**List of Problems – Bloomberg**

1. **You have ladder n-steps in height. You can either take one step or two steps up the ladder at a time. How can you find out all the different combinations up the ladder? Then figure out an algorithm that will actually print out all the different ways up the ladder. ie: 1,1,2,1,2,2... etc... (Goldman Sach)**
2. **Given an array, count the number of pairs having sum K.(Goldman Sach).**
3. **Given a vector of integers, check if any two consecutive elements sum is K or not?(Bloomberg)**
4. **Given a vector of strings having chances of duplicate, find out the latest n unique strings? (Bloomberg)**
5. **Given a vector of integers, count number of unique numbers.**
6. **Given a vector of integers, duplicate numbers are allowed, count the frequency of each numbers.**
7. Give an array of 100 random integers. Write an algorithm to find the closest 2 integers (closest by position) in the array that add up to 100.
8. **Given an array of integers, write a method that returns an array of the same size where each index is the product of all integers except itself, ie given array {1,2,3,4} return {24,12,8,6} explicitly {2\*3\*4,1\*3\*4,1\*2\*4,1\*2\*3}.**
9. Giving a char array with only Xs and Ys, do an in-place separation of the Xs and Ys. Example: "XYXXYYYXX" -> "YYYYXXXXX"
10. Write an algorithm to calculate the square root of a number.
11. Given the function: "bool numExists( int array[], int array\_len, int num )" where "array" is a sorted array of integers. Determine if "num" exists in the array.
12. The standard library function of atoi() is not very robust. How would you design/implement a better version of it?
13. Given the root node to a singly linked list, reverse the last 5 nodes in the list. For a list with 5 or less nodes, reverse the whole list.
14. Given the root node to a singly linked list, write an algorithm to detect if there is a loop in the list.
15. Implement a deque. Think about what properties a deque must have. Implement it as a base class that can be extended and as a template. In general, start thinking about what's underneath all the other STL data types and how they work.
16. Given a char pointer to large buffer of memory, write your own version of my\_malloc and my\_free without using any system calls. Make it as robust as possible. How would you minimize memory fragmentation?
17. Implement a Singleton. Everyone knows the "textbook" implementation of the singleton but think of all the different ways you can implement it and what are their pros/cons? Make a thread-safe version.
18. Implement a circular queue.
19. Subset sum problem – Given a set of positive integers s, is there any non empty subset whose sum to s

Ex:- set = {7,3,2,5,8} sum=14 output=yes

1. Partition Problem - Given a set of positive integers, find if it can be divided in two

Subset with equal sum Ex- S={3,1,1,2,2,1} can partition into two partition each having sum 5.

s1={1,1,1,2} , s2={2,3}

1. Move all zeros present in an array to the end.
2. Find the largest element in a BST.(Bloomberg)
3. Find the Kth largest element in a BST.(Bloomberg)

**List of Problems – Synchrone**

1. Find the biggest value of sub-string which was a dynamic programming problem
2. Given two arrays of sorted integers, how would you find the minimum difference in O(n) time
3. Copy a block of memory from source to destination. You need to consider the overlapping cases.
4. Return the index of the largest and second largest number of an given array
5. Return the occurrence of each letter of a given string in alphabetical order
6. If there is a people standing in the middle of a railway and there is a train from a unknown distance coming, there are two stations distanced 300m and 500m in two directions of the railway, he has to decide which direction he should run
7. Best time to buy and sell stock
8. Brain teaser: Two robots, same program make them meet each other without knowing their location and no communication between them. Solve it both in 1d and 2d
9. Two linked list joint together, find the node they first meet, what if there is another list point to one of them, how to find the point which the two lists merge
10. There are two linked list that might merge, find the merged node.
11. Integer to string
12. String to integer
13. If a function returns itself, what will happen if it's called?
14. Find the maximum difference in an unsorted array with the index of max greater than min
15. You're given a binary tree--not necessarily complete or proper--and you need to give each node a "friend" pointer that points to the node to its right in the tree. This node is on the same level but is not necessarily a sibling, which makes the problem a little tricky. The friend pointer of the node farthest to the right on each level should be null. View Answer
16. You're given two arrays of the same size filled with positive integers, and an integer 0 <= N <= 255. You need to determine whether N can be written as the sum of some number from the first array and some number from the second array.
17. C++ template meta programming (that team was into functional programming and compile time computations). Standard, find nth Fibonacci number using recursive templates
18. 1st round: They asked me to select a data structure for storing a dictionary that i have to use for searching words with given letters. It is similar to that of SCRABBLE game.
19. Passing a multi-dimensional array in c89 and other variations.
20. 2nd round: Design a class that takes any length integer (memory is the limit) given as string and implement constructors, addition by operator overloading (as i've told them about my choice of C++).
21. 3rd round: Write a code to find the common letters in two strings. He was more interested in how his input will break my code and how will i overcome it and what will happen at OS level.
22. Implement a queue using stacks
23. Search through an array of integers and find pairs that add to a target View Answer
24. What happens when you assign a string literal to a pointer using strcpy
25. How to remove duplicates from a linked list

**List of Problems – Open System (Bloomberg)**

1. Excel column number - convert excel column number to letter and vice versa. Example column A is 1 and AA is 27 and so on.
2. Is binary tree a BST
3. How is virtual functions implemented under the hood
4. How is c++ STL class map implemented? What about multi map?
5. Print all subsets of a given set
6. Max subsequence of array
7. Change making problem
8. Print all permutations of numbers from 1 to n
9. Reverse linked list - with n without recursion.
10. Given a binary tree, find the right sibling for every node in the tree,
11. Given a system which generates Stock prices to the list of clients. What is the data structure at the client side of keep track of number of changes for each Stock ticker.
12. Implement shared pointers with references.
13. Modified version - what if you do not want to de-allocate memory automatically when the object goes out of scope.
14. Implement LRU cache
15. Given a binary tree, find the right sibling for every node in the tree, (For the rightmost node at any level, the sibling is null, so should not be printed).
16. What is the difference between copy constructor and assignment operator in C++
17. Define encapsulation, inheritance, polymorphism
18. What is the difference between semaphore and mutex
19. What is the difference between inner join and outer join

**PROBLEMS FROM GLASSDOOR**  
  
**JAN 2017**

1. How would you design a trade order matching application?
2. What do you know about Bloomberg?
3. Find min of array that decrease then increase, like [5,4,3,2,1,2,3,4,5]
4. Reverse an int
5. Given a list of numbers and a number S, find all pairs of numbers that sum to S.
6. If YOU are required to program for an indexed resource like excel, how do you implement it?
7. Given array is [0,1,1,0,1,1,1] ; output should be [0,1,1,0,1,2,3] ie., for every non-zero element in array, find its distance to the nearest zero in O(n) time. i would definitely encourage the candidates who read this post to share their solution for this question

**DEC 2016**

1. Given a 2D matrix, print all the elements one diagonal at a time.
2. Given a root of tree where every node can have arbitrary number of children, write a function which would truncate the tree to a given height and return the root. The leaf nodes of the truncated tree should have the sum of all its children as its value. Define your own data structure to represent the tree.
3. How to multiply two integer with out using multiply and division operations
4. Deep copy a linked-list with next pointers and random pointers.
5. Find the floor of the square root of a number without using special, math functions.
6. Design question about web traffic; recording 'hits' and print top-10 most visited websites (both in constant time).
7. Difference between public/protected/private variables in C++.
8. Given an array of real numbers, find the average of all the numbers except the minimum and maximum.

**NOV 2016**

1. Traverse a balanced binary tree and find the greatest sum from one path.
2. Figure out how to maximize profits from a single stock in one week given you can only buy once and sell once.
3. Any other companies that you have applied for?
4. Find whether a tree is balanced and is a BST
5. What brings you to Bloomberg. How did you know Bloomberg.
6. How to prune and correct error nodes in a binary search tree?
7. Describe flaws in your personalities.
8. Check if a string is a palindrome. Scale this up to process faster (was looking for multi-threading concepts)
9. Trim a tree upto a given height and sum all the nodes below to add to the value of the leaf node
10. Write an algorithm to check the correctness of a Sudoku puzzle solution
11. Paint fill with follow-up about detecting intersections of circles, detect the node where two linked lists merge into one, implement topological sort.
12. Marathon Problem
13. Deep Copy a graph
14. Joseph Problem
15. Given a matrix of integers and a starting point, find all adjacent neighbors with same value, and repeat process with each identified neighbor.
16. Data structure for maintaining a leaderboard, allowing updates. Retrieve first k each time
17. Round table with m people, remove nth person each time, find the last person left
18. Implement a Stack that supports a max function

**Fedessa – Questions**

1. MinimumGates.cpp - At an airport you have a timetable for arrivals and departures.

You need to determine the minimum number of gates you\*d need to provide so that all the planes can be placed at a gate as per their schedule.

The arrival and departure times for each plane are presented in two arrays, sorted by arrival time, and you're told the total number of flights for the

day. Assume that no planes remain overnight at the airport; all fly in and back out on the same day. Assume that if a plane departs in the same minute as another plane arrives, the arriving plane takes priority (i.e. you'll still need the gate for the departing plane). Write a function that returns

the minimum number of gates needed for the schedules you're given.

Example: arrQ = {900, 940, 950, 1100,1500,1800} depQ = {910,1200,1120, 1130,1900, 2000} flights = 6

1. Matching pairs - You are given a String, input, comprised of alphabetical letters with varying case.These letters should create pairs with one another, based on case. For example, the letter 'N forms a "matching pair' with the letter 'a', in that order.Rules:1. The first letter must be upper-case.2. Every upper-case letter must be followed by its lower-case version or any upper-case letter.3. When an upper-case letter is followed by its lower-case version, those two letters are considered a "matching pair and can then be disregarded from further match consideration.4. If any of these rules are broken or a lower-case letter is encountered that does not create a "matching pair' with its nearest un-matched left neighbour, that letter and all following letters are considered "un-matched".Output: Your method should return the zero-based index of the last matching lower-case letter, or -1 if no pairs exist.Limits: 0 < input length < 10,000 characters The optimal method has a running time of O(input length).Sample input #1ABbaSample output #1 3
2. Phone Screen (2 hrs):  
   The interviewer called perfectly on time and was extremely nice. After testing the connection of the hackerrank session he asked about my experience which I had prepared and I described the tasks that I had worked on in my internships. Then he asked "Why Bloomberg". Definitely prepare a series of points for that as this is crucial to your interview. After that it was technical. Questions:  
   **- Given a set of arbitrary float numbers in an SQL table select only the ones that are exactly 4 decimal places  
   - Remove arbitrary spaces from a sentence:  
   eg: "The sky is blue " --> "The sky is blue"  
   - Reverse an integer:  
   eg: 3421 --> 1243**  
   I was then contacted within two days to schedule an interview onsite. The HR department is extremely efficient. They scheduled and paid for flights and hotel and they compensate you with a gift card as well.  
     
   Onsite Interview (4 rounds):  
   The onsite interview begins with the tour of the building. Its an amazing office. The tour ends in a room with the first set of interviewers who find you in the group of people and take you to your interview room where you will be for the rest of the day.  
     
   Round 1 (2 hrs):  
   2-on-1 interview. Interviewers are very very helpful. I feel like a struggled at times but they were encouraging and basically test you to your limit.  
   First I was asked in great detail about my internship. Definitely prepare your background from your resume. They are extremely knowledgable and will delve into great details about past projects.  
   The technical question was to **design a stack with O(1) lookup for minimum element in the stack**. They first make you optimize your design till they are satisfied and then you have to write code for push, pop.  
     
   Round 2 (2 hrs):  
   Again 2-on-1 interview. These interviewers were probably the ones who were supposed to be harsh. "Why Bloomberg". Be prepared! Then they asked about database management systems. Why is is better to have that over just creating text files? But he was never satisfied with my answer but I kept trying to resolve his questions without giving up. I think that is crucial. Then I was asked to **design an address book which you can use to:  
   a) Get the the info of a person from the name  
   b) Get the info of a person from a number**  
   Numbers are unique but names are not. They will ask you to heavily optimize your design (most optimal design: use hash tables with key as the the name or number and value as a pointer to the location of info with binary trees to handle collisions)  
     
   At this point I noticed people being escorted out. So basically if you don't pass your first two rounds then they walk you out of the building. If not then you have an HR and managerial interview.  
     
   Round 3 (45 mins):  
   An HR lady will interview you. At this point you've basically passed and they're just checking a personality fit for the job. This interview was mostly just HR related. Finding out status of visa etc. Expected salary? Where else have you applied? Do you have an offer? etc etc. Keep the answers to those to a minimum. Do not mention more than 1 or 2 companies.  
     
   Round 4 (1 hr):  
   Managerial interview was by far the most relaxed interview of all. It was basically just a conversation while delving into details about the past projects. I was also asked why I chose my internship and where I applied AND where I got accepted (that was definitely a little unexpected). We discussed my goals at Bloomberg and also extra curricular activities that I would like to get involved in. When were out of time she thanked me and walked with me till the entrance of the building.  
     
   I was contacted within 3 days of the onsite interview with an offer over the phone. The official offer letter was sent by email a few days later.  
     
   P.S. The interview process took around 40 days for me because I could not make it for the recommended onsite interview date for personal reasons and had to schedule for a later date.Show Less

Q: Find an element k in a 2D linked list

Q.Design a data structure that keeps track of all the URLs visited and can efficiently return the top K most visited URLs. Implement two functions, 1) visit(String url), 2) topK(int k, String url)

**Q.**Design a parking lot

Q. Level wise binary tree traversal

Q. Merge k sorted linked lists/arrays