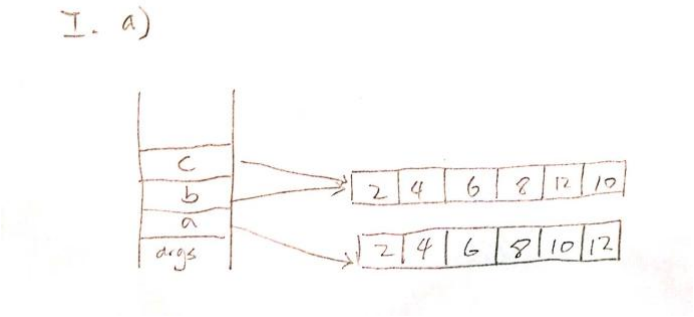
CSCI E-22: Paul Zeng
Part I, 1.a



Part I, 1.b Indicate what will be printed by the final line of code shown above
Answer: the final line will print: 12 10 10

Part I, 2.a

```
public static void swapPairs(int[] arr){

    if (arr == null ){
        throw new IllegalArgumentException();
    }

    for (int i = 0; i < arr.length-1; i += 2){
        int temp = arr[i];
        arr[i] = arr[i+1];
        arr[i+1] = temp;
    }
}
```

Part I, 2.b

```
public static int longestSorted(int[] arr){

    if (arr == null) {
        throw new IllegalArgumentException();
    }

    if (arr.length == 0) return 0;
    if (arr.length == 1) return 1;

    int length = 1; // the length of the longest increasing sequence
    int curr_len = 1; // the length of currently running sequence

    // at this point, arr should have at least two elements
    for (int i = 0; i < arr.length-1; i++){

        if (arr[i] < arr[i+1]){
            curr_len++;
```

```
        } else {
            curr_len = 1;
        }

        if (curr_len > length) {
            length = curr_len; // update the length of the longest increasing sequence
        }
    }

    return length;
  }
```

Part I, 3.a

```
main calls mystery(10, 1)
        mystery(10, 1) calls mystery(7, 2)
                mystery(7, 2) calls mystery(4, 3)
                        mystery(4, 3) calls mystery(1, 4)
                                mystery(1, 4) returns 1
                        mystery(4, 3) returns 4
                mystery(7, 2) returns 6
        mystery(10, 1) returns 7
main()
```

Part I, 3.b

mystery(10, 1) returns 7.

Part I, 3.c

When the base case is reached, there were 5 frames on the stack

Part I, 3.d

No, because either a <= b, in which case we've already reached the base case, or we go to the recursive case and
a is reduced by 3, and b is increased by 1. Because a is strictly decreasing and b is strictly increasing, there will
be a finite number of recursive calls when the base case is reached.

Part I, 4

```
  public static void printReverse(Object[] arr, int i){

    if (i >= arr.length-1){
        System.out.println(arr[i]);
        return;
    } else {
        printReverse(arr, i+1);
        System.out.println(arr[i]);
        return;
    }
  }
```