



Centre for Innovation (CFI)

Indian Institute of Technology Madras

Application for the post of Programming Club Coordinator, Centre for Innovation (CFI), 2019-2020

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Questionnaire

1. What is your motivation to become a coordinator for the respective Club? Mention your strengths and previous experience as well.

I started coding from my class 10 and realised I was so passionate about it from the very first time I started coding. In my class 11, I cleared ZIO and ZCO and attempted INOI. In class 12, knowing I had to prepare for various entrance exams I did not want to write INOI as I felt I would get carried away by it. But still the zeal inside me forced me to do and learn something new. So I, apart from doing a hotel management computer science project for class 12, did another project which was an interpreter for my own language. I designed my own language and syntax, implemented strings, arrays and decimal data types and variables, loops (for type and while type), ladder if-like condition checking, and extended expression evaluation to evaluate both infix and postfix expressions using shunting yard algorithm. I also designed a basic code editor for executing programs written in my language which I named "Brackets". I received the best project in Computer Science Award for the project.

Then after entering college, I got into competitive programming completely. I completed two courses - Programming, Data structures and algorithms using Python and Design and Analysis of algorithms course on NPTEL and I am among top 1% scorers in both. I am now practicing competitive coding on codeforces (1433 rating) and codechef (1919 rating) and trying to improve my CP skills gradually. I also learnt some basic stuff about GIT in my winter vacations, and doing a course on Machine Learning online. I feel programming club will be the most suited club for me to quench my passion and love towards coding, and I also believe clubs are also the best way to learn and improve on a particular field, and to put our present skills into good use. My major strengths are being open-minded and enthusiastic to learn new stuff, love coding anytime, anywhere and my willingness to work hard.

2. What do you think will be your role as a club coordinator in the coming year?

As a club coordinator, I believe I have to be responsible for conducting the club's discussion and teaching sessions ; Conduct the TechSoc Programming Contest, framing questions and test cases, and getting the online platform (like codechef) ready to host the contests ; Conduct other fun sessions or programming contests ; Take sessions in Summer school if organised ; Monitor the club's projects and organise the CFI's Open House.

3. Mention all the activities of the Club in year 2018-19 and your views on them. What changes would you like to bring in them?

In the year 2018-19, about 7 sessions had been conducted by the club apart from the orientation and fundae sessions :

1. Intro to C++
2. Intro to STL
3. Intro to Python Programming
4. Number Theory and Intro to CP
5. Dynamic Programming
6. Basics of Graph Theory
7. BIT and Segment trees

These sessions put together cover most of the ideas, concepts, DS and algorithms needed to getting started and even going on to master CP. The group created on codeforces, and the materials and practice problems being posted on it was of even greater help.

There was also a TechSoc Programming Contest held on Codechef, which was conducted smoothly and the questions of increasing difficulty were good.

The club members also easily approachable in case of doubts and queries.

One thing which I thought could be done is to conduct more fun CP contests among students of the same year (or hostel) which might be even more competitive considering students of the same year might be of almost same level, or there can be also contests after a set of sessions based on what is taught in those sessions so that we get familiarised with the usage of those DS and algo, and also get to know where we need to improve.

4. What are your views on the type and number of projects that the Club is handling right now? Describe some areas of interest that you think the club should explore next year. Discuss on the feasibility of projects and potential applications in these areas.

The programming club is, I feel already handling a variety of projects under domains from AI, natural language processing to Parallel Programming (N-body simulation under gravitational field). And on an average it takes up 4-5 projects per year and completes 2-3 of them. The number of completed projects is just perfect considering the time constraints of students, other activities that the club undertakes and difficulty level of each project. But the number of projects proposed can also be made less ambitious and more planning can go into finalising them so that the project proposed to those completed conversion rate becomes high.

Some areas on which focus can be increased are security, building libraries for specific programming languages for specific purposes, a new programming language aimed mainly at a particular need, servers, etc.

We all know how important libraries have become, with growing technologies and code. Though it's just as simple as a pre-written code, the need for short, concise code which need to be done faster especially for specific domains like machine learning, etc. has become growingly important.

Security is one such domain where as solutions become higher, problems become higher and because of that it constantly under evolution. The projects in this can range from a simple encryption-decryption to a sandbox. A sandbox can be used to isolate execution of malicious files thereby preventing any damage to the PC.

5. Explain all the managerial teams in CFI and your interaction with them while working as a coordinator for the respective club that you're applying for.

There are four main Managerial teams in CFI :

1. Project Management - Takes care of project monitoring, inventory resource management, and financing which include things like budgeting, and reimbursement of bills.
We discuss with them for initiating projects, conducting events like TechSoc and other sessions, collaborating with E-Cell, Shaastra, IAR and for organising the CFI Open House.
 2. Branding and Engagement - They help us in branding and working out strategies for publicising our events and projects, increasing alumni interactions and student engagement, gathering feedback, and in design and content curation for social media, blogs and websites.
 3. Sponsorship - They search, select, interact, and shortlist sponsors from outside. They draft the sponsorship brochure, and decide the extent to which the project can be taken to and the possible deliverables.
 4. Product Design - They identify a product's capabilities, propose a proper design and manufacturing process keeping in mind it's usefulness to the users, and make it look appealing as well.
6. Make a brief pitch for your respective club describing all activities OR Make a brief outline for a session that the club can conduct.

Programming club conducts sessions to improve the coding culture in the institute, does interesting projects and showcases the same in CFI Open House.

One new session which the Programming Club can conduct is a Hackathon kind of thing where students can be given some 12 hrs to solve a problem statement, develop a simulation model, or even develop a game using a set of rules. There are a lot of takeaways from such hackathons, some of which include creativity, good command over the programming language, knowledge of the libraries, advanced data structures and algorithms.

Also there can be a CP contest after every few set of sessions based on those sessions which will expose the student's weakness and strengths to him/her self, and also in the process get him exposed to different kinds of problems one can expect from those topics, so that one of the tough skills in CP which is identifying the Data Structure or algorithm suitable for solving a problem also occurs to them quite naturally.

7. **(Club-specific question)** What shortcomings do you see in the present coding culture of the institute and what steps do you feel could be taken to improve it?

One major factor deteriorating the present coding culture is lack of confidence. Some people may not be aware that one cannot master cp in a short span as they can do for other skills probably. So they tend to believe that they are not good enough for doing competitive coding and leave it after a series of failures. I believe that people also need to be told the journey behind successful people in the field, their failures, how they overcame them, what they did to attain success. Also I think there can be many fun intra-college, or inter-hostel coding contests that can increase the enthusiasm and urge to code among students, thereby improving coding culture. Also there can be some events or workshop kind of thing where students get to do mini projects or solve a set of problems as a group, etc. which will also increase the participation and exposure of students towards the club.

8. **(Club-specific question)** What shortcomings do you see in the current Project Structure and issues over the last year and what steps need to be taken to overcome these problems.

Other clubs have coordinators managing the projects. For programming club, it is quite different. The projects are a part of the club and isolating the coordinators from it may not be a good idea. I, instead think, coordinators must also be involved in the projects as they propose the projects, and they might have spent time to learn the underlying concept and design the problem statement. So their inputs might constructively add to the project team's implementation. Besides the coordinators also get to learn new stuff, and their takeaways increase. The decision of being involved in the project can also remain to be dependent on the coordinator's decision as it's being done now.

Major issue with the Project structure last year was though five projects were proposed only two were completed and made it CFI Open House. This can be overcome by planning in advance how much time and resource each project takes, number of people to be involved, fixing deadlines and taking into consideration time and resource constraints. So these can ensure that a precise number of projects are proposed and they all get to be completed and displayed at CFI Open House, increasing the efficiency of the club.

9. **(Bonus)** Ideate on a project relevant to the Club and state the abstract, learning outcome and feasibility of the project.

One project I thought about is developing a web-crawler or a search engine that can be used to search for any information regarding IIT Madras. We can optimise it's storage, space and time complexity and link all web pages, blogs, news, social media, etc. about IITM to search about anything related to it. The project does not handle all websites, social media that exist over the internet, as this is just an "IITM search engine" thus we do not have large datasets to handle, making the project feasible. At the same time, we get to learn about search engine algorithms similar to the ones Google uses, a bit of web development, databases and optimisation methods.

An other project that came to my mind is a Spoiler - Blocker which can be added as an extension to Chrome Browser (This project, however is more related to web development). If certain TV shows and/or movies are added, it must filter out any spoiler or revealing information related to it. This might also require some machine learning to categorise a given information as a spoiler related to it or not. It must not however block information which are related to the selected topics but aren't spoilers. The project doesn't demand anything big in terms of resources and money and is feasible, but yet is an useful extension. Some major takeaways from it are gaining knowledge of certain topics of artificial intelligence and machine learning algorithms, and some web development (HTML, CSS, Javascript, Angular and JQuery).