

Worksheet: Arrays Practice 3

1. Study the following code. Method `linearSearch` is intended to search the array `arr`, and return the index of the last (rather than first) element in the array that matches the `String` given in the parameter `value`.

```

1 public static int linearSearch(String[] arr, String value) {
2     for(int index=arr.length-1; index >= 0; index--) {
3         boolean found = arr[index].equals(value);
4         if(found) {
5             return index;
6         }
7     }
8     return -1;
9 }

```

Given `arr = { "red", "fish", "blue", "fish" }`, complete the trace table for each given `value`. You may not need to use all the rows of each table.

a) `value = "blue"`

index	arr[index]	found
3	fish	false
2	blue	true

return value: 2

b) `value = "fish"`

index	arr[index]	found
3	fish	true

return value: 3

c) `value = "red"`

index	arr[index]	found
3	fish	false
2	blue	false
1	fish	false
0	red	true

return value: 0

d) `value = "shark"`

index	arr[index]	found
3	fish	false
2	blue	false
1	fish	false
0	red	false
-1		

return value: -1

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2. Study the following code for method `fibonacciArray` then

```

1 public static int[] fibonacciArray(int size) {
2     if(size <= 0) return new int[0];
3     if(size == 1) return new int[] {1};
4     int[] fib = new int[size];
5     fib[0] = 1;
6     fib[1] = 1;
7     int stop = fib.length;
8     for (int i=0; i<stop; i++) {
9         fib[i+2] = fib[i] + fib[i+1];
10    }
11    return fib;
12 }

```

- a) Complete the trace table for the method call `fibonacciArray(5)`.

fib before line 9					values before line 9			after line 9	
[0]	[1]	[2]	[3]	[4]	i	f[i]	f[i+1]	f[i+2]	i<stop
1	1	0	0	0	0	1	1	2	true
1	1	2	0	0	1	1	2	3	true
1	1	2	3	0	2	2	3	5	true
1	1	2	3	5	3	3	5	<i>error</i>	true

- b) The trace table above should have revealed a problem with the given code. Write a corrected version of line 7 such that the loop stops at the correct value of `i`.

```
int stop = fib.length - 2;
```

- c) Complete the trace table for the method call `fibonacciArray(5)` with the new loop condition. You may not need all the space in the table.

fib before line 9					values before line 9			after line 9	
[0]	[1]	[2]	[3]	[4]	i	f[i]	f[i+1]	f[i+2]	i<stop
1	1	0	0	0	0	1	1	2	true
1	1	2	0	0	1	1	2	3	true
1	1	2	3	0	2	2	3	5	true
1	1	2	3	5	← fib after loop				