

Microsoft Pre Placement Interview(PPI) 2009-2013

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Hi guys,

I'm sharing my microsoft interview experience in this doc. Hope it will help you gain a visual idea of what is expected out of an interview and how to approach it. Am also adding my kind suggestions then and there which will help you in any of your interviews. I had an awesome experience in microsoft. It is a workplace which can't get more comfortable. I used to go to office at my convenience, usually at morning sorry noon 1.30pm or 2pm and return at around 3am to 5am. There is lots more stuffs about this internship, fine lets go to interview.

Based on the performance in the intern project, team manager gave me recommendation to interview. I had strong recommendation from my mentor as I did my project well. Manager recommendation and review on your performance is something which is very much important factor for getting hired. I had 3 rounds of interview, Initial two rounds will decide whether you'll get final 3rd round or not. At each round the interviewer will specify HIRE or NO HIRE and pass on the feedback and follow up regarding what skills of the candidate are tested and which skills need to be tested in future rounds.

Round 1

Interview started with a chat on my projects done at college, then about my intern project at microsoft. Then he asked me whether I have done any projects applying any data structures. Be careful with these kinda questions, if you tell a project which you really have not done properly or got from snr better don't talk about it. I played safe and said like I've done some mini projects that are part of our course but they are more like assignments. Interviewer said fine and started with his questions. He started his questions and increased the difficulty gradually. Some of the questions were like. "What is a BST?" I told some definitions, then about its importance. Then he asked me how do i check if a binary tree is a BST? I said my approach and algo. Next question was how do you delete a node from a BST? It was fairly simple but I thought through and gave my approach to the interviewer. I kept the interviewer in track along with my thinking progress. This is something that is very important when you attend any technical interview. Then I wrote code for this. He then gave me some test cases and I walked him through my code for those cases. He was fine with the solution. He asked me if can think of some other solution to check if binary tree is BST, (previously i gave min-max solution) He didnt want me to use recursion this time,since I used recursion in every single code i wrote so far. I enquired if I can use extra space and all. Again here, Asking right set of questions to the interviewer is very essential. They sometimes purposely ask vague questions to check if you ask questions and verify the ambiguity. It is one of the things they test the candidates. So always ask questions when something is unclear and don't make your own assumptions without confirming with the interviewer. He was fine with using extra space as he just wanted me to come out with a non recursive code for it. I told like I can do inorder traversal and check if the array is sorted. Interviewer's next question was how will you do inorder traversal, I gave a smile and said recursion again :P :P He asked me to do inorder traversal without recursion. He didn't want me to write working code but just give my algo and explain it. I implemented my stack and wrote code to do inorder traversal. (There is a better solution called morris traversal which modifies the tree to traverse it and then recreates the tree. But no interviewer will ask you do such things unless its very very trivial, The motto of the interview is to test your capability not your knowledge, so its not needed to learn such complex algo, just be strong with the basics and think clean). Also he asked me to write some modules which i wrote with recursion in my code for deletion with loops. Then, Interviewer was fine and gave me next question, Given a value N write a function that will print all valid paranthesis.

For eg.

i/p: N = 2

o/p:

(())

()()

It is not a very simple question when you see it first time. But it doesn't matter if you see a question for the first time in your interview. Don't ever panic. Think out loud and try to solve it, interviewer will correct if you go off track. Never give up trying, it'll create a bad impact on you. I approached the question drawing recursion tree. He was fine with my recursion tree for N=2. He asked me to apply the same on recursion tree for N=3. I took some time to draw the entire tree. I missed one valid parantheses but i kept it more like a convo asking the interviewer like did i miss any? Then finally the recursive tree was in place. Interviewer was happy with my approach. He said it's perfect and said now can you convert this logic into code. He said he wants perfect working code. I took some time and wrote working code, It had a small bug he gave me some hints to validate my recursion and asked me to mail working code to him. Interview one was over, He gave feedback as my algo solving skill is sound and my follow up for successive rounds will be to conc more on converting my algo's into code, with that said my round 1 was over.

I was informed by the HR that I've cleared round1 and my 2nd round will be scheduled next day.

Round 2

This time my interviewer was a Principle SDE. My interview was scheduled at 10am but he came bit late. I called him to remind about my interview, he said he's in traffic will come by soon. Came around 10.30am then we moved to conference room for interview.

Interviewer started the convo asking about my intern project and my experience with microsoft. Then he told me that he has got 2 questions for me in this round, one is logic question and one coding question(As per my follow up of previous interview)

1. Given a full binary tree of height H (all nodes will have two children except the child) give me expression for number of nodes in the binary tree.

I thought for a while with some scribbling told him the answer is $N = 2^h - 1$. He said my answer is right and asked me how i arrived at it. I said since its full binary tree each level will have

2^i number of nodes, where i is the depth. So it forms a G.P. $2^0 + 2^1 + 2^2 + \dots + 2^h$. Sum of a G.P is $S_n = a(r^n - 1)/(r - 1)$

here $a = 1$, $r = 2$, $n = h$

so Sum of nodes = $1(2^h - 1)/(1)$

The interviewer agreed with my solution and asked me if suppose this comes for a 10mark question in ma Algorithms semester exam how much mark will this proof fetch. I said may be i can try using induction then and checked if he's fine with it. I was not happy bcoz i'm not a big fan of induction proof, just decided to try out. Gave my basis, induction and tried to prove my expression, but didnt do it well. Scrolled a paper and retried again. Interviewer wanted me to just have clarity in giving solution using induction. (perhaps thats what he expected) He said my solution lacks clarity and felt logic may break somewhere. He then told the straightforward idea to do it with induction, when he started I remembered what i read somewhere in my CLRS.

2. This was a pure coding question. Given a string with ascii characters, compress the string such that the length of the string doesn't increase.

For eg:

i/p: aaaaaabbbc

o/p: a6b2c1

This question is simple in terms of logic but when writing code bug free code can be tricky.

like if you get

i/p : abc

o/p: abc and not a1b1c1 (since the size of string should not increase)

also in case like

i/p : aaaaaaaaaa(100times)bbc

o/p: a100b2c1 (Easy assumption to make is cnt less than 10)

Here the count conversion from int to char and then appending to o/p needs to be done.

I wrote code with logic explained. Checking ith element with i-1th element in the string so the check for last element will happen out of the loop. I wrote code and showed to the interviewer, He asked me why have you written duplicated code to check the boundary cond outside the loop. I said it can be avoided with minor change and i did so to avoid mistakes. Then he asked me how do I convert cnt into string and assign. He asked "you have to call the functions many times is it good practice?". I din have proper answer for these questions. I got impression that I'm pissed.

He asked me one more small question saying this will be my last quest.

3. How many palindromes are there with length 5. (quite simple i gave ans in few secs)

I was very upset with my round 2, it didn't go as good as my round 1 where I was never stuck up on anything. I was sure that I'll get NO HIRE from this interviewer based on his replies to my answers. He was never happy with my answer.

Had chat with my friends(other interns who were waiting for me to come after interview). Told them Interview is gone and said my questions, they tried to convince me not so but i was strong on my statement. Then they asked me to ask HR guy about the feedback of interview. I said will ask after an hour and went to my cubicle bit desperate. Then after an hour asked HR guy about my interview feedback. The reply was "You have cleared both rounds, will schedule aa(As Appropriate) round and let you know ". I was in big surprise. You can never predict how you did in an interview, its all relative. So try not to predict how you performed in an interview as you can never get it right. (There are cases where you feel you did well but still you get NO HIRE).

Final round

It was with the director and partner of Azure team of microsoft. He asked questions of what I did in ma internship and what is its impact. I explained. He went asking in depth details of my project as if he doesnt know it (or he really dunno those as i worked in a different team). He made it sure whether I am knowing what I did and why i did. He also asked more project specific questions which I answered clearly since I had good understanding of the internals. Then he gave me a the question. I was asked to design data structure

for the scramble game. I don't even know what is a scramble. Whenever you get a question you never even heard of don't panic. Its never a problem, interviewer will help you tell what it is. (Its never a knowledge test as i already told). He told me the game rules and asked me what is the complexity with which I can solve that given n letters.
Lemme tell you the rules,

- you'll be given n letters and a dictionary
- you need to return a meaningful dictionary word using those n letters in any order.

I thought for a while and understood the problem then said complexity will be $O(n!)$ since i'd generate all possible words using those n letters and check if it is there in dictionary. He said fine and asked can you do better? It was so vague question. I was thinking of it for a while and then he gave me a hint as don't worry about the space can you improve the time complexity. Then I thought for a while and gave a $O(n)$ solution to create a hash with the sorted letters and pre-processes to build all meaningful words for all possible characters and all possible lengths and do $O(1)$ look up. He was asking me how will I implement that pre-process data structure I gave approach with TRIE with nodes having sorted words as path to leaves and leaves having all valid words that can be generated with those letters. Suppose I don't have words in particular sorted word set it means it has no valid dictionary word. He asked me to tell complexity of this soln. And we had some discussion about whether to use a hash or a trie and I was telling the tradeoff in each approach.

Then interviewer told where I messed up initially, I was thinking my soln in and around dictionary implemented using TRIE. Then interviewer asked me if i have any question for him. I really didnt have any questions and so said nothing. Then he asked me about my college projects and added that he didnt have detailed look of those from my resume. I explained about my project in cloud computing, current CTDT project(He gave his views on my project and I was able to understand that he's a pioneer in this area based on his argument) Then I asked my personal questions related to analytics and BigData to him, asked why cant we build a search engine that can perform query on these social data like data from facebook and twitter and provide more meaningful search. He then explained me why cant and reasons. He was truly a geek, I was getting all my doubts cleared from him. He then asked me about my final year project. I said am looking for some research topics and asked him for some suggestions and areas which i can work on. He was willing to help me asked me to send him a mail. Always try to have a technical talk with your interviewer if you find him the relevant guy. Not all will encourage such talk when they take bulk interview, but realize the fact that those ppl who interview you are great ppl and you have got a chance to get your unanswered queries answered. Not only that, it also helps you show case your interest and passion for technology to the interviewer, that is really a big plus. So don't hesitate to talk about your projects in which you have really worked (on the other hand talking about projects which you never worked or haven't worked properly may get you into trouble as interviewer can figure out you are not knowing it in depth.)

After 2 days wait, I was informed that I'm hired today :)

Cheers,
Vicky.