

**Instructions:** This homework assignment focuses primarily on some of the basic syntax and semantics of C++. The answers to the following questions can be determined from Chapters 3 through 6 of the lecture notes and Chapters 2 through 6 of the text. Assume any `#include` directives, variable declarations, etc, which are needed to make the given code syntactically correct.

Opscan forms will be passed out in class this week. Print your name and code your ID number on the opscan form. Mark Group 1 if you are in the 8TTh section and Group 2 if you are in the 10MWF section. Turn in your completed opscan at class on March 18<sup>th</sup> or 19<sup>th</sup>, or to the 1044 GTAs in McB 116/118 between 12:00 and 3:00 on Friday March 19<sup>th</sup>. Opscans will not be accepted late or at any other time.

1) What is the value of `loopCount` after control exits the following loop?

```
int loopCount = 1, alpha = 5;
while (loopCount <= 145) {
    alpha = alpha + 7;
    loopCount++;
}
```

- 1) 1                      2) 144                      3) 145                      4) 146  
5) None of these

2) What is the value of `someInt` after control exits the following loop?

```
int someInt = 273;
while (someInt > 500)
    someInt = someInt - 3;
```

- 1) 270                      2) 273                      3) 497                      4) 500  
5) Infinite loop                      6) None of these

3) What is the termination condition for the following while loop?

```
int beta = 5;
while (beta > 0 && beta < 10) {
    cout << beta << endl;
    cin >> beta;
}
```

- 1) `beta > 0 && beta < 10`                      2) `beta >= 0 && beta <= 10`  
3) `beta < 0 || beta > 10`                      4) `beta <= 0 || beta >= 10`  
5) None of these

4) What is the output of the following code fragment?

```
int n = 1;
while (n <= 5) {
    cout << n << ' ';
    n++;
}
```

- 1) 1 2 3 4 5                      2) 1 2 3 4  
3) 1 1 1 forever                      4) 2 3 4 5  
5) 2 3 4 5 6                      6) None of these

5) What is the output of the following code fragment?

```
int n = 1;
while (n < 5) {
    n++;
    cout << n << ' ';
}
```

- |                  |                  |
|------------------|------------------|
| 1) 1 2 3 4 5     | 2) 1 2 3 4       |
| 3) 1 1 1 forever | 4) 2 3 4 5       |
| 5) 2 3 4 5 6     | 6) None of these |

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

```
int n = 1;
while (n <= 5)
    cout << n << ' ';
    n++;
```

- |                  |                  |
|------------------|------------------|
| 1) 1 2 3 4 5     | 2) 1 2 3 4       |
| 3) 1 1 1 forever | 4) 2 3 4 5       |
| 5) 2 3 4 5 6     | 6) None of these |

7) Which of the following would be a poor choice for a sentinel value?

- |   |                               |
|---|-------------------------------|
| 1) a value of 999 for voterAge          | 2) a value of 1 for testScore |
| 3) a value of 13 for birthdayMonth      | 4) a value of 75 for carSpeed |
| 5) 2 and 4 above                        |                               |
| 6) None of these would be poor choices. |                               |

8) With respect to the loop in the following main( ) function, what is missing?

```
#include <iostream.h>
int main() {
    int loopCount = 4;

    while (loopCount <= 8) {
        cout << "Hi";
        loopCount++;
    }
    return 0;
}
```

- |  |
|--|
| 1) the initialization of the loop control variable |
| 2) the testing of the loop control variable        |
| 3) the incrementation of the loop control variable |
| 4) Nothing is missing.                             |

- 9) Indicate where (if at all) the following loop needs a priming read.

```
int sum = 0;           // line 1
while (inFile)         // line 2
{
    sum = sum + number; // line 4
    inFile >> number;   // line 5
}                      // line 6
```

- 1) between lines 1 and 2                      2) between lines 2 and 3  
3) between lines 3 and 4                      4) between lines 4 and 5  
5) No priming read is necessary.

- 10) After execution of the following code, what is the value of Length?

```
int Length = 5,
    Count = 4;
while (Count <= 6) {
    if (Length >= 100)
        Length = Length - 2;
    else
        Length = Count * Length;

    Count++;
}
```

- 1) 600                      2) 100                      3) 98                      4) 20  
5) None of these

- 11) In the following code fragment, a semicolon appears at the end of the line containing the while condition.

```
cout << 'A';
int loopCount = 1;
while (loopCount <= 3);
{
    cout << 'B';
    loopCount++;
}
cout << 'C';
```

The result will be:

- 1) the output AC                                      2) the output ABC  
3) the output ABBBC                                  4) a compile-time error  
5) an infinite loop                                  6) None of these

12) What is the output of the following code fragment?

```
int Sum = 0,
    outerCount = 1;

while (outerCount <= 3) {
    int innerCount = 1;

    while (innerCount <= outerCount) {
        Sum = Sum + innerCount;
        innerCount++;
    }
    outerCount++;
}
cout << Sum << endl;
```

- |       |                  |       |       |
|-------|------------------|-------|-------|
| 1) 1  | 2) 4             | 3) 10 | 4) 20 |
| 5) 35 | 6) None of these |       |       |

13) What is the output of the following code fragment?

```
const int Limit = 8;
cout << 'H';
int loopCount = 10;
do {
    cout << 'E';
    loopCount++;
} while (loopCount <= Limit);
cout << "LP";
```

- |                  |         |          |           |
|------------------|---------|----------|-----------|
| 1) HLP           | 2) HELP | 3) HEELP | 4) HEEELP |
| 5) None of these |         |          |           |

14) To produce the output 2 4 6 8, what loop condition should be used in the blank below?

```
int n = 0;
do {
    n = n + 2;
    cout << n << ' ';
} while ( _____ );
```

- |            |                  |          |           |
|------------|------------------|----------|-----------|
| 1) n <= 10 | 2) n < 10        | 3) n < 8 | 4) n >= 2 |
| 5) n > 8   | 6) None of these |          |           |

- 15) Which for loop is equivalent to the following while loop? Equivalent here means that the value of each of the variables would be the same when the code has completed execution.

```
int count = -5, sum = 0;
while (count <= 15) {
    sum = sum + count;
    count++;
}
```

- 1) 

```
int count, sum = 0;
for (count = -5; count <= 15; count++)
    sum = sum + count;
```
- 2) 

```
int count, sum = 0;
for (count = -5; count <= 15; count++) {
    sum = sum + count;
    count++;
}
```
- 3) 

```
int count, sum = 0;
for (count = -5; count <= 15; count++) {
    count++;
    sum = sum + count;
}
```
- 4) 

```
int count, sum = 0;
for (count = 1; count <= 21; count++)
    sum = sum + count;
```
- 5) None of these are equivalent to the given while loop.

- 16) Which of the loops below produces the same number of loop iterations as the following loop?

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

- 1) 

```
for (int count = 10; count >= 1; count--)
    DoSomething();
```
- 2) 

```
for (int count = 0; count < 10; count++)
    DoSomething();
```
- 3) 

```
for (int count = 10; count >= 0; count--)
    DoSomething();
```
- 4) 1 and 2 above
- 5) 1, 2, and 3 above
- 6) None of these

- 17) What is the output of the following code fragment?

```
for (int loopCount = 1; loopCount < 3; loopCount++)
    cout << loopCount << ' ';
cout << "Done" << endl;
```

- 1) Done
- 2) 1 Done
- 3) 1 2 Done
- 4) 1 2 3 Done
- 5) 1 2 3 4 Done
- 6) None of these

18) What is the output of the following code fragment?

```
for (int loopCount = 1; loopCount > 3; loopCount++)  
    cout << loopCount << ' '  
cout << "Done" << endl;
```

- |               |                 |                  |
|---------------|-----------------|------------------|
| 1) Done       | 2) 1 Done       | 3) 1 2 Done      |
| 4) 1 2 3 Done | 5) 1 2 3 4 Done | 6) None of these |

19) In the following code fragment, the programmer mistakenly placed a semicolon at the end of the for statement heading. What is the result?

```
cout << 'A';  
for (int count = 1; count <= 3; count++);  
    cout << 'B';  
cout << 'C';
```

- |                         |                     |
|-------------------------|---------------------|
| 1) a compile-time error | 2) an infinite loop |
| 3) the output ABC       | 4) the output ABBC  |
| 5) the output ABBBC     | 6) None of these    |

20) What is the output of the following code fragment?

```
int n = 2;  
  
for (int loopCount = 1; loopCount <= 3; loopCount++) {  
    while ( n <= 4 )  
        n = 2 * n;  
}  
cout << n << endl;
```

- |       |                  |       |       |
|-------|------------------|-------|-------|
| 1) 4  | 2) 8             | 3) 16 | 4) 32 |
| 5) 64 | 6) None of these |       |       |