Quiz: `String` and Arrays

1. Fill in the boxes with the correct Java code segment

a) Write a statement that ***declares*** a local variable and ***initializes*** it to the value `1.5`.

```
double x = 1.5;
```

b) Write a statement that ***declares*** a local array and ***initializes*** it with the integer digits 0 through 5, inclusive.

```
int[] a = { 0, 1, 2, 3, 4, 5 };
```

c) Write a statement that ***declares*** and ***initializes*** an array of fifty `boolean` variables.

```
boolean[] a = new boolean[50];
```

d) Consider the following code segment with preceding line numbers:

```
1 | boolean comp = ( str1 == str2 );
2 | System.out.print( comp );
```

Both `str1` and `str2` are valid `String` objects, and both contain the same sequence of characters; however, the equality comparison `str1 == str2` returns the value `false`. Please rewrite line 1 of the code using the `equals` method such that `comp` will be evaluate to `true` when the `str1` and `str2` contain the same sequence of characters, and `false` if they do not.

```
boolean comp = str1.equals(str2); // or: str2.equals(str1);
```

e) Rewrite the answer to part (d) using the `compareTo` method.

```
boolean comp = str1.compareTo(str2) == 0;
        // or: str2.compareTo(str1) == 0;
```

f) Write a chained `if` statement that determines which of the strings `"care"`, `"careful"`, or `"careful"` occurs in a variable `text` of type `String`, and prints exactly one corresponding message. If `text` contains `"carefully"`, print `"Adverb form."`. If `text` does not contain `"carefully"` but contains `"careful"`, print `"Adjective form."`. If `text` contains neither substring, print `"Noun form."`. Assume any string will contain at least one of these forms. For example:

- If text has the value `"Code carefully."`, the code should print only `"Adverb form."`.
- If text has the value `"He is careful."`, the code should print only `"Adjective form."`.
- If text has the value `"Provide care."`, the code should print `"Noun form."`.

Use only String methods from the AP Java Subset (which does not include the method `contains`).

```
if (text.indexOf("carefully") != -1) {
    System.out.println("Adverb form.");
} else if (text.indexOf("careful") != -1) {
    System.out.println("Adjective form.");
} else {
    System.out.println("Noun Form.");
}
```

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2. Given each set of code and expected output, write the specified Java method.

b) Write method `distanceFromOrigin` such that it returns the distance on a cartesian coordinate plane from the origin to the point specified by parameters `x` and `y`. Recall that this distance is calculated with the formula: $d = \sqrt{x^2 + y^2}$.

code
```
System.out.println( distanceFromOrigin(3.0, 4.0) );
```

output
```
5.0
```

answer
```
public static double distanceFromOrigin( double x,
                                         double y)
{
   return Math.sqrt(x*x + y*y);
}
```

b) Write method `printStrInfo`.

code
```
printStrInfo("Hello");
printStrInfo("Hello World!");
```

output
```
The string "Hello" is 5 characters long.
The string "Hello World!" is 12 characters long.
```

answer
```
public static void printStrInfo(String str) {
   System.out.print("The string \""+str+"\"");
   System.out.print(" is "+str.length());
   System.out.print(" characters long.\n");
}
```

3. Given the method header, write the method body that performs ***linear search*** on the array parameter named `arr` to search for the string given in the `String` parameter named `value`, and returns the index of the first location in the array containing the string (returning `-1` if the string is not found in the array).

```
public static int linearSearch(String[] arr, String value) {


 for(int i = 0; i < arr.length; i++) {
    if(arr[i].equals(value)) {
       return i;
    }
 }
 return -1;

}
```