ITSE 2417 (DL)- Fall 2016
Quiz 1- Chapters 1-7
Total Points: 70

Due: Saturday, October 1st @ 11:59PM. Look at Syllabus/ICR on late work.

Directions: For Questions 1-26, clearly mark answers on a separate word (or notepad) document. See sample file/directions provided by your professor and submit to the appropriate location on the MyTCC (BlackBoard) site.

– Assume all variables are properly declared- unless otherwise mentioned.

Multiple Choice. Mark the one best answer for each question. **(2 pts. each)**

1. To achieve platform independence, the Java virtual machine
   A. interprets the source code
   B. interprets the bytecodes
   C. interprets the virtual code
   D. interprets the machine code

2. Suppose `x` and `y` are int variables. Consider the following statements:

```
if (x > 5)
  y = 1;
else if (x < 5)
  {
     if (x < 3)
       y = 2;
     else
       y = 3;
  }
else
  y = 4;
```

   What is the value of `y` if `x = 5`?
   A. 1
   B. 2
   C. 3
   D. 4

3. Which of the following will cause a semantic error, if you are trying to compare `x` to 5?
   A. `if (x == 5)`
   B. `if (x = 5)`
   C. `if (x <= 5)`
   D. `if (x >= 5)`

4. Given the method heading:

```
int larger(int x, int y)
```

   which of the following does not demonstrate method overloading?
   A. `int larger(int x, int y, int z)`
   B. `int larger(char x)`
   C. `int max(int x, int y)`
   D. `double larger(double x, double y)`

5. What is output by the code below?

```
System.out.println(Math.floor(6.7));
```

A. 6.0
B. 7.0
C. 8.0
D. 9.0

6. What is the output of the following Java code?

```
int x = 7;
boolean found = false;

do
{
    System.out.print(x + " ");
    if (x <= 2)
      found = true;
    else
      x = x – 5;
}
while (x > 0 && !found);

System.out.println();
```

A. 7
B. 2 7
C. 7 2
D. None of these

7. What is stored in `ans` as a result of the arithmetic expression, given the following declarations?

```
int ans = 5, v1 = 2, v2 = 10, v3 = 18;
ans += v1 + 10 * (v2-- / 5) + v3 / v2;
```

A. 27
B. 12
C. 29
D. None of the above

8. Which of the following loops will print out the numbers 2, 4, 6, 8, 10?

I.

```
int i = 2;
while(i < 10){
   System.out.println(i);
   i = i + 2;
}
```

II.

```
for(int i = 2; i <= 10; i = i + 2)
{
   System.out.println(i);
}
```

III.

```
int i = 2;
while(i <= 10){
   System.out.println(i);
   i = i + 2;
}
```

A. I and III only
B. I only
C. II only
D. II and III only

9. Given the following method heading:

```
public static void mystery(int list[], int size)
```

and the declaration

```
int[] alpha = new int[50];
```

Which of the following is a valid call to the method `mystery`?

A. `mystery(alpha[50]);`
B. `mystery(alpha[],50);`
C. `mystery(alpha, 50);`
D. None of these

10. Assume that a game has four doors and the only way to win the game is to successfully find all four doors. If the player finds all four doors, the method should return true. If all four doors are not the found, the game should return false. Each time a door is found, a variable for that door is set to true. Which of the following code segments could be placed in the method to properly check for the doors and return the appropriate values?

I.

```
if(doorOne || doorTwo || doorThree || doorFour )
   return true;
return false;
```

II.

```
if(doorOne && doorTwo && doorThree && doorFour )
   return true;
return false;
```

III.

```
if(!doorOne)
   return false;
if(!doorTwo)
   return false;
if(!doorThree)
   return false;
if(!doorFour)
   return false;
return true;
```

A. III only
B. I only
C. I and II only
D. II and III only

11. You can leave out the ____ statements in a `switch` structure.
A. `break`
B. `switch`
C. `if`
D. `case`

12. You code an access modifier on a `static` method to indicate if it
A. accepts parameters
B. can be called from other classes
C. returns a value
D. is overloaded

13. You can use a `Scanner` object to:
A. get the next token in an input line
B. display a prompt on the console
C. display a blank line on a console
D. check your Java code for exceptions

14. Consider the following code:

```
// Insertion Point 1
public class CircleArea{
      // Insertion Point 2
    static final float PI = 3.14

    public static void main(String[]args){
      //Insertion Point 3

       float r = 2.0;
       float area;
       area = PI * r * r;
       System.out.println("Area = " + area);
    }
      // Insertion Point 4
}
```

In this code, where do the `import` statements belong?

A. Insertion Point 1
B. Insertion Point 2
C. Insertion Point 3
D. Insertion Point 4

15. What is the value of the third element in the array that follows?

```
double[] percents = new double[4];
percents[1] = 85.66;
percents[2] = 56.98;
percents[3] = 25.66;
```

A. 25.66
B. 56.98
C. 85.66
D. A third element doesn't exist

16. Which of the following correctly fill `/* code */` in method `copy()` below?

```
//method copy method should return a new array that contains
//the first count values from array excluding occurrences of val

public static int[] copy(int[] ray, int cnt, int val)
{
   /* code */
}
```

A.
```
int[] nums = new int[cnt];
for(int i = 0; i < cnt; i++)
{
   if(ray[i] != val)
      nums[i] = ray[i];
}
return ray;
```

B.
```
int[] nums = new int[cnt];
for(int i = 0, j = 0; j < cnt && i < ray.length; i++)
{
   if(ray[i] != val)
      nums[j++] = ray[i];
}
return nums;
```

C.
```
int[] nums = new int[cnt];
int j = 0;
for(int item : array)
{
   if(item != val)
      nums[j++] = item;
}
return nums;
```

D.
```
int[] nums = new int[cnt];
int j = 0;
for(int item : array)
{
   nums[j] = item;
   j++;
}
return nums;
```

17. Which of the values below will not be printed to the console when this code is executed?

```
for (int i = 0; i < 3; i++){
    for (int j = 0; j < 2; j++){
        if (i == j)
          continue;
        System.out.println("i = " + i + " j = " + j);
    }
}
```

A. i = 2 j = 0
B. i = 2 j = 1
C. i = 1 j = 1
D. i = 1 j = 0

18. What is output by the code below?

```
int i = 9;
int j = 10;

do{
   i = i - 2;
   j--;
}while(i > 5 || j > 5);

System.out.println(i + " - " + j);
```

A. 3 - 4
B. -1 - 4
C. 5 - 4
D. -1 - 5

19. What is output by the code below?

```
int[] array = {33,14,37,11,27};

System.out.println(array[7 / 2]);
```

A. 14
B. 11
C. 33
D. There is no output due to a runtime exception.

20. The memory allocated for a `float` value is _____.

A. 2 bytes
B. 4 bytes
C. 8 bytes
D. 32 bytes

Short Answer. Clearly mark answers as directed. Partial Credit will be given. (**10 @ 2 each)**

21. Write a Java statement for the following mathematical formula:

$$\texttt{cat} = \frac{\frac{4}{A}}{B}\left[\frac{1+\frac{5}{C+D}}{A}\right]^{\frac{1}{2}} - \frac{A}{C+D}$$

Note: `cat` is a `double` variable.

22. Rewrite the following as a simple statement without using a compound assignment operator:

```
x -= z + y - t;
```

23. Rewrite the following without using the `?:` operator:

```
int x = ((y > 0) ? (y > 5) : (y < -5)) ? 3 : 4;
```

24. Write a `for` loop to print the multiples of 3 from 300 down to 3.

25. Rewrite the following method to work exactly the same way using as few words as possible in the method body:

```
public static boolean interesting(boolean value) {
   if(value == true) {
     if(value == false)
         value = false;
      else
         value = true;
   }
   else
      if(value == false)
         value = false;
      else
         value = true;
   return value;
}
```

26. As a way to pass the time on long trips, people growing up in the United States have been known to sing the following repetitive song:

```
99 bottles of beer on the wall.
99 bottles of beer.
You take one down, pass it around.
98 bottles of beer on the wall.

…

2 bottles of beer on the wall.
2 bottles of beer.
You take one down, pass it around.
Only one bottle of beer on the wall.

1 bottle of beer on the wall.
1 bottle of beer.
You take one down, pass it around.
No more bottles of beer on the wall.
Go to the store and buy some more, 99 bottles of beer on the wall.
```

You get the idea. Write a Java program to generate the lyrics to this song. Use a constant to initialize the number of bottles. Do not hardcode the lyrics to the song.

Fill in the missing parts of the program below to solve the problem as stated above. Do not add any additional lines of code. **(10 @ 2 each)**

```
//BottlesOfBeer.java

_____________________                                          //1
   public static void main(String args[]) {

    ____________________                                       //2
    int bottles = MAX_BOTTLES;

    while (bottles > 0) {
      if (bottles == 1) {
         System.out.println("1 bottle of beer on the wall.");
         System.out.println("1 bottle of beer.");
     } else {
         System.out.println(bottles + " bottles of beer on the wall.");
         System.out.println(bottles + " bottles of beer.");
    }
    bottles--;
    ___________________                                        //3
    switch (bottles) {
      case 0:
        System.out.println("No more bottles of beer on the wall.");
        System.out.println("Go to the store and buy some more,
                            99 bottles of beer on the wall.");
```

```
        break;
      case 1:
        _________________________                                   //4
        break;
      _______________                                               //5
        System.out.println(bottles + " bottles of beer on the wall.");
        break;
    }
    System.out.println();
   }
  }
}
```

Pre Test- This part has already been taken. Your score will be added to the quiz. **(10 pts.)**

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Extra Credit: Implement the following program. Follows same program guidelines and graded on the same scale as program sets. Submit only your `.java` file- no test runs required. Partial credit given. (**10 points)**

A prime number is any positive integer having exactly two distinct divisors among the positive integers: itself and one. (Note that this excludes 1, because it has only itself as a divisor.) Each positive integer can be expressed (according to the Fundamental Theorem of Arithmetic, in a unique way) as a product of powers of the prime numbers. This product is called a prime factorization. For example,

$$374556 = 22 \cdot 31 \cdot 50 \cdot 74 \cdot 110 \cdot 131 \cdot 170 \cdot 190 \cdot 230 \cdot 290 \cdot \ldots$$

Typically, when we write such a product, we omit those factors in which the exponent is zero (becomes 1) and we omit any exponent that is 1. Rewriting the above product that way, you get

$$374556 = 22 \cdot 3 \cdot 74 \cdot 13$$

A prime factorization written in this way is said to be in normal form.

Write a Java program that, given a positive integer (`n > 1`), outputs its prime factorization, in normal form. Due to the limitations of "plain text", there is no nice way of displaying exponents, nor of producing the multiplication operator (`·`) the dot. The best that can be done is to display a prime factorization on two lines, with the exponents on the first line and the prime factors on the second with factors listed in ascending order, lined up properly with the exponents. As for the multiplication operator, use the asterisk (`*`), as is the case in most programming languages. For example, the prime factorization above would appear as

```
          2        4
374556 = 2  * 3 * 7  * 13
```

Input the number to be factored into primes from the keyboard. For each number given, its normal form prime factorization is to be displayed, on two lines, as described above. In particular, each occurrence of

an asterisk should be such that exactly one column to its left and one column to its right are blank (in both rows). If the number is prime (cannot be factored), output the message "`m is prime`". Output should look similar to below.

Sample Runs:

```
Enter number to factor: 13

13 is prime


Enter number to factor: 5120

        10
5120 = 2   * 5

Enter number to factor: 18207

         2         2
18207 = 3  * 7 * 17
```

Name the program: `PrimeFactNormFormXX.java`, where `XX` are your initials.