CS302: Self Check Quiz 2

name: ___________________________________________________________________

Part I  True or False

For these questions, is the statement true or false? Assume the statements are about the Java programming language.

1.) The result of an expression with a single logical operator && is a boolean value.
2.) A syntax error occurs if true is used as the condition (i.e. boolean expression) of a while loop.
3.) Local variables only exist while their method executes.
4.) Class methods are declared without the static modifier.
5.) A compound statement is a sequence of statements surrounded by parentheses.
6.) Variables declared inside a method’s body are called data members.
7.) There is no limit to the number of levels of nesting in Java.
8.) The result of: true && !(true && true)
9.) Java programs are terminated if an overflow error occurs.
10.) Short-circuit evaluation only occurs when a boolean variable is assigned a boolean value.
11.) A count-controlled loop repeats until a sentinel value is reached.
12.) It is a good programming practice to design an object to handle many tasks.
13.) The code: i = d; is legal if i is a variable of type int and d is a variable of type double.
14.) The data type MainWindow is a reference data type.
15.) Nesting is when a statement is placed inside the body of another statement.
16.) The logical operator ! is a binary operator.
17.) It is a good programming practice to cover all possible cases when using a selection control statement.
18.) If a then block or an else block is just one statement, braces (i.e. {}) aren’t needed.
19.) Pseudocode is an informal description of code that is useful for describing complex algorithms.
20.) A recursive method is one that calls itself.
21.) For loops are posttest loops since they have an increment part.
22.) A boolean expression must have either a true or false result.
23.) The code, new Exam(), can be used as the argument for a parameter that specifies the type Exam.
24.) You cannot put a while loop inside an if’s then block.
25.) Arguments are passed to methods using the pass-by-value scheme.
Part II  Multiple Choice

For these questions, choose the one best answer after reading all of the choices.

26.) The following symbols are used to indicate the parts of a flow diagram:

<table>
<thead>
<tr>
<th>symbol</th>
<th>meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a condition (i.e. a boolean expression)</td>
</tr>
<tr>
<td></td>
<td>a single statement or compound statement</td>
</tr>
<tr>
<td></td>
<td>a path in the flow of execution</td>
</tr>
</tbody>
</table>

Consider the following flow diagram:

This flow diagram represents which one of the following?

A. an if statement with a while loop nested inside
B. a while loop with an if statement nested inside
C. an if statement with an if statement nested inside
D. an if statement with a do-while loop nested inside
E. a while loop with an do-while loop nested inside

27.) Assume the variables below represent hours and minutes, and are assigned values within the valid ranges:

```cpp
int hour; // valid range: 0 - 23
int minute; // valid range: 0 - 59
```

Which one of the following expresses the interval from 7:15 to 9:15?

A. hour == 7 || hour == 8 || hour == 9 && minute <= 15
B. hour == 7 && minute >= 15 || hour == 9 && minute <= 15
C. hour >= 7 && minute >= 15 || hour <= 9 && minute <= 15
D. hour == 7 && minute >= 15 || hour == 8 || hour == 9 && minute <= 15
E. hour == 7 || minute >= 15 && hour == 8 && hour == 9 || minute <= 15
28.) Which one of the following code fragments computes the factorial of 5? The factorial of 5 is computed by multiplying all of the numbers between 1 and 5 inclusive (i.e. including 1 and 5).

A. int factorial = 1;
   for (int n = 5; n >= 0; n--) {
      factorial = factorial * n;
   }

B. int factorial = 1;
   for (int n = 1; n <= 5; n++) {
      factorial *= factorial;
   }

C. int n = 1, factorial = 1;
   while (n < 5) {
      factorial = factorial * n;
      n = n + 1;
   }

D. int n = 1, factorial = 0;
   while (n <= 5) {
      factorial *= n;
      n += 1;
   }

E. int n = 5, factorial = 1;
   do {
      factorial = factorial * n;
      n = n - 1;
   } while (n > 0);

29.) Consider the following expression:
   
   !(n > 11 && n <= 22)

   The expression above is equivalent to which one of the following?

A. n < 11 || n >= 22
B. n <= 11 || n > 22
C. n > 11 || n <= 22
D. n < 11 && n >= 22
E. n <= 11 && n > 22

30.) Assume n is an integer variable that has been initialized to some positive number and odd is a boolean variable that has been initialized to true. Consider the following three code fragments:

<table>
<thead>
<tr>
<th>fragment 1</th>
<th>fragment 2</th>
<th>fragment 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>if (n%2 == 0)</td>
<td>if (n%2 == 1)</td>
<td>odd = n%2 == 1;</td>
</tr>
<tr>
<td>odd = false;</td>
<td>odd = true;</td>
<td></td>
</tr>
<tr>
<td>else</td>
<td></td>
<td>odd = true;</td>
</tr>
<tr>
<td>odd = true;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Which of the fragments results in odd being true if n is an odd number and otherwise false?

A. fragment 2 only
B. fragment 1 and fragment 2 only
C. fragment 1 and fragment 3 only
D. fragment 2 and fragment 3 only
E. all three fragments
31.) Consider the following code fragment:

```java
switch (i) {
    case 10:
    case 15: d = 2.2; break;
    case 25: d = 7.7; break;
    default: d = 1.1;
}
```

This fragment is equivalent to which one of the following?

A. `if (i == 10 || i == 15) d = 2.2;
   if (i == 25) d = 7.7;
   d = 1.1;`

B. `if (i >= 10 && i <= 15) d = 2.2;
   if (i == 25) d = 7.7;
   d = 1.1;`

C. `if (i >= 10 && i <= 15) d = 2.2;
   else if (i == 25) d = 7.7;
   else d = 1.1;`

D. `if (i >= 10 || i <= 15) d = 2.2;
   else if (i == 25) d = 7.7;
   else d = 1.1;`

E. `if (i == 10 || i == 15) d = 2.2;
   else if (i == 25) d = 7.7;
   else d = 1.1;`

32.) Consider the following boolean expression intended to test if `count` is a prime number between 1 and 10:

```java
count == 1 && count == 2 && count == 3 && count == 5 && count == 7
```

Which one of the following best describes this code?

A. The result is always false, and the `&&`’s should be changed to `||`’s.

B. The result is always true, and the `&&`’s should be changed to `||`’s.

C. The result is true if count is a prime number between 1 and 10, otherwise the result is false.

D. A compilation error occurs because variables can’t be used more than once in a boolean expression.

E. A compilation error occurs because each equality test (i.e. `==`) must be surrounded by parentheses.

33.) Consider the following code fragment:

```java
for (int j = 1; j <= 10; j++)
    for (int k = 0; k < j; k++)
        System.out.print('*');
```

How many * characters are displayed by this code fragment?

A. 10
B. 45
C. 55
D. 65
E. 100
34.) Consider the following poorly indented method in a class named Test:

```java
public int calculate(int x, int y, int z) {
    if (x == 1)
        if (y == 4)
            z = z + 2;
        else
            z = z + 4;
    return z;
}
```

If `testObject` is an instance of the `Test` class, which one of the following values is returned by the message `testObject.calculate(1, 2, 3)`?

A. 0  
B. 3  
C. 5  
D. 7  
E. none of the above

35.) Consider the following variables that are initialized:

```java
int year  = 2000;
int month = 11;
int day   = 1;
```

Which one of the following boolean expressions does not result in short-circuited evaluation?

A. year == 1999 || year == 2000 || year == 2001  
B. year > 2001 && year < 2020  
C. month == 11 && day == 1 || month == 12 && day == 1  
D. year == 2000 && month == 12 && day == 22  
E. year == 2000 && month == 11 && day == 22

36.) Consider the following two code fragments:

```java
fragment 1
if (a == b) {
    if (c == d) {
        System.out.print("A");
    }
} else {
    System.out.print("B");
}
```

```java
fragment 2
if (a == b && c == d)  
    System.out.print("A");
else  
    System.out.print("B");
```

Under which of the following conditions will the two fragments produce the same output?

i. Only a and b are the same values.
ii. Only c and d are the same values.
iii. a and b are the same values, and c and d are the same values.

A. i only  
B. iii only  
C. i and iii only  
D. ii and iii only  
E. i, ii, and iii
Part III  Written Answers

1.) Show the output for the code fragment below in the box provided. Show a trace of your execution for partial credit.

```java
// out is a properly created OutputBox object
int n = 3;

while (n <= 7) {
    for (int c = n; c > 1; c -= 1) {
        if (n%2 == 0)
            out.print("*");
        else
            out.print("-");
    }
    out.skipLine(1);
    n = n + 1;
}
```

Show your output here.
One character per box. Use only as many boxes as needed.

2.) Consider the following classes and partial lists of their methods:

- Toy class
  Toy (double price) // constructs a toy with the specified price
double getPrice () // returns the price of the toy

- ToyListIterator class
  boolean hasMoreToys () // returns true if there are more toys in the list
  Toy nextToy () // returns the next toy in the list

- ToyChest class
  ToyChest () // constructs a toy chest
  boolean addToy (Toy toy) // adds toy to the toy chest
  ToyListIterator getToyListIterator () // returns a ToyListIterator for the toy chest

Write a code fragment that creates a ToyChest named, myToys, and add 22 toys, where the first toy has the price 1.01, the second toy has the price 1.02, up to the last toy that has the price 1.22.

Assume that the ToyChest, myToys, above has many more toys added to it. Write a code fragment that displays in the console window the total price of all of the toys in this toy chest.