

Due Dates: Saturday, September 19 at 11:59pm

Submit: eLearning

Late Policy: -10 points per hour late

Instructions: This is an individual assignment. Answers should be your own work.

### Chapter 3

10 points

1. Linked lists and arrays:
  - a. What are some advantages of linked lists versus arrays?
  - b. What are some advantages of arrays versus linked lists?

15 points

2. What is the Big-O running time of the following code fragment?  
Assume `lst1` has `N` items, and `lst2` is initially empty.

```
public static void add( List<Integer> lst1, List<Integer> lst2)
{
    for ( Integer x : lst1 )
        lst2.add(0, x);    // add to front
}
```

- a. If an `ArrayList` is passed for `lst1` and `lst2`. Explain your answer.
- b. If a `LinkedList` is passed for `lst1` and `lst2`. Explain your answer.

15 points

3. What is the Big-O running time of the following code fragment?

```
public static void erase( List<Integer> lst )
{
    Iterator<Integer> itr = lst.iterator();

    while ( itr.hasNext() )
    {
        Integer x = itr.next();
        itr.remove();
    }
}
```

- a. If an `ArrayList` is passed for `lst`. Explain your answer.
- b. If a `LinkedList` is passed for `lst`. Explain your answer.

15 points

4. What is the Big-O running time of the following code fragment?  
Assume `lst1` has `N` items, and `lst2` has `N` items.

```
public static int Count( List<Integer> lst1, List<Integer> lst2)
{
    Iterator<Integer> itr1 = lst1.iterator();

    int count=0;
    while ( itr1.hasNext() )
    {
        Integer x = itr1.next();
        Iterator<Integer> itr2 = lst2.iterator();
        while ( itr2.hasNext() )
```

```

        if ( x.equals( itr2.next() ) )
            count++;
    }

    return count;
}

```

- a. If an ArrayList is passed for lst1 and lst2. Explain your answer.
- b. If a LinkedList is passed for lst1 and lst2. Explain your answer.

15 points

5. What is the Big-O running time of the following code fragment?

```

public static int calc( List<Integer> lst )
{
    int count = 0;
    int N = lst.size();

    for ( int i=0; i<N; i++)
    {
        if (lst.get(i) > 0)
            sum += lst.get(i);
        else
            sum += lst.get(i) * lst.get(i);
    }
    return sum;
}

```

- a. If an ArrayList is passed for lst. Explain your answer.
- b. If a LinkedList is passed for lst. Explain your answer.

15 points

6. Suppose a Java method receives a List<Integer> and reverses the order of the items it contains by removing each item from the front of the list and pushing it onto a Stack<Integer>, and then popping the items from the stack and inserting each item to the end of the list.

What is the expected Big-O running time if:

- a. If an ArrayList is passed. Explain your answer.
- b. If a LinkedList is passed. Explain your answer.

15 points

7. Show each step of converting  $a+b*c+(d-e)$  from infix to postfix notation, using the algorithm described in the textbook that uses a stack.

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