UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY

Academic Year 2009/2010 –2nd Year Examination – Semester 4

IT4103: Programming II

Part 1: Multiple Choice Question Paper

14th August, 2010

(ONE HOUR)

Important Instructions :

- The duration of the paper is **1 (one) hour.**
- The medium of instruction and questions is English.
- The paper has **25 questions** and **8 pages**.
- All questions are of the MCQ (Multiple Choice Questions) type.
- All questions should be answered.
- Each question will have 5 (five) choices with **one or more** correct answers.
- All questions will carry equal marks.
- There will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from 0 (*All the incorrect choices are marked & no correct choices are marked*) to +1 (*All the correct choices are marked & no incorrect choices are marked*).
- Answers should be marked on the special answer sheet provided.
- Note that questions appear on both sides of the paper.
  If a page is not printed, please inform the supervisor immediately.
- Mark the correct choices on the question paper first and then transfer them to the given answer sheet which will be machine marked. **Please completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**

1) Select from among the following, the valid statement(s) on implementation of priority queues and arranging elements of them.

(a) One can expect the arrival of elements into a priority queue in random order.
(b) When implementing a priority queue as a type of a linked list, elements can be stored in its entry order.
(c) Elements in a priority queue can be stored in its proper place when implementing it as a another type of priority queue.
(d) A priority queue can be implemented as a simple linked list with an additional array of references to it.
(e) Priority queues can be implemented visiting each node starting from the lowest level and moving down level by level, visiting nodes from left to right.

2) Consider the following operations done for a queue.

enqueue(10)
enqueue(5)
dequeue()
enqueue(15)
enqueue(7)
dequeue()

What would be the outcome after performing the above operations?

(a) 10
(b) 10.5
(c) 5
(d) 157
(e) 7

3) Consider the following statement.

"For an unsorted list, adding an element is immediate, but searching an element n should be performed from the beginning to the end of the list."

What would be the operational time of the above operation if it is represented using a big O notation?

(a) $O(n_2)$
(b) $O(n^3)$
(c) $O(n^2)$
(d) O(n)
(e) (n)O

4) Consider the following pseudocode.

```
whatSort(array[])
  if array.length > 1
    choose bound; //partition array in to subarray1 and subarray2
    while there are elements left in array
    include element either in subarray1 = {e1 : e! <= bound )
       or in subarray2 = { e1 : e1 >= bound};
whatArray(subarray1);
whatArray(subarray2);
```

Select from among the following, the correct sorting algorithm which has been used in the above pseudocode.

(a) quick
(b) selection
(c) insertion
(d) heap
(e) radix

5) Consider the following pseudocode.

```
whatSort ( data[ ])
  for i = 1 to data.length – 1
      tmp = data[i];
      move all elements data[j] greater than tmp by one position;
      place tmp in its proper position;
```

Select from among the following, the correct sorting algorithm which has been used in the above pseudocode.

(a) insertion (b) selection (c) quick
(d) bubble (e) shell

6) Select from among the following, the correct statement/s which is/are describing a B – tree.

(a) A B – tree operates closely with secondary storage and can be tuned to reduce the impediments imposed by the storage.
(b) A size of a node in a B – tree can be made as large as the size of a block in a secondary storage.
(c) The time penalty for accessing secondary storage can be significantly reduced by using a B – tree.
(d) In a B – tree, all the leaves are positioned on the same level.
(e) In the root of a B – tree, one can expect at least two nodes.

7) Consider the following paragraph noting the blanks indicated with characters A, B and C.

"Most microprocessors use _______A_______ - based architecture. When a method is called, its return address and arguments are ______B_______ onto a stack, and when it returns, they are _______C_______ from it"

At the same time consider the following different options which can be considered as candidates for filling the blanks.

i) A → stack
ii) B → pushed
iii) C → dequeued
iv) A → queue
v) B → enqueued
vi) C → popped

Select from among the following, the correct roman numbers that can be used fill the blanks.

(a) i), ii), iii) only (b) iv), v), vi) only (c) i), iii), v) only
(d) i), ii), vi) only (e) ii), v), vi) only

8) Consider the following program written in Java.

```
 class Problem{

int what ( int n){
    if( n < 2 )
        return n;
  else return what(n-2) + what(n-1);
 }
}

public class DriverProgram{
public static void main(String args[]){
Problem obj = new Problem();
      for( int i= 0; i<= 6 ;i++)
    System.out.print(obj.what(i));
 }
}
```

What would be the result of the above Java Program?

(a) 0	(b) 0112358	(c) 8
(d) 0123456	(e) 6543210	

9) Select from among the following, the package in which the JMenu class is available.

(a) java.io	(b) java.awt	(c) java.applet
(d) javax.swing	(e) java.menu	

10) Consider the following paragraph noting the blank.

"A __________________ translates API calls into operations for a specific data source."

Select from among the following, the correct term which can be used to fill the blank given considering the JDBC basics.

(a) Driver Manager	(b) Driver	(c) Connection
(d) statement	(e) Resultset	

11) What would be the reaction of a FileDescriptor object if the file which is being searched, does not exist?

Note: A FileDescriptor object represents an existing connection to a file.

(a) An exception of the type *FileNotFoundException* will be thrown.
(b) An exception of the type *FileNotFoundException* will not be thrown.
(c) A file object with a default name will be opened to append data.
(d) A file object with a default name will be created enabling inserting data.
(e) The file descriptor object will close all its channels and release all its resources associated with it.

12) Select from among the following, the main purpose served by a File object in Java.

(a) A File object can be used to create File stream objects.
(b) A File object enables creation of hierarchy of classes by deriving classes from a base class.
(c) A File object enables checking the pathname that it encapsulates on the physical file system.
(d) A File object enables creating a buffer by wrapping existing arrays of the same type as the buffer elements by calling one of the static wrap() methods.
(e) A File object provides a range of collection classes implemented as generic types.

13) Consider the following expression.

a = b +(c – d) * (e – f)

A programmer is contemplating a way to match the delimiters in the expression programmatically. Select from among the following, the correct way/s to implement the problem.

(a) As a stack
(b) As a radix
(c) As a folding
(d) As a merge
(e) As a graph

14) When considering the connectivity of graphs, it comes in degrees. Select from among the following the, valid statement/s on connectivity of Graphs.

(a) A graph is 2-connected or biconnected for which there are at least two non overlapping paths between any two vertices.
(b) If the removal of a vertex causes a Graph to be split, then such vertices are called articulation points or cut vertices.
(c) If an edge causes a Graph to be split into two sub Graphs, then it is called a bridge or cut edge.
(d) A directed Graph is called weakly connected if the undirected Graph with the same vertices and the same edges is connected.
(e) A directed Graph is strongly connected, if for each pair of vertices, there is a path between them in both directions.

15) Select from among the following, the correct statement/s on finding the shortest path in a Graph.

(a) For label setting method, in each pass through the vertices still to be processed, one vertex is set to a value that remains unchanged until the end of the execution.
(b) The label correcting method can be applied to Graphs with vertices having negative values.
(c) An algorithm developed by Dijkstra helps to find the shortest path of a graph using the label setting method.
(d) The algorithm which is developed by Lester Ford is an alternative algorithm for the label setting approach.
(e) By using Radix sort algorithm, one can get the same functionality as the Dijkstra algorithm.

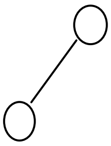
16) Select from among the following, layout managers which are defined in the javax.swing package.

(a) BoxLayout
(b) SpringLayout
(c) GridLayout
(d) CardLayout
(e) FlowLayout

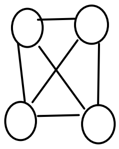
17) Consider the following examples of Graphs noting the labels given for each Graph A – E.

A

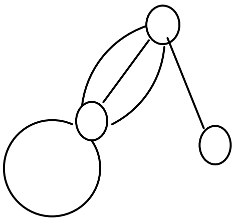
B



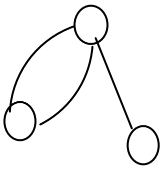
C



D



E



Select from among the following, the correct definition given for each illustration.

(a) A → digraph (b) B → simple graph (c) C → complete graph
(d) D → multigraph (e) E → pseudograph

18) Read the following paragraph

“In order to balance a tree, there are algorithms that require little additional storage as intermediate variables and use no sorting procedure.”

Select from among the following, the correct option which matches with the description given.

(a) AVL Tree (b) DSW
(c) Bubble (d) splaying
(e) Sorted array based tree balancing

19) Read the following paragraph

“To avoid restructuring a tree locally by recreating a tree, one can opt for a self adjusting strategy. A strategy proposed by Brian Allen, Ian Munro and James Bitner, consists of two possibilities for self adjustment.”

Select from among the following, two possibilities proposed.

(a) splaying (b) AVL
(c) Simple rotation (d) Self-restructuring
(e) Moving to the root

20) Consider the following pseudocode.

```
whatSort(data[])
     for i = 0 to data.length – 2
         select the smallest among data[i]…….data[data.length – 1]
          swap it with data[i];
```

Select from among the following, the sorting algorithm which has been depicted by the above algorithm.

(a) bubble
(b) quick
(c) merge
(d) insertion
(e) selection

21) Consider the following segment of a program.

```
public void insert(int el){
     IntBSTNode p = root, prev = null;
         while(p != null){
             prev = p;
              If(p.key < el)
                      p = p.right;
              else p = p.left;
    }
if(root == null}
      root = new IntBSTNode(el)
else if(prev.key < el)
       prev.right = new  IntBSTNode(el);
else prev.left  = new  IntBSTNode(el);
}
```

Select from among the following, the correct statement/s on the above program.

(a) The given code implements the radix sorting algorithm.
(b) The given segment of code can be used to insert a node to an existing tree.
(c) The given segment of code can be used to delete a node from a tree.
(d) By using the given code, a shortest path of a graph can be determined.
(e) A linked list node has been implemented by using the given segment of code.

22) Select from among the following, the algorithm/s that can be used for traversing a graph.

(a) Depth-first search
(b) Single rotation
(c) Moving to the root
(d) Breadth-first search
(e) Shortest path

23) Consider the following statement regarding a Hash function.

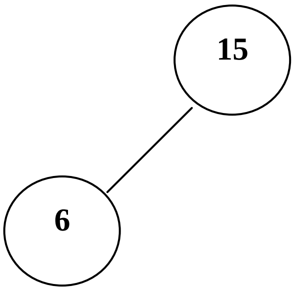
“The key is divided into several parts and these parts are then processed using a simple operation such as addition to combine them in a certain way.”

Select from among the following, the hash function/s which is/are described by the above statement.

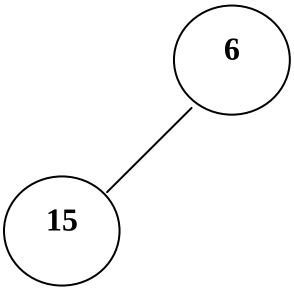
(a) division
(b) folding
(c) mid square
(d) extraction
(e) radix

24) Consider the following illustration of trees.

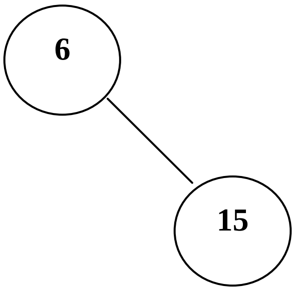
A



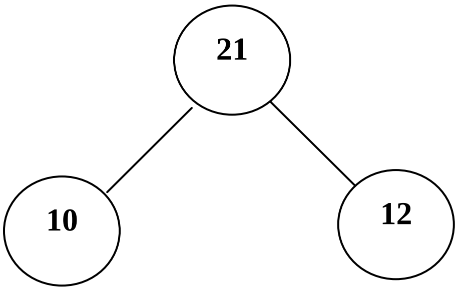
B



C



D



Select from among the following, the correct options which can be considered as heaps.

(a) A only	(b) A and C only	(c) B only
(d) B and D only	(e) A and D only	

25) Consider the following pseudocode.

```
Receive(buffer)
 while buffer is not filled up
    if information is still incoming
       get a character and store it in buffer;
     else exit();
     decode(buffer);

decode(buffer)
    decode information in buffer;
    store(buffer);

store(buffer)
    transfer information from buffer to file;
    receive(buffer);
```

Select from among the following, the recursion type which has been used in the above pseudocode.

(a) tail	(b) nontail	(c) indirect
(d) nested	(e) excessive	

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