Spring 14, Dr. Punch. Exam #1 (10/3), form 1 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). **Eight 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

**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.

Key

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1) For the program in Figure 1, given user input of 3, what output is produced by Line 1?
   a) 3  
   b) 4  
   c) 5  
   d) 6  
   e) None of the above.

2) For the program in Figure 1, given user input of 3, what output is produced by Line 2?
   a) 3  
   b) 4  
   c) 5  
   d) 6  
   e) None of the above.

3) For the program in Figure 1, given user input of 1, what output is produced by Line 1?
   a) 3  
   b) 4  
   c) 5  
   d) 6  
   e) None of the above.

4) For the program in Figure 1, what is the largest value that the variable cnt can hold?
   a) about 2 billion  
   b) about $2^{32}$  
   c) about $2^{64}$  
   d) no limit to the size it can hold  
   e) None of the above.

5) For the program in Figure 1, what is the name for the :: found in statements like using std::cout?
   a) rename operator  
   b) scope resolution operator  
   c) iostream operator  
   d) include operator  
   e) None of the above.
6) Which of the following is true of the phrase "compile time"?
   a) the time period during which you compile your code.
   b) the time when C++ syntax errors are discovered.
   c) the time when types are checked.
   d) All of the above
   e) None of the above

7) Which of the following is true about post increment (my_var++)?
   a) my_var value is not changed
   b) return value is not the changed
   c) the return value is incremented by one
   d) cannot be used on a double
   e) None of the above

8) What is the return value of an assignment statement?
   a) the value assigned
   b) the value of the variable before assignment
   c) no return
   d) the null value of the type being assigned
   e) None of the above.

9) Which of the following is true about a logical expression such as (a && b)?
   a) returns the value that made the result "obvious"
   b) always returns true or false
   c) can only be used for integer types
   d) All of the above
   e) None of the above

10) Which of the following is a declaration of a pointer variable?
    a) long ptr;
    b) long *ptr;
    c) long ptr = *p;
    d) long ptr++;
    e) None of the above

11) unsigned is a modifier for what kinds of types
    a) floating point types
    b) integer types
    c) Boolean types
    d) all types
    e) None of the above

12) An appropriate synonym for a reference type is:
    a) pointer
    b) integer
    c) long
    d) unsigned
    e) None of the above
Figure 2

#include<iostream>
using std::cout; using std::endl;

int main () {
    long l1 = 1234;
    long *l2 = &l1;
    long &l3 = l1;

    cout << l1 << endl; // Line 1
    cout << l3 << endl; // Line 2
    l1 = 4567;
    cout << l2 << endl; // Line 3
    cout << *l2 << endl; // Line 4
    l3 = 0;
    cout << l1 << endl; // Line 5
}

13) For the program in Figure 2, give the output of Line 1.
   a) 1234
   b) 4567
   c) 0
   d) some address
   e) None of the above
14) For the program in Figure 2, give the output of Line 2.
   a) 1234
   b) 4567
   c) 0
   d) some address
   e) None of the above
15) For the program in Figure 2, give the output of Line 3.
   a) 1234
   b) 4567
   c) 0
   d) some address
   e) None of the above
16) For the program in Figure 2, give the output of Line 4.
   a) 1234
   b) 4567
   c) 0
   d) some address
   e) None of the above
17) For the program in Figure 2, give the output of Line 5.
   a) 1234
   b) 4567
   c) 0
   d) some address
   e) None of the above
using std::cout; using std::endl;

long a_fun(long l1, long &l2){
    long result = 0, num = l1;
    while (num > 0){
        result = result + (num % 10);
        num = num/10;
    }
    l2 = result;
    return l2 - l1;
}

int main (){
    long l1=10, l2=0;
    long result = a_fun(l1,l2);
    cout << result << endl;  // Line 1
    cout << l1 << endl;     // Line 2
    cout << l2 << endl;     // Line 3
    cout << a_fun(9,l2) << endl; // Line 4
    cout << l2 << endl;     // Line 5
}

Figure 3

18) For the program shown in Figure 3, what output is produced by Line 1?
   a) 10
   b) 1
   c) 0
   d) 9
   e) None of the above

19) For the program shown in Figure 3, what output is produced by Line 2?
   a) 10
   b) 1
   c) 0
   d) 9
   e) None of the above

20) For the program shown in Figure 3, what output is produced by Line 3?
   a) 10
   b) 1
   c) 0
   d) 9
   e) None of the above

21) For the program shown in Figure 3, what output is produced by Line 4?
   a) 10
   b) 1
   c) 0
   d) 9
   e) None of the above
22) For the program shown in Figure 3, what output is produced by Line 5?
   a) 10
   b) 1
   c) 0
   d) 9
   e) None of the above
   f) 

```cpp
#include <iostream>
using std::cout; using std::cin; using std::endl;

long some_fun(long val){
    long result = 0;
    if ((val % 2 == 0) && (val % 3 == 0))
        result++;
    else if (val % 5 == 0)    // Line 1
        result--;
    return result;
}

int main(){
    long i = 10, first=0, last=0, the_sum=0;
    cin >> first >> last;    // Line 2
    for(long i = first; i < last; i++)
        the_sum += some_fun(i);
    cout << i << endl;    // Line 3
    cout << the_sum << endl;    // Line 4
}
```

23) For the program in Figure 4, with the inputs 15 and 21, what value is printed by Line 3?
   a) 0
   b) 5
   c) 6
   d) 10
   e) None of the above

24) For the program in Figure 4, with the inputs 15 and 21, what value is printed by Line 4?
   a) 0
   b) 5
   c) 6
   d) 10
   e) None of the above
25) For the program in Figure 4, if Line 1 had \( \text{==} \) replaced with \( \text{=} \) making \((\text{val} \ % \ 5 = 0)\), which of the following would be true?
   a) program would not compile
   b) program would compile, but the answer would be different
   c) program would compile and give the same answer
   d) program would compile but would have a run-time error
   e) None of the above

26) For the program in Figure 4, what does Line 2 imply about the needed inputs?
   a) the input values must be comma (,) separated
   b) the input values must be colon (:) separated
   c) the input values must be floating point
   d) the input values must be white-space separated
   e) None of the above

```cpp
using std::cout; using std::endl;
#include<cmath>
using std::sqrt;

const double a_fun(long *num, const double * const diff){
    double result = sqrt(*num);
    if (result - *diff > 0)
        return result;
    else
        return *diff;
}

int main (){
    const double d = 0.5;
    const double * const p = &d; // Line 1
    long l = 16;
    cout << a_fun(&l, p) << endl; // Line 2
    cout << d << endl; // Line 3
    cout << p << endl; // Line 4
}
```

27) For the program in Figure 5, what output is produced by Line 2?
   a) 0
   b) 4
   c) 0.5
   d) some address
   e) None of the above

28) For the program in Figure 5, what output is produced by Line 3?
   a) 0
   b) 4
   c) 0.5
   d) some address
   e) None of the above
29) For the program in Figure 5, what output is produced by Line 4?
   a) 0
   b) 4
   c) 0.5
   d) some address
   e) None of the above

30) For the program in Figure 5, which of the following is true about the type found in Line 1?
    a) it is a pointer
    b) it can point to constant values
    c) what it points to cannot change
    d) All of the above
    e) None of the above