

IPRO Report

Company Name: AlgoPi

Team Members

Member	Role	Email
Sofia Yang	Project Coordinator	syang78@hawk.iit.edu
Zuhuang Wang	Weekly Discord Content Creator, Admin	zwang235@hawk.iit.edu
Chris Hunter	Admin, Substack Content Creator	chunter3@hawk.iit.edu
Zain Farhat	Member	zfarhat@hawk.iit.edu

Problem Statement

How can we help computer science (CS) students at IIT strengthen their problem-solving skills and communication skills to get their first career position as a software engineer?

The problem

Many CS students struggle with finding an entry-level position as a software engineer after they graduate, and feel that they are lacking the skills to succeed at their career. These students would like to find opportunities to strengthen the necessary problem-solving and communication skills so that they are well prepared to find and excel at their first post-graduate position as a software engineer.

Our target customer

CS fourth year undergraduate students at IIT seeking a full-time early-career position as a software engineer after graduation.

Evaluation criteria

Evaluation criteria for our success at solving the problem will be determined by the amount of time between a student's graduation and gaining their first career position as a software engineer.

Part 1: People

The experiment began by finding a sample of 20 CS and ITM (information technology management) undergraduate third and fourth year students at IIT, as well as some industry professionals. The channels of communication were the AlgoPi community Discord [server](#) and various other IIT CS student organization Discord servers.

Part 2: Procedure

The team interviewed each student through a brief 15 to 20 minute chat, either through private messages on Discord or in-person. The students were asked about their previous experiences with applying for software engineering positions, and which aspects they struggled with or found the most difficult. Then the students were asked about how they prepared or attempted to handle those difficult aspects of job seeking and interviews and the results of those attempts. After that, the team asked students what advice they would give to other students going through the same experience. The students in the AlgoPi Discord server were asked if the current content provided was useful, and if there were any suggestions or feedback on the content. The team also had conversations with a few industry professionals, who were asked about their experience on gaining their first position as a software engineer and their advice for students. The industry professionals were also asked what they found most important when viewing a job application and interviewing students.

Part 3: Results

To measure our demand, we analyzed all of the interview feedback, and based on the result we found that about 80% of the interviewees mentioned that communication skills are the most important or most lacking aspect in terms of getting a job in the relative field. In this case, we have been practicing to strengthen our community members' communication skills by having them not only work through our weekly coding problem, but also have to be able to explain it to the rest of the group members, their thought process and also prepare to have questions asked by other members. So right now we think that we are on the right track with our focus, even beyond this we have this mock interview idea on the road, to have our community members be more prepared in this way. In addition, we will keep following our community members to make sure that they are satisfied with our progress.

1. Lots of students struggle with interviews, due to not being prepared enough/not having enough skills.
2. Researching and preparation is critical
 - Learning about details of the company
 - Learning the position skill set requirements
 - Review/prepare for 'soft' problems
3. Communication is one of the most important aspects of interviews.
 - Especially in technical interviews, analyzing and explaining a thought process is critical.
 - Communication includes readable code - A performance-wise suboptimal 'explainable' answer is better than an optimal solution that the interviewee cannot explain.
 - Certain companies place higher emphasis on problem solving and communication skills over actual experience, especially with early career positions.
4. Problem Analysis in Technical Screenings
 - Often, interviewees will be given smaller subtasks, which then have added scenarios / higher time complexity requirements.
 - Keeping track of the components needed to solve a problem, and adapting to added scenarios is crucial.

- This is very difficult for lots of students who can implement a suboptimal solution, but cannot optimize/create improvements on it..

5. Miscellaneous Insights

- Working with code in industry is different from working with code in a school setting. The fundamentals learned in a school setting do not completely align with workplace requirements/expectations.
- The software development lifecycle is not widely taught at IIT (even in classes like CS487 and CS587), which may cause students to struggle in their career after they graduate.

It is not until we have members of our community finding jobs and reflecting on their interview experience and how we helped them nail it that we will see the value of our community. This process takes time and since we are working with students that work on a fixed schedule and are most likely graduating next Spring. It is until next Summer that we will be able to gather even more data, this time more relevant to our purpose and able to change our direction. These people can give us advice on what we could have done better and what helped and what didn't. Feedback is necessary and some feedback is better than others. This is something we should do in the meantime. We need to start approaching members of our community and see who has an interview coming up. We approach the person and ask if we can track their progress and take a look at their results. With this experiment we learn what we need to fix in our approach and how to become better. A larger number of participants is necessary to gather feedback and improve our solutions. More experiments need to be run and it is until we have a reputation for getting software engineers in the industry that we will be successful in our mission.

Competition

Currently, we want to prioritize IIT students as our primary customer base. Our discussions with community members have revealed several ways they have attempted to solve

the problem we've outlined. For instance, a large number of members have reported using services like LeetCode to hone several programming-related skills (e.g., data structures, algorithms, problem-solving, etc.). This service is also one we've identified as being among our most notable competitors. Admittedly, services like LeetCode are excellent resources for technical interview preparation or refreshing your knowledge. However, these services don't provide customers with much industry insight or skill sets most companies desire from potential candidates. In other words, these services focus too much on the short term aspects of procuring employment while sidelining the long term aspects. In terms of solutions available on campus there's Scarlet Data Studio (SDS), a program to help underrepresented IIT students gain experience in the field of software engineering. It functions like most 10 to 12 week internships during the Summer where interns work alongside mentors on a given project. However, SDS is an opportunity and not a solution. The program favors underrepresented students and isn't able to accept or accommodate all IIT students seeking an internship.

Interviewee Quotes and Responses

- “Well, in my experience, working with code in the industry is different than working with code in a school setting. There are a variety of different paradigms that are used that generally aren't covered in courses at IIT. Furthermore, the importance of the software development life cycle is not widely taught in the IIT CS curriculum (even in classes like CS487), which I feel leaves students somewhat ill-prepared for what is eventually to come.”



krystianpl26 10/07/2022

I actually agree with this despite it being my first year at IIT. There's definitely a difference between what we learn in school and reality and I think it's especially important to be exposed to internships early on.



skara 10/07/2022

Final thoughts:

1. Not everyone in college is going into industry. Some are going into academia, and curriculum should be the greatest common factor of what is useful.
2. Teams use different practices because of different constraints (industry, product, timelines, etc.). It's practically impossible to teach a version that would be useful for everyone, and sometimes knowing one way to do things that work for certain circumstances can be more harmful than not knowing anything.

Who are you?

Person 1: Anonymous 1,

Senior year, Finishing up his bachelor's and master's, has received work offers from Atlassian.

Person 2: Anonymous 2,

Senior year, Doing his bioinformatic and master in computer science, has received work offers. Amazon as Software Engineer

If you could go back in time, what you could wish to be at your disposal?

Person 1: More structured interview Prep, more exposure to recruiters, more direct path to the material.. that I'm learning.

Person 2: Want to know the optimal application time for the career; it is Important stuff. Doing a leetcode and getting hands-on experience on the actual project would help tremendously. A few of the projects I have done helped me to feel confident to take the interview.

What is the key to your success?

Person 1: Hard Work, Perseverance, and Having a determined goal in mind.

Person 2: Good Resume, additional research, and make sure your resume is friendly to the parser; important to understand the application problems and understanding the process of applying for a job.

What skills are most important in getting the job you have?

Person 1: Critical thinking, Communication, Cooperation.

Person 2: Communicating technical topics, it yourself mindset, self-independent

Since you are in our community, what do you think we can improve to help community member to get a job after graduation?

Person 1: I would like to get people to engage to participate in leetcode and be more adaptive to answering behavioral questions and social questions.

Person 2: Mock interview, Profession workshop, collaboration with ACM.