Practice Test 1

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. Which is an example of an index?
a. `1`
b. `"Elaine"`
c. `names(1)`
d. `names`

____ 2. In an array, the index of the first item is
a. 0
b. 1
c. 2
d. a

____ 3. *Given the following code segment:*

```
public class Test {
  public static void main(String[] args) {
    int[] i = new int[10];
    System.out.println("The value of i[2] is: " + i[2]);
  }
}
```

Which will be displayed after the code executes?
a. `The value of i[2] is 0.`
b. `The value of i[2] is 2.`
c. `The value of i[2] is 10.`
d. A run-time error is generated because `i[2]` is not assigned a value.

____ 4. How many array elements are declared in the statement:
`String[] names = {"Lisa", "Fernando", "Whitney"};`?
a. 0
b. 1
c. 2
d. 3

____ 5. The length attribute determines
a. the longest element in an array.
b. the number of elements in an array.
c. the index of the last element.
d. the index of the longest element.

____ 6. What is `values.length` given the statement `int[] values = {1, 2, 3, 4};`?
a. 1
b. 2
c. 3
d. 4

____ 7. Which statement determines an offset array index when the low value is 200 and the high value is 1000?
a. `offset = new int[200 - 1000];`
b. `offset = new int[200, 1000];`
c. `offset = new int[1000 - 200];`
d. `offset = new int[1000 - 200 + 1];`

____ 8. Which is stored when a letter is assigned a `char` variable?
a. the binary representation of the letter
b. the Unicode representation of the letter
c. the actual letter
d. an index value between 1 and 26

____ 9. Which method is used to convert a string to a `char` array?
a. toChar()
b. toCharArray()
c. charAt()
d. toArrayChar()

____ 10. In Unicode, uppercase letters from A to Z have values
a. 0 through 64
b. 65 through 90
c. 97 through 122
d. 122 through 150

____ 11. Which statement properly declares a two-dimensional array with 9 String elements?
a. `String[] gameBoard = new String [3][3];`
b. `String[][] gameBoard = new String [3][3];`
c. `String[][] gameBoard = new String [9];`
d. `String[9] gameBoard = new String [3][3];`

____ 12. Which property can be used to return the number of rows in an array?
a. length
b. size
c. rank
d. noRows

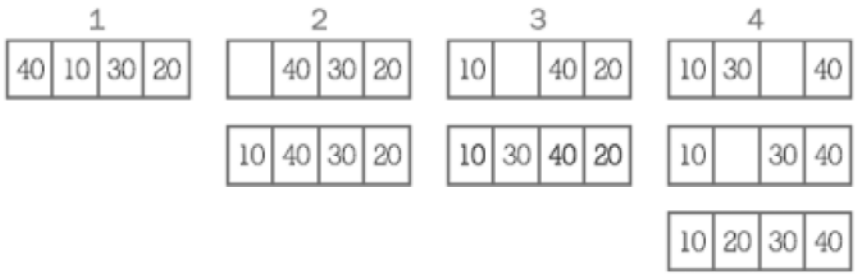
____ 13. Which statement inserts an element at the end of a dynamic array?
a. `gameBoard.add("X");`
b. `gameBoard.add(5, "X");`
c. `gameBoard.set("X");`
d. `gameBoard.get("X");`

____ 14.
```
for (arrayIndex = 0 to numItems-1) {
   for (subarrayIndex = arrayIndex to numItems-1) {
     if (items[subarrayIndex] < items[arrayIndex]) {
         swap items[subarrayIndex] and items[arrayIndex]
     }
   }
}
```

Which algorithm is defined in the pseudocode above?
a. selection sort
b. insertion sort
c. mergesort
d. binary search

____ 15. Which sorting algorithm sequentially removes an item from a list and adds it back to the list in the appropriate position relative to the previous items in the list?
a. sequential sort
b. selection sort
c. insertion sort

____ 16. Which algorithm is illustrated in the visual below?



a. selection sort
b. insertion sort
c. mergesort
d. binary search

____ 17. An array A of 100 items is to be sorted by mergesort. Suppose that the two halves of the array have been sorted through recursive calls, and the merge() method is then called with the statement:

```
merge(A, 1, 50, 100);
```

How many comparisons between elements will be performed during this call?

a. 10
b. 50
c. 100
d. 500

____ 18. *Given the following code segment:*

```
public void whatzOutput(int x) {
   System.out.println(x);
      if (x > 0) {
         if (x % 2 == 1) {
            whatzOutput(x/3);
         } else {
            whatzOutput(x/2);
         }
       }
}
```

Which is displayed when `whatzOutput(10)` is called?

a.
```
5
1
0
```
b.
```
10
3
0
```
c.
```
10
5
1
0
```
d.
```
10
3
1
0
```

____ 19. *Given the following code segment:*

```
public static int whatzOutput(int x) {
    if (x == 0) {
      return(x);
    } else {
      return(whatzOutput(x-1));
    }
}
```

Which is displayed when `whatzOutput(-1)` is called?

a. 0
b. -1
c. -2
d. No value is returned because this call results in infinite recursion.

____ 20. *Given the following code segment:*

```
public void whatzOutput(int x) {
 if (x > 0) {
   for (int y = 0; y < x; y++) {
      System.out.print("*");
   }
   System.out.println();
   whatzOutput(x - 1);
 }
}
```

Which is displayed when `whatzOutput(5)` is called?

a.
```
*****
```

b.
```
***************
```

c.
```
*****
****
***
**
*
```

d.
```
*
**
***
****
*****
```

____ 21. Which algorithms take a divide and conquer approach?

I. Selection Sort
II. Insertion Sort
III. Mergesort
IV. Binary search

a. I and II
b. I, II, and III
c. III and IV
d. I, III, and IV

____ 22. Which item of an array sorted from low to high is examined first in a binary search?

a. the lowest item
b. the middle item
c. the highest item
d. the first item

____ 23. Which elements would be checked in a search for 99 in an array that stores 3, 12, 23, 56, 78, 99 using the binary search?

a. 23, 78, and 99
b. 99 only
c. 56 and 99
d. 3, 12, 23, 56, 78, and 99

____ 24. How many elements would be checked in a search for 5 in an array that stores 2, 4, 17, 89, 100 using the binary search?

a. 1
b. 2
c. 3
d. 5

____ 25. Which algorithms are implemented recursively?

I. selection sort
II. insertion sort
III. mergesort
IV. binary search

a. I and II only
b. I, II, and II only
c. III and IV only
d. II, III, and IV only

____ 26. Which algorithm is said to having a running time of Log_2n?
a. selection sort
b. merge sort
c. insertion sort
d. binary search

Assume the binary search algorithm will be used to find elements in the ordered array with the sequence of elements below:

22, 23, 33, 42, 55, 85, 88

____ 27. How many elements would be examined to find the number 88, including the 88 itself?
a. 1
b. 2
c. 3
d. 7

____ 28. Which elements would be examined in an unsuccessful search for 99?
a. 42, 55, 85, 88
b. 42, 23, 85, 22, 33, 55, 88
c. 42, 85, 88
d. 22, 23, 33, 42, 55, 85, 88

____ 29. Which is <u>not</u> true about a stack?
a. A stack can contain many data items.
b. A stack is referred to as a first-in-first-out (FIFO) data structure.
c. A data structure organizes data.
d. A stack can be emptied.

____ 30. *Given the following code segment:*

```
public static void main(String[] args) {
    Stack s = new Stack(10);
         s.push(5);
         s.push(8);
         s.push(4);
         s.pop();
         System.out.println(s.top());
    }
}
```

Which will be displayed when the code is run?
a. `4`
b. `5`
c. `8`
d. `10`

____ 31. Which situations could be represented in a queue?

I. ticket line
II. lines at a toll booth
III. stand-by list for plane seats

a. I only
b. I and II only
c. I and III only
d. I, II, and III

____ 32. Which operation returns the number of data items in a stack or a queue?

a. isEmpty
b. enqueue
c. size
d. length

____ 33. *Given the following code segment:*

```
public static void main(String[] args) {
    Queue q = new Queue(10);
         q.enqueue(55);
         q.enqueue(84);
         q.enqueue(24);
         System.out.println(q.size());
         q.enqueue(14);
         q.dequeue();
         System.out.println(q.front());
         System.out.println(q.size());
    }
}
```

Which will be displayed when the code is run?

a.
```
3
84
3
```

b.
```
10
55
4
```

c.
```
3
55
4
```

d.
```
3
84
4
```

____ 34. *Given the following code segment:*

```
public static void main(String[] args) {
    Queue q = new Queue(10);
         q.enqueue(7);
         q.enqueue(4);
         q.enqueue(14);
         q.makeEmpty();
         q.enqueue(14);
         System.out.println(q.front());
         System.out.println(q.size());
    }
}
```

Which will be displayed when the code is run?

a. `0`
b. `14`
   `1`
c. `7`
   `4`
d. `14`
   2

____ 35. Which must each item in a linked list contain?

I. data
II. index
III. pointer

a. I only
b. I and II only
c. I and III only
d. I, II, and II

____ 36. A class that contains a class member is called a

a. nested class
b. member class
c. inner class
d. outer class

____ 37. Which of the following operations are supported by a linked a list?

I. Retrieve an element from the list.
II. Insert a new element to the list.
III. Remove an element from the list.

a. I only
b. I and II only
c. I and III only
d. I, II, and III

____ 38. *Given the following code segment:*

```
public static void main(String[] args) {
    LinkedList list = new LinkedList();
         list.addAtFront("Peter");
         list.addAtFront("Susan");
         list.addAtFront("Alonzo");
         list.addAtFront("Khoi");
         list.remove("Peter");
         System.out.println(list);
    }
}
```

Which will be displayed when the code is run?

a.
```
Peter
Susan
Alonzo
Khoi
```

b.
```
Susan
Alonzo
Khoi
```

c.
```
Khoi
Alonzo
Susan
Peter
```

d.
```
Khoi
Alonzo
Susan
```

____ 39. A game requires each player to be given a set of chips. If a player loses a round, a chip is moved from the top of that player's pile onto the top of the other player's pile. Which would be the best data structure to simulate this game?

a. stack
b. queue
c. linked list
d. nested class

____ 40. An application requires theatre attendees wait in four lines based on the level of their ticket. Which would be the best data structure to use in this application?

a. ten stacks of attendees
b. ten queues of attendees
c. ten linked lists of attendees
d. ten nested classes of attendees