Unit 08: 2D Arrays – Worksheet 2

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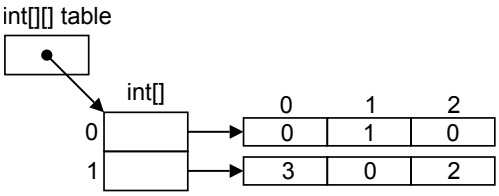
1. Show you know the most basic declaration and initialization of two-dimensional arrays.

   a) Write a statement that declares a two-dimensional array named `arr` that is intended to store real numbers.

   b) Write a statement that takes the arr variable declared in part (a), and allocates memory to store an array with five rows and four columns.

2. Consider the conceptual diagram of the memory structure to the right, and answer the following questions.

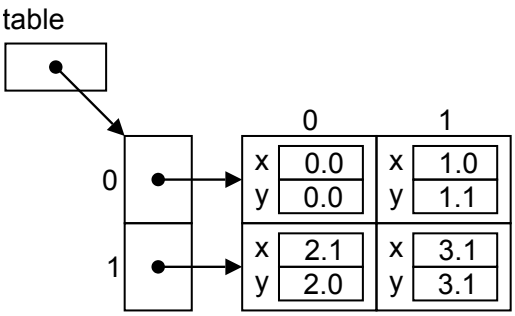


   a) Write a statement that will declare the variable `table`, and allocate the memory necessary to store the 2x3 array pictured. Then write three more statements, one to store each of the values (1, 2, and 3) in the position of the array as is shown.

   b) Write a single statement that will produce the same results as part (a). Ensure the proper placement of all curly braces, commas, and semicolons.

3. Given the class definition in the box below left and the conceptual diagram of a two dimensional array of instances of class `Vector`, in the box below, write the code that will declare and initialize the array.

```
1 public class Vector {
2    public double x;
3    public double y;
4    public Vector(double x, double y) {
5       this.x = x;
6       this.y = y;
7    }
8 }
```



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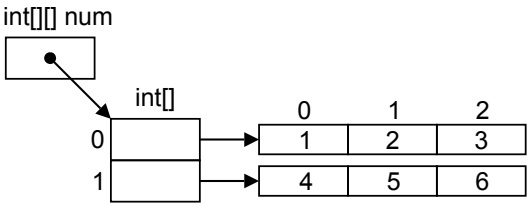
4. Consider the code given below left, and the conceptual diagram of the memory structure below right.

```
1 public static void sumRows(int[][] num) {
2    for (int[] r : num) {
3       int sum = 0;
4       for (int j=0; j<r.length; j++) {
5          sum += r[j];
6       }
7       System.out.print(sum + " ");
8    }
9 }
```



a) What does the for loop on line 2 iterate over?

b) What does the for loop on line 4 iterate over?

c) If the `sumRows` method is called with the data structure given in the diagram, what is the final output?

d) What would the output be if line 4 were replaced with:
`for (int j=0; j<num.length; j++) {`

e) Rewrite the code in lines 4 through 6 such that it uses an enhanced `for` loop.

```
4
5
6
```

e) Rewrite the code in lines 2 through 6 such that both loops use normal `for` loops (with loop counters).

```
1 public static void sumRows(int[][] num) {
2
3
4
5
6
7    System.out.print(sum + " ");
8    }
9 }
```