

USENIX notes

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Members of the USENIX Association receive the following benefits:

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THE INTERNATIONAL OLYMPIAD ON INFORMATICS

Rob Kolstad, USACO Head Coach

Each year, the USENIX-sponsored USA Computing Olympiad identifies and trains our country's top four pre-college competition programmers in anticipation of the world championships: The International Olympiad on Informatics.

The 2008 Olympiad was conducted August 16–23 just outside of Cairo, Egypt, in six-year-old Mubarak Educational City. MEC is a walled compound of perhaps 50 acres capable of housing 1,000 guests (usually teachers for in-service training). It is surrounded by desert and located about an hour's drive from the outskirts of Cairo. While the blisteringly hot weather would wilt normal flora, a team of caretakers tends and waters beautiful foliage throughout the year, providing an attractive, if extremely warm (100+°F), outdoor environment.

Our team of four (see the photograph below) arrived on August 16 for the week-long event. Rising MIT freshman David Benjamin hails from Indiana; fellow MIT-student-to-be Jacob Steinhardt has graduated from Thomas Jefferson High School of Science and Technology in Virginia, hailed by some as America's #1 high school. They were joined by rising juniors Brian Hamrick, also from TJHSST, and Neil Wu from Louisiana.



From left: Jacob Steinhardt (Silver medalist), Brian Hamrick (Silver), Neal Wu (Gold), David Benjamin (Gold)

The student excursion to the Pyramids was surely the recreational highlight of the trip. Buses moved all 300 participants (and an additional 300 coaches/chaperones) to the Great Pyramids (and Sphinx) on the edge of Cairo. Many students were able to journey to the center burial chamber of one of the pyramids, a medium-sized room with a temperature of perhaps 110°F. Travel tip for visiting Egypt: choose one of the eleven months cooler than August.

Coaches and visitors were afforded an extra excursion to one of Cairo's bustling bazaars. The bazaar was enormous, with buildings and covered pedestrian-only walkways over an area of approximately half a square mile. In fact, it was large enough that I became lost after an unfortunate separation from my more navigation-savvy group. (A real-world application of a maze-solving algorithm returned me 20 minutes later to the bus.)

Two five-hour contests highlighted the Olympiad competition. Each contest included three extremely challenging tasks. Contestants coded solutions in C, C++, or Pascal, which were then submitted to a grading system that ran each task with many sets of test data to see if the program could calculate the proper answer within the time and memory constraints. See below for the hardest task; only four students received 60% or more credit on this one.

The results were announced at a gala marathon awards ceremony, followed by a banquet of sorts. The top 1/12 of the students (24 this year) earn Gold medals; the next 2/12 (1/6) earn Silver medals; the subsequent 3/12 (1/4) earn Bronze medals.

While official country results are not kept, unofficial tallies abound. China continued its winning streak but with slightly less domination than the past: three Gold medals and one Silver for the best overall performance. Poland was second (or tied for first, depending on your point of view), with three Gold medals and one Silver, but with slightly lower overall places and scores. The United States came in third, with

two Gold medals and two Silver. Russia also earned two Gold and two Silver medals, but received lower places/scores than the U.S.

Individually, our Gold medal winners performed extremely well, with David Benjamin placing 8th overall (in the world!) and Neal Wu placing 10th. Jacob Steinhardt's 29th place put him just six spots out of the running for Gold. At 37th place, Brian Hamrick was not far behind Jacob.

The USA Computing Olympiad continues to hold monthly competitions for three divisions of competitive programmers. This year's contests have each drawn 1,000 or more competitors from more than 60 countries. Thanks to USENIX and its membership for continuing sponsorship of this great program.

FISH: THE GREATEST CHALLENGE

The task below is shown in full (just as presented to the students) at <http://ace.delos.com/ioi2008-1.pdf>.

It was told by Scheherazade that far away, in the middle of the desert, there is a lake. Originally this lake had F fish in it. K different kinds of gemstones were chosen among the most valuable on Earth, and to each of the F fish exactly one gem was given for it to swallow. Since $F \leq K$, two or more fish might swallow gems of the same kind.

As time went by, some fish ate some of the other fish. One fish can eat another if and only if it is at least twice as long (fish A can eat fish B if and only if $L_A \geq 2 * L_B$). There is no rule as to when a fish decides to eat. One fish might decide to eat several smaller fish one after another, while some fish may decide not to eat any fish, even if they can. When a fish eats a smaller one, its length doesn't change, but the gems in the stomach of the smaller fish end up undamaged in the stomach of the larger fish.

Scheherazade has said that if you are able to find the lake, you will be allowed to take out one fish and keep all the gems in its stomach for yourself.

You are willing to try your luck, but before you head out on the long journey, you want to know how many different combinations of gems you could obtain by catching a single fish.

Write a program that, given the length of each fish and the kind of gemstone originally swallowed by each fish, finds the number of different combinations of gems that can end up in the stomach of any fish, modulo some given integer M . A combination is defined only by the number of gems from each of the K kinds. There is no notion of order between gems, and any two gems of the same kind are indistinguishable.

Constraints:

```
1 <= F <= 500,000
1 <= K <= F
2 <= M <= 30,000
1 <= LX <= 1,000,000,000
3 seconds on modern PC
64MB memory limit
```

GOT A MINUTE?

Jane-Ellen Long,
Director of IS & Production

USENIX and SAGE offer oh so many ways for you to contribute to the community and get your name in lights. Well, OK, in print or on the Web, at least. Here are a few options to get you started.

GET THE WORD OUT: WRITE FOR ;LOGIN:

Air a controversial opinion, share a great tool or technique, bare the dark underside of a recent hard-won tech battle. How? Write a ;login: article or proposal.

Not enough time for that? How about writing the occasional book review, or reporting on conference or workshop sessions?

Send your article, proposal, or other offer to login@usenix.org.

HELP YOUR COMRADES

Can you (perhaps with a little help from your friends) supply a quickstart guide to a sysadmin task? SAGE is always on the lookout for new authors and subjects. Whether you have an

idea for a whole Short Topics booklet (see http://www.sage.org/pubs/short_topics.html for the current list) or you just want to distill a recent experience into a short White Paper, suggestions@sage.org would like to hear from you.

CALLING ALL ACADEMICS

USENIX Campus Representatives act as our eyes and ears on campus, spreading the word about USENIX, helping their school's students get USENIX travel grants to attend events, and making our CFPs and publications available on campus. What's in it for you? Plenty. See <http://www.usenix.org/students/outreach.html> for the details.

GOT TOOLS? (OR BOOKS)

The Sysadmin Toolbox—<http://www.sage.org/field/toolbox.html>—and the extensive SAGE Recommended Reading lists— <http://www.sage.org/books/books.html>—always need updating. We welcome ideas for new sections, as well as comments about individual books. Contact suggestions@sage.org.

LOOKING FOR LOCALS

Both the USENIX and the SAGE Web sites maintain lists of user groups. Names, meeting information, and contact information for local, national, and international groups will be added promptly upon receipt by production@usenix.org. News of defunct organizations is also solicited.

USENIX DISCUSSION LIST

Anne Dickison, Director of Marketing

Want to talk about a ;login: article? Have suggestions for future topics? Share your thoughts on the new USENIX discussion list. Sign up at <http://lists.usenix.org/mailman/listinfo/usenix-discuss>.

NEW VIDEOS AVAILABLE!

Anne Dickison, Director of Marketing

Did you miss LISA? Want to see the USENIX Security '08 keynote? Videos from 2008 conferences are now available at <http://www.usenix.org/publications/multimedia>.

USER FRIENDLY by J.D. "Illiad" Frazer

