

NATIONAL UNIVERSITY OF SINGAPORE

CS1020 – DATA STRUCTURES AND ALGORITHMS I

(Semester 2: AY2014/15)

ANSWER BOOKLET

Time Allowed: 2 Hours

INSTRUCTIONS TO CANDIDATES

1. This Answer Booklet consists of **EIGHT (8)** printed pages.
2. Fill in your Matriculation Number clearly below and at the top of pages 3, 5, and 7.
3. The last blank page (page 8) may be used if you need more space to write your answers.
4. You may write your answers in pencil.

MATRICULATION NO.:

A									
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(Write your Matriculation Number above legibly with a pen.)

Questions	Possible	Marks
MCQs 1 – 6	18	
Q7	3	
Q8	6	
Q9	8	
Q10	7	
Q11	10	
Q12	20	
Q13	8	
Total	80	

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Q9.

[8 marks]

```
public static
ListNode <E> reverseLinkedList(ListNode <E> head,
                               ListNode <E> revHead) {

}
}
```

Q10.

[7 marks]

```
public static void printInOrder(double[] num, int[] rank) {

}
}
```

```
import java.util.*;

public static LinkedList<Integer> mergeSortedQueues(
    LinkedList<Integer> queue1, LinkedList<Integer> queue2) {

}

}
```

Q12. (a)

[10 marks]

```
import java.awt.Point;
class Bead {
    private Circle _disc, _hole;
    private double _area; // area of the bead

    public Bead(int discX, int discY, double discRad,
                int holeX, int holeY, double holeRad) {
        // Write a single statement below

    }

    public Bead(Circle disc, Circle hole) {

    }

    public double getArea() {

    }

    public String toString() {

    }

    // Return true if this bead is valid,
    // i.e. the hole is inside the disc, or false otherwise.
    public boolean isValid() {

    }

}
}
```

Q12. (b)**[8 marks]**

```
// Returns the largest difference in area between any
// two beads in the list
public static double largestDiff(ArrayList<Bead> list) {
```

```
}
```

Time complexity of above method: $O(\quad)$

Q12. (c)**[2 marks]**

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Q13.

[8 marks]

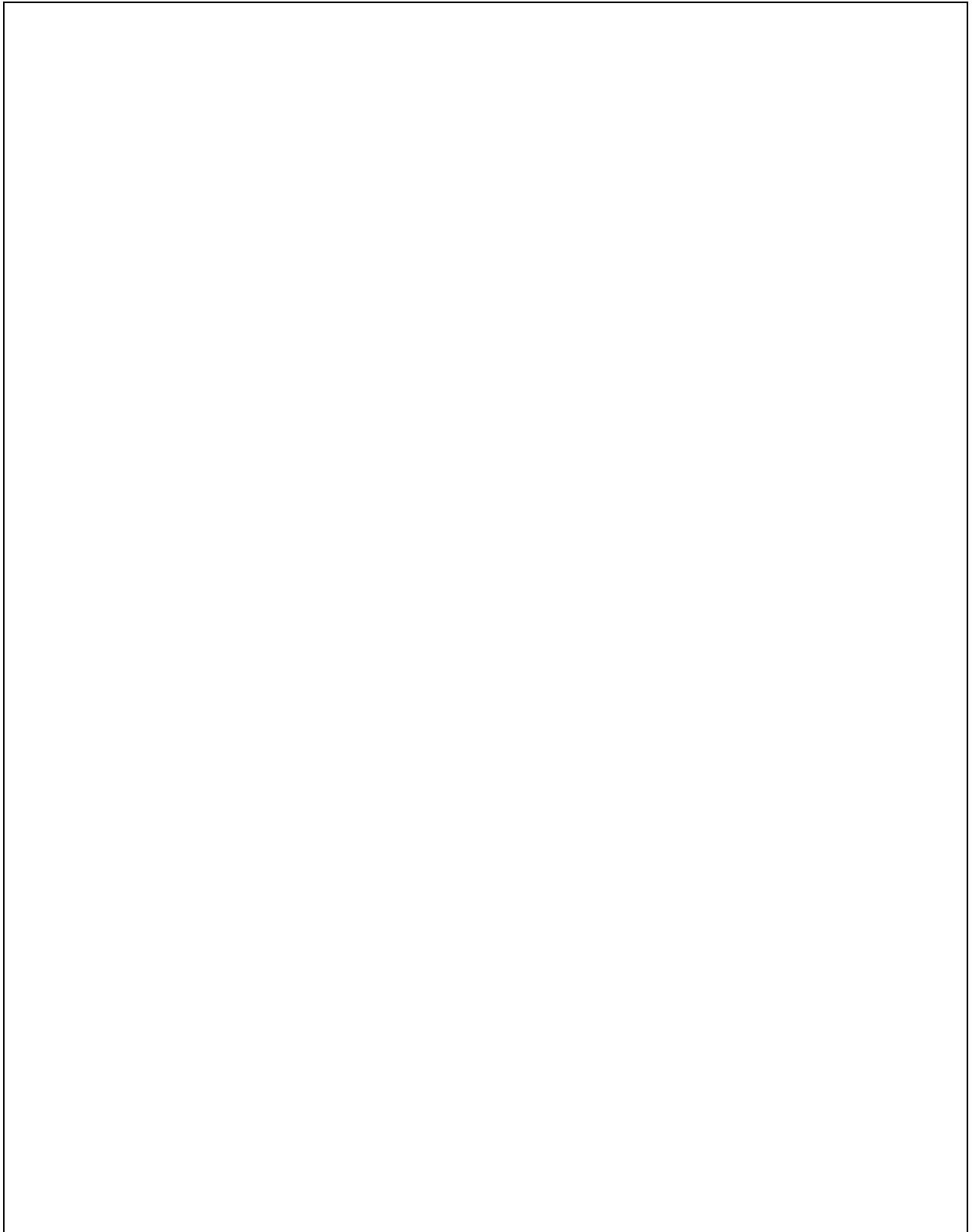
```
public static  
boolean reachable(char[][] maze, int N, int locX, int locY) {
```

```
}
```

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Do NOT use it for your rough work.

Use it ONLY if you need extra space for your answer, in which case please indicate the question number clearly.



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