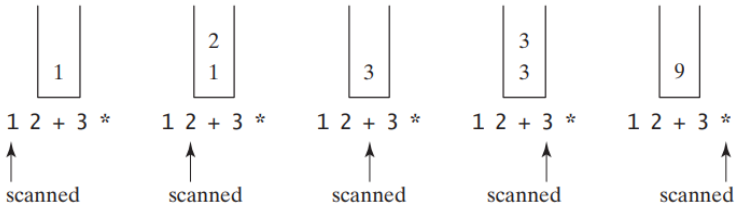
Week 7 – Tutorial 6

Collections Framework

Questions from reference text: Y Daniel Liang (2015). Introduction to Java programming. Boston: Pearson.

1. ***(Sort points in a plane)*** Write a program that meets the following requirements:
    a) Define a class named Point with two data fields x and y to represent a point's x- and y-coordinates. Implement the Comparable interface for com□paring the points on x-coordinates. If two points have the same x-coordinates, compare their y-coordinates.
    b) Define a class named CompareY that implements Comparator. Implement the compare method to compare two points on their y-coordinates. If two points have the same y-coordinates, compare their x-coordinates.
    c) Randomly create 100 points and apply the Arrays.sort method to display the points in increasing order of their x-coordinates and in increasing order of their y-coordinates, respectively.
2. ***(Use iterators on linked lists)*** Write a test program that stores 5 million integers in a linked list and test the time to traverse the list using an iterator vs. using the get(index) method.
3. ***(Postfix notation)*** Postfix notation is a way of writing expressions without using parentheses. For example, the expression (1 + 2) * 3 would be written as 1 2 + 3 *. A postfix expression is evaluated using a stack. Scan a postfix expression from left to right. A variable or constant is pushed into the stack. When an operator is encountered, apply the operator with the top two operands in the stack and replace the two operands with the result. The following diagram shows how to evaluate 1 2 + 3 *.



Write a program to evaluate postfix expressions. Pass the expression as a command-line argument in one string.