v1.back() << ":" << v2.back() << endl;  // Line 3
    v1 = {1,2,3};
    cout << fn2(v1) << endl;  // Line 4
    cout << v1.size() << endl;  // Line 5
    cout << v1.back() << endl;  // Line 6
}

Figure 1

25) What type is \( i \) on Line 1 of Figure 1?
   a) vector
   b) vector<long>
   c) Iterator
   d) vector<long>*
   e) None of the above.

26) What output is produced by Line 2 in Figure 1?
   a) 0
   b) 1
   c) 2
   d) 3
   e) None of the above.
27) What output is produced by Line 3 in Figure 1?
   a) 3:4
   b) 3:5
   c) 5:8
   d) 4:7
   e) None of the above.

28) What output is produced by Line 4 in Figure 1?
   a) 1
   b) 2
   c) 6
   d) 12
   e) None of the above.

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

30) What output is produced by Line 6 in Figure 1?
   a) 1
   b) 2
   c) 6
   d) 12
   e) None of the above.