READ THIS NOW!

Failure to read and follow the instructions below may result in severe penalties. Failure to adhere to these directions will not constitute an excuse or defense.

- Print your name in the space provided below.
- Print your name and ID number on the Opscan form; be sure to code your ID number correctly on the Opscan form. Code Form B on the Opscan; code your section group number:

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Section</th>
<th>Time</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Struble</td>
<td>Nor 136</td>
<td>8:00am MWF</td>
<td>1</td>
</tr>
<tr>
<td>Struble</td>
<td>Han 100</td>
<td>11:15am MWF</td>
<td>2</td>
</tr>
<tr>
<td>Barnette</td>
<td>Nor 136</td>
<td>8:00am TuTh</td>
<td>3</td>
</tr>
<tr>
<td>Tucker</td>
<td>Torg 2150</td>
<td>2:00TuTh</td>
<td>4</td>
</tr>
</tbody>
</table>

- Choose the single best answer for each question — some answers may be partially correct. If you mark more than one answer to a question, you will receive no credit for any of them.
- Unless a question involves determining whether given C++ code is syntactically correct, assume that it is. Unless a question specifically deals with compiler #include directives, you should assume the necessary header files have been included.
- Be careful to distinguish integer values from floating point (real) values (containing a decimal point). In questions/answers which require a distinction between integer and real values, integers will be represented without a decimal point, whereas real values will have a decimal point, [1044 (integer), 1044.0 (real)].
- When you have finished, sign the pledge at the bottom of this page and turn in the test and your Opscan.
- **This is a closed-book, closed-notes examination. No calculators or other electronic devices may be used during this examination. You may not discuss (in any form: written, verbal or electronic) the content of this examination with any student who has not taken it. You must return this test form when you complete the examination. Failure to adhere to any of these restrictions is an Honor Code violation.**
- There are 30 equal-valued multiple-choice questions.
- The answers you mark on the Opscan form will be considered your official answers.

Do not start the test until instructed to do so!

Name (Last, First) ____________________________________________________________________________ printed

Pledge: On my honor, I have neither given nor received unauthorized aid on this examination.

__________________________________________
signature
int X; // 1

void main() {
    int Y; // 2
    while(Y < 10) {
        int X = 0; // 3
        X++;
        Y = Y + X;
    }
    cout << X << endl;
}

1) Choose the correct statement about the above code:
   1) The lifetime of the variable X in declaration 1 is the entire execution of the program.
   2) The variable X in declaration 3 is initialized to 0 during each iteration of the while loop.
   3) The scope of the variable X in declaration 1 is the entire body of main() except for the while loop.
   4) The variable Y in declaration 2 should be initialized; otherwise, the content of Y is unpredictable.
   5) All of the above.
   6) None of the above.

2) Choose the correct statement about parameter passing by value:

   1) Actual and formal parameters must be of similar types.
   2) Formal parameters must be declared as local variables in the function body.
   3) Actual parameters in a function call cannot be constants or expressions; they must be variables.
   4) Parameter passing by value can be used both for input and output communication purposes.
   5) All of the above are correct.
   6) None of the above is correct.

For the next 2 questions consider the following code:

void main () {
    int Value1 = 1;
    int Value2 = 3;
    Mystery (Value1, Value2);
    cout << Value1<< ' ' << Value2 << endl;
}

void Mystery (int Param1, int& Param2) {
    Param1 = Param1 * 5;
    Param2 = Param2 * 2;
}

3) What is printed out for Value1?
   1) 1   2) 2   3) 3   4) 4   5) 5
   6) 6   7) 0   8) 10   9) none of the above

4) What is printed out for Value2?
   1) 1   2) 2   3) 3   4) 4   5) 5
   6) 6   7) 0   8) 10   9) none of the above
5) Given the function heading

```cpp
int FindIt( int& howMany,
            float& alpha,
            float beta )
```

which of the following is a valid function prototype for FindIt?

1) `int FindIt( int& howMany, float& alpha, float beta );`
2) `void FindIt( int&, float&, float );`
3) `int FindIt( int, float&, float& );`
4) 1 and 2 above
5) 1, 2, and 3 above

6) What is the output of the following code fragment if the input value is 4? (Be careful here.)

```cpp
int num;
int alpha = 10;
cin >> num;
switch (num)
{
    case 3 : alpha++;
    case 4 : alpha = alpha + 2;
    case 8 : alpha = alpha + 3;
    default : alpha = alpha + 4;
}
cout << alpha << endl;
```

1) 10 2) 14 3) 12 4) 19 5) 15

For the next 2 questions consider the execution of the following program:
(Hint – trace the program carefully.)

```cpp
void main()
{
    int LoopCounter, Count=0;
    for (LoopCounter = 0; LoopCounter < 10; LoopCounter++)
    {
        LoopCounter++;
        Count++;
    }
cout << LoopCounter;
cout << Count;
}
```

7) What value is printed for the variable `LoopCounter`:

1) 1 2) 2 3) 3 4) 4 5) 5
6) 6 7) 0 8) 10 9) none of the above

8) What value is printed for the variable `Count`:

1) 1 2) 2 3) 3 4) 4 5) 5
Consider executing the following program:

```c++
void main ()
{
    int i, j, count=0, Answer;
    Answer = 1;
    for (i=1; i<3; i=i+1) {
        for (j=1; j<5; j=j+2){
            count++;
            Answer = Answer * i * j;
        }
    }
    cout << Answer << endl << count << endl;
}
```

9) What value is printed for the variable Answer:

1) 0  2) 1  3) 2  4) 15  5) 18  6) 36
7) 72  8) none of the above

10) What value is printed for the variable count:

1) 0  2) 1  3) 2  4) 15  5) 18  6) 36
7) 72  8) none of the above

```c++
void main()
{
    int Count = 0;
    int number = 2;
    bool done = false;
    while (!done)
    {
        Count++;
        number = number * 2;
        done = (number > 64);
    }
    cout << Count << endl;
}
```

11) What is printed out when the above code is executed?

1) 1  2) 2  3) 3  4) 4  5) 5
6) 6  7) 0  8) 10  9) none of the above
void main()
{
    int i=1, sum, j;
    while (i <= 5)
    {
        sum = 0;
        j = 1;
        while (j<=i)
        {
            sum = sum + j;
            j++;
        }
        i++;
    }
    cout << sum << endl;
}

12) What is printed out for sum when the above code is executed?
   1) 0  2) 1  3) 5  4) 14  5) 15  6) none of the above

13) What is the output of the following code fragment? (All variables are of type int.)

int alpha, beta;
alpha = 3;
beta = 20;
if (beta > 10)
{
    int alpha = 5;
    beta = beta + alpha;
    cout << alpha << ' ' << beta << endl;
}
cout << alpha << ' ' << beta << endl;

   1) 3 20  2) 3 25  3) 5 25  4) 5 25  5) 5 25

Consider the following code:

void silly (int);
int main()
{
    int x,y;
    // do something silly
    x=10;
y=11;
silly(x);
silly(y); // values here
    return 0;
}
14) What are the values of main function variables \( x \) and \( y \) at the point marked // values here?

1) \( x=10 \) and \( y=11 \)  
2) \( x=20 \) and \( y=22 \)  
3) \( x=11 \) and \( y=10 \)  
4) \( x=40 \) and \( y=40 \)  
5) \( x=20 \) and \( y=12 \)  

15) What are the values of the main function’s variables \( x \) and \( y \) if \( x \) was passed by reference to the silly function at the point marked // values here?

1) \( x=10 \) and \( y=11 \)  
2) \( x=20 \) and \( y=22 \)  
3) \( x=11 \) and \( y=10 \)  
4) \( x=40 \) and \( y=11 \)  
5) \( x=20 \) and \( y=12 \)  
6) \( x=40 \) and \( y=14 \)

```c
void main() {
    int i, j, A[2][4] = {1,2,3,4,5,6,7,8};
    for (i = 0; i < 4; i++)
        for (j = 0; j < 2; j++)
            cout << A[j][i] << endl;
}
```

16) What is the value printed on the fifth line of output?

1) 1  
2) 2  
3) 3  
4) 4  
5) 5  
6) 6  
7) 7  
8) 8  
9) none of the above

17) What is the contents of the array \( arr \) after the for loop?

```c
int arr[5];
int j = 0;
for (i = 0; i < 5; i++)
{
    arr[i] = i+j;
    j = j+1;
}
```

1) 0 1 2 3 4  
2) 1 2 3 4 5  
3) 0 2 4 6 8  
4) 1 3 5 7 9  

Consider the following code:

```c
int main() {
    int x[8];          // line 1
    for (int i=0;i<9;i++)  // line 2
        x[i] = i;    // line 3
    return 0;          // line 4
}
```

18) Which line of code should be changed to prevent a possible runtime error in the program?

1) 1  
2) 2  
3) 3  
4) 4  
5) either 1 or 2  
6) either 1 or 3  
7) either 2 or 3  
8) either 1 or 4
19) Consider the function definition

```cpp
void DoThis( int& alpha,
             int beta )
{
    int temp;
    alpha = alpha + 100;
    temp = beta;
    beta = 999;
}
```

Suppose that the caller has integer variables `gamma` and `delta` whose values are 10 and 20, respectively. What are the values of `gamma` and `delta` after return from the following function call?

DoThis(gamma,delta);

1) gamma = 10 and delta = 20  
2) gamma = 110 and delta = 20  
3) gamma = 10 and delta = 999  
4) gamma = 110 and delta = 999  
5) none of the above

20) Which of the loops below produces the same number of loop iterations as the following loop? (count is of type int)

```cpp
for (count = 1; count <= 10; count++)
    DoSomething();
```

1) for (count = 10; count >= 1; count--)
   DoSomething();
2) for (count = 0; count < 10; count++)
   DoSomething();
3) for (count = 10; count >= 0; count--)
   DoSomething();
4) 1 and 2 above
5) 1, 2, and 3 above

21) What does the above code segment display?

```cpp
num = 345;
do
{
    cout << num % 10;
    num = num /10;
}while (num > 0);
```

1) 5 .5 0  
2) 3 4 5  
3) .5 0 0  
4) 5 4 3  
5) 34.5 3.45 .345  
6) none of the above
For the next 5 questions, consider the incomplete function definition given below:

```cpp
// CountAs takes an array of characters and count the number of times
// the character 'A' appears in the list.
//
// Parameters:
// CharacterList[] array containing characters.
// NumOfCharacters number of characters to check
// TotalA number of As in the array

void CountAs( char _________, int NumOfCharacters, int& TotalA)// Line A
{
    int LoopCounter;
    for(LoopCounter=0;________;LoopCounter++) //Line B
    {
        if ( _________ == 'A') //Line C
            TotalA=TotalA+________; //Line D
    }
    cout << "The number of 'A's is = " << _________; //Line E
}
```

22) How should the blank for the first parameter in line A be filled?

1) CharacterList  
2) CharacterList[]  
3) 'A'  
4) it should be left blank  
5) none of these

23) How should the blank in line B be filled?

1) LoopCounter < 100  
2) LoopCounter <= NumOfCharacters  
3) LoopCounter <= 100  
4) LoopCounter < NumOfCharacters  
5) none of these

24) How should the blank in line C be filled?

1) CharacterList[NumOfCharacters]  
2) CharacterList[LoopCounter]  
3) LoopCounter  
4) none of these  
5) NumOfCharacters

25) How should the blank in line D be filled?

1) 1  
2) CharacterList  
3) LoopCounter  
4) none of these  
5) NumOfCharacters

26) How should the blank in line E be filled?

1) TotalA  
2) CharacterList[LoopCounter]  
3) LoopCount  
4) none of these  
5) NumOfCharacters
Consider the following code:

```cpp
for (int i=1; i<10; i++)
{
    for (int j=0; j<i; j++)
    {
        cout << setw (4) << (i + j); //first
        cout << endl; //second
    }
}
```

27) How many times does the first `cout` statement execute?

1) 100   2) 56
3) 10     4) 55
5) 11     6) cannot be determined

28) How many times does the second `cout` statement execute?

1) 100   2) 56
3) 10     4) 55
5) 11     6) cannot be determined

29) What is the last value displayed?

1) 10     2) 19
3) 11     4) 20
5) 18     6) none of the above

30) What is the output of the following code fragment? (beta is of type int)

```cpp
beta = 5;
do
{
    switch (beta)
    {
        case 1 : cout << 'R';
            break;
        case 2 :
        case 4 : cout << 'O';
            break;
        case 5 : cout << 'L';
    }
    beta--;
} while (beta > 1);
cout << 'X' << endl;
```