CS 161 Exam I:

True (A)/False(B) (2 pts each):
1. In the statement: cout << “Hello!”;
   “Hello!” is called a string literal.
2. There is no limit on the size of the numbers that can be stored in the int data type.
3. The value of 3/4 is 0.75.
4. There are only two possible values for the bool data type.
5. A function prototype mush consists of a return type, function name, and parameter list.
6. The return statement in the following function causes a syntax errors.
   ```c++
   void f()
   {
       int max = 0;
       if (max != 0)
           cout << max;
       else
           return;
   }
   ```
7. Function prototypes are placed at the end of a program.
8. Void functions return an integer.
9. When the value of x is 0 in the expression, this will cause a runtime error.
   ```c++
   if ((x != 0) && (y/x < 3))
   ```
10. Functions are executed in the order in which they are defined.
11. This is a valid statement:
    ```c++
    bool maybe = (6 == 7);
    ```
12. A precondition is a condition that must be true before the function is called.
13. A function prototype must be terminated with empty curly braces.
14. Evaluate the Boolean expression below if the variables have the following values, x is 5, num is 7.5, z is 10, mark is true, and more is false.
    ```c++
    (more || mark) && ((x + num) > z)
    ```
15. A function should only have one task.
16. The inner loop below will execute 25 times:
   
   ```c++
   for (int a = 0; a < 5; a++)
       for (int b = 0; b < 5; b = b + 2)
   ```

17. A `for` loop can always be rewritten as a `while` loop.

**Multiple Choice (3 pts each)**

18. Why do computers use zeros and ones?
   A. because binary numbers are the bases upon which all other number systems are built.
   B. because combinations of zeros and ones can represent any numbers and characters.
   C. because digital devices are made of circuits that are on or off and open or closed.
   D. because binary numbers are simplest.

19. A block is enclosed inside __________.
   A. Brackets `[]`
   B. Braces `{}`
   C. Parentheses `()`
   D. Double Quotes ""

20. What would be the output of the following lines of code?
   ```c++
   string word = "somebody";
   cout << word.at(3);
   ```
   A. m
   B. e
   C. r
   D. d

Use the following snippet of code to answer #21 and #22.
```c++
int count = 0;
do {
    cout << "Welcome to C++";
} while (count++ < 9);
cout << count;
``` 

21. What is the value in count after the above loop is executed?
   A. 8
   B. 0
   C. 11
   D. 9
   E. 10

22. How many times the following code prints "Welcome to C++"?
   A. 9
   B. 8
   C. 11
   D. 10
   E. 0
23. To improve readability and maintainability, you should declare _________ instead of using literal values such as 3.14159.
A. constants  
B. variables  
C. classes  
D. functions

24. The ASCII of 'a' is 97. What is the ASCII for 'c'?
A. 97  
B. 98  
C. 96  
D. 99

25. Suppose x=10 and y=10. What is x after evaluating the expression (y >= 10) || (x++ > 10).
A. 10  
B. 11  
C. 9

26. Which of the following statement prints smith\exam1\test.txt?
A. cout << "smith\exam1\test.txt";
B. cout << "smith"\exam1\"test.txt";
C. cout << "smith\exam1\"test.txt";
D. cout << "smith\exam1\test.txt";

27. Which of the following is not a legal way to add a value 1 to variable x?
A. x = x + 1;  
B. ++x;  
C. 1 + x = x;  
D. x += 1;  
E. x = 1 + x;

28. Which of the following expression will yield 0.5?
A. (double) 1 / 2  
B. (double) (1 / 2)  
C. 1 / 2  
D. None of the above

29. Which of the following is not a C++ reserved word?
A. float  
B. integer  
C. return  
D. using

30. Which of the following lines must end with a semicolon (;)?
A. #include <iostream>  
B. int main ( )  
C. // a comment  
D. using namespace std
31. Which of the following is a preprocessor directive:
A. `#include <iostream>`
B. `using namespace std;`
C. `int main()`
D. `// a comment`

32. What is the value of the following arithmetic expression if the variables have these values, `a is 7`, `b is 3`, and `c is 10`?
   
   ```
   a + b % c
   ```

A. 0
B. 7
C. 7.3
D. 10

33. What kind of error is the following:
   
   ```
   float height = 6.0,
   ```

A. syntax
B. logic
C. run-time
D. undetected

34. The following code displays ______________.

   ```
   #include <iostream>
   using namespace std;

   void maxValue(int value1, int value2, int max)
   {
   if (value1 > value2)
   max = value1;
   else
   max = value2;
   }

   int main()
   {
   int max = 0;
   maxValue(1, 2, max);
   cout << "max is " << max << endl;
   
   return 0;
   }
   ```

A. max is
B. max is 1
C. max is 0
D. max is 2

35. Which of the following is a valid function prototype?

A. `float some function();`
B. `void nothing;`
C. `int (int thing);`
D. `void something();`
36. Suppose the input for number is 9. What is the output from running the following program?

```cpp
#include <iostream>
using namespace std;

int main() {
    int i, number;
    bool isPrime = true;

    cout << "Enter an integer: ";
    cin >> number;

    for (i = 2; i < number && isPrime; i++)
        if (number % i == 0)
            isPrime = false;

    cout << "i is " << i << endl;

    if (isPrime)
        cout << number << " is prime" << endl;
    else
        cout << number << " is not prime" << endl;

    return 0;
}
```

A. i is 3 followed by 9 is not prime
B. i is 3 followed by 9 is prime
C. i is 4 followed by 9 is prime
D. i is 4 followed by 9 is not prime

37. Analyze the following code:

```cpp
long xfunction(long n){
    cout << "long";
    return n;
}

int main()
{
    cout << xfunction(5);
}
```

A. The program displays long.
B. The program does not compile because the compiler doesn’t know what a long is.
C. The program displays long followed by 5.
D. The program displays 5 followed by long.

38. What is stored in x after execution of the following code segment?

```cpp
int x = 5;
for (int c = 0; c < 5; c++)
    for (int d = 0; d < 3; d++)
        x = x + 1;
```

A. 13
B. 15
C. 20
D. 29
39. Given the following function definition, what is the printout of the call nPrint('a', 4)?
   ```
   void nPrint(char ch, int n) {
       while (n > 0) {
           cout << ch;
           n--;
       }
   }
   ```
   A. invalid call
   B. aaaaa
   C. aaaa
   D. aaa
   
   Extra Credit (2 pts each)
   40. (True/False) The following loop will terminate.
       ```
       unsigned int balance = 10;
       while (1) {
           if (balance < 0) break;
           balance = balance - 10;
       }
       ```
   41. What is the output of the following code?
       ```
       bool even = false;
       cout << (even ? "true" : "false") << endl;
       ```
   A. true false
   B. nothing
   C. true
   D. false
   42. What is the printout of the following switch statement?
       ```
       char ch = 'a';
       switch (ch) {
           case 'a':
           case 'A':
               cout << ch << endl; break;
           case 'b':
           case 'B':
               cout << ch << endl; break;
           case 'c':
           case 'C':
               cout << ch << endl; break;
           case 'd':
           case 'D':
               cout << ch << endl;
       }
       ```
   A. ab
   B. a
   C.abcd
   D. aa
43. What are the values of x and y after execution of the following statements?
   
   ```
   x = 5;
   y = ++x;
   ```
   
   A. x = 5, y = 6
   B. x = 6, y = 6
   C. x = 6, y = 7
   D. The second statement is a syntax error

44. What is the output of the function call, given the following function definition?

   ```
   int loopFunction (int x, int y=3) // function definition
   {
       int local = x;
       for (int c = 0; c < y; c++)
       {
           local += 2;
       } 
       return local;
   }
   ```

   ```
   cout << loopFunction(5); // function call
   ```

   A. 6
   B. 7
   C. 9
   D. 11
   E. Syntax error