FORM 1 (Please put your name and form # on the scantron!!!!)

CS 161 Exam I:
True (A)/False(B) (2 pts each):

1. The basic commands that a computer performs are input (get data), output (display result), storage, and performance of arithmetic and logical operations.

2. A function may return more than one item.

3. To develop a program to solve a problem, you start by analyzing the problem.

4. When you compile your program, the compiler identifies the logic errors and suggests how to correct them.

5. Assume all variables are properly declared. The output of the following code is 2 3 4 5.

```cpp
n = 1;
while (n < 5)
{
    n++;
    cout << n << " ";
}
```

6. In C++, both ! and != are relational operators.

7. An operator that has only one operand is called a unique operator.

8. A void function can be used in an assignment.

9. If input failure occurs in a C++ program, the program terminates immediately and displays an error message.

10. Assuming goodData is a Boolean variable, the following two tests are logically equivalent.

```cpp
if (goodData == false)
if (!goodData)
```

11. The value of the expression \(6 < 5 \lor \text{‘g’} > \text{‘a’} \land 7 < 4\) is ________.

12. If a C++ arithmetic expression has no parentheses, operators are evaluated from left to right.

13. You can use the function getline to read a string containing blanks.
14. Assume that all variables are properly declared. The following for loop executes 20 times.
   ```
   for (i = 0; i <= 20; i++)
     cout << i;
   ```

15. A comma is also called a statement terminator.

16. If the parameter list of a function is empty, the parentheses after the function name are not needed.

17. The following while loop terminates when \( j > 20 \).
   ```
   j = 0;
   while (j < 20)
     j++;
   ```

Multiple Choice (3 pts each)

18. ____ is a valid char value.
   a) “-129”
   b) ‘A’
   c) “A”
   d) 129
   e) None of the above

19. What is the value of \( x \) after the following statements?
   ```
   int x;
   x = x + 30;
   ```
   a) 0
   b) 30
   c) 33
   d) Unknown

20. Suppose that \( x \) is an int variable. Which of the following expressions always evaluates to true?
   a) \((x > 0) || (x <= 0)\)
   b) \((x >= 0) || (x == 0)\)
   c) \((x > 0) && (x <= 0)\)
   d) \((x > 0) && (x == 0)\)
   e) None of the above

21. Before using the data type string, the program must include ________.
   a) <stdlib>
   b) <iostream>
   c) <string>
   d) <cstring>
22. Suppose `str = "Hello There!"`. The output of the statement
   ```cpp
   cout << str.length() << endl;
   ```
   is ____.
   
   a) 11  
   b) 12  
   c) 13  
   d) 14

23. Given the following code fragment, which of the following expressions is always true?
   ```cpp
   int x;
   cin >> x;
   ```
   
   a) if( x < 3)  
   b) if( x==1)  
   c) if( (x / 3) >1 )  
   d) if( x = 1)  
   e) None of the above

24. What should be the output from this code segment?
   ```cpp
   int main() {
     for( int i = 0; i < 10; i++) {
       cout << "hello" << endl;
     }
     cout << i << endl;
     return 0;
   }
   ```
   
   a) 10  
   b) 9  
   c) 0  
   d) The variable i is undefined in this scope, so this should not compile

25. An example of a floating point data type is ____.
   
   a) int  
   b) char  
   c) double  
   d) short  
   e) None of the above

26. A function prototype is ____.
   
   a) a definition, but not a declaration  
   b) a declaration and a definition  
   c) a declaration, but not a definition  
   d) a comment line  
   e) None of the above
27. What is the output of the following C++ code?
```cpp
count = 1;
num = 25;
while (count < 25)
{
    num = num - 1;
    count++;
}
cout << count << " " << num << endl;
```

- a) 24 0
- b) 24 1
- c) 25 0
- d) 25 1
- e) None of the above

28. Functions that do not have a return type are called ____ functions.

- a) zero
- b) null
- c) void
- d) empty
- e) None of the above

29. Suppose `sum`, `num`, and `j` are `int` variables, and the input is `4 7 12 9 -1`. What is the output of the following code?
```cpp
cin >> sum;
cin >> num;
for (j = 1; j <= 3; j++) {
    cin >> num;
    sum = sum + num;
}
cout << sum << endl;
```

- a) 24
- b) 25
- c) 41
- d) 42
- e) None of the above

30. The expression `(int)(6.9) + (int)(7.9)` evaluates to ____.

- a) 13
- b) 14
- c) 14.8
- d) 15
- e) None of the above
31. Suppose that \( \alpha \) and \( \beta \) are int variables. The statement \( \alpha = --\beta; \) is equivalent to the statement(s) ____.
   a) \( \alpha = 1 - \beta; \)
   b) \( \alpha = \beta - 1; \)
   c) \( \beta = \beta - 1; \)
   d) \( \alpha = \beta; \)
   e) None of the above

32. The \texttt{pow(x)} and \texttt{sqrt(x)} functions are found in which include file?
   a) \texttt{<cmath>}
   b) \texttt{<iostream>}
   c) \texttt{<cctype>}
   d) \texttt{<cstdlib>}
   e) None of the above

33. The ____ rules of a programming language tell you which statements are legal, or accepted by the programming language.
   a) semantic
   b) logical
   c) syntax
   d) grammatical

34. Which of the following function prototypes is valid?
   a) \texttt{int funcTest(int x, int y, float z);}() 
   b) \texttt{funcTest(int x, int y, float);}();
   c) \texttt{int funcTest(int, int y, float z)}
   d) \texttt{int funcTest(int, int, float);}
   e) None of the above

35. Assume you have three int variables: \( x = 2, \ y = 6, \) and \( z \). Choose the value of \( z \) in the following expression: \( z = (y / x > 0) \ ? \ x : y; \).
   a) 2
   b) 3
   c) 4
   d) 6
   e) None of the above

36. Given the following function prototype: \texttt{int myFunc(int, int);}(), which of the following statements is valid? Assume that all variables are properly declared.
   a) \texttt{cin >> myFunc(y);} 
   b) \texttt{cout << myFunc(myFunc(7, 8), 15);} 
   c) \texttt{cin >> myFunc('2', '3');}
   d) \texttt{cout << myFunc(myFunc(7), 15);} 
   e) None of the above
37. Given the following function:

```cpp
test int strange(int x, int y) {
    if (x > y)
        return x + y;
    else
        return x - y;
}
```
what is the output of the following statement?
```cpp```
cout << strange(4, 5) << endl;
```cpp```

a) -1  
b) 1  
c) 9  
d) 20  
e) None of the above

38. If this code fragment were executed in an otherwise correct and complete program, what would the output be?
```cpp```
int a = 3, b = 2, c = 5;
if (a > b)
a = 4;
else
    a = 5;
else
    a = 6;
cout << a < endl;
```cpp```

a) 3 
b) 4 
c) 5 
d) 6 
e) None of the above, the cout statement belongs to the else and so is skipped.

39. Choose the output of the following C++ statement:
```cpp```
cout << "Sunny " << "\n" << "Day " << endl;
```cpp```

a) Sunny 
Day 

b) Sunny \nDay endl 
c) Sunny 
Day 

d) Sunny \nDay 

e) None of the above
Extra Credit (2 pts each)

40. In C++, reserved words are the same as predefined identifiers. [F]

41. The function main is always compiled first, regardless of where in the program the function main is placed.

42. What is the final value of x after the following fragment of code executes?
   
   ```
   int x = 0;
   do {
       x++;
   } while (x > 0);
   ```
   
   a) 9  
   b) 10  
   c) 11  
   d) infinite loop.  
   e) None of the above

43. What is the output of the following C++ code?
   
   ```
   int x = 55;
   int y = 5;
   switch (x % 5) {
       case 0:
       case 1:
           y++;
       case 2:
       case 3:
           y = y + 2;
       case 4:
           break;
       case 5:
       case 6:
           y = y - 3;
   }
   cout << y << endl;
   ```
   
   a) 5  
   b) 6  
   c) 8  
   d) 10  
   e) None of the above
44. Given the following function:

```cpp
class Solution {
public:
    int next(int x) {
        return (x + 1);
    }
};
```

what is the output of the following statement?

```cpp
    cout << next(next(5)) << endl;
```

a) 5  

b) 6  

c) 7  

d) 8  

e) None of the above