### Group 31

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#### HW3

### 3. Recursion

- 3.1
- H03\_31.java file submitted separately.
- 3.2
- H03\_32.java file submitted separately.
- 3.5
- H03\_35.java file submitted separately.

# 4. Linear and Binary Search

- 4.1
- H03 41.java file submitted separately.
- 4.3

Not Graded.

# 5. Algorithms and Big O Notation

5.1

$$f(n) = 2.5n + 4 = O(n)$$

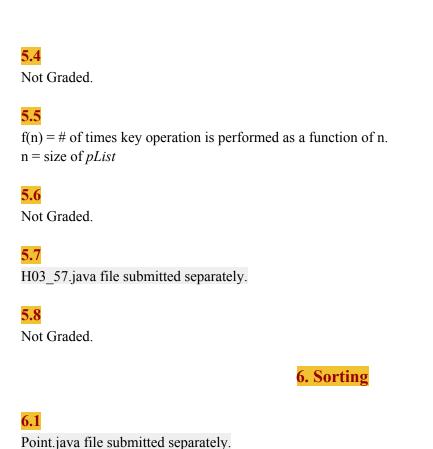
$$f(n) >= C * |g(n)|$$

for all 
$$n > n0$$

where 
$$O(n) = C * |g(n)|$$

- **5.2**
- Not Graded.
- 5.3

Not Graded.



6.2

Not Graded.

6.3

Not Graded.

**6.4** 

Insertion Sort worst case time complexity :  $n^2 = 10^20$ This Super Computer performs 1 comparison ever 25ns

Total Time: (25\*10^11)/60

The above result accounts for the time per minute, and is also the result.

Answer: For a computer to sort 10billion elements in 1 minute or less, it would have to be a minimum 41666666666.7 times faster than a computer that performs one comparison every 25ns.