



SWERC

Southwestern Europe Regional Contest

<http://swerc.up.pt/2016/>

Information Brochure



Porto, 18-20 November 2016

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This document is available at: <http://swerc.up.pt/2016/info4Teams.pdf>

## ACM International Collegiate Programming Contest 2016

## SWERC'2016: Southwestern Europe Regional Contest

<http://swerc.up.pt/2016/>

## 1 Welcome and General Information

The ACM International Collegiate Programming Contest is a programming world championship for college students organized and conducted yearly by the ACM. It started in 1970 as a local contest somewhere in Texas and has since grown exponentially in the number of participating universities each year. The numbers are impressive: in 2015 there were more than 40,266 students participating, from 2,736 universities from 102 countries.

The ACM programming contests provide students with an opportunity to demonstrate and sharpen their problem solving and computing skills. Apart from the fun of competing (and hopefully winning), the contest is also an excellent opportunity to make international contacts. The contest is a two-tiered competition among teams of students representing institutions of higher education. The winning teams of the regional contests will go forward to the contest world finals.

The Southwestern Europe Regional Contest is one of the five European Regionals. In 2016, it includes 64 teams from 7 countries (France, Israel, Italy, Kosovo, Portugal, Spain and Switzerland) representing 32 institutions of higher education. Winners of the regional contests on six continents (128 teams in total) advance to the ACM Programming Contest World Finals in Rapid City, South Dakota, USA, May 20-25, 2017.

The 2016 Southwestern Europe Regional Contest is organized under the patronage of the Faculty of Science (Computer Science Department) of the University of Porto, Portugal. It lasts for two and half days. Teams can register on Friday evening or Saturday morning. Saturday, is dedicated to the opening ceremony, sponsored talks, clarification sessions and a team practice session to get acquainted with the contest environment. Lunch and a contest banquet are provided. Sunday, the 20th, is dedicated to the contest, from 10am till 3pm. Each team, composed of three students, will get a set of problems which they have to solve on a single computer, programming either in C, C++, or Java. During the contest, a box lunch will be provided to contestants. The event terminates with the awards ceremony in which the first 12 teams receive medals, 5 bronze, 4 silver and 3 gold (top three teams). The winner qualifies to the final. A second team may also proceed, but that will be decided centrally by the ICPC committee.

We are very thankful to our sponsors, namely IBM and Microsoft, and also to our local support from the Computer Science Department and the Faculty of Science of University of Porto.

Welcome to the city and the University of Porto.

The Contest Directors: Fernando Silva and José Paulo Leal

## 2 Organization

We are very thankful to all faculty, staff and students that accepted to collaborate in the organization of this event.

**Leading organizers** all from FCUP, University of Porto

Fernando Silva Contest Director  
 José Paulo Leal Contest Co-Director and Judging System Manager  
 Pedro Ribeiro Chief Judge and problem setter

### Judges and Problem Setters

Ana Paula Tomás Judge FCUP, University of Porto  
 André Susano Pinto Judge Google  
 Eduardo Marques Judge FCUP, University of Porto  
 Margarida Mamede Judge Nova University of Lisbon  
 Miguel Araújo Judge FCUP, University of Porto & CMU, US  
 Miguel Oliveira Judge FEUP, University of Porto  
 Pedro Guerreiro Judge University of Algarve  
 Pedro Pereira Judge INESC-TEC  
 Pedro Vasconcelos Judge FCUP, University of Porto  
 Sérgio Crisóstomo Judge FCUP, University of Porto

### Event coordinators

Paulo Cavaleiro System administrator FCUP, University of Porto  
 Duarte Petiz System administrator FCUP, University of Porto  
 Alexandra Ferreira Local activities FCUP, University of Porto  
 Isabel Gonçalves Registrations FCUP, University of Porto  
 Pedro Ribeiro Web-site and posters FCUP, University of Porto

**Volunteers:** all from FCUP, University of Porto.

Ana Cristina Carvalho	MSc student	Ana Filipa Crespo	MSc student
Ana Patrícia Silva	MSc student	Catarina Ferreira	Researcher
Diana Pacheco	MSc student	Diogo Fernandes	BSc student
Duarte Figueiredo	BSc student	Fábio Domingues	Researcher
Gil Ferro	Researcher	Inês Lima	BSc student
João Pedro Pedrosa	Lecturer	João Rodrigues	PhD student
Joaquim Silva	PhD student	Jorge Silva	PhD student
José Nuno Costa	MSc student	Luís Lopes	Lecturer
Marcelo Santos	MSc student	Manuel Barbosa	Lecturer
Maria Eduarda Silva	Lecturer	Miguel Areias	Post-Doc
Miguel Silva	Researcher	Nuno Guimarães	MSc student
Pedro Brandão	Lecturer	Pedro Cabral	MSc student
Ricardo Rocha	Lecturer	Sandra Alves	Lecturer
Teresa Costa	PhD student	Tiago Peres	BSc student
Vanda Azevedo	BSc student		

### 3 Final Schedule

#### Friday, November 18th

17:00 - 19:30 Registration of Teams Computer Science Dept.

#### Saturday, November 19th

08:30 - 09:15 Last Minute Registration Auditorium Hall  
 09:15 - 09:30 *Opening Ceremony* Auditorium 1  
 Dean of School of Sciences, UP  
 Luís Filipe Antunes, Head of CS Department  
 Fernando Silva, Contest Director  
 9:30 - 10:30 *Common Security Flaws* Auditorium 1  
 Microsoft Tech Talk with Arman Hilmioglu  
 10:30 - 11:00 Coffee Break Main entrance hall  
 11:00 - 11:45 *Privacy in a Connected World* Auditorium 1  
 Luís Filipe Antunes, CS Dep, University of Porto  
 11:45 - 12:15 *Introduction to the Practice Session*  
 José Paulo Leal, Judging System Manager  
 Pedro Ribeiro, Chief Judge  
 12:15 - 13:45 *Lunch* Main entrance hall  
 13:45 - 14:00 *Teams enter computer labs (coaches not allowed)*  
 14:00 - 16:00 **Practice Session** Computer labs  
 15:00 - 16:00 *Coaches allowed to enter computer labs*  
 16:10 - 16:30 *Questions & Answers Session* Auditorium 1  
 16:30 - 17:00 Coffee Break Main entrance hall  
 17:00 - 20:00 Free time  
 20:00 - 22:30 *Contest dinner at Hotel Tucla - Restaurante Pimenta Preta (please take your badge with you)*

#### Sunday, November 20th

09:00 - 09:30 *Last minute announcements* Auditorium 1  
 Fernando Silva, Contest Director  
 Pedro Ribeiro, Chief Judge  
 José Paulo Leal, Judging System Manager  
 09:30 - 09:50 *Teams enter computer labs* (all with t-shirts and badges)  
 10:00 - 15:00 **Programming Contest** Computer labs  
*Contestants: box with food and drinks;* Computer labs  
 12:00 - 13:30 *Coaches, guests and volunteers: lunch* Main entrance hall  
 15:00 - 16:00 Time to cool down Food and drinks  
 16:00 - 16:30 *Problem Set Analysis and Contest Statistics* Auditorium 1  
 Pedro Ribeiro, Chief Judge  
 José Paulo Leal, Judging System Manager  
 16:30 - 17:30 **Awards Ceremony** Auditorium 1  
 Fernando Silva, Contest Director  
 José Paulo Leal, Contest Co-Director  
 Sponsor: Microsoft

## 4 General Contest Rules

The rules for the 2016 Southwestern Europe Regional Programming Contest are the official rules defined by the ICPC for the 2016 ACM Regional Programming Contests. Please refer to: <http://icpc.baylor.edu/regionals/rules>.

Coaches and contestants are expected to be aware of the official rules.

Some important aspects we would like to stress:

**Language:** The official language of the contest is English.

**Team Coaches:** A team may only have one coach and the coach cannot also be a contestant. A team coach is typically a faculty member or a representative of the sponsoring institution of higher education. A coach certifies the eligibility of contestants of a team.

**Team composition:** Each team consists of three contestants who are eligible to compete in the ICPC World Finals as described under the official rules. The team's contestants must satisfy the following eligibility rules.

**Eligibility:** A student who has competed in two World Finals is NOT eligible to compete; A student who has competed in five Regional Contests is NOT eligible to compete; A student that FIRST began post-secondary studies in 2012 or later is eligible to compete; A student who meets the Basic Requirements and was born in 1993, or later is eligible to compete.

### Conduct at Contest:

- Solutions to problems submitted for judging are called runs. Each run is judged as accepted or rejected by a judge, and the team is notified of the results.
- Notification of accepted runs may be suspended at an appropriate time to keep the final results secret. A general announcement to that effect will be made during the contest. Notification of rejected runs will continue until the end of the contest.
- A contestant may submit a claim of ambiguity or error in a problem statement by submitting a clarification request to a judge. If the judges agree that an ambiguity or error exists, a clarification will be issued to all contestants.
- Contestants are not to converse with anyone except members of their team and personnel designated by the regional contest director. Systems support staff may advise contestants on system-related problems such as explaining system error messages.
- While the contest is scheduled for a particular time length (typically five hours), the regional contest director has the authority to alter the length of the contest in the event of unforeseen difficulties. Should the contest duration be altered, every attempt will be made to notify contestants in a timely and uniform manner.
- A team may be disqualified by the regional contest director for any activity that jeopardizes the contest such as dislodging extension cords, unauthorized modification of contest materials, or distracting behavior.

- A problem is solved when it is accepted by the judges. The judges are solely responsible for accepting or rejecting submitted runs. In consultation with the judges, the Regional Contest Director determines the winners of the regional contest. The regional contest director and judges are empowered to adjust for or adjudicate unforeseen events and conditions. Their decisions are final.
- Teams are ranked according to the most problems solved. For the purposes of awards, or in determining qualifier(s) for the World Finals, teams who solve the same number of problems are ranked by least total time. The total time is the sum of the time consumed for each problem solved. The time consumed for a solved problem is the time elapsed from the beginning of the contest to the submittal of the accepted run plus 20 penalty minutes for every rejected run for that problem regardless of submittal time. There is no time consumed for a problem that is not solved.

**Misconduct:** If irregularities or misconduct are observed during the contest, team members or coaches should bring them to the attention of the contest officials so that action may be taken as soon as possible. After the conclusion of the contest and the results have been made public, coaches may file complaints or appeals following the procedure set in the official rules.

## 5 Contest System Environment

### 5.1 Mooshak Judging System

SWERC'2016 will use the Mooshak Contest System developed by José Paulo Leal at the Computer Science Department, University of Porto (<http://mooshak.dcc.fc.up.pt>).

Solutions to problems submitted for judging are called runs. Each run is judged as accepted or rejected, and the team is automatically notified of the result. The meaning of the judgements is as follows (refers to your program):

<b>accepted:</b>	it passed all tests, thus it is accepted as correct;
<b>presentation error:</b>	the output seems to be correct but it is not presented in the required format. Since it is not always easy to distinguish this message from the wrong answer message, it is only sent in obvious cases;
<b>wrong answer:</b>	it runs through one or more test cases without a run-time error but the output did not match the expected output;
<b>time-limit exceeded:</b>	it did not finish within the allocated amount of time;
<b>run-time error:</b>	it “crashed”, i.e., it exited prematurely due to a run-time error;
<b>compile time error:</b>	the system was not able to successfully compile it.
<b>invalid submission:</b>	your submission does not comply with expected extensions, or it was submitted without using the web interface;
<b>output too long:</b>	it generates an output too long for this problem; the limits are dependent on the test cases, but are usually low;
<b>program too long:</b>	it is too long, thus it will not be considered (source limit is around 100KB);
<b>requires re-evaluation:</b>	for some reason your program has to be re-evaluated;
<b>contest rule violation:</b>	it violates a contest rule like calling non-standard libraries.

## 5.2 Operating environment

At the contest, all teams will have a similar **working environments**:

**Hardware:** mix of Intel and AMD 4 or 6-cores with 4 or 8GB RAM; mostly 21" monitors; Keyboards have the Portuguese layout, however teams are allowed to bring and setup their own keyboards during the first coffee break of Saturday morning. The keyboards are to be connected to USB ports.

**Software:** Linux Fedora 24.0 with all usual goodies of Linux: a light window manager; browsers: mozilla, Chrome; editors Emacs/XEmacs, Vim-X11, Gedit, Geany, Gedit, SublimeText3; IDEs Eclipse, Code::Blocks, Kate; debuggers gdb, valgrind ; other software Python 3. Same compilers as in the server's evaluation system server.

The browsers are pre-configured to be used with the submission system.

Internet (<http>) access is allowed only for to access Mooshak and provided documentation (STL and Javadoc).

**Judging/Backup servers:** Mooshak will run on a large server with a similar software environment installed, i.e. Fedora 24.0 and same compilers and compilation commands used on the machines used by teams.

A backup server is in operation to take over the judging if anything happens to the main server.

**Online-contest server:** Another server is set to run a contest accessible to coaches. They will see teams submissions, but teams won't see coaches submissions.

## 5.3 Using the Mooshak system

**Accessing the contest system:** All teams are given a login and password to access SWERC's contest system. The browsers provided have the links to the system already set. Teams have to go through the authentication process, in principle, just once.

Coaches and general audience can follow the contest, and also participate in it, through a different instance of Mooshak: <http://swerc-coaches.dcc.fc.up.pt/>

This contest system will be synchronised with SWERC's contest Mooshak server, receiving the activity of the teams. Teams, however, will not see any activity in the coaches' Mooshak.

**Submissions and evaluation:** to submit a solution for some problem, proceed as follows:

1. select the problem your team is attempting to solve (A, B, C,...);
2. load the source code of your program that solves the problem you selected, and then click on **Submit**.

Once you have made a submission, the result of the automatic judge should appear almost immediately. This result is initially marked as in **Pending** state to indicate that it has to be confirmed by a contest judge. Once confirmed, the submission result is marked **Final**.

*Please note:* any attempt to send too many adhoc submissions near the end of the contest will be interpreted as misconduct by the judges.



**Compilation commands and file extensions:** all machines provide an alias for each language compiler with the flags already set as used in the judging server. Next, we list for each language the compilation command, corresponding alias and source file extension that should be used:

Language	Alias	File extension
<b>C (gcc 6.2.1):</b>	mygcc	.c
<b>C++ (g++ 6.2.1):</b>	myg++	.cpp
<b>OpenJDK 1.8.0_111:</b>	myjavac	.java

**File extensions are crucial.** Mooshak doesn't guess the programming language you are using. It assumes that the file extension you give, correctly identifies the language.

On the other hand, for C and C++ the filename you use for your programs is irrelevant, but for Java the filename must have the name of that of the class that contains the `main()` method.

Language	Compilation command
<b>C</b>	<code>gcc -w -O2 -std=gnu99 \$SOURCE -lm</code>
<b>C++</b>	<code>g++ -w -O2 -std=gnu++14 \$SOURCE</code>
<b>Java</b>	<code>javac -encoding UTF-8 -classpath . \$SOURCE</code>

**Manuals:** the system includes the usual *man-pages* in Linux as well as the Gnu-Emacs *info*. The STL and Java documentation can be accessed locally and the links are pre-configured in your browser.

**Printing your programs:** to print a copy of one of your programs, use the Mooshak to load it first and then press the button **Print**. Please do not leave your place to collect the printout from the printer, someone will bring it to you. You are only allowed to print your programs not the problem descriptions.

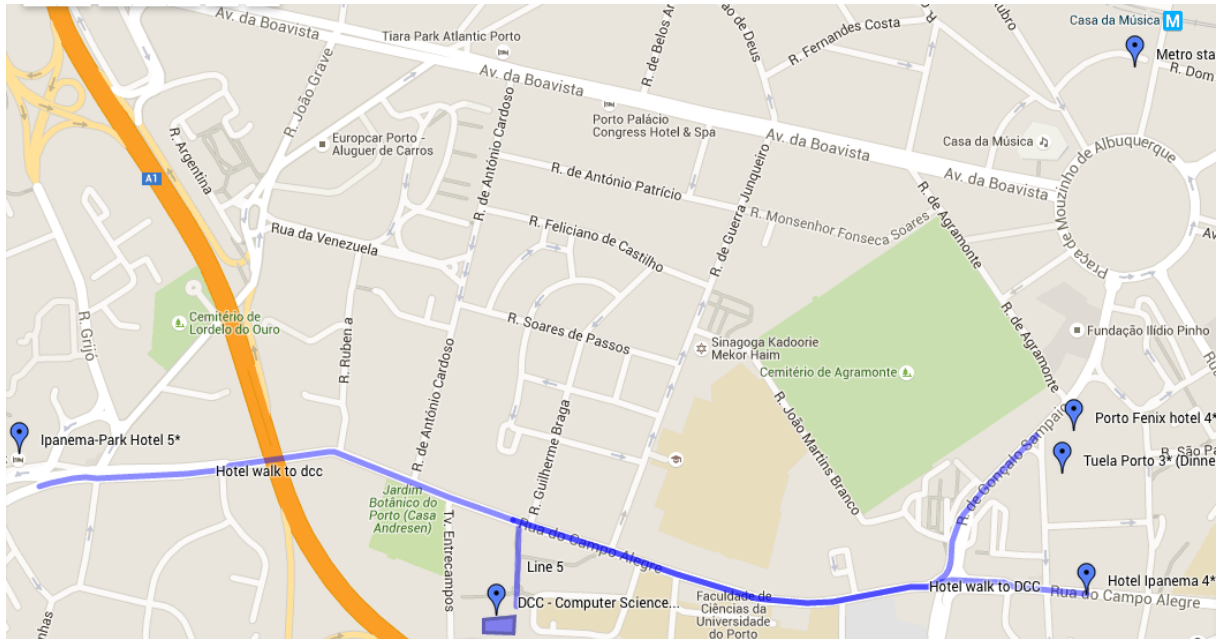
**Problem descriptions:** even though each team member receives a paper copy of the problem set, the judging system allows you to access the problem descriptions through your browser. Please select the problem and then press on the **View** button.

**Asking questions:** in case you need to ask a question to the jury, please select the problem to which the question is related and then press **Ask**. Once you have submitted the question, every team will have access to it as well as the answer given by the judges. Some questions may not be answered directly, because they have been already answered or because the judges feel it cannot be answered without giving away relevant information.

The use of Mooshak to ask questions must be used wisely and responsibly. Misuse of this facility, e.g. to give away information regarding a solution, may be classified as misconduct by the judges.

## 6 From Recommended Hotels to the Contest Site

The recommended hotels, Tuela, Fénix and Ipanema Porto are just within a 10 minutes walk from the contest site, that is from the Computer Science Department. The following map suggests a walking path.



Address for the CS department:

*Rua do Campo Alegre, 1021*

*Phone: +351 220402900/959, GPS coordinates: 41.152259,-8.640876*

## 7 Meals

With your registration you are entitled to the following meals (please use your badge to identify yourself):

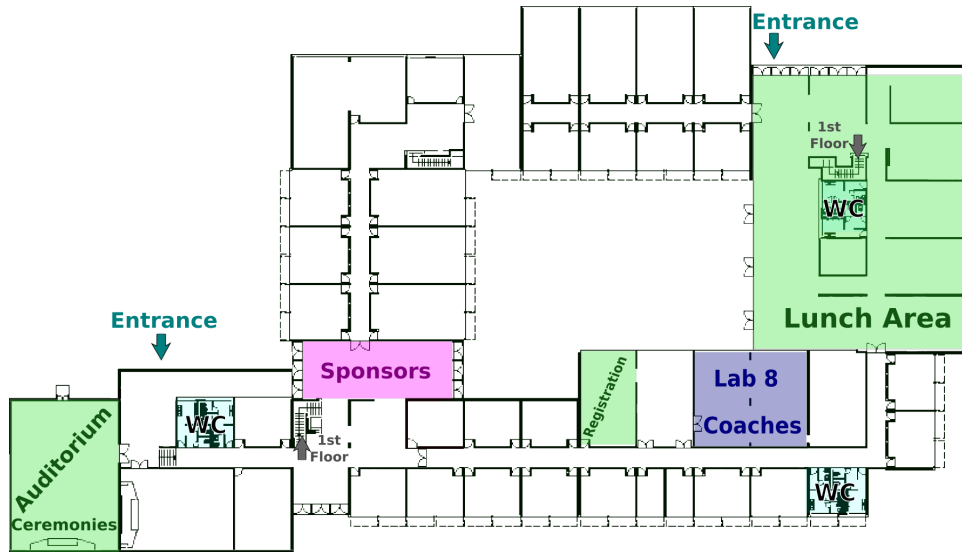
- Saturday: two coffee breaks; lunch-buffet; and contest dinner at the Hotel Tuela - Restaurante Pimenta Preta (at 8pm). All with badges please.
- Sunday: lunch for coaches and volunteers from 12:00 till 13:30; lunch boxes for teams at 12:00; more food and drinks from 15:00 till 16:00.

Nearby the hotels and in the city centre there are plenty of restaurants in case you want to try one at some other time. A nice place with many options near the hotel is “Mercado Bom Sucesso”.

## 8 Contest Site - CS Department

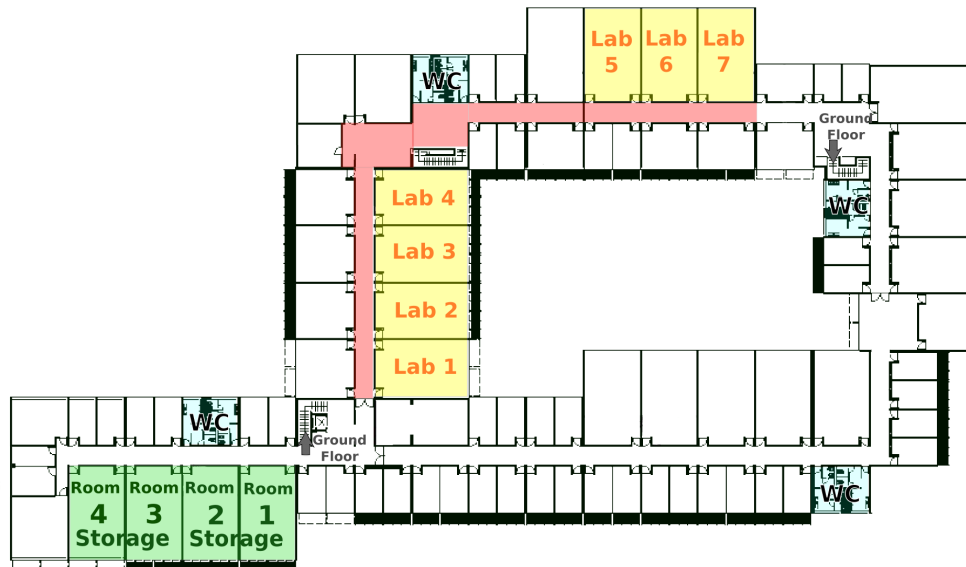
SWERC takes place at the Computer Science Department (DCC-FCUP). The following maps show the rooms and labs we will be using.

**Ground Floor: entrance, auditoriums and coaches laboratory**



Coaches use Lab8 in ground floor only.

**First Floor: storage rooms, contest laboratories**



On contest day, i.e. Sunday, teams are not allowed to take anything into the contest labs, except pens and pencils. **Contestants must wear the t-shirts to enter the computer labs.** Teams must leave their belongings in the storage rooms (preferably leave their cellphones with their coaches). Teams in Lab1 and Lab2 use storage room 1; Teams in Lab3 and Lab4 use storage room 2; Teams in Lab5 to Lab7 use storage rooms 3 and 4.

## 9 WiFi Access

WiFi is available in the whole Department building. It supports eduroam access. For those without eduroam, please use the `wifi_events` network with the following credentials:

Login: `dcc.wifi.1@fc.up.pt`

Password: Swerc2016

## 10 Participating Teams and Lab Assignments

We received 62 team registrations. Their names, institutions and contest lab assignments are:

N.	Country	Team	Institution	Lab.
1	France	4chan 4ever	Ecole Normale Supérieure de Cachan	Lab6
2	France	CMD Paris-Saclay	Ecole Normale Supérieure de Cachan	Lab1
3	France	Middle-third	Ecole Normale Supérieure de Cachan	Lab4
4	France	ENS Ulm 1	École Normale Supérieure ULM	Lab3
5	France	ENS Ulm 2	École Normale Supérieure ULM	Lab2
6	France	ENS Ulm 3	École Normale Supérieure ULM	Lab5
7	France	dangling pointers	École Normale Supérieure de Lyon	Lab4
8	France	ENSlip	École Normale Supérieure de Lyon	Lab2
9	France	ENString	École Normale Supérieure de Lyon	Lab5
10	France	BIRL++	Ecole Polytechnique	Lab6
11	France	Mad Hackerz	Ecole Polytechnique	Lab1
12	France	out_of_range	Ecole Polytechnique	Lab4
13	Switzerland	EPFLegend	Ecole Polytechnique Fédéral de lausanne	Lab3
14	Switzerland	Yingxiong-bohater-ghahreman	Ecole Polytechnique Fédéral de lausanne	Lab2
15	Switzerland	2sIO(w)	ETH Zürich	Lab1
16	Switzerland	rETHink again	ETH Zürich	Lab3
17	Portugal	Caracóis Hipocondríacos	Faculdade de Ciências - Universidade de Lisboa	Lab1
18	Portugal	FCUP-1	Faculdade de Ciências da Universidade do Porto	Lab3
19	Portugal	FCUP-2	Faculdade de Ciências da Universidade do Porto	Lab1
20	Portugal	FCUP-3	Faculdade de Ciências da Universidade do Porto	Lab2
21	France	INSA Lyon 1	INSA de Lyon	Lab2
22	France	INSA Lyon 2	INSA de Lyon	Lab5
23	France	INSA Rouen 1	Institut National des Sciences Appliquées de Rouen	Lab6
24	France	INSA Rouen 2	Institut National des Sciences Appliquées de Rouen	Lab3
25	Portugal	AncelISTas1911	Instituto Superior Técnico da Univ. De Lisboa	Lab4
26	Portugal	Diversitas	Instituto Superior Técnico da Univ. De Lisboa	Lab5
27	Italy	IDK Man	Politecnico Di Milano	Lab5
28	Italy	PoliMi	Politecnico Di Milano	Lab4
29	Italy	std::rand	Politecnico Di Milano	Lab6
30	Israel	The7thBalloon	Technion - Israel Institute of Technology	Lab4
31	France	SegmentationFault	Télécom Bretagne	Lab1
32	France	TeleCinesis	Télécom ParisTech	Lab3
33	France	The Pick-code Artists	Télécom ParisTech	Lab7
34	Spain	Cirel Bros	Universidad Autónoma de Madrid	Lab4
35	Spain	Cybersquad	Universidad Autónoma de Madrid	Lab1
36	Spain	VoleyPlayeros	Universidad Autónoma de Madrid	Lab6
37	Spain	NameNotFoundException	Universidad Complutense de Madrid	Lab2
38	Spain	Skullberry	Universidad Complutense de Madrid	Lab3

<b>N.</b>	<b>Country</b>	<b>Team</b>	<b>Institution</b>	<b>Lab.</b>
39	Spain	Team Limit Exceeded	Universidad Complutense de Madrid	Lab7
40	Spain	Resource acq is initialization	Universidad de Murcia	Lab7
41	Spain	The Hash Coders	Universidad de Murcia	Lab2
42	Italy	UniTrento	Università di Trento	Lab1
43	Spain	UPC-1	Universitat Politècnica de Catalunya	Lab3
44	Spain	UPC-2	Universitat Politècnica de Catalunya	Lab2
45	Spain	UPC-3	Universitat Politècnica de Catalunya	Lab5
46	Spain	ETSINF-1	Universitat Politècnica de València	Lab6
47	Spain	ETSINF-2	Universitat Politècnica de València	Lab4
48	Spain	The Binary Three	Universitat Pompeu Fabra	Lab6
49	France	UTC	Université de Technologie de Compiègne	Lab7
50	Kosovo	UBT1	University for Business and Technology	Lab2
51	Kosovo	UBT2	University for Business and Technology	Lab7
52	Israel	TopOfTheMountain	University of Haifa	Lab6
53	Spain	Berri Txarrak	University of the Basque Country	Lab4
54	Spain	Beti Gaizki	University of the Basque Country	Lab6
55	Spain	Zerotan Bele	University of the Basque Country	Lab5
56	Spain	UVa 1	University of Valladolid	Lab1
57	Spain	UVa 2	University of Valladolid	Lab7
58	Italy	gladiatorsOfVerona	University of Verona	Lab7
59	France	CS1	CentraleSupélec	Lab5
60	France	CS2	CentraleSupélec	Lab7
61	Italy	Sapienza 1	Università di Roma - La Sapienza	Lab3
62	Spain	Team Sombrero	Universidad Rey Juan Carlos	Lab7

The places for the teams in the computer labs are clearly marked. When teams enter the labs, they should seat in their allocated space and wait without touching anything until told to start. During the contest, volunteers will be at the computer labs to deliver printouts and ballons to teams. Food and drink will be provided during the contest.