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| **APCS Exposure Java** | **Exercises 10.06-10** | **Date:** |
| **Name:** | | **Period:** |

1. What is the difference between declaring a 1D array and a 2D array?

*1D arrays require one set of brackets. 2D arrays require 2.*

**Use this 2D array example to answer questions 2 through 5.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q** | **W** | **E** | **R** | **T** | **Y** |
| **U** | **P** | **A** | **S** | **D** | **F** |
| **G** | **H** | **J** | **K** | **L** | **Z** |
| **X** | **C** | **V** | **B** | **N** | **M** |

2. What is located at index [1][2]?

*A*

3. What is located at index[3][5]?

*M*

4. Where is the *Q* located?

*index[0][0]*

5. Where is the *V* located?

*index[3][2]*

6. Write the code to declare a 2D array of integers with 10 rows and 20 columns.

*int matrix[][] = new int[10][20];*

7. Write the code to declare a 2D array of strings with 20 rows and 10 columns.

*Strng matrix[][] = new String[20][10];*

8. Look at the *initializer list* in program ***Java1015.java***.

Explain why a 2D array can be called an *Array of Arrays*.

*The initializer list declares an array who elements are arrays themselves.*

9. Look at program ***Java1016.java***. Why does it crash?

*The matrix has 7 rows and 5 columns, but attempts to display 5 rows and 7 columns.*

*Displaying fewer rows is not a problem. Displaying columns that do not exist causes the crash.*

10. 2D arrays normally involve matrices and matrices are usually displayed in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_configuration.

*row X column*

11. Look at programs ***Java1017.java*** and ***Java1018.java*** and their outputs.

How did the second program make the output line up?

*By using the DecimalFormat class*

12. Can a nested **for..each** loop be used to display a 2D Java static array?

*Yes*

13. What limitation does **for..each** have?

*It is read-only access.*

14. Refer to the previous question. Is this limitation for 1D arrays, 2D arrays, or both?

*Both*

15. We have seen arrays of integers and arrays of strings. Can we have arrays of objects?

*Yes*

16. Look at programs ***Java1021.java*** and ***Java1022.java*** and their outputs.

Both programs use the **length** field to indicate the number of rows and columns.

Why does this work for the first program, but not the second.

*In the first program, the number of rows and columns are the same.*

*They are different in the second program*.

17. Look at programs ***Java1023.java***. What is used to indicate the number of rows and columns?

*m.length is used for the number of rows. m[0].length is used for the number of columns.*

18. What is a *ragged array*?

*A 2D array where each row has a different number of elements.*

19. Would the technique from program ***Java1023.java*** work is the 2D array were *ragged*?

*No*

20. Look at programs ***Java1024.java***. What does it use to indicate the number of columns?

*m[r].length*

21. Are ragged arrays covered on the AP Exam?

*No*

22. Look at programs ***Java1025.java***. The variables **p** and **q** are passed to a **swap** method.

Explain why their values are now *swapped* in the output.

*It is because a copy of the values in p and q were sent to swap.*

*Swapping the copies has no effect on the originals.*

23. Look at programs ***Java1027.java***. Why does the **swap** method work in this case?

*In this program, the parameters are not copies of the information.*

*They are indexes of the actual information in an array.*