UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY

Academic Year 2011/2012 – 2nd Year Examination – Semester 4

IT4104: Programming II

PART 2 - Structured Question Paper

20st July, 2013

(ONE HOUR)

To be completed by the candidate

BIT Examination Index No: .....

Important Instructions:

- The duration of the paper is **1 (one) hour**.
- The medium of instruction and questions is English.
- This paper has **2 questions** and **7 pages**.
- **Answer both questions. Questions do not carry equal marks. (60% and 40%)**
- **Write your answers** in English using the space provided **in this question paper**.
- Do not tear off any part of this answer book.
- Under no circumstances may this book, used or unused, be removed from the Examination Hall by a candidate.
- Note that questions appear on both sides of the paper.
  If a page is not printed, please inform the supervisor immediately.

Questions Answered

Indicate by a cross (×), (e.g. [X]) the numbers of the questions answered.

	Question Numbers		
To be completed by the candidate by marking a cross (×).	1	2	
To be completed by the examiners:			

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1)

a) Write the postfix expressions of the following infix expressions (10 Marks)

1. **A*B+C**
2. **A*(B+C)**
3. **A*B+C*D**
4. **(A+B)*(C–D)**
5. **((A+B)*C)–D**

ANSWER IN THIS BOX

1.AB*C+

2. ABC+*

3. AB*CD*+

4. AB+CD–*

5. AB+C*D–

b) Consider the following Java program illustrating a link of a singly linked list.

```
class Link
{
public long dData;
public Link next;

public Link(long dd) { dData = dd; }

public void displayLink()
{ System.out.print(dData + " "); }
}
```

Write a Java program to implement a stack using a singly linked list considering the link class shown above. When writing the linked list write only the statement/ methods noted in the answer box and writing other methods make no effect to the marking process. (35 Marks)

a) Write a statement to refer to the first item on the list.

```
private Link first;
```

b) Write the required method to check whether the linked list is empty.

```
public boolean isEmpty()
{ return (first==null); }
```

c) Write a method to push an element into the stack.

```
public void push(long dd)
{
Link newLink = new Link(dd);
newLink.next = first;
first = newLink;
}
```

d) Write a method to pop an element from the stack.

```
public long pop()
{
Link temp = first;
first = first.next;
return temp.dData; }
```

2) a) Name three(03) different ways one can represent a graph. (15 Marks)

ANSWER IN THIS BOX

1. Adjacency list

2.Adjacency matrix

3. Incidence matrix

b) Write a segment of Java code to implement selection sort algorithm.

(20 Marks)

ANSWER IN THIS BOX

```
public void selectionSort()
{
```

```
int out, in, min;
for(out=0; out<nElems-1; out++) // outer loop
{
min = out; // minimum




for(in=out+1; in<nElems; in++) // inner loop
if(a[in] < a[min] ) // if min greater,




min = in; // we have a new min
swap(out, min); // swap them
} // end for(out)
} // e
```

c) Write a segment of Java code to implement bubble sort algorithm.

(20 Marks)

ANSWER IN THIS BOX

```
public void bubbleSort()
Bubble Sort 85
{
int out, in;
for(out=nElems-1; out>1; out--) // outer loop (backward)
for(in=0; in<out; in++) // inner loop (forward)
if( a[in] > a[in+1] ) // out of order?
swap(in, in+1); // swap them
} // end bubbleSort()
```

```
private void swap(int one, int two)
{
long temp = a[one];
a[one] = a[two];
a[two] = temp;
```

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