I. Fill in the Blank (30 pts)

1. If a variable in a class definition is declared ________________, then it can only be accessed in the class definition.

2. The ________________ method in the String class will create an array containing tokens in the String seperated by a delimiter.

3. We use the ________________ method to determine the number of characters in a String.

4. If an entity is declared ________________, then once it is assigned a value, its value can’t be changed.

5. If the characters ________________ are encountered on a line, then the compiler ignores the rest of the line.

6. ________________ occurs when we have two or more methods in a class definition with the same name but different parameter lists.

7. The ________________ in a class definition always has the same name as the class.

8. ________________ are English like instructions where we spell out what we will do but it isn’t written in a form that a computer can understand.

9. An object created from a class is called ________________ if there are no public means to change the variables defined in the class.

10. The numeric literals 1, 14, 22, 38, and 74 are automatically of type ________________.

11. An object becomes ________________ when there are no valid references to it.

12. If a variable in a class definition is not declared static, then it is an ________________ variable.

13. All parameter passing in Java is by ________________.
14. ____________ is the ability to restrict the access to or the visibility of data.

15. Older languages allowed ____________ which is a perjorative term for a program with many goto statements.

16. A while loop is a ____________ loop since the condition is checked before the body is executed.

17. ____________ is the binding together of data and the code that operates on the data.

18. If a ____________ statement is encountered in a loop, then the remainder of the current iteration is skipped.

19. We use the ____________ field of an array to determine its size.

20. If the return type on a method is ____________, then the method doesn’t return a value.

21. The ____________ of a method in Java is a combination of its name and parameter list.

22. If an array of 5 booleans is created, then the value of each is, by default, ____________.

23. In ____________, if the value of a logical boolean expression can be determined by examining the first operand, then the second isn’t evaluated.

24. A ____________ is a style of programming.

25. The ____________ method in the String class determines the position of the first occurrence of a character in the String.

26. The ____________ of a variable is the portion of the program where the variable is known.

27. Java uses ____________ to encode characters.

28. In order to change a double variable to an int, we perform a ____________.

29. If a type is ____________, then the value of the 1st bit in its binary value is significant.

30. If an array is named numbers, then the last valid position in the array is ____________.
II. Matching (10 pts)

31. null ______ A. Will cause all surrounding loops or switch statements to end
32. formal parameters ______ B. When used between object references, tests whether or not the contents of the objects they refer to are the same
33. final int[] numbers ______ C. When used between object references, tests whether or not they refer to the same objects
34. default constructor ______ D. String concatenation
35. break ______ E. Numerical addition
36. a++ ______ F. Has the value 3 if a is currently 2
37. Legal Identifiers in Java ______ G. The default value of a primitive type
38. Hardware ______ H. The default value of a reference variable
39. == ______ I. Creates a reference to an int[] and numbers cannot be reassigned to refer to another array
40. + in 1 + "" ______ J. Is generated anytime we use the new operator on a constructor of a class with no parameter list regardless of whether there are any constructors defined in the class

K. The parameters listed in a method declaration
L. Has the value 2 if a is currently 2
M. Is generated by the compiler when the new operator is invoked on a constructor of a class with no parameter list and there are no constructors defined in the class
N. Creates a reference to an int[] whose contents can’t be changed
O. name45, name$, name_, and name-
P. The software that controls the components in a computer.
Q. The parameters listed in a method call
R. The physical components in a computer.
S. name123, name45, name$, and name_
T. name123, name45, name$, and name-
U. Will cause the closest surrounding loop or switch statement to end
III. Short Answer (20 pts)

41. (2 pts) What is the binary equivalent of the decimal number 75?

42. (2 pts) Given that an int is stored in 4 bytes and is a signed type, what are the smallest and largest int values that can be stored?

43. (2 pts) Would the following cause a compile-time error? Explain.

```java
final int i = 1;
i = 2;
```

44. (2 pts) How would we generate a random integer between 192 and 291?

45. (2 pts) What would happen if the following three lines are executed?

```java
int i = 1;

while (i = 1)
    System.out.println(i);
```
46. (2 pts) Does the Math.abs method always return a positive value? Explain.

47. (2 pts) What is the syntax for creating an array in one line that consists of the even numbers between 2 and 12 with 2 and 12 included?

48. (2 pts) In what constructs is the break statement allowed?

49. (2 pts) What is the syntax for creating a void method called sum that can accept any number of char parameters?

50. (2 pts) Suppose we have an array called numbers containing ints. Show how the for each loop can be used to display the contents of the array.
IV. Discussion (10 pts)

51. (3 pts) What is the implication of short-circuit evaluation? Give an example to illustrate this.

52. (3 pts) Explain how the Bubble Sort works.

53. (4 pts) Explain what it means for an instance variable to “belong” to an instance and not to the class. Give an example to illustrate this.
V. Problem Solving and Coding (30 pts)

54. (5 pts) What does the following print? Explain the output. You may use a calculator, abacus, or ENIAC computer if you have one available if you want.

```java
public class Question54 {
    public static void main(String[] args) {
        String temp = "This is a test";
        temp.concat("World" + temp.length() + temp.charAt(4) + temp.charAt(5));
        temp.concat("T" + temp.charAt(temp.length()/2));
        temp.concat("WOW this is alot" + temp.charAt(5));
        temp = "";
        temp.concat("J" + temp.charAt(temp.length()-4/5-3) + temp.indexOf('s'));
        temp.concat("K" + temp.charAt(temp.length())/(int)Math.sin(175*3.14/180)+5));
        temp.concat("R" + temp.length()*(int)Math.pow(4,15)*(int)Math.sin(36*temp.length()));
        temp.toUpperCase().toLowerCase();
        System.out.println(temp.length());
        System.out.println(temp);
    }
}
```

55. (5 pts) What does the following code print? Explain the output.

```java
for (int counter=0;counter<40;counter++) {
    if (counter % 2 == 0 && counter % 3 == 0 && counter > 0)
        continue;
    if (counter % 4 == 0 && counter % 2 != 0)
        break;
    System.out.println(counter);
}
```
public class Question5 {
    public static void swap(int[] array, int firstIndex, int secondIndex) {
        int temp = array[firstIndex];
        array[firstIndex] = array[secondIndex];
        array[secondIndex] = temp;
    }

    public static void sort(int[] array) {
    }

    public static void main(String[] args) {
        int[] numbers = {22, 14, 18, 5, 6, 12, 10};
        sort(numbers);
    }
}
57. (7.5 pts) Write a method called count which will accept as parameter a String and will display to the user the number of occurrences of each character in the String. Only display a count of the characters that are in the String.

58. (7.5 pts) Write a method called addToArray which will accept as parameters an array of ints named numbers and an int named number. It will return an array consisting of the contents of numbers and the new number. Show a main method that will use this method.