

cse-15L-report

Part 1 Bugs

I picked the reverseInPlace bug contained in the ArrayExamples.java.

Here is the J-Unit Test I wrote to detect the bug

```
public void testReverseInPlace() {  
    int[] input1 = { 3 };  
    ArrayExamples.reverseInPlace(input1);  
    assertEquals(new int[]{ 3 }, input1);  
    int[] input2 = { 2 , 3};  
    ArrayExamples.reverseInPlace(input2);  
    assertEquals(new int[]{ 3, 2},input2);  
    int[] input3 = { 1 , 2 , 3};  
    ArrayExamples.reverseInPlace(input3);  
    assertEquals(new int[]{ 3, 2, 1},input3);  
}
```

Here is the J-Unit Test I wrote that doesn't detect the bug even though the bug is still in the program

```
public void testReverseInPlace() {  
    int[] input1 = { 3 };  
    ArrayExamples.reverseInPlace(input1);  
    assertEquals(new int[]{ 3 }, input1);  
}
```

Here are the symptoms of running the test that induce a failure

```

6 public void testReverseInPlace() {
7     int[] input1 = { 3 };
8     ArrayExamples.reverseInPlace(input1);
9     assertEquals(new int[]{ 3 }, input1);
10    int[] input2 = { 2 , 3};
11    ArrayExamples.reverseInPlace(input2);
12    assertEquals(new int[]{ 3, 2},input2); ... Expected [2] but was [3]

```

Expected [2] but was [3] testReverseInPlace()

Expected	Actual
-2	+3

Here are the symptoms of running the test that doesn't induce a failure

```

4 public class ArrayTests {
5     @Test
6     public void testReverseInPlace() {
7         int[] input1 = { 3 };
8         ArrayExamples.reverseInPlace(input1);
9         assertEquals(new int[]{ 3 }, input1);
10    }

```

Here is the bug before the fix

```

static void reverseInPlace(int[] arr) {
    for(int i = 0; i < arr.length; i += 1) {
        arr[i] = arr[arr.length - i - 1];
    }
}

```

Here is the bug (no longer a bug) after the fix

```
static void reverseInPlace(int[] arr) {  
    int[] tempArray = new int[arr.length];  
    for(int i = 0; i < arr.length; i++){  
        tempArray[i] = arr[i];  
    }  
    for(int i = 0; i < arr.length; i += 1) {  
        arr[i] = tempArray[arr.length - i - 1];  
    }  
}
```

The fix I made to the bug fixed the issue my test found when testing if `input2` would change from `{2,3}` to `{3,2}` if called the `reverseInPlace` method. How the bug caused that symptom is when `input2` went through its first iteration, it was changed to `{3,3}`. Then in the second iteration, element `2` is no longer there because of the first iteration, resulting in the final array of being `{3,3}`. To prevent the original element from disappearing, I made a `tempArray` to contain those elements and used it to directly modify `int[] arr`.

Part 2 Researching Commands

I will be researching four different command-line options for `find`

1. `find -name`: This command is useful because it helps find the name of a specific file or a specific type of file. The command then prints out which file.

Example 1:

```
[user@sahara ~/docsearch/technical]$ find . -name chapter-1.txt
```

Output

```
./911report/chapter-1.txt
```

Example 2:

```
[user@sahara ~/docsearch/technical]$ find . -name *.txt
```

Output

```
./biomed/1471-2105-3-6.txt  
./biomed/1476-069X-1-3.txt  
./biomed/1475-9268-1-1.txt  
./biomed/bcr620.txt  
./biomed/1472-6882-1-12.txt  
./biomed/1471-2407-3-4.txt  
./biomed/bcr294.txt  
./biomed/1477-7827-1-23.txt  
./biomed/1476-5918-1-2.txt  
./biomed/1471-2164-4-21.txt  
./biomed/ar68.txt  
./biomed/1471-2407-2-16.txt  
./biomed/1471-2180-1-7.txt  
./biomed/1471-2148-2-7.txt  
./biomed/1472-6963-3-13.txt  
./biomed/1471-2210-2-4.txt  
./biomed/1472-6882-2-5.txt  
./biomed/1471-2180-1-29.txt  
./biomed/1471-230X-1-8.txt  
./biomed/1471-2105-3-28.txt  
./biomed/1471-2164-3-9.txt  
...  
//all the txt file found in the technical directory
```

1. `find -link` : This command is useful because it helps detect which file has n links. Then the command prints out which file.

Example 1:

```
[user@sahara ~/docsearch/technical]$ find . -links 1
```

Output

```
./biomed/1471-2105-3-6.txt
./biomed/1476-069X-1-3.txt
./biomed/1475-9268-1-1.txt
./biomed/bcr620.txt
./biomed/1472-6882-1-12.txt
./biomed/1471-2407-3-4.txt
./biomed/bcr294.txt
./biomed/1477-7827-1-23.txt
./biomed/1476-5918-1-2.txt
./biomed/1471-2164-4-21.txt
./biomed/ar68.txt
./biomed/1471-2407-2-16.txt
./biomed/1471-2180-1-7.txt
./biomed/1471-2148-2-7.txt
./biomed/1472-6963-3-13.txt
./biomed/1471-2210-2-4.txt
./biomed/1472-6882-2-5.txt
./biomed/1471-2180-1-29.txt
./biomed/1471-230X-1-8.txt
./biomed/1471-2105-3-28.txt
./biomed/1471-2164-3-9.txt
./biomed/1471-2288-2-10.txt
./biomed/1471-2334-3-11.txt
./biomed/1471-2148-1-4.txt
./biomed/1471-2164-3-1.txt
...
//all other files that have an attached link inside it
```

Example 2

```
[user@sahara ~/docsearch/technical]$ find . -links 2
```

Output

```
./biomed  
./911report
```

1. `find -type` : This command is useful because it can find what type of files is available. Then the command prints it out. According to `man find`, the argument after `-type` is 'b', 'c', 'd', 'l', 'p', 'f', or 's' for block special file, character special file, directory, symbolic link, FIFO, regular file, or socket, respectively.

Example 1:

```
[user@sahara ~/docsearch/technical]$ find . -type d
```

Output

```
.  
./biomed  
./911report
```

Example 2:

```
[user@sahara ~/docsearch/technical]$ find . -type f
```

Output

```
./biomed/1471-2105-3-6.txt
./biomed/1476-069X-1-3.txt
./biomed/1475-9268-1-1.txt
./biomed/bcr620.txt
./biomed/1472-6882-1-12.txt
./biomed/1471-2407-3-4.txt
./biomed/bcr294.txt
./biomed/1477-7827-1-23.txt
./biomed/1476-5918-1-2.txt
./biomed/1471-2164-4-21.txt
./biomed/ar68.txt
./biomed/1471-2407-2-16.txt
./biomed/1471-2180-1-7.txt
./biomed/1471-2148-2-7.txt
./biomed/1472-6963-3-13.txt
./biomed/1471-2210-2-4.txt
./biomed/1472-6882-2-5.txt
./biomed/1471-2180-1-29.txt
./biomed/1471-230X-1-8.txt
./biomed/1471-2105-3-28.txt
./biomed/1471-2164-3-9.txt
...
//listed all regular files which are .txt files
```

1. `find -newer` : this command is useful because it can find the files that are modified more than a file you put in as an argument. This command then prints out the files that it finds.

Example 1

```
[user@sahara ~/docsearch/technical]$ find . -newer 911report/chapter-1.txt
```

Output

```
.  
./biomed  
./biomed/1471-2105-3-6.txt  
./biomed/1476-069X-1-3.txt  
./biomed/1475-9268-1-1.txt  
./biomed/bcr620.txt  
./biomed/1472-6882-1-12.txt  
./biomed/1471-2407-3-4.txt  
./biomed/bcr294.txt  
./biomed/1477-7827-1-23.txt  
./biomed/1476-5918-1-2.txt  
./biomed/1471-2164-4-21.txt  
./biomed/ar68.txt  
./biomed/1471-2407-2-16.txt  
./biomed/1471-2180-1-7.txt  
./biomed/1471-2148-2-7.txt  
./biomed/1472-6963-3-13.txt  
./biomed/1471-2210-2-4.txt  
./biomed/1472-6882-2-5.txt  
./biomed/1471-2180-1-29.txt  
...  
// all other files it found that is modify more than chapter-1.txt
```

Example 2

```
[user@sahara ~/docsearch/technical]$ find . -newer 911report/chapter-1.txt
```

Output

```
./911report/chapter-2.txt
```

```
//I got this output because I modified chapter 1 by adding 1 line and modified chapter-2.txt by adding two lines
```