

- 1) (2 points) What is the decimal value of a binary literal 0b11010 in a Java program?

Decimal value: **26**

- 2) (2 points) List four primitive types and four classes used in many Java programs:

Primitive: char, byte, short, int, long, boolean, float, double

Classes: System, String, Scanner, PrintWriter, Math, Arrays, etc.

- 3) (3 points) Write the Java code to create a **Scanner** to read the file named by **filename**, including the **try/catch** block for **IOException e**. Don't worry about imports, or using or closing the Scanner.

```
try {  
    Scanner reader = new Scanner(new File(filename));  
} catch (IOException e) {  
    // Error handling  
}
```

- 4) (2 points) Write one Java statement to print four variables of type **char**, **String**, **int**, and **double**, named *myChar*, *myString*, *myInteger*, and *myDouble*, separated by commas. The double must be printed with 5 digits after the decimal point.

```
System.out.printf("%c,%s,%d,%.5f\n",  
    myChar, myString, myInteger, myDouble);
```

- 5) (2 points) When **declaring** a Java method, is the programmer required to explicitly specify the **data type** of each parameter?

a. **yes**

b. no

- 6) (1 point) What is the value of the **boolean** variable **myBoolean** after the following statement?

```
boolean myBoolean = (16 <= 5) && true;    false
```

- 7) (3 points each) Write the output of the following code in the spaces provided.
HINT: Consider integer math, type casting, order of operations. Indices are zero based!

```
public class FinalExam1 {  
  
    public static void main(String[] args) {  
  
        int i = 23, j = 4;  
        double x = 1.3, y = 5.2;  
  
        // First line  
        System.out.printf("%d,%.2f\n", i / j + i % j, j * x);  
  
        // Second line  
        System.out.printf("%d,%.2f\n", (int)x - j, y + x * 2);  
  
        String s0 = "Java";  
        String s1 = "~!@#%^0123456789";  
  
        // Third line  
        String str = s1.charAt(5) + ":" + (s0 + s1).charAt(7);  
        System.out.println(str);  
  
        // Fourth line  
        int num = s1.indexOf('2') + s1.indexOf('@');  
        System.out.printf("%d\n", num);  
  
        // Fifth line  
        String sub = s0.substring(1, 3) + s1.substring(2, 5);  
        System.out.println(sub);  
    }  
}
```

First line of output: **8,5.20**
Second line of output: **-3,7.80**
Third line of output: **av@#**
Fourth line of output: **11**
Fifth line of output: **av@#**

- 8) (3 points each) Write the output of the following code in the spaces provided.
HINT: Consider pass by value, pass by reference, immutability of strings.

```
import java.util.Arrays;

public class FinalExam2 {

    public static void capitalize(String sChars) {
        sChars = sChars.toUpperCase();
        System.out.println(sChars); // First line
    }
    public static void square(double dValue) {
        dValue = Math.pow(dValue, 2);
        System.out.println(dValue); // Second line
    }
    public static void sort(int[] iArray) {
        Arrays.sort(iArray);
    }
    public static void main(String[] args) {

        String testString = "Whatever";
        capitalize(testString);
        double testValue = 4.0;
        square(testValue);
        int[] testArray = {12, 6, 3, 9};
        sort(testArray);
        System.out.println(testValue); // Third line
        System.out.println(testString); // Fourth line
        System.out.printf(Arrays.toString(testArray)); // Fifth line
    }
}
```

First line of output: **WHATEVER**

Second line of output: **16.0**

Third line of output: **4.0**

Fourth line of output: **Whatever**

Fifth line of output: **[3, 6, 9, 12]**

- 9) (3 points each) Write the output of the following code in the spaces provided.
HINT: Draw a diagram of the contents of both arrays, and track changes.

```
import java.util.Arrays;

public class FinalExam3
{
    public static void main(String[] args) {

        // Declare, allocate, initialize array
        double doubles[] = {5.0, 4.0, 3.0, 2.0};
        String[][] strings = new String[2][3];

        // Modify 1D array
        for (int i = 0; i < doubles.length; i++)
            doubles[i] = doubles[i] / 2.0 + i;

        // Initialize 2D array
        for (int row = 0; row < 2; row++)
            for (int col = 0; col < 3; col++)
                strings[row][col] = "(" + row + "," + col + ")";

        // Print array information
        System.out.println(doubles.length);
        System.out.println(Arrays.toString(doubles));
        System.out.println(strings.length);
        System.out.println(strings[0].length);
        System.out.println(strings[1][2]);
    }
}
```

First line of output: **4**
Second line of output: **[2.5, 3.0, 3.5, 4.0]**
Third line of output: **2**
Fourth line of output: **3**
Fifth line of output: **(1,2)**

10) (3 points each) Write the output of the following code in the spaces provided.

```
import java.io.File;
import java.util.Scanner;

public class FinalExam4 {

    public static void main(String[] args) {
        int i;
        double d;
        try {
            Scanner scan = new Scanner(new File("data.txt"));
            System.out.println(scan.nextLine());
            char c0 = scan.next().charAt(0);
            char c1 = scan.next().charAt(0);
            System.out.println(c0 + "," + c1);
            System.out.println(scan.nextInt() + ":" +
                               scan.nextDouble());
            d = scan.nextDouble();
            i = scan.nextInt();
            System.out.printf("%0.1f, %d\n", d, i);
            scan.close();

        } catch (Exception e) {
            System.out.println("Exception!");
        }
    }
}
```

Here are the contents of the “data.txt” file:

```
Computer Science
Java Programming
123 567
12.34 4.32
```

First line of output: **Computer Science**

Second line of output: **J,P**

Third line of output: **123:567.0**

Fourth line of output: **Exception!**

- 11) (3 points) Write Java code to instantiate a class **MyClass** with the default constructor into an object called **myObject** and use the object to call a method in the class named **myMethod**, with parameters of type **String**, **int**, and **char** (use any values), and print the return value.

```
MyClass myClass = new MyClass();  
System.out.println(myClass.myMethod("String", 123, 'X'));
```

- 12) (2 points) Show one line of Java code that **declares, allocates, and initializes** a character array with 4 elements with values 'a', 'Z', '\$', and '8', in that order.

```
char[] cArray = { 'a', 'Z', '$', '8'};
```

- 13) (5 points) Write a method with the signature shown below. It should allocate a character array called **cArray** that is the same size as **sArray**, copy the first character of each element in **sArray** to the corresponding element in **cArray**, and return **cArray**.

```
public static char[] initials(String sArray[]) {  
  
    char cArray[] = new char[sArray.length];  
    for (int i = 0; i < sArray.length; i++) {  
        cArray[i] = sArray[i].charAt(0);  
    }  
    return cArray;  
}
```

- 14) (2 points) Show the declaration for an instance method called **myMethod** that is visible outside the class, requires instantiation to be called, has an **int** return value, and accepts one parameter which is a two-dimensional array of **doubles**. You do not need to write the code, just show the declaration.

```
public int myMethod(double[][] dArray);
```