

Pencil & Paper 11

1. Most methods, in a class containing an array member variable, will require what kind (data type) of parameter to access a specific element of the array?

Elements of an array can only be accessed by variables that are of the type integer. According to our textbook, "When an array is created, the length of the array is given in square brackets after the array name. The indexed variables are then numbered... starting with 0 and ending with the integer that is one less than the length of the array" (347). A method within a class that accesses an array member variable within that same class must have a parameter of type integer to access a specific element of that array: the integer value passed to the method is then used as the index value when the member method accesses an element of the member array variable.

2. Write an if statement (only the first line -- it does not need an action block) to test that the int variable index is within the bounds of the array basket.

The following code tests if the int variable index is within the bounds of the array basket:
`if(index >= 0 && index < basket.length)`

3. What is the output of the following Java code?

```
String [] messages = {"Hello", null, "Goodbye", null};  
System.out.println("There are " + messages.length + " messages.");
```

The output is as follows:
There are 4 messages.

4. What is the output of the following Java code?

```
String [] messages = {"Hello", null, "Goodbye", null};  
for (String nextMessage : messages)  
    if (nextMessage != null)  
        System.out.print(nextMessage + ",");
```

The output is as follows:
Hello,Goodbye,

5. Write a for loop to count the number of available "slots" in the array messages above.

The following code counts the number of available "slots" in the array messages:

```
int count = 0;  
for( int i = 0; i < messages.length; i++ ) {  
    if( messages[i] == null ) {  
        count++;  
    }  
}
```

6. Write a for loop to count the number of occupied "slots" in the array messages above.

The following code counts the number of occupied "slots" in the array messages:

```
int count = 0;  
for( int i = 0; i < messages.length; i++ ) {  
    if( messages[i] != null ) {  
        count++;  
    }  
}
```

```
}  
}
```

7. Use CongaLine (see link in code section above) to answer this question. Does the removeDancer method "pack" the array after the removal, or does it leave an empty slot at the removal location?

The array is "packed" after the removal. This is accomplished by using a for loop that starts at the position of the removed dancer and cycles through the remaining elements of the array up to the current value of count. Each iteration of the loop assigns the next dancer object in the array to the current index location, moving all of the empty values to the end.

8. Use CongaLine (see link in code section above) to answer this question. Does the addDancer method add the Dancer at the end of the occupied "slots", or does it insert the Dancer at the first available (null) spot it finds?

The addDancer method adds the dancer object at the end of the currently occupied slots. This is accomplished by using the variable count, which keeps track of the index location in the array where the unoccupied "slots" begin.

9. Use CongaLine (see link in code section above) to answer this question. Assuming there is at least one Dancer in the array, and that the supplied index value is greater than or equal to zero and less than the count of Dancers in the array, is it possible to get a null value returned by the method?

No, it is not possible to have a null value returned when the given conditions are satisfied. The variable count keeps track of the first available "slot" in the array conga. When a dancer is removed via the method removeDancer the array is "packed" to ensure that there are no null values within all entries in the array that are less than the current value for count. The only time a value of null will be returned is when the value of index exceeds the value of count, which itself must always be less than the length of the conga array.

10. What is the EXACT output of this week's "Coding" files after they have been completed, compiled, and executed?

The output is as follows:

There are 996 in this conga line, and 44 people who are really into it!