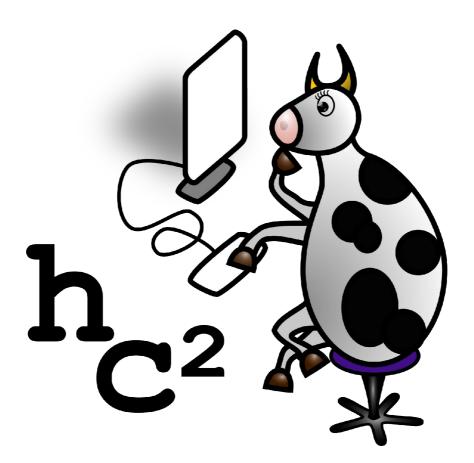
Helvetic Coding Contest Official Report



Abstract

The *Helvetic Coding Contest (HC²)* is a new Switzerland-wide programming contest held for the first time on March 13, 2010 at the Ecole Polytechnique Fédérale de Lausanne. The competition gathered 40 of Switzerland's brightest students from seven different higher educational institutions.

The participants proved their skills in algorithmics, teamwork and programming. In teams of two or three students, they tried to solve as many problems as possible by writing short C, C++ or Java programs.

We congratulate team VIS I - We Take No Prisoners from ETH Zürich for achieving the first rank.

The Helvetic Coding Contest was made possible due to the generous sponsorship of *Brocade Communications*. It was organized by the student association *PolyProg*.







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Introduction

The goal of the Helvetic Coding Contest (HC²) is to offer a platform for friendly competition in the field of algorithmics and programming. This idea is not new; local as well as world-wide programming contests have a long tradition. Events such as the ACM International Collegiate Programming Contest are well established and attract thousands of participants from all over the world. However, until recently no event

- targeted students from high school to PhD level,
- · was open to a Switzerland-wide audience,
- provided a wide range of programming challenges such as partially scored or interactive problems,
- promised to be so much fun.

The HC² was organized to fill this gap.

The first edition of the HC² took place on March 13, 2010 at the Ecole Polytechnique Fédérale de Lausanne. 15 teams from seven educational institutions followed our invitation, a total of 40 participants.

The remaining sections present the people and organizations behind HC², explain the contest itself and show the results.



Team SOI 2 discussing a problem

Teams of two or three students share a single computer and collaborate to solve as many problems as possible.

The event was held in a computer lab at EPFL. The contestants' machines run a special version of Linux which provided a uniform and fair contest environment.









Behind the scenes of HC²

It all started in a restaurant in Madrid. A delegation of PolyProg members had just represented their School, the EPFL, at the ACM International Collegiate Programming Contest. While celebrating their medals and looking back on the event, they wondered whether it would be possible to keep the extraordinary spirit of this programming competition alive by organizing an event of this kind in Switzerland.



PolyProg is a young (founded in September 2009) student association at EPFL. It offers a range of algorithmic seminars, trainings and contests to prepare students for international PlyPrig competitions. Besides that, its mission is to promote algorithmics and programming in general at EPFL. An event such as HC² fits well into the spirit of PolyProg.

The organization committee of the HC² was composed of the following PolyProg members:

- Christian Kauth (Problemsetter, coordination)
- Pierluca Borsò (Rules, communication)
- Titus Cieslewski (Website, registration)
- Robert R. Enderlein (Contest judge, accounting)
- Jean-Paul Wenger (Sponsoring)
- Jonas Wagner (Infrastructure, contest environment, graphical design)

Brocade

Brocade Communications is the exclusive sponsor of the Helvetic Coding Contest. The company is an industry leader in data center networking solutions and services that enable organizations to manage their most vital

™ information assets. Global 500 companies rely on Brocade technology to keep their businesses running around the clock.

BROCADE

Brocade has pioneered the technologies that enable highly reliable and secure data center connectivity. Today most of

the world's data flows through Brocade equipment and data center networks built on Brocade technology.

During HC2, the contestants enjoyed a presentation of Brocade and had the opportunity to learn about the company's extraordinary products and solutions. Brocade was also featured in one of the problems of the contest.













EPFL

The Ecole Polytechnique Fédérale de Lausanne (EPFL) is one of the two federal schools of technology in Switzerland. Like its sister institution, ETHZ, it has three missions: education, research and technology transfer at the highest international level.



The unique structure of the school encourages collaboration and a vibrant campus life. It is this environment that allowed the creation of PolyProg and its thriving.

In its idyllic location on the shores of Lake FÉDÉRALE DE LAUSANNE Geneva, EPFL brings together more than 10,000 people from 107 nations: students,

professors, researchers and entrepreneurs. EPFL offers 13 complete study programs in engineering, basic sciences, computer and communication sciences, life sciences, civil engineering, architecture and environmental sciences. With more than 250 laboratories and research groups on campus, EPFL is one of Europe's most productive and innovative technology institutes, rated first in its field in the 2009 ARWU ranking.

Team YAWN from EPFL during the contest.









A tour of HC²

This section gives an account of what happened during HC² and explains the contest in detail. The following is a summary of the day:

| 10:30 | Registration |
|-------|---|
| 11:00 | Official Start Introduction Presentation of Brocade |
| 12:00 | Dry run and Q&A |
| 13:00 | Contest starts |
| 18:00 | Contest ends |
| 19:00 | Solutions presentation and prizes ceremony |

The contest

In its essence, HC² is a coding and algorithmics contest. This means that in order to win, the participating teams have to solve as many algorithmic problems as possible. We will present one problem of the contest below.



Teamwork is vital, as demonstrated here by team Codehängscht







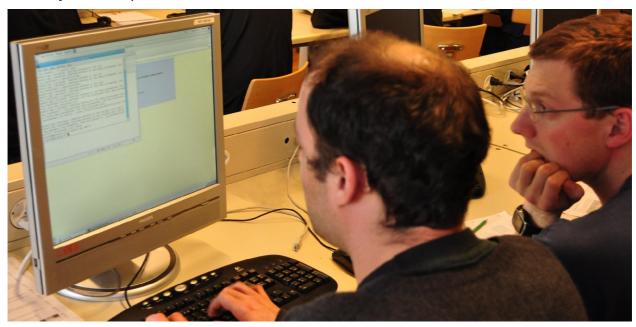
The contestants receive the problem statements in their favorite language, English, German or French. They then understand the problem, discover an adequate algorithm and implement it in either the C, C++ or Java programming language. Once the participants finished coding and testing their solution, they submit it to the automated judging system. The program is then compiled and tested against ten different inputs, each worth one point. The inputs are of increasing complexity. This means that a correct but inefficient solution will solve some inputs. However, in order to get the full points for a problem, efficient algorithms have to be found and implemented.

The winner of the contest is the team which scored most points. In case of equality, the team with fewer incorrect attempts wins.

We will now present one problem of the contest, called "Exploring Switzerland". In this problem *Heidi*, the coding cow and mascot of HC², wants to find a tour around Switzerland for her guests. She knows a set of possible places to visit and the public transport connections between them, and now wants to find the longest round-trip possible. There is one additional constraints which makes the problem interesting: the round-trip must consist of two parts. During one of them, places can only be visited in alphabetically increasing order. The inverse is true for the other part.

Because there can be up to 100 locations, it is impossible to consider every possible round-trip except for the smallest of testcases. Instead, the concept to be used is called *dynamic programming*. It yields and algorithm that runs in a time which is cubic in the number of locations.

It starts by sorting the available locations alphabetically. Then, for each pair of distinct locations L_i and L_j , it stores the maximum number of locations that can be visited when we start at L_i , move up the alphabet to the starting location of the trip and then downwards again to L_j . Once paths are known for all L_i where $i \leq i_0$, paths for location $i_0 + 1$ can be constructed using the already known paths. This continues until all locations have been considered.



Team VIS IV – Ballmer Peak was the first team to solve the problem "Exploring Switzerland" during the contest.







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Results

After five hours of intense programming, four problems had been completely solved by various teams, four had partial solutions and one problem remained unsolved. The exact results are shown in the following table:

| Problem | Submissions | Best score | | | |
|---------|-------------|-------------------|--|--|--|
| А | 9 | 2 | | | |
| В | 16 | 4 | | | |
| С | 0 | 0 | | | |
| D | 26 | 10 | | | |
| Е | 6 | 10 | | | |
| F | 3 | 6 | | | |
| G | 25 | 10 | | | |
| Н | 26 | 9 | | | |
| I | 10 | 10 | | | |

The final scoreboard is shown in the following figure:

| # Country | . Taam | Problems | | | | | | | Calvad | Points ? | | |
|-----------|--|----------|----------------|---|----------|----------------------|---------|-----------------|-----------|----------|--------|----------|
| # Country | Team | Α | В | С | D | E | F | G | Н | - 1 | Solved | Points ? |
| 1 етн | ETHZ VIS I - We Take No Prisoners | | 3 (-1;2) | | 10 (0) | | | 5 <u>(-3;6)</u> | 9 (-18;8) | 10 (-5) | 37 | -27 |
| 2 | EPFL YAWN | 2 (-2;2) | 2 (0;1) | | 10 (0) | 0 (0:4) | | 10 (0) | 2 (0;1) | 7 (0;4) | 33 | -2 |
| 3 етн | ETHZ VIS IV - Ballmer Peak | | 2 (0;1) | | 10 (-12) | 10 <u>(0)</u> | 6 (0;2) | 3 (0;1) | 2 (0;1) | | 33 | -12 |
| 4 ETH | ETHZ VIS III - Codehängscht | | 3 (-1;2) | | 10 (0) | 3 (0;1) | | 2 (0;2) | 2 (0;1) | | 20 | -1 |
| 5 | EPFL ASH | 0 (0;1) | 4 (0;1) | | 6 (0;1) | | | | | 10 (-7) | 20 | -7 |
| 6 | EPFL Ciresarii | | | | 10 (-14) | | | | | 10 (0) | 20 | -14 |
| 7 етн | ETHZ VIS II - Visbjoern Strikes Back | 1 (-2;3) | 2 (0;1) | | 10 (-4) | | | 3 (0;5) | 2 (0;4) | | 18 | -6 |
| 8 nw | FHNW Modulmänner | 0 (0;1) | 2 (0;1) | | 10 (-14) | | | 0 (0:5) | 2 (0;4) | | 14 | -14 |
| 9 🏶 | UNIGE The Wiggles | | 2 (0;1) | | 6 (0;1) | | | 4 (-2;3) | | | 12 | -2 |
| 10 | EPFL YAPT | | 2 (-2;2) | | 10 (-4) | | 0 (0:1) | | | | 12 | -6 |
| 11 🐨 | SOI 2 | 0 (0;2) | 2 (0;1) | | 6 (0;1) | | | | 3 (-3;7) | 0 (0;1) | 11 | -3 |
| 12 🦁 | SOI 1 | | | | 10 (-4) | | | | | | 10 | -4 |
| 13 Hes | HEIG-VD Les champomy | | 2 (0;1) | | 5 (-3;2) | | | | | | 7 | -3 |
| 14 👽 | SOI-jsl | | 1 (0;1) | | 6 (-6;2) | | | | | | 7 | -6 |
| 15 Hes | Hepia Zeptox | | 1 (0;1) | | | | | 0 (0;2) | | | 1 | 0 |

We proudly declare the team VIS I - We Take No Prisoners from ETH Zürich to be the winner of 2010's edition of the Helvetic Coding Contest. The team achieved a total of 37 points by solving two problems completely and scoring 17 points in three other problems.

The top three teams were rewarded for their achievement with book prizes as well as gold, silver and bronze medals. Every participant was also awarded a diploma.







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Feedback and Conclusion

The first Helvetic Coding Contest received very positive feedback both from the participants as well as the organizers. Participants agreed that the contest was fun. They liked the variety of problems and the partial scoring mechanism. Many participants, especially those who are not yet pursuing a higher education, found the problems challenging.

The organizers are glad that the contest passed without technical problems. The logistic and organizational challenges were well handled thanks to excellent teamwork in the organization committee.

A survey at the end of the contest showed that over 90% of the contestants would like to participate at a second edition of HC².



The prizes ceremony: Presenting Switzerland's best coders



Who would come back next year?







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Further information

The Helvetic Coding Contest website contains the detailed contest results, all problem statements and many pictures from the event. You can access it at http://hc2.ch/.

On the PolyProg website you will find information about past and future events organized by PolyProg. The website also contains many algorithmic challenges and provides ample information about the association: http://polyprog.epfl.ch/.

For information about our sponsor Brocade, visit http://brocade.com/.

Ecole Polytechnique Fédérale de Lausanne: http://www.epfl.ch/

If you desire more information, please do not hesitate to contact us directly by email: **polyprog@epfl.ch**

Picture credits

The pictures in this report have been taken by:

Andrea Blankenstijn, Club Photo EPFL (http://kaze.ch):

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Christian Kauth: Page 9









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Heidi the coding cow was the mascot of the Helvetic Coding Contest





