Uva Wellassa University, Sri Lanka
End Semester Examination – June 2009
CST 202-2 Data Structures & Algorithms
Time: Two (02) hour

Total 05 Questions
Answer all questions

Q1. Describe advantages and disadvantages of following data structures.

a.) Array [04 marks]
b.) Ordered Array [04 marks]
c.) Queue [04 marks]
d.) Stack [04 marks]
e.) Linked List [04 marks]

Q2.

a.) Write down the sorting methods? [03 marks]
b.) Describe Bubble sort with a suitable example. [07 marks]
d.) Write an algorithm to sort an array using Bubble sort method. [10 marks]

Q3.

a.) What are differences between stacks and queues? [04 marks]
b.) Write an algorithm to delete an element from a stack. [08 marks]
c.) Write algorithm to delete an element from a queue. [08 marks]

Q4.

a.) What are differences between arrays and linked lists? [04 marks]
b.) Write differences between double-ended and doubly Linked list. [06 marks]
c.) Write algorithm to remove and insert an element from doubly Linked list. [10 marks]

Q5.

a.) Find errors with this and correct them.

```
public boolean delete(long value){
   int j;
   for(j=0; j<nElems; j++)
      if( value == a[j] )
         break;
   if(j==nElems)
      return false;
   else {
      for(int k=j; k<nElems; k++)
         a[k] = a[k-1];
      nElems--;
      return true;
   }
}
```

[10 marks]

b.) Write the output of the following programme.

```
class LowArray {
   private static long[] a;
   public LowArray(int size) {
      a = new long[size];
   }
   public void setElem(int index, long value) {
      a[index] = value;
   }
   public long getElem(int index) {
      return a[index];
   }
}


class LowArrayApp {
   public static void main(String[] args) {
      LowArray arr;
      arr = new LowArray(100);
      int nElems = 0;
      int j;
      arr.setElem(0, 77);
      arr.setElem(1, 99);
      arr.setElem(2, 44);
      arr.setElem(3, 55);
      arr.setElem(4, 22);
      nElems = 5;

      for (j = 0; j < nElems; j++) {
         if (arr.getElem(j) == 55) {
            break;
         }
      }

      for (int k = j; k < nElems; k++) {
         arr.setElem(k, arr.getElem(k + 1));
      }
      nElems--;

      for (j = 0; j < nElems; j++) {
         System.out.print(arr.getElem(j) + " ");
      }
      System.out.println("");
   }
}
```

[10 marks]