CSC 212 Midterm 1 Solution - Spring 2015

College of Computer and Information Sciences, King Saud University
Exam Duration: 90 Minutes

12/03/2015

Question 1 [32 points]

1. See slides.
2.
```
public boolean contains(LinkedList<T> l2) {
        Node<T> tmp = head;
        while (tmp != null) {
                Node<T> tmp1 = tmp;
                Node<T> tmp2 = l2.head;
                while (tmp1 != null && tmp2 != null && tmp1.data.
                   equals(tmp2.data)) {
                        tmp1 = tmp1.next;
                        tmp2 = tmp2.next;
                }
                if (tmp2 == null)
                        return true;
                tmp = tmp.next;
        }
        return false;
}
```

Question 2 [32 points]

1. (a) $g(n) = n^2$, $c = 5$ and $n_0 = 3$.
   (b) 1, $\log n^2$, n, n^2, 2^n, 4^n, $n!$, $nn!$,
   (c) i. $n^2 \log(n)$.
   ii. $n!$.
   iii. 3^n.

2.

	Statement	S/E	Frequency	Total
1	int func(int n) {	0	-	0
2	int sum=0;	1	1	1
3	for(int i=n; i> 0; i- -) {	1	$n+1$	$n+1$
4	for(int j=n-1; j>=i; j- -) {	1	$n(n+1)/2$	$n(n+1)/2$
5	sum=i+j;	1	$n(n-1)/2$	$n(n-1)/2$
6	System.out.println(sum);	1	$n(n-1)/2$	$n(n-1)/2$
7	}	0	-	0
8	}	0	-	0
9	}	0	-	0
Total operations			$3/2n^2 + 1/2n + 2$	
Big-oh			$O(n^2)$	

Question 3 [36 points]

1.
```
public boolean isSymmetric(){
        Node<T> p, q;
        p = q = current;
        while((p != null) && (q != null)) {
                if(!p.data.equals(q.data))
                        return false;
                p = p.next;
                q = q.previous;
        }
        return p == q;
}
```

2.
```
public void crossover(Queue<T> q1, Queue<T> q2) {
        int halfSize = q1.length() / 2;
        for(int i = 1; i <= halfSize; i++) {
                q1.enqueue(q2.serve());
                q2.enqueue(q1.serve());
        }
}
```