Competitive Programming Institute of Engineering and Technology (IET) Summer Mentorship Program

By Prateek Sahu(17CO130)

Acknowledgement

The mentorship opportunity I had with IET was a great chance for learning and professional development. Therefore, I consider myself a very lucky person. I am also grateful for having a chance of talking to hardworking seniors who led me through this mentorship.

I am using this opportunity to express my gratitude and special thanks to Naveen Kumar and Abhishek Kamal who inspite of being busy with thier schedule, took time to guide and keep me on correct path and allowing me to carry out my assignment and help me all along this mentorship.

Abstract

This report describes the competitive programming summer mentorship Programme I join at IET club of National Institute of technology, Karnatka(NITK).
This mentorship report is based on my experience as a learner in the field of competitive programming .

During this mentorship I participated in contest organised by our mentors .I also worked on weekly assignments give by our mentors.

I overall, I am very satisfied with results of my mentorship. Mentors were very profound in explaining concepts. I was able to use my knowledge and apply it in competitive programming problems.

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Problem Definition

Competitive Programming is a sport usually held over the internet. Involving participants
trying to program according to provided specifications. A programming competition generally involves the host presenting a set of logical or mathematical problems to the contestents and contestents are required to write computer program capable of solving each problem Judging is based mostly upon number of problems solved and time spent for writing successful solutions, but may also include other factors .
In most contests, the judging is done automatically by host machines, commonly known as judges. Every solution submitted by a contestant is run on the judge against a set of (usually secret) test cases. Normally, contest problems have an all-or-none marking system, meaning that a solution is "Accepted" only if it produces satisfactory results on all test cases run by the judge, and rejected otherwise.However, some contest problems may allow for partial scoring, depending on the number of test cases passed, the quality of the results, or some other specified criteria. Some other contests only require that the contestant submit the output corresponding to given input data, in which case the judge only has to analyze the submitted output data.

Overview

Mentorship programme consists of ten sessions namely:

01) Introduction of Competitive Programming and STL.
02) Game Theory.
03) Maths and Linear Data structure.
04) Greedy algorithm and bit manipulation.
05) Trees and heaps
06) Dynamic Programming.
07) Graph-1
08) Graph-2
09) Segment trees and Range Queries.
10) Sqrt Decomposition.

We were given six assignments which are described in links below:
Assignment-1:
1)https://www.codechef.com/COOK85/problems/GAMSTICK/
2)https://www.codechef.com/LTIME52/problems/C00K0FF/
Assignment-2:
1)https://www.hackerrank.com/contests/university-codesprint-3/challenges/bobs-game

Assignment-3:
1)http://codeforces.com/problemset/problem/687/B
2)http://codeforces.com/problemset/problem/75/C

3)http://codeforces.com/problemset/problem/983/A
Assignment-4:
1)https://www.codechef.com/problems/IPCTRAIN

2)Implement Binary search tree data structure having following functionalities.
a) insertion of an element
b) Searching an element
c) printing all the element present using all the the four traversal. Output should give all the four traversal order.

3)Implement Max heap or Min heap(whichever you like) having following functionalities:
1) Insertion of an element along with proclaim-up function to place that element at its correction position
2) extract Min/max and use heapify function to maintain the property of heap after removal of min/ max
Assignment-5:
1)https://www.codechef.com/OCT17/problems/MARRAYS

Assignment-6:
1)https://www.codechef.com/ALMOCK01/problems/CHEFD
2) https://www.codechef.com/problems/ADDMUL

Code

Link of Assignments 1 to 6:
https://github.com/Prateek1337/CP-Summer-Mentorship-2018/tree/master/assignments/17CO130_Prateek

contest-1:https://www.hackerrank.com/contests/cp-summer-mentorship-test-1/challenges

submission links:

- *https://www.hackerrank.com/contests/cp-summer-mentorship-test-1/challenges/pop-count/submissions/code/1307870865*
- *https://www.hackerrank.com/contests/cp-summer-mentorship-test-1/challenges/odd-even-saga-1/submissions/code/1307846004*
- *https://www.hackerrank.com/contests/cp-summer-mentorship-test-1/challenges/van-helsing-snares-dracula-1/submissions/code/1307903340*
- *https://www.hackerrank.com/contests/cp-summer-mentorship-test-1/challenges/good-knight/submissions/code/1307860696*
- *https://www.hackerrank.com/contests/cp-summer-mentorship-test-1/challenges/fill-the-tank-1/submissions/code/1307908257*

- *https://www.hackerrank.com/contests/cp-summer-mentorship-test-1/challenges/golf-with-gray-code/submissions/code/1307869589*

contest-2:https://www.hackerrank.com/contests/cp-summer-mentorship-test-2/challenges

submissions links:

- *https://www.hackerrank.com/contests/cp-summer-mentorship-test-2/challenges/munnivsbunny/submissions/code/1308751653*

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- *https://www.hackerrank.com/contests/cp-summer-mentorship-test-2/challenges/trip-to-bahamas*

- *https://www.hackerrank.com/contests/cp-summer-mentorship-test-2/challenges/am-i-special/submissions/code/1308739088*

- *https://www.hackerrank.com/contests/cp-summer-mentorship-test-2/challenges/am-i-special/submissions/code/1308739088*

contest-3:https://www.hackerrank.com/contests/cp-summer-mentorship-final-contest/challenges

Submission Links:

- *https://www.hackerrank.com/contests/cp-summer-mentorship-final-contest/challenges/lesser-primes/submissions/code/1308917492*

- *https://www.hackerrank.com/contests/cp-summer-mentorship-final-contest/challenges/bunny-loves-u/submissions/code/1308918956*

- *https://www.hackerrank.com/contests/cp-summer-mentorship-final-contest/challenges/make-the-arrays-same/submissions/code/1308920720*

- *https://www.hackerrank.com/contests/cp-summer-mentorship-final-contest/challenges/choice-of-seats/submissions/code/1309054631*

- *https://www.hackerrank.com/contests/cp-summer-mentorship-final-contest/challenges/cyclic-array-problem*

Future Work

I have gained valuable insight in Competitive programming. I enjoyed this mentorship organised by IET club NITK. Now I planning to use this mentorship as stepping stone in being a good competitive coder and improving my ranks in competitive coding sites like codechef, codeforces, etc. Also my first objective is to join IET club at NITK and will be trying hard to do so. Joining this club will help me both in my professional and personal development.

Also I will be using knowledge of data structure and algorithm in my college courses. Looking forward in having a decent cgpa.