



# Competitive Programming

From Problem 2 Solution in  $O(1)$

## The ACM ICPC, ACPC, ECPC

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# ACM ICPC Hall



# ACM

- The **Association for Computing Machinery (ACM)** was founded in 1947 as the world's first scientific and educational computing society.



# ICPC

- **International Collegiate Programming Contest** (ICPC) is the oldest, largest, and most prestigious programming contest. It is a *Battle of the Brains*
  - In 2012: **29,479** students from **2,322** universities across **91** countries



Think => Get Idea => Balloon if right

# ICPC Levels

- Local competitions (per university/faculty)
  - If will be hold formally, it is accredited - Must attend.
  - May allow more **slots** for university
- National Level (per country)
  - Each country has formal national competition
  - ECPC (Egyptian), LCPC (Lebanon), ...etc
- Regional Level
  - Nationals Winners qualified to regional
  - ACPC: **A**rab Collegiate Programming Contest
- World Finals (WF)
  - Winners in the regions are qualified to World Finals
  - 128 teams in 2015

# Popular naming mistake

- Don't say “ACM”, It is not ACM
- The right ways
  - ACM ICPC, ICPC
  - ACPC
  - ACM + ECPC, LCPC, TCPC, SCPC, JCPC, MCPC...

# The Contest Organization

- Steering Committee
  - Makes some **strategic** decisions on its level
  - Each level has its committee.
  - Each country has its national committee.
- Regional Contest Director (**RCD**)
  - Executes the regional contest...adhere to rules/policies
  - Contest date, registration, budget, software..etc
  - Regional, may have some customized rules for it than WF
- Chief Judge
  - With help of judges .... Write/Revise problems, test data, solutions....manages the judging room
- Regional Systems Administrator: Software, PC<sup>2</sup>, ...



# The Contest Rules

- An eligible team must be
  - 3 students (same faculty) - At least a half-time load.
    - If you are graduated, then join Master or PhD program
    - Bring recent university ID or an official letter of enrollment (اثبات القيد)
  - Age up to [period of eligibility](#) (around 23 years old)
    - Under some conditions, some **extensions** may occur
  - Coach can be anyone in the world, but **can't** be contestant
    - S\He registers the team. Highly preferred to attend contest.
  - Team member can attend up to 5 regionals / 2 world finals
  - Team member must be eligible to world finals
- See Regional [Rules](#). Finals [Rules](#). Eligibility [tree](#)



# The Contest Rules

- Optionally, you can bring a PDF/text of max 25 pages
  - Every team writes his **Library** in these notes
  - You must bring them in practice session NOT contest day
  - We usually put our written algorithms:
    - Usually either algorithms that you don't know
    - Algorithms that you may do bugs if wrote from mind
    - Whatever...25 pages :)
  - Notes and Formulas. Popular Cheat [sheet](#)
  - Example: Stanford University ACM Team [Notebook](#)
- Books are NOT allowed on WF, but allowed in lower levels. **Advice:** DON'T bring them, never helped
- No Mobiles & USBs inside contest hall. Read rules.

# The Contest Nature

- 3 students => 1 PC + 8-13 problems + 5 hours
- Problems prerequisites
  - Programming Background: [Programming 1](#) (No OOP)
  - Algorithms knowledge and experience (Much adhocks)
- Submission time per problem is important.
  - Re-Submission has a penalty (if solved)
- Winner => solves most **problems** in least **time**
- Many skills needed to win
  - Reading, Thinking, Coding, Testing, Debugging
  - Team Communication Skills, Time Management Skills
- Other success factors: Team Strategy, Spirit, ...

# The Contest Scoring

- For a solved problem
  - Time Score: # minutes till first acceptance + penalty 20 for each wrong submission
  - No penalties after first acceptance
  - No score for unsolved problem.
- Team score: (total problems, total problems time)
- Example, team submitted 6 runs:
  - 3 for problem A, 2 for B, and 1 for C.
  - C accepted after 63 minutes and A after 98, B Wrong
  - C penalty: 63. A penalty =  $98 + 2 * 20 = 138$
  - Total score = (2 problem for 63 + 138 = **201 points**)

# The Contest Scoring

- Teams rank
  - By # of solved problems. If tie, the minimum time score
  - If tie, geometric mean of the individual times for each solved problem without the penalties
  - If tie, coin flip in case the winners

# The Contest Scoreboard

- Inform us about other teams performance
- The last hour (**blind hour**), it is not updated

Rank	Name	Solved	Time	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Total att/solv
1	7DS.GLE.T1	13	1181	1/93	1/75	1/145	4/94	1/33	1/37	1/89	2/13	1/57	1/148	1/101	2/48	2/128	5/--	24/13
2	Control C	8	843	1/105	1/70	1/18	6/173	1/84	1/22	1/103	4/--	1/168	0/--	0/--	0/--	0/--	3/--	20/8
3	AltF4	7	365	1/48	1/74	0/--	1/6	1/51	1/41	1/109	1/36	0/--	0/--	0/--	0/--	6/--	0/--	13/7
4	SyntaxError	7	622	1/23	1/18	2/165	1/34	1/60	1/142	1/160	6/--	0/--	0/--	0/--	0/--	0/--	0/--	14/7
5	ENCQT	7	880	1/129	1/99	2/117	1/78	0/--	1/58	1/175	7/84	0/--	0/--	0/--	0/--	0/--	0/--	14/7
6	3 shades of J	5	315	1/96	2/13	0/--	5/--	1/81	1/66	0/--	1/39	0/--	0/--	0/--	0/--	1/--	0/--	12/5
7	winRAL	5	376	1/45	1/30	0/--	4/17	0/--	0/--	0/--	3/104	0/--	1/80	0/--	0/--	0/--	0/--	10/5
8	Team VOM	5	472	1/44	1/98	0/--	3/125	1/66	1/99	0/--	4/--	0/--	0/--	0/--	0/--	0/--	0/--	11/5
9	HappyCoders	5	630	2/99	0/--	0/--	4/17	0/--	1/157	0/--	2/67	0/--	0/--	0/--	0/--	2/170	0/--	11/5
10	FaHaBa	4	440	1/13	1/115	0/--	6/33	2/159	0/--	0/--	4/--	0/--	0/--	0/--	0/--	0/--	0/--	14/4
11	TD4W	3	165	1/11	1/31	0/--	4/--	0/--	1/123	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	7/3
12	10i	3	261	1/14	0/--	0/--	4/56	0/--	1/131	0/--	11/--	0/--	0/--	0/--	0/--	0/--	0/--	17/3
13	NewBee	3	344	1/117	0/--	0/--	8/34	0/--	1/53	1/--	1/--	0/--	0/--	0/--	0/--	0/--	0/--	12/3
14	dotCPP	2	452	1/98	0/--	0/--	12/134	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	13/2
15	Overcomerz	1	118	0/--	1/118	0/--	1/--	0/--	0/--	2/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	4/1
16	Wckd	1	164	0/--	0/--	0/--	1/164	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	1/1
17	Ginat'an ++	0	0	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/--	0/0
Rank	Name	Solved	Time	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Total att/solv

Submitted/1st Yes/Total  
Yes

15/11/14 12/13/11 6/18/4 65/6/13 8/33/7 11/22/11 8/89/5 46/13/6 2/57/2 2/80/2 1/101/1 2/48/1 11/128/2 8/--/0 197/79

Created by [CSUS PC^2 9.2.3 20120910 build 2565](#)

<http://www.ecs.csus.edu/pc2/>

Last updated Sun Mar 15 15:43:38 PHT 2015

# The Contest Prizes & Awards

- World Finals
  - Top team: \$12,000 + Gold medal
  - 3 other teams: \$6,000 + Gold medal
  - Silver Medal gets \$3,000, Bronze \$1,500
- Regionals: Prestigious prizes.
- Nationals: Little prizes .. depends on event sponsors
- **Awards:** First to Solve a problem, Extreme Programmers, Steadfast Gurus, Solid Programmers, Relentless Programmers
- Membership to the ACM for a year....Job Offers!

# The Contest Environment

- See [World Finals](#)
  - Hardware, Software, Editors...etc
- Other Levels...very similar
  - Operatings systems: Either Windows or **Linux**
  - Coding IDE: Mainly C++/Java Eclipse (No VS)
  - Programming languages: C, C++, or JAVA
  - Submission Software: Usually [PC<sup>2</sup>](#)
    - Not used in WF since 2008



# ACM ACPC

- **Arab Collegiate Programming Contest**
- It Manages the regional and national contests
- Send notifications about the contests
- Follow their social media [Site](#), [Facebook](#)
- It occurs in **Nov / Dec**
- Nationals before that
  - E.g. ECPC in October
- World finals in **next** year
  - Around May/June



# World Finals - Region Champions

- Our Africa and Middle East **champions** 2015, **AUC Team / 5 problems**
- Team: **Islam** Diao, **Hossam** Samy, **Mohamed** Ghoneim
- Coach: Mohamed Mahmoud Abd El-**Wahab**



# Registration Email

ACM-ECPC 2015 (Registration is now open)



Inbox x



**ACM ECPC Operations**

Sep 17 ☆



to ACM, bcc: me ▾

Dear ECPC fellow,

We are delighted to announce that **registration is now open** for the upcoming **ACM-ECPC 2015** contest which will be held on **16 & 17 October** of this year.

<http://icpc.baylor.edu/regionals/finder/ecpc-2015>

The contest is going to be held either in **Alexandria or Cairo**; However, exact venue shall be **announced within a week**. The registration fees shall be **400 LE per team ± 20 %** depending on the venue.

Furthermore, the transportation and accommodation plan shall be furnished upon determining the final location.

Good luck and hope to see you all there.

Best regards,

ECPC 2015 Operations team

# Registration Steps

- When registration opens for the contest, coach should create an **account** (if not yet) and **create** the **team** and its details
  - If they don't have account yet, they receive invitation
  - <https://icpc.baylor.edu/register>
- To know more about overall region status
  - Go to <https://icpc.baylor.edu> / Regional finder
  - Select ACPC Region, then the country

# Registration

Site

Institution

Team Members

Name your team and choose your institution

## Contest details

Site name: *	ECPC-2015	Registration begin: *	09/17/2015
Site email: *	<a href="mailto:ecpc@acmecpc.org">✉ ecpc@acmecpc.org</a>	Registration official end: *	10/09/2015
Location: *	TBD	Lite registration? *	no
Home page:		Time zone ID:	

Contest allows you to set 3 contestants and a contestant reserve.

**i Choose team name and institution (you can make multiple teams at once)**

Number of teams:

1

Team 1 name ? : \*

S2++;

Institution ? :

Cairo University - Faculty  
of Computers and  
Information

[\(change\)](#) [Full match](#) [Help](#)

**i You can only select certified institution ([not in the list?](#))**

# Registration

https://icpc.baylor.edu/regionals/finder/ecpc-2015

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» Regional finder » Africa/Middle East » ACPC2015 » subcontests ▼

## Regional finder

acmicpc international collegiate programming contest

UNDER

Africa/Middle East ▼

- ACPC2015 ▼
  - ALCPC2015
  - ECPC2015 ▼
    - AinShamsCPC2015
    - AlexCPC2015
    - DeltaCPC2015
    - FciCairoUniCPC2015
    - FECCPC
  - JCPC2015
  - KCPC2015
  - LCPC2015
  - MCPC2015
  - OCPC2015
  - PCPC2015
  - SCPC2015
  - TCPC2015
- South Africa

The 2015 Egyptian Collegiate

Egypt

The contest represents the geographic area of Egypt. The contest is sponsored by IBM. [ecpc@acmacpc.org](mailto:ecpc@acmacpc.org).

The contest dates are to be determined.  
The registration is open between **17 Sep - 9 Oct '15**.

Register now



# Registration - Teams

https://icpc.baylor.edu/regionals/finder/ecpc-2015/teams

Verified by: Internet2 acm icpc

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Log In



» Regional finder » Africa/Middle East » ACPC2015 » ECPC2015 » subcontests

## Registration list

### Teams for The 2015 Egyptian Collegiate Programming Contest

#### Site: ECPC-2015

Site: ECPC-2015

Home page:

Date: 10/16/2015

Email: [ecpc@acmecpc.org](mailto:ecpc@acmecpc.org)

Institution	Country	Team	Status
Ahram Canadian University	 Egypt	blue team	PENDING
Ahram Canadian University	 Egypt	illusionists	PENDING
Al-Azhar University	 Egypt	Azhary	PENDING
Al-Azhar University	 Egypt	Hopeful	PENDING
Alexandria University - Faculty of Engineering	 Egypt	#InstaCoders	PENDING
Alexandria University - Faculty of Engineering	 Egypt	AMA	PENDING

a/Middle East  
ACPC2015  
ALCPC2015  
ECPC2015  
AinShamsCPC2015  
AlexCPC2015  
DeltaCPC2015  
FciCairoUniCPC2015  
FECCPC  
JCPC2015  
KCPC2015  
LCPC2015  
MCPC2015  
OCPC2015  
PCPC2015  
SCPC2015  
TCPC2015  
South Africa  
Regionals 2015  
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America  
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h Pacific



# Registration - Follow up Emails



**Mostafa Saad** <mostafa.saad.fci@gmail.com>

9/15/14 ☆



to ACM, ACM ▾

Dear Admins,

I confirm to pay all needed fees for the team I am coaching (Displine-Monitor team [Ziad Mohamed, Mohamed Magdy, Mohamed Yasser], a team from FCI-CU.

kindly if any extra steps are needed, inform me.

...



**ACM ECPC Operations** <ecpc@acmacpc.org>

10/1/14 ☆



to ACM, bcc: me ▾

Dear Coach,

We have just finished phase two of the teams acceptance process for the 2014 ECPC. So if you still have pending teams and less than 15 accepted official teams, then your team members need to review their profiles on the ICPC system to give us a chance to consider accepting them in the contest.

# Accommodation Emails



ECPC 2014 Accommodation



Inbox x



 **ACM ECPC Operations** <ecpc@acmacpc.org>

 10/1/14 



to ACM, Yomna, bcc: me 

Dear ECPC 2014 attendee,

The ECPC 2014 will take place in AAST Alexandria (Abu Keer Campus), with the following details:

- The contest isA will take place on 7, 8 October 2014 (Tuesday and Wednesday)
- Registration fees will be 400 EGP per team.
- We managed to arrange accommodation in the same facility as last year in the Abu Keer Youth camp which has a students' resident and a VIP hotel that is -according to those who have been there- way better than the hotels inside the AAST campus, and it is only 10 minutes walking distance from the contest to the hotel.
  - The cost for the room in the students' resident is 100 EGP per night and can accommodate up to four people, Same rates apply if the room was used as single or double or triple.
  - The cost for the hotel room is 250 EGP per night and can accommodate up to threepeople in a room. Same rates apply if the room was used as single or double.
  - There are only 10 hotel rooms available and will be served to the first to revere them.
- For teams coming from Cairo we can help with transportation to the contest, the fess per person per one way (Cairo to Alexandria or vice verse ) will be the same as last year 30 EGP.

If you are interested in reserving accommodation and/or transportation; please fill the attached form and reply with it to this email maximum by tomorrow -Thursday 2 October 2014- at 11:00 AM, after that we can promise nothing.

Note:

Only one person send the data for his team

# Teams to National Level

- Countries National is the qualifier to the regionals.
- Each university 2 slots + 2 extra **excellence** slots if (Hosting official contest, Camps, Send trainers)
- Remaining slots equally distributed. Reminder by national steering committee
- Example: ECPC will host 93 teams. 20 Universities will share. 5 Universities with **excellence** efforts
  - 5 Universities => 10 slots. Remaining 83 slots.
  - 4 slots for each university. Remaining 3 slots.
  - 3 slots distributed by national steering committee

# Teams to Regional Level

- Each country 2 slots + 10% of its national teams
  - Team MUST solve 1 problem at least
  - E.g. if ECPC 93 slots. 82 teams solved problems
    - Total slots  $\Rightarrow 2 + 8 = 10$  slots
- Maximum 2 teams per university
- RCD Steering committee distributes extra slots
  - University may get more than 2 here
- Competitions (local, national, regional) must be **accredited** by the steering committee
  - If local is official too, team must attend it

# Teams to World Finals

- Each region 1 slot
  - Depending on Region size, little more slots are given
  - Maximum 1 team per university
  - Say **top** scoreboard teams: FCI1, FCI2, AUC, FCI3, GUC
  - If 3 slots => FCI1, AUC, GUC

# Registration Fees

- You should receive email about such details
- Nationals - ECPC around 400-500 LE
- ACPC Regional => around \$400-500
- These fees depend on some factors...they may **go up!**
- World Finals => ZERO
- You should care with all your fees
  - Registration, Accommodation, Transportation, Pocket Money
  - In WF, Registration, Accommodation = For **Free**
- Ask your faculty to support you. Try to find a helpful doctor who works with you over that.

# More on ACPC: Figures

- Originally named Arab & North Africa Regional Contest (**ANARC**)
- Founder: **Sidi Ali Maelainin** from Morocco
  - He was the 2015 World Finals Director
- In 1998, 1st contest in Al Akhawayn University with 8 Universities / 4 countries





# More on ACPC: Figures

- In 2010, the region renamed to Arab Collegiate Programming Contest (ACPC)
  - 91 teams attended in 2012
- Dr Ziad Najem
  - GodFather of ACPC
  - RCD for many years



# More on ACPC: Figures

- Dr Ossama Ismail
  - Director, North Africa and the Middle East Contest
  - They are doing great efforts in the nationals and regional
  - They are doing great efforts in the EOI / IOI competitions too



# More on ACPC: Volunteers

- Problem authoring, and judging:
  - Usually we Call for Contribution and its **rules**
  - Contact Chief judge or [Wahab](#)
- Organizing a contest
  - [Mohamed Fouad](#), Executive Regional Contest Director
- Volunteering in the ACPC staff
  - Event Operations. Fundraising. Guest relations.
  - Media Logistics and Supply. Admin and front office.
  - Contact operations [people](#)
- More contacts: RCD [Contact](#) Or ACPC Page

# ICPC community in your faculty

- Some faculties have strong community (e.g. Cairo University)...Others have 1-2 students!
- It is your responsibility to launch ICPC community
- Find a helpful doctor to be your managerial coach
  - He can get funds for you.
  - Arrange with other doctors if competition during exams.
- Try to make summer training, even if you are junior
  - Teach them whatever you know...Utilize my channel
- Ask faculty for an ICPC room, even a small one
- You may create ACM Chapter

# Related: IOI Competition

- IOI (International Olympiad in Informatics) is an exciting contest for High schools
  - EOI: Egyptian Olympiad in Informatics
- To learn more, [See](#). How to [train](#)?
- It is very different from ICPC: [See 1](#). [See 2](#)
- If you are a college student, you probably don't need to give attention.
- If you grew up and become a senior, you may solve some IOI contests.

# تم بحمد الله

علمكم الله ما ينفعكم

ونفعكم بما تعلمتم

وزادكم علماً