

Unit 10 PBL 2: mergeSort ()

1. Complete the methods in order to implement a recursive mergeSort algorithm. Once complete, show your code and be able to answer the question below.

```
1 public static void mergeSort(int[] arr) {
2     if (arr == null || arr.length <= 1) {
3         return; // Already sorted
4     }
5     int[] scratch = new int[arr.length];
6     mergeSort(arr, 0, arr.length - 1, scratch);
7 }
. private static void mergeSort(int[] arr, int low, int high,
.                               int[] scratch) {
.     // Implement this method
. }
private static void merge(int[] arr, int low, int mid, int high,
                           int[] scratch) {
    // Implement this method
}
```

The temporary array, `scratch`, is allocated in the one-parameter `mergeSort` method. It is passed as a parameter to the `mergeSort` method, which then passes it as a parameter to the `merge` method. The array variable is not used in either `mergeSort` method, but is only used in the `merge` method. If the array were to be created within the `merge` method, rather than within the single-parameter `mergeSort` method, the `scratch` parameter could be removed from both the four-parameter `mergeSort` method and the `merge` method.

What advantage does the current implementation, with `scratch` allocated in the one-parameter `mergeSort` method, have over the alternative method described immediately above?