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# **ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY**

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Computer Science and Engineering Club

Summer Training for National and  
Regional ICPC



AUGUST , 2019

## **Abbreviations**

**ICPC** - International Collegiate Programming Contest

**ASTU** - Adama Science and Technology University

**CSE** - Computer Science and Technology (Program)

**CSEC** - Computer Science and Engineering Club

## **1. Introduction**

CSEC is a club under CSE programme that performs various tasks and activities for the ASTU community. It has various divisions and the Competitive Programming Division is one of them. The main focus of this division is to equip students with problem solving mind set in order for them to tackle various problems presented to them. Such environment is created when students participate on competitive programming competitions.

The ICPC is a well known programming competition that takes place between programmers from various countries. In order to compete on this big stage one has to pass through series of competitions. First a programmer has to compete among students of his/her University and then win in order to represent that University. Then there is the National ICPC competition where programmers from all around a country challenge in order to represent their country. Thereafter, a fellow programmer has to pass one more hurdle in order to participate on the Final ICPC competition. He/she has to win the Regional competition in which the country is found in. After such hard work, a programmer gets to compete among fellow programmers from all around the world. The questions presented on ICPC require both problem solving and programming skills. They vary in difficulty and on the topics they cover.

## **2. Purpose and Vision**

The main objective of this summer training is help students participate on National and Regional ICPC contents and obtain good ranks. The training is aimed at producing students who are capable of excelling on ICPC.

The main visions after the completion of the training are:

- ❖ To get all 5 places from 1<sup>st</sup> to 5<sup>th</sup> rank on the National ICPC
- ❖ To get all 5 places from 1<sup>st</sup> to 5<sup>th</sup> rank on Ethiopian participants of Regional ICPC
- ❖ To at least get one team to place from 1<sup>st</sup> to 5<sup>th</sup> on the Regional ICPC

### 3. Schedule

The overall schedule of the summer training extends from August 6, 2019 to August 30, 2019. During these days there will be tutorial, contest and problem solving sessions on a daily basis. The last week is dedicated for solving and working on previous Regional ICPC problem. In the end there will be a closing Contest to mark the finalization of the training.

The overall schedule looks like the following.

<b>August 6, 7, 8, 9, 13, 14, 15, 16, 19, 20, 21, 23 – Tutorial and contest</b>				
<b>Start</b>	<b>End</b>	<b>Description</b>	<b>Location</b>	<b>Attendance</b>
2:00 am	3:30 am	Tutorial	B-508 R-9	Mandatory
3:30 am	5:30 am	Contest	B-508 R-9	Mandatory
5:30 pm	8:00 am	Lunch	-----	-----
8:00 am	10:00 am	Problem Solving	B-508 R-9	Mandatory
<b>Friday August 24 -Three Week Final Contest</b>				
<b>Start</b>	<b>End</b>	<b>Description</b>	<b>Location</b>	<b>Attendance</b>
2:30 am	5:30 am	Contest	B-508 R-9	Mandatory
5:30 am	8:00 am	Lunch	-----	-----
8:00 am	10:00 am	Problem Solving	B-508 R-9	Mandatory
<b>August 26, 27, 28, 29 – Contest and solve problem</b>				
<b>Start</b>	<b>End</b>	<b>Description</b>	<b>Location</b>	<b>Attendance</b>
2:00 am	3:15 am	Contest, Regional and National Problems	B-508 R-9	Mandatory
3:30 am	6:00 am	Problem Solving	B-508 R-9	Mandatory
6:00 am	8:00 am	Lunch	-----	-----
8:00 am	10:00 am	Practice Session	B-508 R-9	Mandatory
<b>Friday August 30 -Final Contest</b>				
2:30 am	6:30 am	Final Contest	B-508 R-9	Mandatory
6:30 am	8:00 am	Lunch	-----	-----
8:00 am	10:00 am	Problem Solving	B-508 R-9	Mandatory

The topics to be covered on each tutorial sessions are as follows.

<b>August 6 2019</b>	<b>August 7 2019</b>
Linear DS with Built-in Libraries <ul style="list-style-type: none"> <li>● Static Array</li> <li>● Dynamic Array</li> <li>● Array Sorting,</li> <li>● Stack, Queue,</li> <li>● Double Ended Queue.</li> </ul>	Non-Linear DS with Built-in Libraries <ul style="list-style-type: none"> <li>● Balanced Binary Search Tree (BST): C++ STL map/set</li> <li>● Heap: C++ STL priority queue</li> <li>● Hash Table: C++11 STL unordered map</li> </ul>
<b>August 8 2019</b>	<b>August 9 2019</b>
Data Structures with Our Own Libraries <ul style="list-style-type: none"> <li>● Graph <ul style="list-style-type: none"> <li>■ Adjacency Matrix</li> <li>■ Adjacency List</li> <li>■ Edge List</li> </ul> </li> <li>● Union-Find Disjoint Sets</li> <li>● Segment Tree</li> </ul>	Complete Search <ul style="list-style-type: none"> <li>● Iterative Complete Search</li> <li>● Recursive Complete Search</li> </ul> Divide and Conquer <ul style="list-style-type: none"> <li>● Interesting Usages of Binary Search</li> </ul> Greedy
<b>August 13 2019</b>	<b>August 14 2019</b>
Dynamic Programming	Graph Traversal Minimum Spanning Tree <ul style="list-style-type: none"> <li>● Kruskal's Algorithm</li> <li>● Prim's Algorithm</li> </ul>
<b>August 15 2019</b>	<b>August 16 2019</b>
Single-Source Shortest Paths <ul style="list-style-type: none"> <li>● SSSP on Unweighted and Weighted Graph</li> <li>● SSSP on Graph with Negative Weight Cycle</li> </ul> All-Pairs Shortest Paths <ul style="list-style-type: none"> <li>● Explanation of Floyd Warshall's DP Solution</li> </ul>	Special Graphs <ul style="list-style-type: none"> <li>● Directed Acyclic Graph (DAG)</li> <li>● Tree and Eulerian Graph</li> </ul>
<b>August 19 2019</b>	<b>August 20 2019</b>
Combinatorics <ul style="list-style-type: none"> <li>● Fibonacci Numbers</li> <li>● Binomial Coefficients</li> <li>● Catalan Numbers</li> </ul>	Number Theory
<b>August 21 2019</b>	<b>August 22 2019</b>
String Matching Knuth-Morris-Pratt's (KMP) Algorithm String Processing with Dynamic Programming String Alignment (Edit Distance) Longest Common Subsequence	Basic Geometry Objects with Libraries
	<b>August 23 2019</b> Algorithm on Polygon with Libraries

<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>	<b>Saturday</b>	<b>Sunday</b>
<b>August 5, 2019</b>	<b>August 6, 2019</b>	<b>August 7, 2019</b>	<b>August 8, 2019</b>	<b>August 9, 2019</b>	<b>August 10, 2019</b>	<b>August 11, 2019</b>
Participants settle in campus	Orientation Tutorial Daily Contest Problem Solving	Tutorial Daily Contest Problem Solving	Tutorial Daily Contest Problem Solving Football Game	Tutorial Daily Contest Problem Solving Meeting with couches	Movie Night	
<b>August 12, 2019</b>	<b>August 13, 2019</b>	<b>August 14, 2019</b>	<b>August 15, 2019</b>	<b>August 16, 2019</b>	<b>August 17, 2019</b>	<b>August 18, 2019</b>
	Tutorial Daily Contest Problem Solving	Tutorial Daily Contest Problem Solving	Tutorial Daily Contest Problem Solving Football Game	Tutorial Daily Contest Problem Solving Meeting with couches	Movie Night	Puzzle Day
<b>August 19, 2019</b>	<b>August 20, 2019</b>	<b>August 21, 2019</b>	<b>August 22, 2019</b>	<b>August 23, 2019</b>	<b>August 24, 2019</b>	<b>August 25, 2019</b>
Tutorial Daily Contest Problem Solving Football Game	Tutorial Daily Contest Problem Solving	Tutorial Daily Contest Problem Solving	Tutorial Daily Contest Problem Solving Football Game	Tutorial Daily Contest Problem Solving Meeting with couches	Training finalizing contest Problem Solving Movie Night	Puzzle Day
<b>August 26, 2019</b>	<b>August 27, 2019</b>	<b>August 28, 2019</b>	<b>August 29, 2019</b>	<b>August 30, 2019</b>		
Contest & Problems ● Regional ● National Problem Solving Practice Session Football Game	Contest & Problems ● Regional ● National Problem Solving Practice Session	Contest & Problems ● Regional ● National Problem Solving Practice Session	Contest & Problems ● Regional ● National Problem Solving Practice Session Football Game	Final Contest Closing Ceremony Problem Solving		

#### **4. Rules and Regulations for participating students**

For a proper flow of activities in the training, there needs to be rules and regulations to regulate the preceding of activities. The rules and regulations will focus on three major parts. These are:

- a) Time keeping and Attendance
- b) Performance Evaluation
- c) Behavioral Evaluation

##### **A) Time keeping and Attendance**

The morning sessions of tutorial begins on 2:00 am (local time). Thus all participants are required to be present on the following times.

##### **Morning Session (Tutorial and Contest)**

- ❖ Morning 1:55 am to 2:05 am is a proper time to be present. Members present at this time may enter with out any problem.
- ❖ Morning 2:05 am to 2:15 am is a not on time attendance. Thus participants who arrive at the laboratory at this time will be allowed to sign attendance, but with a warning.
- ❖ Morning 2:15 to 2:30 is a late appearance. Members who arrive at this time may enter and participate on the activities, but no attendance will be taken for them.
- ❖ After 2:30 no member is allowed to enter the club laboratory and that member is automatically not present for the morning session.

##### **Afternoon Session (Problem Solving)**

- ❖ In the afternoon 7:30 am up to 8:00 am is taken as on time and attendance is taken.
- ❖ After 8:00 am students may attend the problem solving session, but no attendance will be taken for their appearance.

The attendance will play a key role in keeping the flow of activities. They will be used in evaluating whether a participant should continue the training or whether he/she should receive a certificate at the end of the training.

The training will be divided into two phases in terms of schedule. The main goal of the two phases is to asses participants in terms of their attendance and determine who should continue the training and who should not.

- ❖ The first phase consists of 10 days after the beginning of the training. After this days a participant should have at least 40% (4 days) of attendance. A student falling to do so is dismissed from the training and can't participate on National ICPC.

- ❖ The second evaluation of attendance is done after the complete of the training, i.e including both phase 1 and phase 2. The evaluation at the end of the training are:

- A participant is expected to have at least 40% from the total expected attendance days(18 days). This mans a students should at least be present for 8 days. Anyone falling to do so will not receive any certificate for the completion of the training and will not be allowed to compete in the National ICPC.

- All participants who have more than 40% attendance should have at least 8 days of attendance with out any warning. A participants falling to meet this criteria will not receive certificate but will be allowed to participate on the National ICPC.

- All participants who have more than 40% attendance should have at least 8 days of attendance on problem solving session in order to receive a certificate. A participants falling to meet this criteria will not receive certificate but will be allowed to participate on the National ICPC.

The club laboratory will be open from 1:30 am in the morning to 4:00 pm in the evening. The restriction is to help students focus and allow enough time to rest.

### **B) Performance Evaluation**

The performance of the participants is evaluated in two ways.

- ❖ First the number of problems solved for each daily contest is kept in a record for all teams. The top 3 teams to have the largest sum of problems solved on each day will be awarded at the end of the training.

- ❖ Second way to evaluate performance is on the final contest of the training. The teams ranking from 1<sup>st</sup> to 3<sup>rd</sup> will be awarded for their excelling performance.

### **C) Behaviour Evaluation**

The behaviour and manner of participants has a key part in the success of the training. Thus all participants are expected to abide by the following conducts.

- ❖ Disturbing the work environment of the training is not allowed. There should be no sound disturbance. Further more no food is allowed in the lab.

- ❖ All participants are expected to listen to the coordinating committee. Any student causing any quarrel with the committee will be presented for evaluation to the Advising Board.

- ❖ Any kind of cheating is strictly forbidden. In such act both the providing and receiving parties will be automatically dismissed from the training.

Any gaps not mentioned in this conduct can be overseen by the Advising Board. Thus the coordinating committee may forward any concerns that may hinder the training to the Advising Board.



## 5. About Coordinating Committee

The coordinating committee is composed of students who are seniors in the organizing activities within the club. The coordinating committees are up front in conducting the summer training and they directly report to the Advisory Board. The Advisory Board is composed of staff of CSE programme that are assigned by the department.

There are 4 divisions in the tasks of the coordinating committee. These are:

### ❖ **Tutorial conducting sub-committee**

The main responsibility of this sub-committee is to prepare lecture slides, get them confirmed by the Advisory Board and give tutorials. Furthermore, members of this sub-committee lead the tutorial session and may participate on problem solving session.

### ❖ **Public Relation sub-committee**

The main responsibilities of this sub-committee is to communicate information and notification to all participants, secure any venues needed for any events, coordinate any events and keep attendance of members.

### ❖ **Lab coordinators sub-committee**

The main responsibility of this sub-committee is to ensure a good working environment in the laboratory, open and close the laboratory at the designated time and ensure the safety of all resources for the training.

### ❖ **Question preparation sub-committee**

The main responsibilities of this sub-committee is to prepare questions, to prepare & maintain the server and post questions. Furthermore, member of this sub-committee also lead the contest and problem solving sessions.

The designated coordinating committee members are the following:

1. Mukerem Ali
  - ❖ Leader of the Summer coordinating committee
  - ❖ Tutorial conducting sub-committee leader
2. Amir Khieru - Tutorial conducting sub-committee member
3. Elias Amha
  - ❖ Vice-leader of the Summer coordinating committee
  - ❖ Question preparation sub-committee leader
4. Mebatsion Sahle - Public Relation sub-committee leader
5. Wendirad Demelash - Public Relation sub-committee member
6. Temkin Mengistu - Lab coordinator sub-committee leader
7. Abinet Tassew - Lab coordinator sub-committee member

For the summer ICPC training session these students are responsible for all activities and events. Existing or new Executive committee of the club are allowed to forward suggestions to this coordinating committee, but any decisions regarding the training are left for the coordinating committee. This statement is certified by the existing President of the club on 2011.

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President(2011)

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Signature

### 6. Participants of the Summer ICPC Training

No.	Full Name	Gender	ID	Email	Phone	Team Name
1	Atsnagn Kifle	Male	A/UR14745/10	kifleatsnagn@gmail.com	0985233113	0011 Idiots
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3	Wendirad Demelash	Male	UGR/17757/11	wendiradame@gmail.com	0945224486	0011 Idiots
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20	Nathanael Bogale	Male	A/UR14674/10	nathanaelbogale0@gmail.com	0932661739	iCode
21	Asma Ahmed	Female	A/UR15088/10	asma313132@gmail.com	0931313258	Perfectly-done
22	Hayat Shukure	Female	A/UR14748/10	shukurehayat@gmail.com	0960972949	Perfectly-done
23	Hayat Ahmed	Female	A/UR15378/10	hahmedayat@gmail.com	0913562056	Perfectly-done
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25	Amanawit Gezahegn	Female	A/UR15144/10	amanawit14gezahegn@gmail.com	0911118796	Pioneer
26	Frehiwot Getachew	Female	A/UR15146/10	frehiwotbirke.3@gmail.com	0904180874	Pioneer
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29	Yonathan Assefa	Male	UGR/17850/11	yab95assefa@gmail.com	0989472386	Run Time Terrors
30	Bethelhem Atnaf	Female	UGR/16877/11	beti20201@gmail.com	0904358893	Scorpions
31	Hana Tesfahun	Female	UGR/17189/11	hanahtesfahun@gmail.com	0910493259	Scorpions
32	Meaza Nigusu	Female	UGR/17343/11	meazanigusu19@gmail.com	0978002200	Scorpions
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35	Seretse Firesibhat	Male	A/UR15149/10	seretsefiresibhat@gmail.com	0988155777	SMS
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## **7. Approval by Advising Board**

This document of the summer training is proposed by:

\_\_\_\_\_  
Leader of Coordinating Committee

\_\_\_\_\_  
Signature

This proposed document of the summer ICPC training is approved by:

\_\_\_\_\_  
Member of Advisory Board

\_\_\_\_\_  
Signature

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Member of Advisory Board

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Signature

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Head of CSE programme

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Signature