AP Computer Science Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Retake** Quiz: Arrays, 2D Arrays, ArrayLists Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_

AP Quick Reference Sheet Allowed

No Calculator

**Multiple Choice: Choose the best answer and circle it on your quiz.**

1. Which of the following loops will reach every element in the array a?
2. for (int j = 0; j < a.length + 1; j++)
3. for (int j = 0; j < a.length; j++)
4. for (int j = 1; j < a.length; j++)
5. for (int j = 1; j <= a.length; j++)
6. for (int j = 0; j <= a.length; j++)
7. Assuming all variables are declared correctly, which of the following swaps two elements in an array of integers called numbers the at the index of x and y?
8. numbers[x] = numbers[y];

numbers[y] = numbers[x];

1. int temp = numbers[x];

numbers[y] = numbers[x];

numbers[y] = temp;

1. int temp = numbers[x];

numbers[x] = numbers[y];

numbers[y] = temp;

1. I only
2. II only
3. III only
4. II and III
5. I, II, and III
6. What does the following code do? Assume list is an array of int values, temp is some previously initialized int value, and c is an int initialized to 0.

for (j = 0; j < list.length; j++)

if(list[j] < temp)

c++;

1. It finds the smallest value and stores it in temp
2. It finds the largest value and stores it in temp
3. It counts the number of elements equal to the smallest value in list
4. It counts the number of elements in list that are less than temp
5. It sorts the values in list to be in ascending order

**For questions 4 – 5, assume an int array, candy, stores the number of candy bars sold by a group of children where candy[j] is the number of candy bars sold by child j. Assume there are 12 children in all.**

4. Which of the following code could be used to compute the total number of bars sold by the children?

1. for (int j = 0; j < 12; j++)

sum += candy[j];

1. for (int j = 0; j < 12; j++)

candy[j] = sum;

1. for (int j = 0; j < 12; j++)

sum = candy[j];

1. for (int j = 0; j < 12; j++)

sum += [j];

1. for (int j = 0; j < 12; j++)

[j] += sum;

5. What does the following method do?

public int question5( )

{

int value1 = 0;

int value2 = 0;

for (int j = 0; j < 12; j++)

if(candy[j] > value1)

{

value1 = candy[j];

value2 = j;

}

return value2;

}

1. It returns the total number of candy bars sold.
2. It returns the total number of children who sold 0 candy bars.
3. It returns the total number of children who sold more than 0 candy bars.
4. It returns the number of candy bars sold by the child who sold the most candy bars.
5. It returns the index of the child who sold the most candy bars.

6. Which of the following initializes an 8 x 10 matrix with integer values that are perfect squares? ( Note: 0 is a perfect square, so a 2D array of all zeros would contain all perfect squares )

I. int[][] mat = new int[8][10];

II. int[][] mat = new int[8][10];

for (int r = 0; r < mat.length; r++)

for (int c = 0; c < mat[r].length; c++)

mat[r][c] = r \* r;

III. int[][] mat = new int[8][10];

for (int c = 0; c < mat[r].length; c++)

for (int r = 0; r < mat.length; r++)

mat[r][c] = c \* c;

A. I only

B. II only

C. III only

D. I and II only

E. I, II, and III

7. What is printed as a result of executing the following code segment?

List<Integer> list1 = new ArrayList<Integer>();

list1.add(new Integer(1));

list1.add(new Integer(2));

list1.add(new Integer(3));

list1.set(2, new Integer(4));

list1.add(2, new Integer(5));

list1.add(new Integer(6));

System.out.println(list1);

1. [1, 2, 3, 4, 5]
2. [1, 2, 4, 5, 6]
3. [1, 2, 5, 4, 6]
4. [1, 5, 2, 4, 6]

8. Given the following code and assume that nums initially contains [0, 0, 4, 2, 5, 0, 3], what will nums contain as a result of executing numQuest?

private List<Integer> nums;

// precondition: nums.size() > 0;

// nums contains Integer objects

public void numQuest()

{

int k = 0;

Integer zero = new Integer(0);

while (k < nums.size())

{

if (nums.get(k).equals(zero))

nums.remove(k);

k++;

}

}

1. [0, 4, 2, 5, 3]
2. [3, 5, 2, 4, 0, 0, 0, 0]
3. [0, 0, 0, 0, 4, 2, 5, 3]
4. [4, 2, 5, 3]
5. [0, 0, 4, 2, 5, 0, 3, 0]

**9 – 13 Consider the following method:**

10.

public static int arrayMystery4(int[] list) {

int x = 0;

for (int i = 1; i < list.length; i++) {

int y = list[i] - list[0];

if (y > x) {

x = y;

}

}

return x;

}

For each array below, indicate what value would be returned if the method arrayMystery4 were called and passed that array as its parameter.

Top of Form

|  |  |  |
| --- | --- | --- |
| 9. {5} | \_\_\_\_\_\_\_  0  [^0-9,]+ | 0 |
| 10. {3, 12} | \_\_\_\_\_\_\_  9  [^0-9,]+ | 9 |
| 11. {-4, 2, 10, 8} | \_\_\_\_\_\_\_  6  [^0-9,]+ | 6 |
| 12. {1, -9, -3, -5, -7} | \_\_\_\_\_\_\_  8  [^0-9,]+ | 8 |
| 13. {8, 2, 10, 4, 10, 9} | \_\_\_\_\_\_\_2  [^0-9,]+ | 2 |

Bottom of Form

***Short Answer: Write the code for the following methods.***

14. Complete the method that will shift the given static array of integers to the right by 1.

The array could be any size. Note, it is a circular shift, so move the last element in the array into the first element.

shiftRight( [3, 2, 1, 0] ) -> [0, 3, 2, 1]

shiftRight( [1] ) -> [1]

public void shiftRight (int [ ] a) {

15. (3 points) Write a method to remove all values less than the target number in an ArrayList.

public void removeValuesBelow(int number, List<Integer> list) {

16. (3 points) Write a method to return an array of sum of each row in the 2D array.

public int[] sumOfRows(int[][] matrix) {

AP Computer Science Name \_\_\_\_\_\_\_\_**SOLUTIONS**\_\_\_\_\_\_\_\_

Quiz: Arrays, 2D Arrays, ArrayLists 22 points Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_

AP Quick Reference Sheet Allowed

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**Multiple Choice (1 points each): Choose the best answer and circle it on your quiz.**

1. Which of the following loops will reach every element in the array a?
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6. for (int j = 0; j <= a.length; j++)
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1. int temp = numbers[x];

numbers[y] = numbers[x];

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1. int temp = numbers[x];

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for (j = 0; j < list.length; j++)

if(list[j] < temp)

c++;

1. It finds the smallest value and stores it in temp
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4. Which of the following code could be used to compute the total number of bars sold by the children?

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sum += candy[j];

1. for (int j = 0; j < 12; j++)

candy[j] = sum;

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sum = candy[j];

1. for (int j = 0; j < 12; j++)

sum += [j];

1. for (int j = 0; j < 12; j++)

[j] += sum;

5. What does the following method do?

public int question5( )

{

int value1 = 0;

int value2 = 0;

for (int j = 0; j < 12; j++)

if(candy[j] > value1)

{

value1 = candy[j];

value2 = j;

}

return value2;

}

1. It returns the total number of candy bars sold.
2. It returns the total number of children who sold 0 candy bars.
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II. int[][] mat = new int[8][10];

for (int r = 0; r < mat.length; r++)

for (int c = 0; c < mat[r].length; c++)

mat[r][c] = r \* r;

III. int[][] mat = new int[8][10];

for (int c = 0; c < mat[r].length; c++)

for (int r = 0; r < mat.length; r++)

mat[r][c] = c \* c;

A. I only

B. II only

C. III only

D. I and II only

E. I, II, and III

7. What is printed as a result of executing the following code segment?

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list1.add(2, new Integer(5));

list1.add(new Integer(6));

System.out.println(list1);

1. [1, 2, 3, 4, 5]
2. [1, 2, 4, 5, 6]
3. [1, 2, 5, 4, 6]
4. [1, 5, 2, 4, 6]

8. Given the following code and assume that nums initially contains [0, 0, 4, 2, 5, 0, 3], what will nums contain as a result of executing numQuest?

private List<Integer> nums;

// precondition: nums.size() > 0;

// nums contains Integer objects

public void numQuest()

{

int k = 0;

Integer zero = new Integer(0);

while (k < nums.size())

{

if (nums.get(k).equals(zero))

nums.remove(k);

k++;

}

}

1. [0, 4, 2, 5, 3]
2. [3, 5, 2, 4, 0, 0, 0, 0]
3. [0, 0, 0, 0, 4, 2, 5, 3]
4. [4, 2, 5, 3]
5. [0, 0, 4, 2, 5, 0, 3, 0]

**9 – 13 (1 point each) Consider the following method:**

10.

public static int arrayMystery4(int[] list) {

int x = 0;

for (int i = 1; i < list.length; i++) {

int y = list[i] - list[0];

if (y > x) {

x = y;

}

}

return x;

}

For each array below, indicate what value would be returned if the method arrayMystery4 were called and passed that array as its parameter.

Top of Form

|  |  |  |
| --- | --- | --- |
| 9. {5} | \_\_\_\_0\_\_\_  0  [^0-9,]+ | 0 |
| 10. {3, 12} | \_\_\_\_9\_\_\_  9  [^0-9,]+ | 9 |
| 11. {-4, 2, 10, 8} | \_\_\_\_14\_\_  6  [^0-9,]+ | 6 |
| 12. {1, -9, -3, -5, -7} | \_\_\_\_0\_\_\_  8  [^0-9,]+ | 8 |
| 13. {8, 2, 10, 4, 10, 9} | \_\_\_\_2\_\_\_2  [^0-9,]+ | 2 |

Bottom of Form

***Short Answer: Write the code for the following methods.***

14. Complete the method that will shift the given static array of integers to the right by 1.

The array could be any size. Note, it is a circular shift, so move the last element in the array into the first element.

shiftRight( [3, 2, 1, 0] ) -> [0, 3, 2, 1]

shiftRight( [1] ) -> [1]

public void shiftRight (int [ ] a) {

**if** (a.length == 0)

**return**;

**int** temp=a[a.length-1];

**for** (**int** k=a.length-1; k>0; k--)

a[k] = a[k-1];

a[0] = temp;

}

15. Write a method to remove all values less than the target number in an ArrayList.

public void removeValuesBelow(int number, List<Integer> list) {

int index = 0;

while (list.size() < 0) {

if (list.get(index) < number) {

list.remove(index);

} else {

index++;

}

}

OR

for (int x = 0; x < list.size(); x++) {

if (list.get(x) < number) {

list.remove(x);

x--;

}

}

}

16. Write a method to return an array of sum of each row in the 2D array.

public int[] sumOfRows(int[][] matrix) {

int[] sumRows = new int[matrix.length];

for (int r = 0; r < matrix.length; r++) {

for (int c = 0; c < matrix[0].length; c++) {

sumRows[r] += matrix[r][c];

}

}

return sumRows;

}