ABOUT BLOOMBERG PRODUCTS

Here is some stuff about Bloomberg Products. Since yours is only phone interview, you could just read up about "Bloomberg Terminal" and watch may be 10-12 minutes of the video. When you go for on-site (which I hope you do), you can read up the other stuff.

Bloomberg’s main product is Bloomberg Terminal. What is it?

* 1 hour long video -<https://www.youtube.com/watch?v=LE8HiHZcgEE>
* Wikipedia page -<https://en.wikipedia.org/wiki/Bloomberg_Terminal>

Over the years, Bloomberg has created add-on products geared towards specific type of financial institutions. Some of these are:

**MARS (read this only if you are interviewing with MARS)**

* I couldnt find much except page 2 on <http://www.bbhub.io/assets/sites/2/2013/02/Credit_Risk_Fact_Sheet.pdf>

**PORT (read this only if you are interviewing with PORT)**

* <http://www.bbhub.io/professional/sites/4/Portfolio_and_Risk_Analytics_Brochure4.pdf>
* <http://www.bbhub.io/professional/sites/4/609303600_HF_Port_BCH_DIG.pdf>

**Trading Solutions (read this only if you are interviewing with Trading Solutions)**

* **Overview**
  + <http://www.bloomberg.com/trading-solutions/content/uploads/sites/3/2013/09/TS-Overview.pdf>
* **SSEOMS**
  + <https://www.diliger.com/system/media_documents/documents/190/884/768/original/207464070.pdf?1467059178>
* **AIM**
  + <https://data.bloomberglp.com/solutions/sites/3/2013/09/AIM-brochure1.pdf>
* **TOMS**
  + <https://data.bloomberglp.com/solutions/sites/3/2013/09/TOMS_Brochure.pdf>

SOME INTERESTING QUESTIONS TO ASK  
  
**CAREER**

* What career path is available for me? What are the different levels? And how does the progression happen?
* How big are the teams? Does each person work on one project at a time or do multiple people work on multiple projects together
* What kind of career growth opportunities are available?
* Do we interact directly with customers or does that happen via an intermediary like product managers.
* What are two things you like the most about your job
* What are two things that you dont like about your job
* When you joined Bloomberg, why did you choose Bloomberg over other job opportunities you had at that time

**PRODUCTS**

* You store portfolio data for hedge funds. What kind of design and security measures are taken to make sure you dont end up showing one clients data to another one?
* What do you work on? Can you tell me more about what's the biggest technical challenge you face in what you do?

QUICKLY BRUSH UP C++  
  
you can just walk through this one to quickly brush up your C++  
<http://www.cplusplus.com/doc/tutorial/>

SET 1 of TECHNICAL QUESTIONS

* Excel column number - convert excel column number to letter and vice versa. Example column A is 1 and AA is 27 and so on.
* Is binary tree a BST
* How is virtual functions implemented under the hood
* How is c++ STL class map implemented? What about multi map?
* Print all subsets of a given set
* Max subsequence of array
* Change making problem
* Print all permutations of numbers from 1 to n
* Reverse linked list - with n without recursion.
* Given a binary tree, find the right sibling for every node in the tree,
* 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.
* Implement shared pointers with references.
  + Modified version - what if you do not want to de-allocate memory automatically when the object goes out of scope.
* Implement LRU cache
* 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).
* What is the difference between copy constructor and assignment operator in C++
* Define encapsulation, inheritance, polymorphism
* What is the difference between semaphore and mutex
* What is the difference between inner join and outer join

SET 2 of TECHNICAL QUESTIONS (COLLECTED FROM GLASSDOOR & CAREER CUP WEBSITES)

**PROBLEMS FROM CAREER CUP**

* Given points on a plane like (0,0), (1,0), (0,1), (1,1), (0,2), (2,2), (1,2). How many rectangles can be formed ?
* I was asked to design a stock ticker system. Stock ticker is simply the shortened name of company and its current stock size. e.g. for Apple - "AAPL" -->; "115". Design a data structure to store incoming stream of stock tickers. Stream can contain same company more than once but all the values of it had to be stored. I used HashMap<String, List<Integer>>;. Then he was adding more functionalities to system I don't exactly remember the questions now but one of them was related to calculating some ratio in constant time. Some of the questions were challenging.
* Given a set find its power set. (This question is from CTCI) Interviewer then discussed the complexity of my solution. He asked me to explain him how the complexity is 2^n? As per my solution, I was iterating over an arraylist which contained the set elements so the size of list was getting doubled in every iteration. Hence the complexity (2^0 + 2^1 + 2^2 +.....+2^n-1 = 2^n)
* Given a string, add some characters to the from of it so that it becomes a palindrome. E.g.1) If input is "abc" then "bcabc" should be returned. 2) input ---> "ab" output ---> "bab" 3) input ---> "a" output ---> "a"
* You are given a binary tree. Each node in the tree is a house and the value of node is the cash present in the house. A thief can rob houses in alternate levels only. If thief decides to rob house at level 0 then he can rob houses in levels 2,4,6... or he can rob houses in levels 1,3,5,7...Find out the maximum possible amount thief can rob.
* Given an unsorted integer array, place all zeros to the end of the array without changing the sequence of non-zero elements. (i.e. [1,3,0,8,12, 0, 4, 0,7] --> [1,3,8,12,4,7,0,0,0])
* Implement a tick server the has multiple clients interested in different tickers. Clients have Plotters that are updated in real-time with the top 10 tickers that have the most price updates on the top. What data structure would you choose for the server and client plotters?
* Given a string find biggest palindrome substring. For example for given string "AABCDCBA" output should be "ABCDCBA" and for given string "DEFABCBAYT" output should be "ABCBA"
* THERE ARE SEVERAL LOG FILES COMING BY DATE WITH PRODUCT IDS AND I NEED TO REPORT THE TOP 10 (PRODUCT IDS) DURING A MOVING PERIOD OF 1 MONTH. DISCUSSED ABOUT THE DATA STRUCTURES NEEDED TO IMPLEMENT THE SOLUTION.
* ASSUME YOU HAVE A LARGE FILE WITH LINES OF TIMESTAMPS AND IP ADDRESSES . TIMESTAMPS ARE ORDERED, BUT MAY REPEAT AND MAY SKIP. HOW DO YOU DETERMINE WHETHER <br />THERE IS A TIME WINDOW THAT HAS A CERTAIN IP ADDRESS APPEARING MORE THAN K TIMES? HOW WOULD YOU SOLVE THIS IF INSTEAD YOU RECEIVED A STREAM.
* A client wants to build a software phone book that contains everyone in the world (7 billion people). Every person has only the first name and the name is unique. What data structure would you use to store the data?
* You have a function f1() that generates 0 or 1 with the equal probability. Write a function f29() that generates a number between 0 and 29 with equal probability.

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

* How would you design a trade order matching application?
* What do you know about Bloomberg?
* Find min of array that decrease then increase, like [5,4,3,2,1,2,3,4,5]
* Reverse an int
* Given a list of numbers and a number S, find all pairs of numbers that sum to S.
* If YOU are required to program for an indexed resource like excel, how do you implement it?
* 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**

* Given a 2D matrix, print all the elements one diagonal at a time.
* 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.
* How to multiply two integer with out using multiply and division operations
* Deep copy a linked-list with next pointers and random pointers.
* Find the floor of the square root of a number without using special, math functions.
* Design question about web traffic; recording 'hits' and print top-10 most visited websites (both in constant time).
* Difference between public/protected/private variables in C++.
* Given an array of real numbers, find the average of all the numbers except the minimum and maximum.

**NOV 2016**

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

1. 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. **nterview Questions**

**Q.**Design a parking lot

Q.Level wise binary tree traversal

Q. Merge k sorted linked lists/arrays