**Number of Questions — 22  
Percent of total test grade — 50**

**Directions:** Determine the answer to each of the following questions or incomplete statements, using the available space for any necessary scratch work. Then decide which is the best of the choices given and fill in the corresponding oval on the answer sheet. No credit will be given for anything written in the examination booklet (these pages). Do not spend too much time on any one problem.

Notes:

* Assume that classes listed in the Quick Reference found in Appendix have been imported where appropriate.
* Assume that declarations of variables and methods appear within the context of an enclosing class.
* Assume that method calls that are not prefixed with an object or class name and are not shown within a complete class definition appear within the context of an enclosing class.

1. What is *zero-based indexing* ?  
     
   (A) A collection of information that is stored on a computer and assigned a particular   
    name.

(B) An indexed structure that holds multiple values of the same type.

(C) An array of arrays, the elements of which are accessed with two (or more) integer  
 indexes.

(D) An integer indicating the position of a particular value in an array or other data

structure.

(E) A numbering scheme used throughout Java in which a sequence of values  
 is indexed starting with 0 (element 0, element 1, element 2, and so on).

1. What is an *array* ?  
     
   (A) A collection of information that is stored on a computer and assigned a particular   
    name.

(B) An indexed structure that holds multiple values of the same type.

(C) An array of arrays, the elements of which are accessed with two (or more) integer  
 indexes.

(D) An integer indicating the position of a particular value in an array or other data

structure.

(E) A numbering scheme used throughout Java in which a sequence of values  
 is indexed starting with 0 (element 0, element 1, element 2, and so on).

1. What is a *multidimensional array* ?  
     
   (A) A collection of information that is stored on a computer and assigned a particular   
    name.

(B) An indexed structure that holds multiple values of the same type.

(C) An array of arrays, the elements of which are accessed with two (or more) integer  
 indexes.

(D) An integer indicating the position of a particular value in an array or other data

structure.

(E) A numbering scheme used throughout Java in which a sequence of values  
 is indexed starting with 0 (element 0, element 1, element 2, and so on).

1. What is an *index* ?  
     
   (A) A collection of information that is stored on a computer and assigned a particular   
    name.

(B) An indexed structure that holds multiple values of the same type.

(C) An array of arrays, the elements of which are accessed with two (or more) integer  
 indexes.

(D) An integer indicating the position of a particular value in an array or other data

structure.

(E) A numbering scheme used throughout Java in which a sequence of values  
 is indexed starting with 0 (element 0, element 1, element 2, and so on).

1. Consider the following code segment:  
     
   // Assume that arr is an array of ints  
   for (int i = 0; i < arr.length; i++) {  
    arr[i]++;  
   }  
     
   Which of the following correctly describes how this code affects the array arr when executed?  
     
   (A) Every element of the array arr has been decremented (decreased by 1).  
   (B) Every element of the array arr has been incremented (increased by 1).  
   (C) Every element of the array arr has been doubled (multiplied by 2).  
   (D) Every element of the array arr has been squared (raised to the power 2).  
   (E) This code leaves the array arr unchanged.
2. Consider the following code segment:  
     
   // Assume that arr is an array of ints  
   for (int i = 0; i < arr.length; i++) {  
    arr[i] += arr[i];  
   }  
     
   Which of the following correctly describes how this code affects the array arr when executed?  
     
   (A) Every element of the array arr has been decremented (decreased by 1).  
   (B) Every element of the array arr has been incremented (increased by 1).  
   (C) Every element of the array arr has been doubled (multiplied by 2).  
   (D) Every element of the array arr has been squared (raised to the power 2).  
   (E) This code leaves the array arr unchanged.
3. Consider the following code segment:  
     
   // Assume that arr is an array of ints  
   for (int i = 0; i < arr.length; i++) {  
    int x = arr[i] - 1;  
   }  
     
   Which of the following correctly describes how this code affects the array arr when executed?  
     
   (A) Every element of the array arr has been decremented (decreased by 1).  
   (B) Every element of the array arr has been incremented (increased by 1).  
   (C) Every element of the array arr has been doubled (multiplied by 2).  
   (D) Every element of the array arr has been squared (raised to the power 2).  
   (E) This code leaves the array arr unchanged.

1. Consider the following code segments:

I double [ ] array = new double [1028];

II double [ ] array;  
 array = new double [1028];

III [] double array = new double [1028];

Which code correctly initializes an array that holds 1,028 values of type double ?

(A) I only

(B) II only

(C) III only

(D) I & II only

(E) I, II, & III

1. Consider the following code segment:  
     
   double a = -7.0;

double b = 5.0;

if (Math.abs(a) < b) {

b = a + b;

} else if (Math.abs(a) > b) {

b = b + 2.0;

} else {

b = a;

}

After the above code segment has executed, what is the value of b ?

(A) -7.0  
(B) -2.0  
(C) "a"  
(D) 2.0  
(E) 7.0

1. Consider the following code segment:  
     
   int[] numbers = new int [6];

numbers[1] = 4;

numbers[3] = 104;

numbers[5] = 2;

int x = numbers[1];

numbers[x] = 44;  
numbers[numbers[5]] = 11;  
  
What are the values in the array numbers after this code segment has executed?   
  
(A) { 0, 44, 11, 104, 0, 2 }

(B) { 0, 4, 0, 104, 0, 2 }

(C) { 4, 0, 104, 0, 2, 0 }

(D) { 44, 11, 104, 0, 2, 0 }

(E) { 0, 4, 11, 104, 44, 2 }

1. Consider the following Java program:   
     
   public class ChopItUp {

public static String[] chop(String input) {

String[] output = new String[input.length()];

for (int i = 0; i < input.length(); i++) {

output[i] = input.substring(i);

}

return output;

}

public static void main(String[] args) {

String[] what = chop("Hello, world.");

System.out.println(what[2]);

}

}  
  
  
 What is output to the console when this program is executed?  
  
 (A) Hello, world.  
 (B) llo, world.  
 (C) Hello, worl  
 (D) Hello,  
 (E) world.

**Questions 12-14 refer to the following static method.**  
  
public static int getA(int[] a, int b) {  
 return a[b];  
}

1. What is the value of y after the following code executes?  
     
   int[] x = { 1, 2, 3, 4, 5 };  
   int y = getA(x, 1);  
   y = getA(x, y);  
     
   (A) 1  
   (B) 3  
   (C) 5  
   (D) An exception is thrown because an array index is less than zero  
   (E) An exception is thrown because an array index is too large
2. What is the value of y after the following code executes?  
     
   int[] x = { 1, -1, 5, 1, 3};

int y = getA(x, 1);  
y = getA(x, y);  
  
(A) 1  
(B) 3  
(C) 5  
(D) An exception is thrown because an array index is less than zero  
(E) An exception is thrown because an array index is too large

1. What is the value of y after the following code executes? (See previous page for the definition of the static method getA ).  
     
   int[] x = { 5, 4, 3, 2, 1 };

int y = getA(x, getA(x, 1));  
  
  
(A) 1  
(B) 3  
(C) 5  
(D) An exception is thrown because an array index is less than zero  
(E) An exception is thrown because an array index is too large

1. Which of the following correctly initializes an array superBass to contain five elements each with value 0 ?  
     
   I int[] superBass = { 0, 0, 0, 0, 0 };  
     
   II int[] superBass = new int[5];  
     
   III int[] superBass = new int[5];  
    for (int i = 0; i < superBass.length; i++) {  
    superBass[i] = 0;  
    }

(A) I only  
 (B) II only

(C) I and II only

(D) I and III only

(E) I, II, and III

1. Consider the following Java program:

public class ReferenceMystery1 {

public static void main(String[] args) {

int x = 0;

int[] a = new int[8];

x = x + 2;

mystery(x, a);

x = x + 2;

mystery(x, a);

}

public static void mystery(int x, int[] a) {

x = x + 1;

a[x] = a[x] + 1;

}

}

What are the values in the array a after the main method has finished?

(A) { 0, 0, 0, 1, 0, 1, 0, 0 }

(B) { 0, 0, 0, 0, 0, 0, 0, 0 }

(C) { 0, 0, 0, 1, 0, 0, 0, 1 }

(D) { 0, 0, 1, 0, 1, 0, 0, 0 }

(E) { 0, 0, 1, 1, 0, 0, 0, 0 }

1. Which of the following code segments correctly declares a two-dimensional array with 2 rows and 3 columns?  
     
   I int[][] twoDimensionalArray = new int[3][2];  
      
   II int[][] twoDimensionalArray = new int[2][3];  
     
   III int twoDimensionalArray = new [int][2][3];

(A) I only  
(B) II only

(C) III only

(D) I & III only

(E) II & III only

1. Assume that i is a variable of type int and arr is an array. Consider the following expression:

(i <= arr.length) && (i >= arr.length)  
  
Which of the following expressions is equivalent to the above expression?  
  
(A) false

(B) true

(C) i == arr.length

(D) i != arr.length

(E) i == arr.length - 1

1. Assume that i is a variable of type int and arr is an array. Consider the following expression:

(i <= arr.length) || (i >= arr.length)  
  
Which of the following expressions is equivalent to the above expression?  
  
(A) false

(B) true

(C) i == arr.length

(D) i != arr.length

(E) i == arr.length - 1

**Questions 20-21 refer to the following Java program.**

public class TestProblem {  
 public static int calculateA(int a, int[] b) {

b[a] = b[a/2] / 2;

return b[a/2] + b[a];

}

public static void main(String[] args) {

int result = 3;

int[] x = { 3, 3, 3, 3, 3 };

for (int i=0; i<2; i++) {

result = calculateA(result, x);

}

}

}

1. What is the value of result when Java reaches the end of the main method?  
     
   (A) 1  
   (B) 2  
   (C) 3  
   (D) 4  
   (E) 5
2. What are the elements of the array x when Java reaches the end of the main method?  
     
   (A) { 3, 3, 3, 3, 3 }

(B) { 3, 1, 3, 1, 3 }

(C) { 3, 3, 3, 1, 1 }

(D) { 1, 1, 3, 3, 3 }

(E) { 1, 1, 1, 1, 1 }

**END OF SECTION I.**