Amazon Placement paper 2011

1)You are given a function getInorderSuccessor which takes a BST (Binary Search Tree) as it's parameter. Every node has an extra pointer "next" , which is intialized to null, fill next with node pointers which represent Inorder Successor.

In a binary tree, inorder successor of a node is the next node in inorder traversal of the binary tree. Inorder successor is NULL for the last node in inorder traversal.

In BST, inorder successor of an input node can also be defined as the node with the smallest key greater than the key of input node. So, it is sometimes important to find next node in sorted order.

2)You are given a function printKDistanceNodes which takes in a root node of a binary tree, a start node and an integer K. Complete the function to print the value of all the nodes (one-per-line) which are a K distance from the given start node in sorted order. Distance can be upwards or downwards.

Example:

Sample Input:

Root node: 5
Given start node: 8
Distance (K): 1

Sample Output:

5
6
9

3)SDE Technical Test - October
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Time Remaining: 00:06:46

In given array of elements like [a1,a2,a3,..an,b1,b2,b3,..bn,c1,c2,c3,...cn] Write a program to merge them like [a1,b1,c1,a2,b2,c2,...an,bn,cn].

PS: Doing without using extra memory would fetch more points
Sample Testcases:

Input #00:

{1,2,3,4,5,6,7,8,9,10,11,12}

Output #00:

{1,5,9,2,6,10,3,7,11,4,8,12}

Explanation:

Here as you can notice, the array is of the form
{a1,a2,a3,a4,b1,b2,b3,b4,c1,c2,c3,c4}

4)Given a single linked list with an additional pointer to a random node (which can also be NULL), clone the list and return it.

Example:

One arrow points to the next element, while the other points to the 'random' element. If there is only one arrow out of a node, it points to the next node. Clone and return the head of the new list alone.

Note: Your code will not be considered for evaluation if you just return the input list as the cloned list.

Amazon online test question paper 2011

Paper was of 2 hrs. with 10 MCQs and 5 programming questions.
1. Find repeating characters in the string and print them in lexicographical order. eg- aaabccffd ans- acf
2. Delete Kth node from a linked list.
3. Rotate the given matrix by 90 degree.
4.Clone a directed graph.
5.Write functions to find whether 2 timerange overlap or are within range.

Latest Amazon papers 2011

m:val="0" m:val="0" m:val="centerGroup" m:val="1440" m:val="subSup" m:val="undOvr"

Amazon MNNIT Developer Test - Set 1

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Time Remaining : 1:0:45

Question 1 / 22

In a binary max heap containing n numbers, the smallest element can be found in time

- Pick one of the choices

O(n)
O(log(n))
O(log(log(n))
O(1)

Question 2 / 22

. • A data structure is required for storing a set of integers such that each of the following operations can be done in (log n) time, where n is the number of elements in the set. Deletion of the smallest element Insertion of an element if it is not already present in the set Which of the following data structures can be used for this purpose?

- Pick one of the choices

A heap can be used but not a balanced binary search tree
A balanced binary search tree can be used but not a heap
Both balanced binary search tree and heap can be used
Neither balanced binary search tree nor heap can be used

- Skip QuestionPrevious Question

3. • **Question 3 / 22**

Predict the output

```
void m1(int *a){

 a = new int[20];

 a[0] = 100;

}

void m2(int *a){

   a = new int[20];

   a[0] = 200;

   delete[] a;

}

void foo(){

  int *a = new int[10];

  a[0] = 20;

  printf("%d", a[0]);

  m1(a);

  printf("%d", a[0]);

  m2(a);

  printf("%d", a[0]);

}
```

- Pick one of the choices

20, 100, 200
20, 100, Crash!!
20, 20, 20
None of the above

- **Question 4 / 22**

  What will the following code snippet do, when is it passed the root of a binary tree ?

```
func( Node *node){

  if(node->right != NULL)

       func( node->right);

  if(node->left != NULL)
```

```
            func( node->left);

        if( node->left == NULL && node->right == NULL )

           delete(node);

      }
```

- Pick one of the choices

  Delete the tree from bottom to top
  Delete the tree from top to bottom
  Delete the leaf nodes from right to left
  Delete the leaf nodes from left to right

- **Question 5 / 22**

```
int x[] = { 1, 4, 8, 5, 1, 4 };

int *ptr, y;

ptr  = x + 4;

y = ptr - x;
```

What does y in the sample code above equal?

- Pick one of the choices

-3
0
4
4+sizeof(int)

- Skip QuestionPrevious Question

- **Question 6 / 22**

What's the output?

```
main() {

int a[5] = {1,2,3,4,5};

int *ptr = (int*)(&a+1);

printf("%d %d" ,*(a+1),*(ptr-1));

}
```

- Pick one of the choices

2 2
2 1
2 5
None of the above

- **Question 7 / 22**

A "Most efficient data structure" is designed to optimize the following operations. Pop, Push, Min. The best possible time-complexities with no extra space, respectively would be:

- Pick one of the choices

O(1), O(1), O(N)
O(1), O(N), O(1)
O(N), O(1), O(1)
O(1), O(1), O(1)

- **Question 8 / 22**

Suppose you are given an array s[1..n] and a procedure reverse(s,i,j) which reverses the order of elements in s between positions i and j (both inclusive). What does the following sequence do,where 1 <= k < n:
reverse(s,1,k)
reverse(s,k+1,n)
reverse(s,1,n)

- Pick one of the choices

Rotates s left by k positions
Leaves s unchanged
Reverses all elements of s
None of the above

- Skip QuestionPrevious Question

- **Question 9 / 22**

The number of total nodes in a complete balanced binary tree with n levels is,

- Pick one of the choices

None of the above
3^n + 1
2^(n + 1) -1
2^n + 1

- Skip QuestionPrevious Question

- **Question 10 / 22**

Which of the following statements are correct about the following program?

```
#include

int main(){

    unsigned int num;

    int i;

    scanf("%u", &num);

    for(i=0; i < 16; i++)
    {

        printf("%d", (num<<15)?1:0);

    }

    return 0;

}
```

- *Pick one of the choices*

It prints all even bits from num
It prints all odd bits from num
It prints binary equivalent of num
This result in an error

- *Skip QuestionPrevious Question*

- ***Question 11 / 22***

*What does the function **doSomething** return when the argument is the root of a binary tree?*

```
#define min(a,b) ((a) < (b) ? (a) : (b))
```

```
struct Node {

    struct Node* left;

    int element;

    struct Node *right;

};


int doSomething(Node *ptr){

    static long counter = 0;

    int value = 0;

    if(ptr != NULL){

      value = 1 + min(doSomething(ptr->left), doSomething(ptr->right));

    }

    return (value);

}
```

- *Pick one of the choices*

Width of the tree
Height of the tree
Minimum distance between a leaf node and root.
Minimum distance between 2 leaf nodes.

- *Skip QuestionPrevious Question*

- ***Question 12 / 22***

Memory on a machine has space for 3 pages. For the following page access pattern, what is the sequence of pages for which page fault will occur. Give the answer for two different page swapping algorithms,
(i) least recently used and
(ii) least frequently used. Assume that no page is available in the memory while starting.
8,5,8,9,5,6,5,6,5,8,9,5,8,7,6,7,9

- *Pick one of the choices*

LRU – Page fault sequence: 8,5,9,6,8,9,7,6,9 LFU – Page fault sequence: 8,5,9,6,9,7,6,7,8
LRU – Page fault sequence: 8,5,9,7,8,9,7,6,9 LFU – Page fault sequence: 8,5,9,6,9,7,8,7,9
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LRU – Page fault sequence: 8,5,9,7,8,9,7,6,9 LFU – Page fault sequence: 8,5,9,6,9,7,6,7,9

- ***Question 13 / 22***

How many child processes will be generated by the following?

```
void main() {

        int p1= fork();

        if (p1 == 0) {

             int p2 = fork();
```

```
            if (p2 != 0) {
                  fork();
            }
      }
}
```

- *Pick one of the choices*

3
4
5
6

- ***Question 14 / 22***

A parallel program consists of 8 tasks – T1 through T8. Each task requires one time step to be executed on a single processor. Let X -> Y denote the fact that task X must be executed before task Y is executed. Suppose only the tasks X, Y are to be executed. On any multiprocessor machine it would require at least 2 time steps since in the first step X could be executed, and Y could be executed in the next time step (since it requires X to complete first). Now, suppose the following dependencies exist between the tasks T1 – T8:

```
T1 -> T2
T2 -> T3
T3 -> T6
T2 -> T4
T4 -> T7
T2 -> T5
T5 -> T8
```

What is the minimum number of time steps required to execute these 8 tasks on a 2 processor machine and a 4 processor machine?

- *Pick one of the choices*

4 and 2 respectively
5 and 2 respectively
5 and 4 respectively
6 and 2 respectively

- ***Question 15 / 22***

In a country where everyone wants a boy, each family continues having babies till they have a boy. After some time, what is the proportion of boys to girls in the country? (Assuming probability of having a boy or a girl is the same)

- *Pick one of the choices*

1:2
2:1
1:1
1:4

- ***Question 16 / 22***

Four players A, B, C and D are holding 4 cards each. Each of them has an Ace, a King, a Queen and a Jack. All of them have all the suits (Spades, hearts, clubs and diamonds).

- *I. A has Ace of spades and Queen of diamonds.*
- *II. B has ace of clubs and King of diamonds.*
- *III. C has Queen of clubs and King of spades.*
- *IV. D has Jack of clubs.*

Ace of diamonds is with

- *Pick one of the choices*

A
B
C
D

- ***Question 17 / 22***

Deb normally drives to work in 45 minutes at an average speed of 40 miles per hour. This week, however, she plans to bike to work along a route that decreases the total distance she usually travels when driving by 20%. If Deb averages between 12 and 16 miles per hour when biking, how many minutes earlier will she need to leave in the morning in order to ensure she arrives at work at the in time as when she drives?

- *Pick one of the choices*

135
120
40
75

- ***Question 18 / 22***

Each of the three players – Sehwag, Raina and Yuvraj plays exactly one game among Cricket, Football and Tennis, not necessarily in the same order. Each player always gives two replies to any question . Out of these 3 players, exactly one player always speaks the truth, one always lies and one always alternates between truth and lies in any order. When each was asked "Which game do you play?" , the following were their replies

Sehwag : I am a cricketer. Raina is a football player
Raina : I am a cricketer. Yuvraj is a tennis player
Yuvraj : Sehwag is a football player. Raina is a cricket player

Which game does Raina play ?

- *Pick one of the choices*

Cricket
Football
Tennis
Cannot be determined

- *Skip QuestionPrevious Question*

- ***Question 19 / 22***

In a class , 72 students drink only tea, 50% of the students drink coffee, 25% of the students drink both tea and coffee and 5% of the students drink neither tea nor coffee.
How many of the students drink only coffee ?

- *Pick one of the choices*

29
38
40
49

- ***Question 20 / 22***

There are 6 boxes numbered 1, 2,...6. Each box is to be filled up either with a red or a green ball in

such a way that at least 1 box contains a green ball and the boxes containing green balls are consecutively numbered. The total number of ways in which this can be done is

- *Pick one of the choices*

5
21
33
60

Question 21 / 22
*Given an integer array **sequence**, return the **length** of the longest increasing subsequence (LIS) A longest increasing subsequence is defined as a subsequence in the given sequence of integers such that the elements in the subsequence are in sorted order, lowest to highest and in which the subsequence is as long as possible*

Sample Test Cases:

Input #00:
1, 2, 3

Output:
3

Explanation:
The sequence in itself is an increasing one

Input #01:
4, 5, 6, 7, 8, 1, 2, 1, 2, 3, 5, 4, 6, 7, 8, 9, 0, 6, 7

Output #01:
5

Explanation:
*The length of the LIS is 5. The LIS elements from the sequence are highlighted: **4, 5, 6, 7, 8**, 1, 2,1, 2, 3, 5, **4, 6, 7, 8, 9**, 0, 6, 7*

```
int lengthLIS(int sequence[], int N){
/*N: size of the array */
}
```

Question 22 / 22
You are given a function sprialArray which takes in a 2-d array. Complete the function to print the numbers in a clockwise spiral order

NOTE: Print the numbers with one space separating them. Your output should match with the one given below in the sample testcases Sample Testcases:

Input #00:
M = 3, N = 3
1 2 3
4 5 6
7 8 9

Output #00:
1 2 3 6 9 8 7 4 5

Input #01:
M = 1, N = 1
1
Output #01:
1

```
void printSpiralArray(int a[101][101], int M, int N){
/*M denotes the number of rows, N denotes the number of columns */
}
```

Amazon SDE Date:20/07/2011

The first round was online. It had 20 mcq's and 2 code's.MCQ's where quite simple, it had 15 tech. and 5 apti. Technical where easy it had q's on finding the o/p,complexity,and more importance was in DS, and especially TREE.
The two coding q's where as below.

1) Finding all possible UNIQUE substings of and array of char. And displaying it in sorted order.
2) It was on tree was easy. I don't remember the exact question.

After the first round there was another tech. written round. It also had 2 q's

1) An array of int is given find out the next possible number using that array . eg. Array has 1 2 5 8 6 4 then the next no will be 1 4 2 5 6 8 i.e no num. is possible between given two no. using the int's in the array.
2) Clone a singly link list with an extra pointer in the struct the extra pointer points anywhere and the node doesn't have any value. i.e. node cannot be identified easily.

There was one more coding round again pen n paper it had 2 q's

1) Create a double link list from a tree.

o/p : 5=4=14=6=4.

2) Find the max sum of a sublist of an array.

After these 2 rounds the where interviews both tech. and hr.
So all in all the most important thing is DS and TREE's if u know both u are sure to get through. I advice u to just get hands on coding of tree and link list.Best of Luck

Coding Round :

1. diameter of tree,
2. write routing problem:
ie finding the shortest path for the rat to cheese in a maze

Apti Round:

20 aptitude questions. it was simple..
around 4 to 5 general aptitude ques..
4 to5 find the o/p ques..
some on n/wing

C Questions for Outrput:

1. int a[]={1,2,3,4,5};

```
int *ptr=a;
print((&ptr)-1);
```

2.

base addr+((size of int)*size of arr)-size of int

Package: 12Lakh

Paper Type: CSE B Tech/M Tech /PHD

Experience: Question is base on C/C++/JAVA , Apti.

Questions: 2 programmign ques , 2 output ques and 17 objective

IIT Kanpur:
one was to inplement DFS tree thr were 20 objective and 2 programming

IIT Guwahati

1. Write the code for this

input: 1
output:
{}
input: 2
output:
{}{}
{{}}
input: 3
output:
{}{}{}
{{}}{}
{}{{}}

```
balaneparantasis(int n)
{
}
```

```
import java.io.*;// balance parenthesis
class B
{void fun ( String str , int open , int closed , int n )
{
if ( closed > open ) return ;
if ( closed > n || open > n ) return ;
if ( str.length() == 2*n )
System.out.println(str) ;
fun ( str + '(' , open+1 , closed , n ) ;
fun ( str + ')' , open , closed+1 , n ) ;
}
}c
lass Bracket
```

{public static void main(String args[])
{ int n=3;
B b=new B();
b.fun ("(" , 1 , 0 , n) ; // initially no of open paranthesis is 1
and
closed is 0
}
}

I did not do this. One frnd send me this.

2. Two linked list. u have to suffle this two..

```
l1={1,4,7}
l2={2,8,9}
output:
merge={1,2,4,8,7,9}
merge(list *l1,list *l2)
{
   struct node
  {
     int val;
     struct node *next;
   }

 ....../ wtirte code here..
}
}
```

Apti and C questions:

1. 121 kg u have to make with nearest weight kg only..

Amazon

1) This is an online test
2) 20 MCQ's + 3 online programming
3) The 20 MCQ's are very very simple . Not even of GATE standard .
4) Actually the online test had 2 batches so we had 2 sets of online question pape

For B Tech , Dual the coding programs are

1) LCA in a BST
2) In a array find whether there exists 2 integers whose sum = x
3) Don't remember

For M Tech

1) Find the diameter of a tree
2) Find the Longest monotonic increasing sequence
3) Given coins of some denominations with the minimum number of coins required to make a sum of x rupees.