Experiences from Placements – 2005 – 2006

Some Google Questions

1. Polygon Triangulation - Find the set of non-intersecting chords which will break a polygon down into triangles. Find the triangulation of minimum total perimeter of triangles.

2. Break a number down into any number of parts which sum upto that number and whose product is maximum.

3. In a singly linked list, exchange the odd and even nodes.

4. In a DAG, print the maximal paths.

5. In a hundred floor building, there is a threshold floor value(say 26). If you throw an egg from >= 27th floor, it will break but will remain intact <=26 floors. You have 2 eggs. Find the worst-case minimum number of drops you would have to make to find the threshold value. You can re-use an egg in case it doesn't break. (ans 14)

6. When we find the minimum value in an array by replacing the 'min' variable. Find the expected number of times you would have to replace in an array containing N random integers. (ans ln N)

7. Synchronization mechanisms in Operating Systems

Microsoft - Unanswered questions

1. Print last n lines of a file in one pass, u cant go back in the file. U have one function that returns one line after other. U have to do in constant space.

2. Find max of n numbers without using comparision operator, any kind of comparision operator is not allowed. Every other operator is allowed.

Remaining questions were answered with some help in one or two of them.

Trilogy questions

This is the set of questions asked to me in trio ... if something et repeated ..plz ignore ...

1. From a minheap give a linked list of sorted keys without destructing the heap .
Hint try to use the properties of a tree.

2. write a sudoku solution tester (time alloted 20 mins)..

3.give pros and cons of linked list v/s arrays .. give an intermediate betwwn the two ..
soln i proposed was more or less indexing kinda a solution ....

Microsoft Questions

Round1 -

1. convert a number to base -2 represntation
2. 5 horses can run at a time in a race and u can figure out which are the top 3,but can't note their individual timings. So the minimum number of races to find top 3 horses among 25 horses .
Ans - 7

Round 2 -

This guy was peaceful RK alumnus ... questions for this round were easy(i think)
he asked me following
1. evaluate a postfix expression
Soln- i did using stack ..
then he asked to to check whehter the user has given me a correct pattern (in postfix form) ...straight forward ..

2. implement a queue using 2 stacks ...
asked me to check wheter it worked in parallel environment .. i said no ..aksed to improve it for such env ... i said using shared memory ....
4. asked me questions on TCP 3 way handshake, some equation (i dont even know the name) ...etc etc ... couldnt ans much ...

Round 3-

1. propose DS for a T-9 dictionary(basically in a mobile device)... so an open ended prob ..
soln i proposed was making a tree with key values the number of the key and maintaining a linked list associated with each node ...

2. asked me some os stuff .... wat is paging ? .. thrashing ?? ... wat replacement policies ..etc
3. some network stuff... TCP stack ... diff b/w TCP & UDP ... window etc ...

4. which sorting algo to be used and when ?
5. gave me a puzzle to solve and for a big puzzle write the code ...

Round 4

1. once again an open ended prob .... given 10k docs each having some words (words are not much in number)... some articles/docs match ... given a document req to find the names of the docs with almost same words.

2. an array of N-1 numbers from 0 to N-1 ..find the missing number in O(n) time ... no extra space available and the data bus is of 8 bits only(this is hint that u cant use summation)
soln -- Xor the numbers !!!

Trilogy Questions: 1st and 2nd Rounds

1st Round

1. Given an integer array A, and an integer S, find if there exists x,y in A such that x+y = S.

Initial answer:

i. Brute force.

ii. Sort in O(nlogn). Then for every x in A, using binary search, find if y= S-x exists O(nlogn)

Assume, you already have a sorted array. How would you do the above?

Ans: Start from the extremes of the array. If sum> S, reduce the right pointer, else, increment the left pointer. O(n)

This is the wrong soln. One must start from the value = S/2 in the array. and use 2 indeices to move towards the 2 extremes simultaneously.

Question 2: You have a binary tree, which has minheap property. How would you convert it into a sorted linked list?

Answer:

1. Try to simulate the working of a heap in an array. The way I did it was :

Found 'd' - the depth of tree. Initialized 'counter' to (pow(2,d) -1). I encode this in binary. Eg: 15 = '1111'. Then using this code, I traverse the tree, Eg: 10 = '1010', from root, go 'r->l->r->l', works like an array index. Rest like heap sort. He seemed to accept it.

Variation: You don't want any changes in the tree.

Ans: Applied an AI algo for it... I think the algorithm is Memory Bounded A*... or something like that.. He got frust with it... asked me to get a recursive solution for it. Which was easy....

Round 2:

Puzzle 1:

You have 'n' petrol pumps 'A'-> 'N' on a one-way ring road(circle). Each petrol pump gives only a limited amount of petrol, 'a1',.... 'aN'ltrs, The distance between the petrol pumps is known. Your car gives exactly 1km/ltrl. Your car has infinite tank capacity, but is initially empty.

i. Can you complete a full circle?

ii. If you can, which station would you start?

iii. Complexity of the algorithm?

Ans:

1 Brute force(O(n square))

2. Start from any random petrol pump say 'A'. If you can go from A->B->C but not from 'C->D', try starting from 'D'. We don't have to check for B and C(obvious).

Complexity O(n)

Question 2:
Iterative code for in-order traversal... he wanted detailed code.... had a bug, kinda got stuck with a node not having a right node. The guy was kinda intimidating... but finally managed to write the code.

Yahoo: Format in IIIT Hyderabad

1. written test : (1 hours)
    17 questions
    -mostly c and c++ programs either to be written or evaluating output
    -question from trees, lists.
    -class inheritance , function overloading
    -text processing questions

    q: propose data structure for for storing data retrieved the file with following
      format
      player   score   scored against
      sachin   52   Aus
      Dravid   67   Pak
      sachin   40   SA
      Sehwag   56   Aus

      Also write algo for retrieving top 50 aggregate scores

  q: find lowest commen parent of two nodes of binary search tree, given
      pointers to tree root, and two nodes

  q: intersection and union of two files and subtract recors of one
      file from another

2. programming test (lab) (more than 3 hours)
3. three rounds of interview

Between the questions: Final posting
1. Think simple. No tough questions can be asked in an interview. nobody has time. think simple. often binary trees and simple sorts do the trick. chapter 22,23 and 24 of cormen are a must for the remaining problems.

2. My first interview was with Aditya. he told me the most important thing abt an

interview (which I'm going to remember for the rest of my life). He said,"... i am not interested in getting the correct answer from you. we are interested in seeing how you proceed with your workout. So if you are thinking, think aloud...."
Has two benefits: you exhibit your way of thinking and if you got the question wrong, he/she will correct you.

3. Don't give up (and if you do give up, plz don't show it on outside). I got through 'coz i didn't give up. After the first question of second round (which screwed me real hard), I thought I was totally out of contention. But then I decided to give my best shot to the next question and ...

4. when you code, code properly otherwise... (you know what). except for the very last question which was a cracker, i was asked to write code for every other question. in fact new issues surface when you write codes. be ready to handle them.
Lastly, all the best to everyone. Do your best. Feel free to contact me if you want an explanation of what I have posted here.
Chandu

Trilogy Interview: 2nd Round Recap

1. In a single nested for loop, determine if a filled in sudoku is a valid solution. The actual question was tougher but was reduced to this.
2. This question was asked to Mukund or Dhawan (i don't remember exactly).
Give a data structure to efficiently implement the operations insert, delete, search and find the k th smallest value in the given set.
Easy question, easy answer.
3. This was based on the test. I had correctly answered all the questions in paper1 and the first one in paper2. I had only written an explanation of the last question using Johnson's algorithm.
So, i was asked : What is Johnson's algorithm?
After explaining Johnson's algorithm, I said to my interviewer that 'twas a bit of overkill w/o giving him time to question me.
Next: Give a better solution.
I said that run a BFS from every node and store the largest value. complexity: O(n^2).
He asked for a better solution still. So he had it.
I devised an O(n) solution and presented it to him. By that time, confidence had already settled in.

Questions in Trilogy interview: First Round Recap

1. There are two arrays of int A and B. Give a good algorithm to find out the common elements in the two when they are of comparable sizes and when one of them is much smaller than the other one.
2. There is a linked list each of whose nodes, in addition to the next pointer has two additional data fields: length len and an integer array of length len. Now you have to store

the entire linked list in a file and reconstruct it from there.

   after the initial solution, there were many variants like array of characters with '\0' allowed as a part of string and then the nodes also had another down pointer which pointed to a similar list & the whole structure had to be reconstructed.

   I think I scored heavily on this question.

3. I was offered to choose the area of my interest. I chose Dynamic Programming. Actually this question was also asked to someone before me coz the paper on the board had the function name written and nothing as code. Well then, the question follows:

A swap operation on a binary tree node is defined as swap of left and right subtrees. Two binary trees are said to be isometric if one of them can be obtained from the other one by a sequence of swap operations. Now if you are given two binary trees of same size, determine if they are isometric.

   After I answered the question correctly, the set of keys was restricted to contain distinct integers and I was asked to write a recursive solution. This was easy.

I was nervous while answering the first question and reachd upto Red-Black trees but as the interview progressed, I think I made a positive impact, particularly with the third question. Will be back with Round 2 recap soon.

Lehman Puzzles

1. Multiply 37x48
2. 3/32
3. What are the number of cubes in the outer surface of a 10x10x10 rubik's cube?
4. Number of matches played in a 64 player knockout competition.
5. You have a cup of coffee and a cup of tea each having 100 ml of the respective liquid. You take a teaspoon of tea from the cup of tea to the cup of coffee and then one teaspoon from the coffee cup to the tea cup. What will be higher - volume of tea in tea cup or volume of coffee in coffee cup?
6. You are on an island full of grass. The water around you have sharks in it. Suddenly a fire breaks out in the other part of an island and the wind is blowing in your direction. How do you escape that fire?

- Ashish Bhai :D

1 wonderful link for Interviews

Guys,
this link and especially the tips section has really helped me a lot in my HR and Tech interview. I was much more confidant and focused in my ideas after going through it.

Pls have a look:
http://www1.cs.columbia.edu/~kns10/interview/

Thank you everyone :)

FI Interview Experience of Debrup Das

The FairIsaac Interview (Debrup Das---this is way I spell it. I am tired of ppl writing Debroop, Devrup, ...And I am an EG guy): there were 3 interviews, of duration half-an-hour each on HR, QA, OOP respectively. HR was relatively peaceful. questions like: "Why do u want 2 join FI & not Yahoo or Oracle" etc were asked. always be frank & honest in HR interview. they would cross question u & u would more often than not contradict urself if u r not ... The QA interview started with simple questions on C, logic etc. I am providing the questions which I remember. Some of the lesser known answers r also given. Rest u can find in any gud text book

Q: Wat is the diff between : Char str[6]="abcde" and Char *ptr="abcde"

Q: Char str[10][10]; wat is the diff between *str and str. How will I acess the first row using *

Q: how would u swap 2 numbers (for those who r thinking abt x=x+y...method, never say this answer to a QA person, use the XOR method).

Q: Wat is the limitation of the x=x+y..method?

A: Overflow

Q: Wat r the things u try 2 test in QA?

A: check for Overflows, whether program works fine when invalid input is entered, whether the prog is flexible or not. (I told these, they said thr r thousands more)

Q: Given a program which takes input 3 ints (say a,b,c) and checks whether u can build a triangle with them or not. Wat r the possible tests for this prog?

A: Obviously the prog is checking a+b>c (all possible combinations) and returning true or false. give inputs suc tht a+b=c, to see whether it works fine or not. check whether if any input is -ve then prog shld give

ERROR. check for overflow of a+b, check for individual overlfows of a, b,c ... I was thinking of more, the interview guys said tht we think u covered almost all..

I think this answer got me the job. they were very impressed with this answer.

Q: Find the output of the prog:

for(i=0;i<5;i++)

a[i]=i++;

(all the a[i]s are initially 0) pretty simple one..just watch out tht u effectively have i=i+2 in each loop. I said the answer.Then one of the guys said that it

would be compiler dependant as i is used twice. I said it won't be as in C rule is u cannot modify the contents of a memory location twice in an expression.

So, c=i++*i++ is undefined, but a[i]=i++ is defined as u r modifying a[i] & i. The 2nd interview guy said tht i am correct... In an interview if u can prove the interviewer wrong then it is a big advantage. The

other questions were fairly trivial. They also asked about wat courses in CS i have done, etc. After u finish an interview if the interviewer says that do u hav any questions it is always gud 2 ask some. like

how is the project allocation done,etc.. avoid asking abt salary,etc, but can ask abt the work evaluation,etc.

The OOP interview was a big mess up for me. I did not hav much knowledge abt oop. but

one of my projects were in Java, so got some questions..most of which i could not answer. This part I think u can ask pratik or moiz. One interesting question which this oop
interview guy asked was:
Q: I was once going with my boss in a car and we stopped in a gas station 2 fill up gas. The boss asked me how many petrol pumps r thr in the city. I gave some answer. If I ask u the same question wat would be ur answer.
Actually the guy was asking a seriously question abt some algo. At first I thought it was a puzzle type question so I said. I will tell u any random number (say 500). Now u count them, if thr r more, then they
must have been newly set up, if thr r less then some has been closed down. The interview person at first could not get my answer, when he understood he became
frust. He then said tht he was looking for some mathematical answer. I told I will find how many pumps r thr in a sample area and then extrapolate. He was still not satisfied. I said petrol pumps r of limited
number of companies like HP, bharat petroleum, etc. We can ask thr office and add up. This guy became even more frust. he then changed the question.

-Debrup Das

FI Interview questions

The questions asked to me in technical rounds of FI were mainly from c++ and 1-2 from algorithms.

1) Difference between c and c++
2) Polymorphism concepts (run,compile time)
3) Does polymorphism apply to only methods or   functions?
4) Operator overloading, copy constructor
5) Concepts of friend class, abstract class, virtual function.
6) Need for abstract classes.
7) Inheritance questions,multiple inheritance etc.
8) What is Template?
9) How would u find no. of inversions in a array (if i > j and A[i] < A[j] its counted as 1 inversion)
10)Two c++ codes were shown and I was asked to identify the bug in them.
11) How u estimate the no. of petrol pumps in Calcutta.

A few more questions but this is all I can think of right now …..
Best of Luck to All
Moiz

FI R&D questions

what is the probability og getting consecutive heads in n tosses of a fair coin??

what is the probability that the three parts of a stick of length L form a triangle??

how to find if there is a cycle in a linked list??

FI questions

1) There r 5 points inside a 1cm sided eqilateral triangle. wht is the probability of 2 points having distance of 1/2 cm ?

2)$4x^5+px-p*p+p=0$ has exactly 2 real roots. Tell whether p is imaginary or real and if real give its range.

3) a 4x4 matrix is filled with first 16 prime numbers. Now how many such matrixes can be found which r magic square?(means any column or row adds to same value)

4) the question was:
wht is the output of the prog:

```
void f(char c){
if(c!='.') f(read(c));
print(c);
}
```

read(c) reads a char and print(c) prints c.

a)prints all the char
b)only last char
c)only '.'
d)None of these

-An array has 201 elements, 99 of them repeated twice and one repeated thrice. Time complexity for finding the odd one out.

-A man has 2 children, one of them is boy. whats the probability that the other one is also boy.

-what will this piece of code do
 x = x+y
 y = x-y
 x = x-y

-what does this function does
int f(int x)

```
{
  if (x==0) return 0;
  return 1 + f(x & (x-1))
}
```

A can see none
B can see A
C can see A and B.
P has 3 black and 2 white caps. He puts the caps on their head randomly. A, B and C
knows the number of caps and the colours. But cant see own cap.
On being asked B and C are not sure about their cap's colour.
What is the colour of A's cap?

1) wats the order of sorting a array containing only 3's & 9's
2)wat is the probability of a 10 digit starting with 7 palindrome of being prime
3)wats the order of algo for finding the subsequence of an array having the maximum
sum.The array contains both +ve & -ve nos.

Google Topics

hey guys, Google had mentioned a list of topics that they will be asking. It is no longer in
the tnp notice board. I got hold of it today and am posting it. Arnab will also post that
formally on the notice board.

- Strong CS fundamentals
  + application of tree, hash table, heap, trie, etc
  + Dynamic programming, graph algo, recursion
  + Memory Layout, file system, networking basics
- C++ development skills
- Analytical skills
- System Design
  + Awareness of typical size of disk and memory, access time
  + sort, merge, search, etc on a large data set
- Open ended research problems
- scripting languages
 + python preffered
- codesigning systems
- programming large scale distributed systems
- machine learning is a plus

Niket.

Some More Google Questions..

1.Find the maximum sum subsequence in an array.

2.If data is coming infinitely and you can store only k elements.Design a method such that probability of any element which has appeared till that time of being in the array is the same.

3.Write C code for doing BFS on a nary tree.Sugesst efficient Data structure you will use

4.Polynomaial triangulization

Some more to be posted later.

Parag

Some Trilogy Questions

those that i remember are: (main ones)

1. non-recursive in-order traversal.
2. unsorted array of +ve, -ve numbers, find the duplicate element? then asked abt variants: how will u handle if all numbers are 1..n, how will u handle if no-extra space is given, but u r allowed to destroy the array?
3. code soduko solution verifier.
4. suggest DS which supports insert, delete, search, return kth largest? after DS was designed, code functions kth largest, insert, delete?

there were others, but i coded all of above four and spent maximum of time on them, so remember only this much. will post if i remember anything else.

for interview...
well, think out aloud, and tell interviewer ur concerns. he is more interested in ur methodology and thinking process, rather than reaching correct solution in fastest possible time. dont assume he has specified everything? ask and not assume. like i asked when asked to suggest DS, i asked for which operation(s) DS shud be optimised (more frequent ones)? i coded slow, but steady, always taking care of all boundary conditions. i was not extra-ordinarily brilliant, but was very steady, and got stuck atmost once during both rounds.

~Nitzee

More google questions

1) Given an integer grid with lattice points from (0,0) to (n,n), find the no. of paths from (0,0) to (n,n), using only right and up steps. Find the closed form solution.
2) How to randomly permute (uniform) a very large sequence of elements (say 40GB)
3)Find the recurrance for choosing r elements out of n, such that no two elements are consecutive. Write a program for this and find space, time complexity.
(ans: space complexity is O(3n)=O(n))
4) Code to get the kth node in an inorder traversal of a binary tree.
--
Mark

More Google

1.Find the number of ways of selecting k items from total of n such that no consecutive items are selected. O(nk) in time O(n) in space.

2.write code for finding nth element in inorder traversal

3. There was one more algorithm on arrays which I dont exactly remember now.It dealt with row and column multiplication.

4.A few questions on fields because my project involved some of it.Ex.why does field exist for primes and not for compsites of two primes.

5.Given a coin in which head has probability of .33 and tail .66 find a fair trial.You can do anething u like.

I believe thr were one or two more but I cant remember them now.

Oracle

1.Details abt project
2.Wht does Java compiler do when a derived class object instantiated?
3.Wht does it do when in case of virtual function?
4.string to integer --write code
5.an ant wants to go from one corner of a cube to exactly opposite corner...wht is the shortest path?
6.Given an integer set generate all possible subset
7.wht is regular language?
8.language with alphabet {'{','}'} and only mathemetically valid parenthesis .. is it a regualr language?
9. A language accepting exactly constant number of 1s. is it regular?

10.wht is pumping lemma?
11.Hamiltonian cycle NP complete ? NP hard?

some othr questions frm other guyz
Os synchronisation, link list reverse , suffix tree etc.
a 2d array of + and - integers. sort each row and then sort each column ..will each row be
still sorted? if yes mathemetically prove it.

best of luck to all.
if they ll like(mean u perform well) u u ll go through 3 rd selection process, else single rd
..each rd abt 20-30 mins(in case of mine 1 rd only :( ).

Hirak