FORM 1 (Please put your name, section # (10am-001/2pm-002, and form # on the scantron!!!!)

CS 161 Exam I:

True (A)/False(B) (2 pts each):
1. The following statement is legal:
   ```cpp
cout << "Hello, my name is Bill\n";
```
   True
2. You should write your program before you write the algorithm.
   False
3. The compiler will catch all your programming mistakes.
   False
4. C++ is a low-level language.
   False
5. The opposite of \((x > 3 && x < 10)\) is \((x < 3 && x > 10)\).
   False
6. Loops are used when we need our program to make a choice between two or more things.
   True
7. It is legal to declare more than one variable in a single statement.
   True
8. Variable names may begin with a number.
    False
9. The opposite of less than is greater than.
   True
10. If \(x\) has the value of 3, \(y\) has the value of -2, and \(w\) is 10, is the following condition true or false?
    ```cpp
    if( x < 2 && w < y )
    ```
    False
11. All switch statements can be converted into nested if-else statements.
    True
    True
13. A boolean expression may evaluate to more than 2 values.
    False
14. Every include directive must be followed by `using namespace std;`.
    True
15. Functions may have multiple return statements.
    True
16. A void function can return any value.
    False
17. It is illegal to call other functions from inside a function definition.
    True

Multiple Choice (3 pts each)
18. An algorithm is
   a. The inputs and outputs of a program
   b. The part of the computer that does the processing
   c. A finite set of steps to solve a problem
   d. A complete computer program
   c
19. Which of the following is not an example of a program bug?
   a. Run-time error
   b. Operator error
   c. Syntax error
   d. Logic error
   b
20. Given the following code fragment, and an input value of 0, what is the output that is generated?

```cpp
int x;
cout << "Enter a value\n";
cin >> x;
if(x == 0) {
    cout << "x is zero\n";
} else {
    cout << "x is not zero\n";
}
```

(a) x is zero
(b) x is not zero
(c) unable to determine
(d) x is 1

21. Which of the following is not a valid identifier?
   (a) return
   (b) myInt
   (c) myInteger
   (d) total3

22. What is the value of x after the following statements?

```cpp
int x, y, z;
y = 10;
z = 3;
x = y * z + 3;
```

(a) Garbage
(b) 60
(c) 30
(d) 33

23. Which of the following statements is NOT legal?
   (a) char ch='b';
   (b) char ch='0';
   (c) char ch=65;
   (d) char ch="cc"

24. If a programming language does not use short-circuit evaluation, what is the output of the following code fragment if the value of myInt is 0?

```cpp
int other=3, myInt;
if(myInt != 0 && (other % myInt) != 0)
    cout << "other is odd\n";
else
    cout << "other is even\n";
```

(a) other is even
(b) other is odd
(c) 0
(d) run-time error, no output
25. What is the output of the following code fragment?

```cpp
int x=0;
while( x < 5)
    cout << x << endl;
x++;
cout << x << endl;
```

a. 0
b. 5
c. 4
d. Infinite loop

26. What is wrong with the following switch statement?

```cpp
int ans;
cout <<"Type y for yes on n for no\n";
cin >> ans;
switch (ans) {
    case 'y': cout << "You said yes\n"; break;
    case 'Y': cout << "You said yes\n"; break;
    case 'n': cout << "You said no\n"; break;
    case 'N': cout << "You said no\n"; break;
    default: cout <<"invalid answer\n";
}
```

a. `ans` is an int
b. `break;` is illegal syntax
c. nothing
d. there are no break statements on 2 cases.

27. What is the value of x after the following code executes?

```cpp
int x=10;
if(x++ > 10) {
    x=13;
}
```

a. 10
b. 9
c. 13
d. 11

28. Given the following code, what is the final value of i?

```cpp
int i,j;
for(i=0;i<4;i++) {
    for(j=0;j<3;j++) {
        if(i==2)
            break;
    }
}
```

a. 3
b. 4
c. 5
d. 2
29. What is the output of the following code fragment?
```
int x=0;
{
    int x=13;
    cout << x << " ", ";
}
cout << x << endl;
```

a. 13,13  

b. 0,13  

c. 13,0  

d. nothing, there is a syntax error.

30. What is the value of x after the following statements?
```
double x;
x = 0;
x += 3.0 * 4.0;
x -= 2.0;
```

a. 22.0  

b. 12.0  

c. 10.0  

d. 14.0

31. Which loop structure always executes at least once?

a. do-while  

b. for  

c. while  

d. sentinel

32. What is the value of x after the following statements?
```
float x;
x = 15/4;
```

a. 3.75  

b. 4.0  

c. 3.0  

d. 60

33. Which of the following is a valid case statement in a switch?

a. case 1:  

b. case x<4:  

c. case 'ab':  

d. case 1.5:

34. What is the output of the following program fragment?
```
cout << pow(4,2) << endl;
```

a. 4  

b. 2  

c. 8  

d. 16
35. What is the output of the following program fragment?
   ```
   cout << (double) 3/4 << endl;
   ```
   a. 3
   b. 0.5
   c. 0
   d. 0.75

36. What is the value returned by the following function?
   ```
   int function() {
       int value = 35;
       return value + 5;
       value += 10;
   }
   ```
   a. 35
   b. 40
   c. 50
   d. 10

37. If you have the following constant declaration in your program,
   ```
   const int SIZE=34;
   ```
   then which of the following statements is legal?
   a. SIZE++;
   b. x = SIZE;
   c. cout << SIZE;
   d. cin >> SIZE;

38. Which of the following is true for a void function?
   a. There cannot be a return statement.
   b. The value of void should be returned.
   c. The value of 0 should be returned.
   d. Nothing is returned.

39. Testing your program should be done
   a. As each function is developed
   b. At the end of the coding
   c. Only if there appear to be problems
   d. Only if your instructor requires it.

Extra Credit (2 pts each)

40. Which of the following are equivalent to `(! (x<15 && y>=3))`?
   a. (x>15 && y<3)
   b. (x>=15 && y < 3)
   c. (x>15 || y < 3)
   d. (x>15 || y < 3)
   e. C and D
41. What is the output of the following code fragment if x is 15?
   if (x < 20)
     if (x < 10)
       cout << "less than 10 ";
     else
       cout << "large\n";
   
   a. less than 10
   b. nothing
   c. large
   d. no output, syntax error

42. Which of the following are allowed in the third section of the for loop statement?
   a. i++
   b. i--
   c. i +=2
   d. cout << "Hello\n"
   e. all of the above

43. What is the output of the following function call?
   //function body
   int factorial(int n) {
     int product=0;
     while(n > 0) {
       product = product * n;
       n--;
     }
     return product;
   }
   
   //function call
   cout << factorial(4);
   
   a. 4
   b. 0
   c. 24
   d. 48

44. If you were to write a function for displaying the cost of an item to the screen, which function prototype would be most appropriate?
   a. void display();
   b. void display(float myCost);
   c. int display (float myCost);
   d. float display();