FINALTERM EXAMINATION
Spring 2010

Question No: 1 (Marks: 1) - Please choose one
Here is a small function definition:

```
void f(int i, int &k)
{
i = 1;
k = 2;
}
```

Suppose that a main program has two integer variables x and y, which are given the value 0. Then the main program calls f(x,y); What are the values of x and y after the function f finishes?

- ► Both x and y are still 0.
- ► x is now 1, but y is still 0.
- ► **x is still 0, but y is now 2.**
- ► x is now 1, and y is now 2.

Question No: 2 (Marks: 1) - Please choose one
A binary tree with N internal nodes has _____ links, _____ links to internal nodes and _____ links to external nodes

- ► N+1, 2N, N-1
- ► N+1, N-1, 2N
- ► **2N, N-1, N+1 (page 304)**
- ► N-1, 2N, N+1

Question No: 3 (Marks: 1) - Please choose one
Each node in doubly link list has,

- ► 1 pointer
- ► **2 pointers (Page 39)**
- ► 3 pointers
- ► 4 pointers

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Question No: 4 (Marks: 1) - Please choose one
If you know the size of the data structure in advance, i.e., at compile time, which one of the following is a good data structure to use.

- Array
- List
- **Both of these (page 10)**
- None of these

Question No: 5 (Marks: 1) - Please choose one
Which one of the following is not an example of equivalence relation:

- Electrical connectivity
- Set of people
- **<= relation (Page 388)**
- Set of pixels

Question No: 6 (Marks: 1) - Please choose one
If a complete binary tree has height h then its no. of nodes will be,

- Log (h)
- **2^{h+1}- 1 (page 125)**
- Log (h) - 1
- 2^h - 1

Question No: 7 (Marks: 1) - Please choose one
If a max heap is implemented using a partially filled array called data, and the array contains n elements (n > 0), where is the entry with the greatest value? **Data[0] is correct**

- data[1]
- data[n-1]
- data[n]
- data[2*n+1]

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Question No: 8 (Marks: 1) - Please choose one
Which one is a self-referential data type?

- ► Stack
- ► Queue
- ► **Link list** **Click here for detail**
- ► All of these

Question No: 9 (Marks: 1) - Please choose one
There is/are _____ case/s for rotation in an AVL tree,

- ► 1
- ► 3
- ► 2
- ► **4 (page 229)**

Question No: 10 (Marks: 1) - Please choose one
Which of the following can be the inclusion criteria for pixels in image segmentation.

- ► Pixel intensity
- ► Texture
- ► Threshold of intensity
- ► **All of the given options (page 421)**

Question No: 11 (Marks: 1) - Please choose one
Consider te following array
23 15 5 12 40 10 7
After the first pass of a particular algorithm, the array looks like
15 5 12 23 10 7 40
Name the algorithm used

- ► Heap sort
- ► Selection sort
- ► Insertion sort
- ► **Bubble sort (According to rule)**

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Question No: 12 (Marks: 1) - Please choose one
In a perfectly balanced tree the insertion of a node needs _____ .

- ► **One rotation (Page 225)**
- ► Two rotations
- ► Rotations equal to number of levels
- ► No rotation at all

Question No: 13 (Marks: 1) - Please choose one
If there are N elements in an array then the number of maximum steps needed to find an element using Binary Search is _____ .

- ► N
- ► N^2
- ► $N\log_2 N$
- ► **$\log_2 N$ (page 440)**

Question No: 14 (Marks: 1) - Please choose one
Which of the following is NOT a correct statement about Table ADT.

- ► In a table, the type of information in columns may be different.
- ► **A table consists of several columns, known as entities. (page 408)**
- ► The row of a table is called a record.
- ► A major use of table is in databases where we build and use tables for keeping information.

Question No: 15 (Marks: 1) - Please choose one
If both pointers of the node in a binary tree are NULL then it will be a/an _____ .

- ► Inner node
- ► **Leaf node (page 120)**
- ► Root node
- ► None of the given options

Question No: 16 (Marks: 1) - Please choose one
Suppose we are sorting an array of eight integers using quick sort, and we have just finished the first partitioning with the array looking like this:

2 5 1 7 9 12 11 10

Which statement is correct?

- ► **The pivot could be either the 7 or the 9.(page 506)**
- ► The pivot could be the 7, but it is not the 9.
- ► The pivot is not the 7, but it could be the 9.
- ► Neither the 7 nor the 9 is the pivot.

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Question No: 17 (Marks: 1) - Please choose one
What is the best definition of a *collision* in a hash table?

► Two entries are identical except for their keys.
► Two entries with different data have the exact same key
► **Two entries with different keys have the same exact hash value. (page 464)**
► Two entries with the exact same key have different hash values.

Question No: 18 (Marks: 1) - Please choose one
For a perfect binary tree of height h, having N nodes, the sum of heights of nodes is

► N – (h – 1)
► **N – (h + 1) (Page 373)**
► N – 1
► N – 1 + h

Question No: 19 (Marks: 1) - Please choose one
A binary tree with 33 internal nodes has _____ links to internal nodes.

► 31
► **32 (Page 304)**
► 33
► 66

Question No: 20 (Marks: 1) - Please choose one
Suppose you implement a Min heap (with the smallest element on top) in an array. Consider the different arrays below; determine the one that *cannot* possibly be a heap:

► 16, 18, 20, 22, 24, 28, 30
► 16, 20, 18, 24, 22, 30, 28
► 16, 24, 18, 28, 30, 20, 22
► **16, 24, 20, 30, 28, 18, 22 (see min heap property at page 337)**

Question No: 21 (Marks: 1) - Please choose one
Which of the following is not true regarding the maze generation?

► Randomly remove walls until the entrance and exit cells are in the same set.
► Removing a wall is the same as doing a union operation.
► **Remove a randomly chosen wall if the cells it separates are already in the same set. (Page 424)**
► Do not remove a randomly chosen wall if the cells it separates are already in the same set.

Question No: 22 (Marks: 1) - Please choose one
Which formula is the best approximation for the depth of a heap with n nodes?

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► **log (base 2) of n (Page 353)**
► The number of digits in n (base 10), e.g., 145 has three digits
► The square root of n
► n

Question No: 23 (Marks: 1) - Please choose one
In threaded binary tree the NULL pointers are replaced by ,

► preorder successor or predecessor
► **inorder successor or predecessor (Page 307)**
► postorder successor or predecessor
► NULL pointers are not replaced

Question No: 24 (Marks: 1) - Please choose one
The _____ method of list will position the *currentNode* and *lastCurrentNode* at the start of the list.

► Remove
► Next
► **Start (Page 38)**
► Back

Question No: 25 (Marks: 1) - Please choose one
Mergesort makes two recursive calls. Which statement is true after these recursive calls finish, but before the merge step?

► Elements in the first half of the array are less than or equal to elements in the second half of the array.
► None of the given options.
► The array elements form a heap.
► **Elements in the second half of the array are less than or equal to elements in the first half of the array.** Click here for detail

Question No: 26 (Marks: 1) - Please choose one
Suppose we had a hash table whose hash function is "n % 12", if the number 35 is already in the hash table, which of the following numbers would cause a collision?

► 144
► 145
► **143**
► 148

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