++Oracle

1) Given a stream of characters(a word),check whether a palindrome can be formed by rearranging the characters in the word.
2) Write a function to convert a decimal number to its binary representation.
   i. Write the merge function used in mergesort.
3) Complete the series and write a program to print the first n numbers of the series
   1 11 21 1211 _____
5) Questions related to things mentioned in your resume
   NB: **You are wholly responsible and justifiable to whatever you write in your resume**.. :P

6) Given an m*n matrix, whose columns are sorted and rows are sorted. Given an element 'a' in the matrix , find the position of the element efficiently.

7) Function (recursive or iterative) to reverse a singly linked list.

8) Given a binary tree. Convert it to BST

9) Draw schema for hospital management system.

10) What is normalization and discussed about the various normal forms.

11) What are ACID properties?

12) What are the practical applications of data structures (both linear and Nonlinear)?

13)How can priority queue be implemented using queues?

14) Write code to implement dynamic array.

15)Write c program to find the 3rd element in a linked list.

16)Given an array of size 100, in which numbers from 1-100 are arranged in random order out of which two numbers are missing. Write an efficient algorithm to find the missing numbers.

17)given a string remove minimum number of character such that string becomes palindrome.
example : input - abcaba output - 1

18) Write a recursive function to find the height of a binary tree.

19)Given two binary trees, check whether one is the mirror image of other (using recursion).20)Given a whole number as input, output the immediately larger whole number with the same number of ones in binary representation as that of the given number.

21)Given a collection of strings, you are required to search for a specific string from the collection efficiently. What data structure would you use to represent the collection? How would you implement search for a string in your data structure?

22)What are virtual functions in C++?

23)Implement stack using queues

24) How to merge two binary trees

25) Difference between semaphore and mutex, Implement both

26) Clone a linked list where each node has data,next pointer and random pointer

27) Program to Sort the numbers like this:
Input : 1, 3, 4, 13, 41, 7, 5, 11, 23
Output : 1, 11, 13, 23, 3, 4, 41, 5, 7

28) WAP to detect if a linked list has a cycle or not.

29) WAP to display scrolling text. (Eg: In news channels, breaking news is often displayed as scrolling text. Another eg. is stock prices on business news channels.)

Goldman Sachs

Coding round: You have infinite number of 2x1 and 3x1 (horizontal x vertical) bricks. Find the minimum number of bricks needed to build a wall of dimensions n x m such that no two bricks in consecutive vertical levels end at the same horizontal level. If no such wall can be built, return -1.

Puzzles : http://www.mathsisfun.com/puzzles/logic-puzzles-index.html

1. Given an array A and a number k, find all pairs in A with sum as k
   ---- You can solve this in O(n^2), O(nlogn), O(n) Link
2. Modification : Find if there is a subarray with sum = 0 Link
3. Related to Databases.
   a. What is Normalisation? Why Normalisation? Is it always necessary to Normalise? Adv & disadv Link
   b. Have a basic idea of "LIMIT" keyword used in SQL Queries.
   c. Form validations. RegEx for email address.
4. You are given two **non uniform** ropes and a lighter. Each of the ropes takes 60 mins. to completely burn out. How will you measure 45 mins with these?

Ans: Since a rope takes 60 mins to burn completely, if a rope is burnt from both ends, it will burn out in 30 mins. So burn the first rope from both ends and the second rope from 1 end at the same time. When the first rope burns out, it will be 30 mins and there will be 30 mins left on the second rope(which is still burning). At this point burn the other end of the second rope. When the second rope also burns out it will be 15 more mins, making it 45 mins in total.

5. You have a database which stores the names of files existing in your system. You should be able to add and remove filenames from this database. Also you'll have to search in the database whether a particular filename exists. Suggest an efficient data structure for this.
Ans: Trie.

6.Given an Array . Exchange elements at odd and even positions.

7. Discuss an efficient scheme on how implement an online ticket booking portal for a theatre
Ans: An important point to discuss, use synchronization algorithms/schemes (semaphores, mutex) to ensure isolation between transactions.

8. Construct a binary search tree from the given data
9. Write code to find the distance between 2 nodes in an binary search tree
10. Find the longest palindrome in a given infinite string (starting index, ending index)
11. Write code in Java to demonstrate how an ecommerce application works with product categories, items and transactions
    a. Design a database for the same
    b. Write few SQL Queries based on the designed schema
    c. Discussion on how REST API calls work on the application
12. Give an algorithm to make contextual search on a novel
13. Given 2 arrays of strings, you can take one string from each array at a time, find total numbers of distinct strings that can be formed which do not exist in the given arrays by concatenation of the chosen strings.

Codenation

1. How does a social networking site like facebook keep track of friendship among users? ie. A user sees posts only from his/her close friends when (s)he logs in. This “degree of friendship” also evolves over time. How is this implemented?

Ans. Weighted graph. Users are nodes and edges denote friendship. Weight of edges denote degree of friendship. This weight changes based on user activities such as profile views, likes, etc.

2. Implement a stack that has 3 operations. Push , Pop and Minimum. Minimum will return the smallest element in the stack. All 3 operations should be done in O(1).

Ans. Push and Pop can be done normally on the stack. To implement Minimum, we use a second stack. The second stack will be maintained such that the topmost element on the second stack will be the equal to the smallest element in the first stack. To implement this, each time an element is pushed to the first stack, if it is <= smallest element, (ie. <= the topmost element in 2nd stack) push it to the second stack. Popping also in similar way..

3. Write code to print all possible well formed parenthesis of n pairs.
4. Brief discussion about projects
5. Write code to implement url shortener.
6. Write code to check whether the given binary tree is a binary search tree
7. Explain Oauth2.0 Authorization scheme. How companies like facebook, github etc. use it?
8. How the facebook credentials can be hacked using the recent security breach? What do you do to rectify it?
9. Is it secure to use account manager in android os for storing credentials to make api/network calls? If not, why?
10. How do you prevent an attacker from accessing the resources if the access token is compromised? How do you secure api calls/ access tokens?
11. What’s Dependency Injection? Give an example of how do you implement it in Java.
12. simple questions about patterns in software design

D.E. Shaw & Co.

1. Same question as in GS(1)
2. Implement queue using 2 stacks link
3. Reverse a string (:P)
4. Insert a node at the beginning of a Doubly Linked List.
5. Given an array of 1s followed by 0s find the number of 1s (Algo better than O(n)).(eg : 111110000 ans:5)

6. Given a linked list and a pointer to a node in the list (you do not know head or any other pointer), how would you delete the given node?(Program)
7. Find middle element and delete middle element in a stack in O(1) time

8. Find common ancestor to any 2 nodes in a BST(Program)
9. How to compute x^y in less than O(n) time? (Program)
10. How to set all the bits of a binary number in O(1) time.
11. What is virtual memory?
12. What is swap and what is the maximum size which can be present as swap?
13. What is degree of multiprogramming?
14. How many processes can exist simultaneously?
15. What is ARP protocol?
16. What are the differences between switch and router?
17. What happens when you enter a URL in the browser?
18. What are cookies? How do they work? Where are they present?
19. What transport layer protocol does http use? The answer is TCP. Which transport layer protocol is used for video streaming? The answer is UDP. Then why does the URL show http when watching a video on youtube?
20. What are subnets? What are the classes in subnets?
21. What are cookies? How do they work? Where are they present?
22. Purchasing a stock and selling it to maximize profit(Program)
23. Some puzzles and questions on probabilities
24. What are the number of requests a server can handle simultaneously?
25. What happens when there are many requests simultaneously and not enough resources?
26. Constructing a tree given Inorder and preorder
27. What are triggers? (DBMS)
28. The rest of the questions were based on projects mentioned in resume (Need to be very clear about everything mentioned in resume)
29.Given two strings whether one is an anagram of the other.

Coupondunia

1.Given that Array in one of the four pattern . Identify the pattern
    a.strictly increasing
    b.strictly Decreasing
    c.strictly increasing and then Strictly Decreasing
    d.strictly Dec and then Strictly Inc
2. Find the Number of Binary array (array containing only 0,1) of Length N such that No 1's are adjacent.
3.Simple Dbms questions
4.Os questions
5. some logical puzzles

Cisco

1. Program to insert a node into an AVL tree
2. Where is a) global variables b)static variables c) dynamically allocated arrays d) statically allocated arrays stored ? (i.e.static area, heap, stack etc)
3. Program to insert a node into a sorted linked list
4. What decides the scope of a variable?

5. int *p,*q,*r;
   p=24;
   q=20;
   r=p-q;
   cout<<r;
   What is the output?
   ANS : 1 (assuming compiler is 32bit,so integer occupies 4 bytes)
6. What are the practical applications of AVL trees and why do we use it
7. IOT : What is IOT and 2 instances of daily life which could have been better if IOT is implemented

SANDVINE

1. Example of companies that use NoSQL databases.
2. Why do we have NoSQL databases ? Why did they evolve out of Relational databases ?
3. static int j=4;
   int i;
   j=++i;
   printf("%d %f", i, j);
   What is the output of the program ? Will it compile correctly.
4. Why do some programs compile correctly in C but not in C++ or vice-versa ?
5. In an NxN matrix of numbers, if all numbers in position <i, j> satisfy the criterion that numbers in position <i,j+1>, <i+1,j> and <i+1,j+1> are always greater than or equal to the number, what is the shortest path with maximum sum weight to reach element <N,N> from <1,1> ?
6. Modification of Q5. Give an algorithm that uses graph data structure to solve the same problem.
7. Write an algorithm that gives minimum of stack elements in O(1).
8. void *p = something
   void *q = something else
   Which of the following statements are valid?
   p = q;
   *p = *q;
9. Suppose you are writing a program in c, and you split the program into multiple files. Now, if you have the same name for a function in more than one file, it will give error. How would you solve this issue if you still have to use the same name?
10. What is the difference between long term scheduler and short term scheduler?
11. What are the conditions for deadlock? How to handle deadlocks?
12. Difference between calloc and malloc.
13. Types of scheduling.How does OS prevent the starvation of the process with the least priority,in the case of priority scheduling?
14. What do you mean by re-entrant code?
15. Write a program to find the number of one's in the binary representation of a decimal.
16. difference between exit(0) and return 0.

17.Expected output of basic linux commands like ls -l.
18.Write a program to detect a loop in a linked list.
19.Given 2 linked lists,write a program to check if the node of any one list,points to any node in the other list.
20.Suppose a database server receives 1000 requests at a time,how would each of these requests be processed?(Ans: somewhere along the lines of multi -threading,scheduling).Why not consider each request as a process rather than a thread?(Ans:advantages of threads over processes.Eg:thread switching is much faster compared to processes.)
21.Can a thread of one program communicate with a thread of another program?
22. Write a program that counts the number of set bits in an integer in efficient way.(Bit manipulations)
23. 25 horses , 5 horses each round, find min number of rounds/matches required to find the fastest 3 horses.
24. ALOHA working
25. 9 identical coins . one is heavier than the rest .find the min number of comparisons on a common balance.
26. TCP vs UDP
27. several practical situations and my approaches in handling them.
28. thread vs process , multi thread communications (shared memory)

Directi
Operations Engineer
Round 1

20 MCQ 30 min mostly based on OS, Networks, linux commands and some aptitude questions

Round 2

1. Write a Programme which listens on a port and has the following functionalities
   when a client sends “set key value“ the server should store those in a data structure
   when the client sends get key it should return the value of the key
2. In the previous programme when ctrl+c is pressed the programme should exit saving the data structure to a file
3. In addition to the “set key value” add another field called ttyl which is in seconds after which the key value should expire

Round 3 & 4

1. what happens when we press google.com in the browser explain the dns resolving (both reccursive and itreative) using diagrams?
2. if a system inside the campus has sent a get request to google.com can some man in the middle can modify the content of it (for example modiy the search query) so that google sends a responce that is not inteded by you. (assume a http connection)?
3. whats a https connection how is it different from http?
4. what is SSL and which layer in the osi model does it fit in?
5. are there any other methods to secure the connection rather than SSL?
6. why does a system has both a mac and ip address?

7. a person goes to network A which uses static ip allocation and is allocated an IP but the system does not get bound to it he goes to network B which has a DHCP server but still he is not able to connect to the network what might be the problem assume that the ip address allocated by the network administrator in case of A is free and there are no rogue DHCP servers in network B
8. can we spoof mac address?
9. how does NAT work?
10. Explain in details all the background steps that take place from the moment you power on a system till you see a gui (including run levels)
11. Explain fork system call and describe the practical uses
12. what happens when we plug in a device to a system
13. why are device drivers not a part of the kernel
14. Explain linux file permissions and the significance of sticky bit and umask
15. does google has a single system that runs the webserver if no what is the ip address pointing to
16. is the ip address pointing to a single load balancer if there are multiple load balancers how will the ip get routed
17. if a system has 8GB memory and a process which is using 6GB of the space forked will the child process run
18. your system is running slow how would you debug it
19. how are multiple websites are hosted on a single system in case of apache
20. difference between process and threads pros and cons of both
21. what is the ipv6 loopback address
22. write a script to change file names in a directory from a.txt,b.txt .. to 1.txt,2.txt
23. what are the different states a process can be?
24. what are different types of checkings in Nagios?
25. what are zombie process and orphan process?
26. assume we have 2 disks in our system.how to detect and resolve disk failures?
27. explain virtual file system.
28. what is the difference between ext2 and ext3 file systems in linux?
29. explain chroot command
30. what does a cpu load of 1.3 mean?

Software Engineer

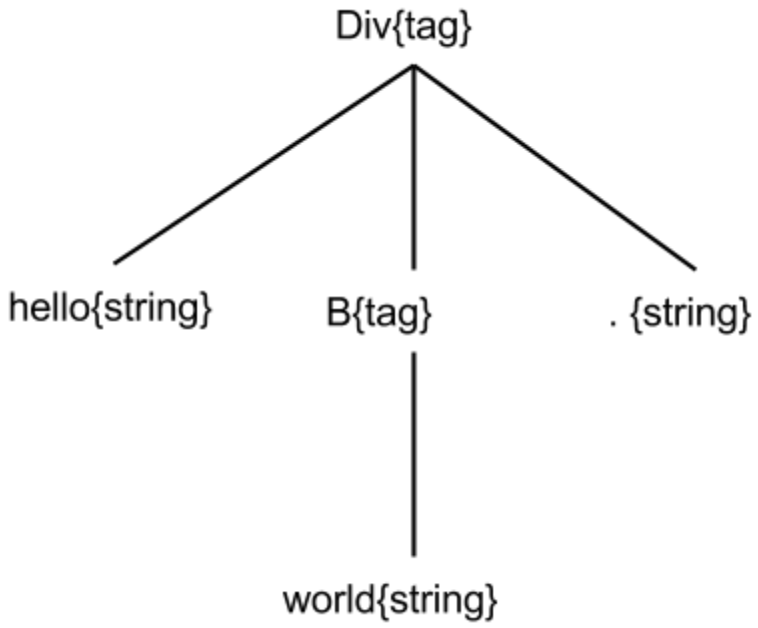
1. i.You are given N locations L1
, L2, ..., LN on a circular route.
At each location Li , you increase your energy by Ei once.
From each location Li , you can reach Li+1(L1 if i is N) by spending Si energy.
You begin the journey at one of the N locations with 0(zero) energy and travel as many locations you can without making you energy negative at any moment.

Find the best start location(s) from where you can travel maximum number of locations.

ii.There are N boxes with w_i weight and M Machines with C_i Capacity(Maximum Load). Each Machine can lift one Box at a time and takes one 1 min to displace one box . All Machines can work simultaneously .Find the Minimum time it takes to Displace all boxes.

iii.{Final Round} Write a program to create a parse tree . Input is Html string .
Ex : hello world .

parse tree



No other questions , only About my intern questions .

1. Given:
    I. Ordered list of coordinates of N gems in a 2D grid.
    II. Coordinates of 2 players.

   Aim: The 2 players should collect all the gems in the given order, covering minimum distance.
2. Find the total set bits in all numbers from 1 to n.

Software Engineer -
https://docs.google.com/document/d/1YsSeR3t-hMnLCroG6Mz-Q7p_gBWoR7vljMptrxkJmFA/edit?usp=sharing

Vizury

1. Given a 2-dimensional plane with length and width .also 2 points (source and destination).Print all paths from source to destination.3 types of moves are allowed.horizontal,vertical and diagonal.
2. Check whether given binary tree is a BST?

3. Write code to Implement LRU caching?
4. Intersection of two unsorted arrays
5. Given two arrays ,first array contains an integer which represent heights of persons and second array contain how many persons in front of him who are greater than him in terms of height and forming a queue. Recreate original queue.

HP(R&D Engineer)

1) Given a linked list representation of 2 numbers (for eg, 1 -> 2 -> 3 -> NULL , for 123), return the list representation of their sum. (Ans: Convert to number, add and then convert to list)
2) What is segmentation?
3) Memory leak. Memory layout of a process.
4) Asked me everything I knew about XoS
5) Reverse a linked list using recursion.
6) On hitting an ISR, where does the kernel store its stack frame? (Hint: Notice that esp does not change)
7) Explain PoC(Proof of Concept). Why do we write PoCs.
8) Process Scheduling Algorithms. Give me an example of where certain algos are used. Why do we need scheduling?
9) Given a 2-D plane full of points, return the line having highest number of points on it.(equation coefficients)
10) Why do we need recursion? What will happen if you run too many recursive calls?
11) Implement sizeof() operator
12) Explain the role of device drivers with respect to firmware.
13) Project based discussion, and discussion on my interests.
14) Pointer based questions, sizeof struct. sizeof a pointer variable = sizeof unsigned int etc.
15) HR was pretty wacky :) , state newton's three laws of motion and where have you applied them, followed by a discussion on co-ed over unisex education

1st round was purely technical, rounds 2, 3 and 4 were a mix of HR and technical and round 5 was purely HR.

another HP experience:

1. why do we use data structures ?
2. a[-1] will give compile time error or not ?
3. where do we use malloc and calloc, and program for using them.
4. polymorphism and overloading, overriding.
5. Why you use stl libraries ?
6. write code for binary search in 30 sec.
7. write code for insert() in binary search tree in 30 sec.
8. what is normalization in dbms and explain all the types you know with examples.
9. where is kernel image stored in Linux.(boot/vmlinuz)
10. why cache memory can not be expanded to main memory size, given we can afford high price of the systems. (hit time will increase)
11. why do we need recursion ? what happens if you run too many recursive calls ?
12. What is memory leak ?

13. what is paging ? why do we need it ?
14. What is virtual memory ? why do we need it ?
15. deadlock conditions ?
16. names of network osi layers
17. In which layer, do we implement security related solutions?
18. what are the stages of compiler ? explain what happens in each of the stage?
19. write all the stages of the compiler for the code of binary search (previously asked me to write), from regex declaration to machine code generation.
20. Which is your area of interest, in current technologies. (I answered cloud computing, so he asked me to tell everything I know about cloud computing)

2nd round was final round for me which was managerial +HR. some questions related to projects, and then HR questions.(newton's laws of motion were asked to me also :P)

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