COS226 Group Activity

1. Give the total memory usage in bytes for N `Point2D` objects from the KdTree assignment (using tilde notation).

```
public class Point2D implements Comparable<Point2D> {
    private final double x;    // x coordinate
    private final double y;    // y coordinate
}
```

2. How many get() calls can a BST implementation perform per second for a BST that contains a 1,000 random keys? You can assume that the keys are integers. When timing do not include the time to build the BST.

   (a) How would you go about measuring this?

   (b) You generate a sequence of N get() queries and count the number of recursive calls.

N	T(N)	recursive get() count
100	0.00	1367
1000	0.0020	14456
10000	0.0060	150165
100000	0.04	1454749
1000000	0.351	14500124
10000000	3.549	145211340
5000000	1.688	66857090

   What further values of N should you select? Give an expected range for the final answer.

3. Suppose you are given an input file with the keys C A H D J B F I E G.

   (a) Draw the BST that results when you insert the keys in that order into an initially empty BST.

   (b) Give the level order traversal of the BST.

4. Start with the BST drawn above.

   (a) Draw the sequence of BSTs that result when you delete G then D then H.

   (b) Give the level order traversal of the BST.