



## 1. Matching [ 20 pts ]

Choose the **best** definition for each term.

1. \_\_\_\_\_ final
2. \_\_\_\_\_ new
3. \_\_\_\_\_ Object
4. \_\_\_\_\_ Data Type
5. \_\_\_\_\_ Package
6. \_\_\_\_\_ static
7. \_\_\_\_\_ break
8. \_\_\_\_\_ Class
9. \_\_\_\_\_ Encapsulation
10. \_\_\_\_\_ Bytecode
  - A. A collection of similar classes grouped together
  - B. The idea that each object protects and manages its own information
  - C. The sequence (or order) of statements that is executed
  - D. The contents of a .class file, the equivalent of machine language for the Java virtual machine
  - E. A Java program that executes in stand-alone mode and has a main method
  - F. A Java reserved word used to create a constant value that cannot be modified
  - G. A Java reserved word which indicates a method in a class that can be called without requiring an object instance be created first
  - H. Creating one class from another class by reusing the original class's blueprint
  - I. An instance of a class
  - J. Defines a set of values and operations that can be performed on those values.
  - K. A java reserved word that lets us instantiate new objects
  - L. A blueprint for creating objects, a collection of data and methods
  - M. A Java reserved word that allows you to exit a loop immediately

## 2. Expressions [ 16 pts ]

What is the value and the type of the following expressions?

4 (a)  $10 * 4 - 3 / 4 + 6 / 3$

Value:

Type:

4 (b)  $((8.0f + 3) + (10.0f \% 3)) * (5 - 3)$

Value:

Type:

4 (c)  $6.2 / 2 * 2 + 3.8$

Value:

Type:

4 (d) assume that the declarations `int x = 6; int y = 5;` are valid.  
 $(x != y) \ \&\& \ ( ((x == 3) \ || \ (y == 5)) \ \&\& \ (x == 6)) \ || \ (! (x <= 6) \ || \ (y > 5))$

Value:

Type:

### 3. Errors [12 pts]

The following code segments have a compilation or runtime error. Explain what the error will be and why it will occur.

(a) 

```
short val;
long dist;
int rate;

dist = 10L;
val = (short)dist;
rate = dist+val;
System.out.println("the rate is " + rate);
```

(b) 

```
double d1 = 54.875;
int neighbor;

neighbor = Math.floor(d1);
System.out.println("Nearest neighbor is " + neighbor);
```

(c) 

```
String s = "Foo";
int x = s.length;
System.out.println("The length of s is: "+x);
```

#### 4. Multiple choice [ 10 pts ]

Choose the single best answer for each question.

- 2 (a) If you want to output the text “hi there”, including the quote marks, which of the following could do that?
- A) `System.out.println("hi there");`
  - B) `System.out.println(""hi there"");`
  - C) `System.out.println("\"hi there");`
  - D) `System.out.println("\"hi there\"");`
  - E) none, it is not possible to output a quote mark because it is used to mark the beginning and ending of the String to be output.
- 2 (b) What value will z have if we execute the following assignment statement?
- ```
float z = 5 / 10;
```
- A) z will equal 0.0
  - B) z will equal 0.5
  - C) z will equal 5.0
  - D) z will equal 0.05
  - E) none of the above, a run-time error arises because z is a float and 5 / 10 is an int
- 2 (c) Which of the following is NOT a valid comment in Java that preserves the declaration of c.
- A) `int c=3; //set c to be three`
  - B) `/* this is a comment */ int c=3;`
  - C) `//this is a comment // int c=3;`
  - D) NEITHER A,B or C allows c to be declared.
  - E) ONLY A allows the declaration of c to be accomplished.
- 2 (d) The idea that program instructions execute in order (linearly) unless otherwise specified through a conditional statement is known as:
- A) boolean execution
  - B) conditional statements
  - C) try and catch
  - D) sequentiality
  - E) flow of control

- 2 (e) Of the following if statements, which one correctly executes three instructions if the condition is true, but none if it is false?
- a) `if (x < 0)`  
    `a = b * 2;`  
    `y = x;`  
    `z = a - y;`
- b) `{`  
    `if (x < 0)`  
    `a = b * 2;`  
    `y = x;`  
    `z = a - y;`  
    `}`
- c) `if { (x < 0)`  
    `a = b * 2;`  
    `y = x;`  
    `z = a - y ;`  
    `}`
- d) `if (x < 0){`  
    `a = b * 2;`  
    `y = x;`  
    `z = a - y;`  
    `}`
- e) b, c and d are all correct, but not a

## 5. Tracing and String Operations [ 12 pts ]

What is the output when the following code segment is run?

```
public class StringOps {
    public static void main(String[] args){
        int i,len,value;
        char ch;
        String fname = new String("john");
        String lname = new String("doe");
        String name = new String(fname.concat(lname));
        System.out.println("Name="+name);

        i = 3;
        ch = name.charAt(i);
        len = lname.length();
        value = lname.compareTo(fname);
        if (value == 0)
            System.out.println("Value is zero");
        else if (value < 0)
            System.out.println("Its negative");
        else
            System.out.println("Its positive");
        System.out.println("char is " + ch +
            " and length is " + len);

        name = lname;
        name.replace('e','t');
        value = name.compareTo(lname);
        if (name.equals(lname))
            System.out.println("Equal");
        else
            System.out.println("Not Equal");
        System.out.println(lname);
        System.out.println(name);
    }
}
```

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Output:

## 6. Tracing, Control Flow [ 10 pts ]

```
public class Tracing {
    public static void main(String[] args) {
        int x=5;
        char ch = 'A';
        switch(ch) {
            case 'A':
                System.out.println("Character was an A");
            case 'B':
                System.out.println("Character was a B");
                break;
            default:
                System.out.println("Done");
        }//end switch
        if (x<10)
            if (x>5)
                System.out.println("Point A");
            else
                System.out.println("Point B");
                System.out.println("Point E");
        x++;
        if (x>5)
            System.out.println("Point C");
        else
            System.out.println("Point D");
    }//end main
}//end class def
```

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OUTPUT:

**7. Coding and Expressions [ 10 pts ]**

Write an application named Time that asks the user for a number of seconds, and outputs the equivalent time in hours, minutes and seconds. For example, for the input 9999, the program would output 2 hours 46 minutes 39 seconds.

Assume that you have the Keyboard class with method `int readInt()` available.

**8. Coding and Iteration [ 10 pts ]**

Finish this application, which accepts an integer from the user, and then prints the sum of all the numbers up to and including the one input. Thus if the user inputs 5, the program would output: "15" (which is  $5+4+3+2+1$ ). Assume you have a Keyboard class available as in the previous question.

```
public class Sum {  
    public static void main(String[] args) {
```