



University of Ljubljana
Faculty of Computer and
Information Science

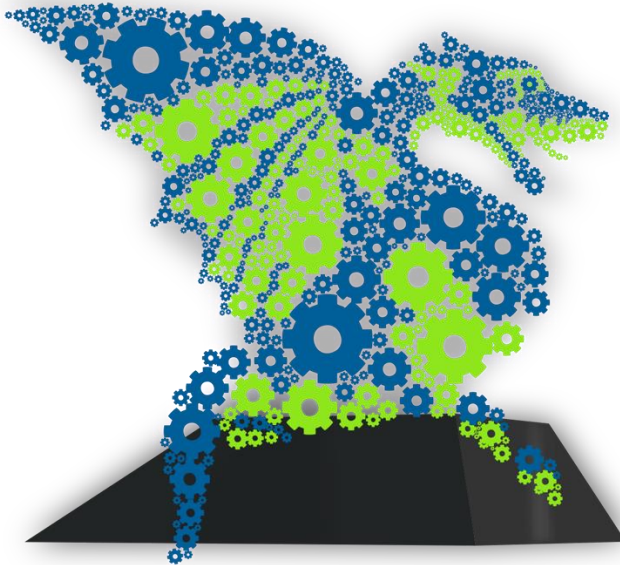


ACM Slovenija

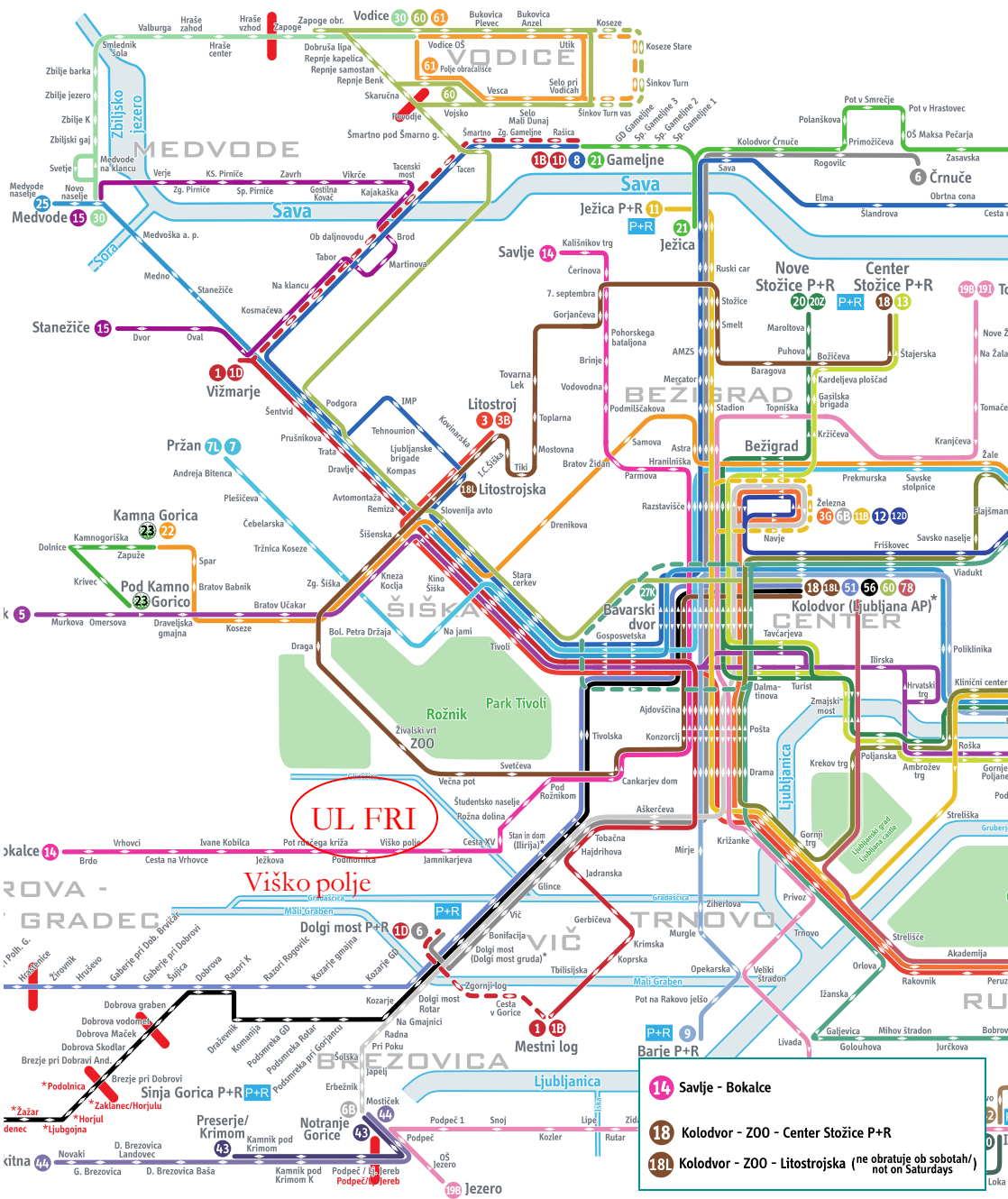
CEOI 2017

24th Central European Olympiad in Informatics

10th - 15th July
Ljubljana, Slovenia



ceoi2017.acm.si



UL FRI

- 14** Savlje - Bokalce
- 18** Kolodvor - ZOO - Center Stožice P+R
- 18L** Kolodvor - ZOO - Litostrojska (ne obratuje ob sobotah/ not on Saturdays)

President of ACM Slovenia



Dear competitors, dear mentors, dear friends,

It is an honour and satisfaction for me to address you as the representative of ACM Slovenia. ACM Slovenia is a branch of the Association for Computer Machinery, the largest international learned society for computing. Computer science merges the theory on one side with the experimentation and engineering on the other side, and is becoming one of the most rapidly developing scientific disciplines in the world. Although considered as a new discipline, Computer science originated back in the 17th century, when the first mechanical calculators

were developed. However, the real bloom of the discipline has just started, and it is penetrating all parts of human activities. The development was possible because the best human brains and the best visionaries dedicated their life to Computer science.

One of the most important ACM missions is Computer science education and this is also where ACM Slovenia focuses their efforts. We are, therefore, extremely happy that we are the organisers of this great event, together with the University of Ljubljana, Faculty of Computer and Information Science.

All of you, dear competitors, invest a great effort to become the members of national teams. This achievement has already placed you among the prospective young personalities of the computing of the future. All of you showed a deep knowledge of algorithms and demonstrated a high skill in practical programming. However, each competition determines the best teams and the best individuals and I am more than happy to congratulate them.

Borut Žalik
President of ACM Slovenia

Dean's Thoughts



University of Ljubljana was established in 1919. Today, 50.000 students in 23 faculties and 3 art academies form a vibrant academic community in which knowledge is created, shared and put into practice. According to ARWU Shanghai, Times THES-QS and WEBOMETRICS rankings the University of Ljubljana is listed amongst the top 500 universities in the world.

The Faculty of Computer and Information Science at the University of Ljubljana is the leading institution in the field of computer and information science in Slovenia. It was founded in 1996, when the Faculty of Electrical Engineering and Computer Science split into two separate faculties. The Faculty moved to new premises in summer 2014. The new building, which was funded by EU, gives us excellent working conditions that allow us to prosper in our endeavors. Computer and information science are much more than just a high-tech field occupied only by engineers, researchers and technology enthusiasts. They are something with which every single one of us lives every day. Powerful computers represent the brains of ever more numerous electronic devices and complex information systems that we use to drive the economy, speed up work processes, unleash creativity, maintain contacts with friends and family, inform and entertain ourselves and even lighten our household chores. This universal presence of computer science offers extraordinary development opportunities, as well as presenting numerous challenges that we must face prudently and responsibly.

The Faculty is home to some of the best experts, educators and researchers in Central Europe, who care about the quality and development of computer and information science. As researchers, we keep pace with rapid development and co-create new trends, and we share all knowledge and findings with our students. In collaboration with numerous research groups and industry partners, we work on some of the most fascinating and rapidly developing disciplines of today, including artificial intelligence, machine learning, data mining, computer vision, bioinformatics, cognitive modelling,

intelligent robotics, data acquisition and the integration of information systems, among others. We are happy to see that our students are able to establish themselves quickly in today's dynamic high-tech environments and that many of our best students choose to pursue academic and research careers, thereby contributing to the excellence of computer science education and research.

Because we are very passionate about the quality and development of computer and information science, it is an honour for us to host CEOI 2017 - 24th Central European Olympiad in informatics. I hope the participants will find many new ideas, spark new interest in informatics and information technology and further develop their problem-solving skills. I believe that the time and effort put into preparing for the competition will prove to be well spent. The society will face many challenges where your knowledge will be invaluable. Quoting Alan Turing: "We can only see a short distance ahead, but we can see plenty there needs to be done."

Bojan Orel

Dean

University of Ljubljana, Faculty of Computer and Information Science

Scientific Committee Address



Dear participants,

I hope you arrived safely in Ljubljana and are ready to make some great memories of your experience here at the CEOI 2017 in Slovenia.

Qualifying for the contest as representatives of your countries is a great achievement showing your knowledge and skills for which I would like to congratulate you. Algorithmic and programming skills are becoming more important every day to handle all kinds of challenges and this is something you are exceptionally good at.

The Scientific and Technical Committee has been very busy during the last few months to prepare an interesting and challenging contest. I wish you good luck and many solved problems at the CEOI and in the future.

Tomaž Hočevar
The Scientific and Technical Committee

Scientific Committee

- dr. Janez Brank
- Tomaž Hočevar (chair)
- Vid Kocijan
- Mitja Trampuš

Technical Committee

- Jan Berčič
- dr. Gašper Fele-Žorž (chair)
- dr. Gregor Jerše

Organizing Committee



Dear guest, dear reader,

It is our great pleasure to host you in Slovenia. It is for the first time that CEOI came here and we are especially happy and proud of this.

We hope that you will find the event and the country memorable in the best possible way.

The prepared programme follows a usual track for the CEOI - two days for competition and two days for getting to know your friends from other countries.

We are especially happy as this year we are hosting all Central-European countries including Austria. Consequently, you will meet your new friends from Austria, Croatia, Czech Republic, Germany, Hungary, Poland, Romania, Slovakia and Slovenia. Besides we also invited Italy and Switzerland from the West, and Azerbaijan and Georgia from the East of Europe. The last invited country is Israel. All together 14 countries and 58 young competitors.

Slovenia is a one of the smallest European countries, but very rich in green nature. In the amount of forests it reaches to the top positions in Europe. Another treasure of Slovenia is water. During the visit you will learn quite a few things about the water and how it enriches Slovenia and how it also shapes it. Literally. Therefore, it is not strange that Ljubljana was in 2016 declared a Green Capital.

Let me conclude this welcome message with a huge thank! It goes on one side to a number of volunteers whose hard work made this event possible. On the other hand, we also need to thank a long list of organizations and companies that financially and materially supported CEOI. If they didn't so generously extend their hand, we simply could not organize the Olympiad.

I want to conclude this section with a very special donator whose contribution is not even mentioned, although it was the largest one. Thank a lot indeed to him/her and to all the supporters!

Andrej Brodnik
Chairman of CEOI 2017

Organizing Committee

- Gregor Anželj
- Blaž Artač
- Alenka Bone
- dr. Andrej Brodnik (chair)
- Matevž Jekovec
- Alenka Krapež
- Rebeka Kropivšek Leskovar
- mag. Matija Lokar (chair)
- Rok Marinšek
- Lea Pečnik
- Anže Peharc
- Aljaž Romih
- Matej Romšak
- Miha Štampek
- Tomas Štefe
- Petra Tankovič
- Helena Brodnik Žugelj

Hosting High Schools from Ljubljana

Ana, another Ana, Blaž, Brina, Elnur, Gaja, Izak, Jaka and Jaka, Jakob, another Jakob, Jerca, Kajetan, Lara, Lea, Leila, Maj, Maja, one more Maja, Manca Tea, Marko, Maruša, Maša, Nastja, Neža, Nina, Pavla, Ronja, Ted, Teja, Tina, Urša and Živa

COMING FROM:

GimnazijaVič



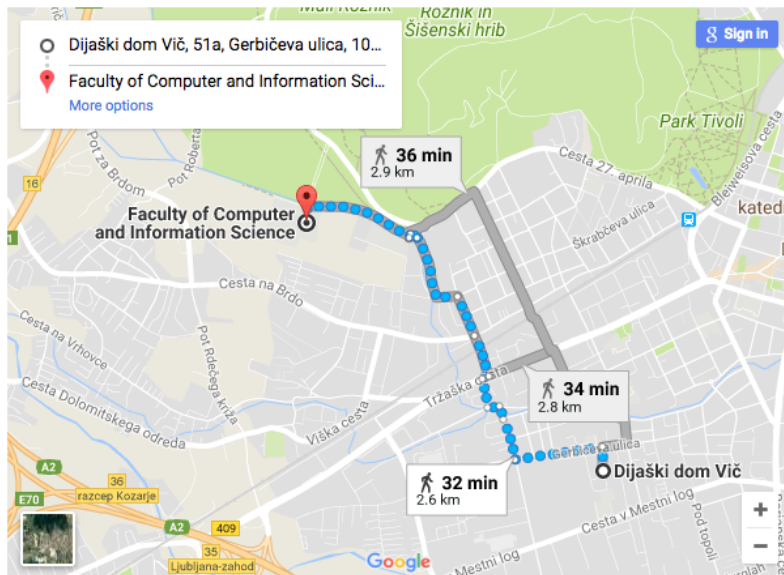
General Information

Public transportation in Ljubljana

CEOI 2017 is held in the new building of the Faculty of Computer and Information Science. The postal address is Večna pot 113 and the nearest LPP bus stations are called “Živalski vrt ZOO” (bus lines 18 and 18L) and “Viško polje” (bus line 14). The frequency of both lines is 2-3 buses per hour till 21:00 for lines 18 and 18L. Line 14 has 3-4 buses per hour till 22:30. Every participant will get a badge and will be able to freely use LPP transportation.

Dormitory

Your accommodation is located at Gerbičeva ulica 51a, which is 30 minutes' walk south east from the FRI UL. Despite it being reachable on foot, using public transport is recommended.



Entrance to the faculty and parking

The main entrance to the faculty is through Building X. Parking slots for CEOI participants are available in the upper garage and at the eastern side of the main faculty building. Since the parking space is limited we recommend using the public transportation.

Internet access

There is freely accessible internet. All CEOI attendees can connect to CEOI 2017 internet with password: ceoi17ceoi17.

Technical support

CEOI 2017 employs technical staff in all lecture rooms. They wear a green T-shirt with a Staff label and a badge with a green bar at the bottom. If you encounter technical problems, do not hesitate to contact any of them.

Catering

Lunches are organized in faculty's restaurant on the 2nd floor of Building X.

All participants will get coupons for daily Lunch at registration and therefore all CEOI 2017 attendees are required to show their coupon when entering the restaurant.

Online information

The CEOI 2017 website is: <https://ceoi2017.acm.si/>

Make sure you take a note of this since it includes full competition rules.

You can follow all the latest updates on CEOI on our Facebook page:

<https://www.facebook.com/ceoi2017>

You are kindly invited to share your thoughts and photos from the event!

Teams

AUSTRIA



Team leader: Florian Leimgruber

Team members: Otto Winter, Thomas Kaar

AZERBAIJAN



Team leader: Elmi Ahmadov

Team members: Alakbar Askarov, Ziya Mukhtarov, Abutalib Namazov,
Rafail Saddatimov

Guest: Eljakim Schrijvers

CROATIA

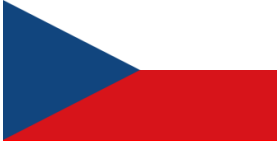


Team leaders: NikolaDmitrović, Ivan Paljak, Domagoj Bradač

Team members: Josip Kelava, Vilim Lendvaj, Josip Klepec,
Leonard Inkret

Guest: Krešimir Malnar

CZECH REPUBLIC



Team leaders: Jan Hadrava, Karolína Burešová

Team members: Josef Minařík, Martin Kurečka, Danil Koževnikov,
Pavel Hudec

GEORGIA



Team leaders: George Mandaria, Zaza Gamezardashvili,

Team members: Teimuraz Toloraia, Vano Gamezardashvili,
Giorgi Kldiashvili, Aleksandre Khokhiashvili

GERMANY



Team leaders: Gregor Matl, Philip Lukert

Team members: Tobias Schindler, Lukas Michel,
Florian Jüngermann, Marian Dietz

HUNGARY



Team leaders: Gyula Horváth, Győző Horváth,

Team members: Orsolya Lili Janzer, Máté Busa, Áron Noszály,
Attila Gáspár

ISRAEL



Team leaders: Nir Lavee, Daniel Hadas

Team members: Roei Sinai, Idan Izmirli, Nir Shalmon, Yuval Salant

ITALY



Team leaders: Luca Versari, Gemma Martini

Team members: Mirko Giacchini, Matteo Zappia, Daniele Venier,
Matilde Padovano

POLAND



Team leaders: Kamil Dębowski, Karol Pokorski

Team members: Anadi Agrawal, Stanisław Strzelecki, Jan Olkowski, Mariusz Trela

ROMANIA



Team leaders: Dan Pracsiu, Eugenie-Daniel Posdărăscu

Team members: Costin-Andrei Oncescu, Andrei Popa, Andrei-Costin Constantinescu, Tamio-Vesa Nakajima

Guest: Adriana Vesa

SLOVAKIA



Team leaders: Gabriela Andrejková, Jaroslav Petrucha

Team members: Ondrej Baranovič, Martin Melicher, Alan Marko, Paulína Smolárová

Guest: Peter Varša

SLOVENIA (I)



Team leader: Jelko Urbančič

Team members: Tadej Gašparovič, Bor Grošelj Simič, Blaž Zupančič, Žiga Željko

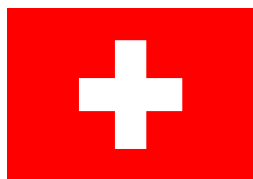
SLOVENIA (II)



Team leaders: Blaž Novak

Team members: Mitja Žalik, Tim Poštuvan, Matej Marinko, Gregor Kikelj

SWITZERLAND



Team leaders: Timon Gehr, Raphael Fischer

Team members: Elias Boschung, Bibin Muttappillil, Fabian Haller, Nicolas Camenisch

Instructions for contestants

Practice session

On Tuesday (11 July) the contestants should gather at the Faculty of Computer Science in hall P.01 at 9:30 where last minute announcements will be given. Each contestant will be assigned a place for the practice session. The usernames and passwords are the same as for the warm-up contest. The practice session will begin at 9:00 and will last 2 hours. In the first hour of the practice, session contestants should behave as if it were a real contest, so no communication or literature will be allowed. In the second hour of the practice session, the coaches may join the contestants and communication with each other is allowed. If any contestant wishes to use their own keyboard or have a mascot, they should bring it to the practice session and leave it there. Your keyboards and mascots will be taken care of and will wait for you at your desk on the first competition day. Literature or electronic devices may not be used as mascots. Should you encounter any issues with your computer, please contact staff immediately. Do not try to solve any technical issues on your own. Note that anything saved at your computer will be erased by the beginning of competition day 1.

Competition days 1 and 2

The contestants should arrive at the competition site by 8:45. The seating plan will be given in advance. The contestants are not allowed to bring anything to the contest site. Snacks, paper and pens will be provided. The contestants may give any valuable personal belongings to their coaches at the beginning of each contest. These items will be returned to their owners after the end of the contest. All the contestant accounts will have their passwords changed. The new passwords for contestant accounts will be waiting at the contestants' desks. If the contestant left a keyboard or a mascot at the practice session, it will be waiting at their desk. If any of the contestants wish to use the lavatories while the contest is running, they should let one of the guides at the site know. Should the contestant have any queries regarding the tasks or the contest, please use the built-in system of the competition environment.

CEIO 2017 SPONSORS & PARTNERS:

Golden



REPUBLIKA SLOVENIJA
**MINISTRSTVO ZA IZOBRAŽEVANJE,
ZNANOST IN ŠPORT**



Zavod
Republike
Slovenije
za šolstvo

Silver



Bronze

Mestna občina Ljubljana



POSTOJNSKA JAMA
CAVE-GROTTA-HÖHLE



ACADEMY



QUINTELLIGENCE
Intelligent Knowledge Management

Partners



For your notes

**Faculty building
1st floor**

**LPP bus station
"Živalski vrt ZOO"**

Building X

**Main entrance
Ground floor**



P22

P01

PR17

PR16

PR15

PR14

PR12

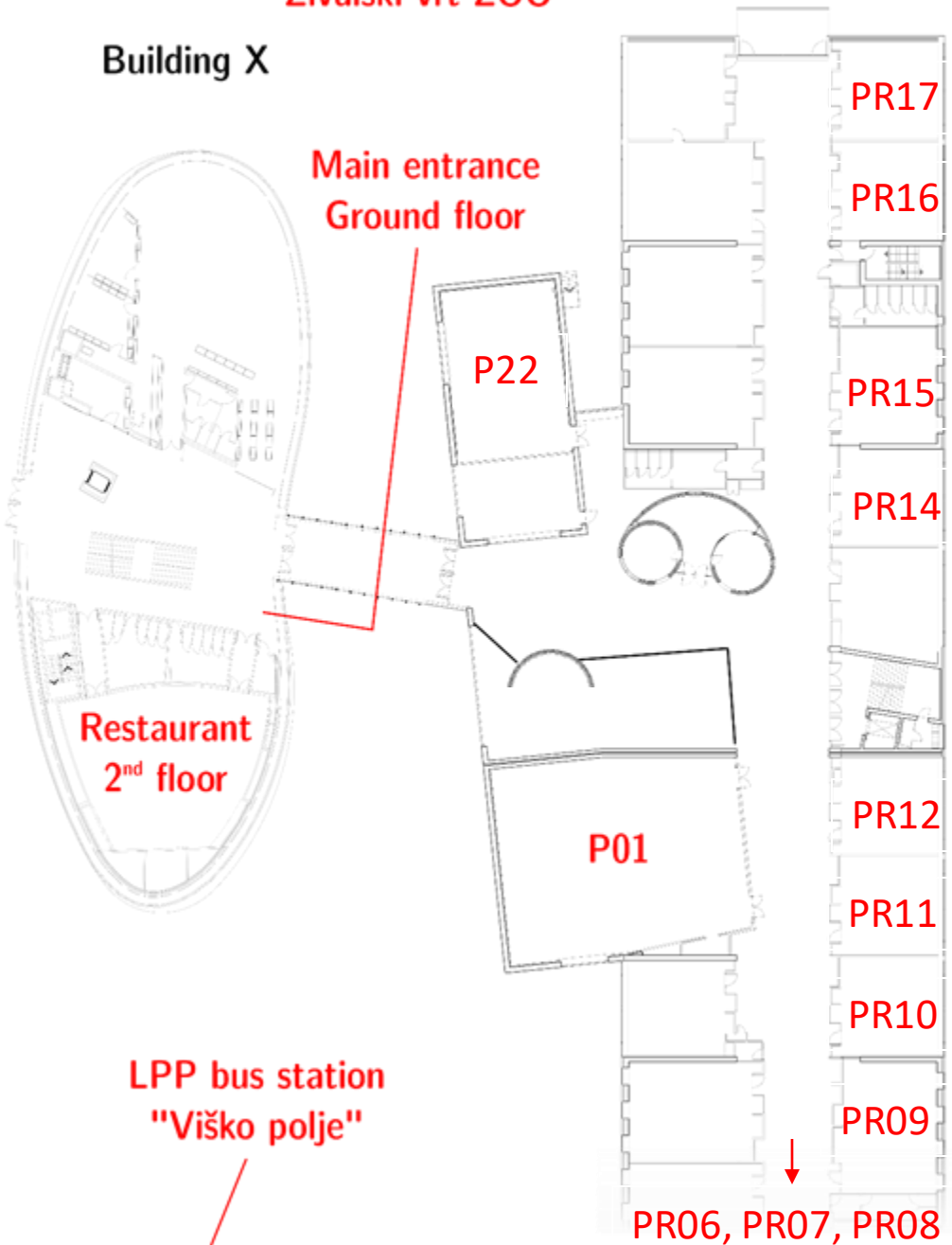
PR11

PR10

PR09

PR06, PR07, PR08

**LPP bus station
"Viško polje"**



CEOI 2017 Schedule – Summary

Monday, July 10 th	Tuesday, July 11 th	Wednesday, July 12 th	Thursday, July 13 th	Friday, July 14 th	Saturday, July 15 th
	7:00-8:30 Breakfast	7:00-8:30 Breakfast	7:00-8:30 Breakfast	7:00-8:00 Breakfast	7:00-8:30 Breakfast
	8:30 – 9:15 Getting to UL FRI	8:00 – 8:45 Getting to UL FRI	9:00 – 18:30 Excursion	8:00 – 8:45 Getting to UL FRI	8:30 – 10:00 Departure
	9:30 – 10:00 Technical instructions	9:00 – 14:00 Competition – Round 1		9:00 – 14:00 Competition – Round 2	
	10:00 – 12:00 Practice session				
	12:00 – 13:30 Lunch	14:00 – 15:00 Lunch		14:00 – 15:00 Lunch	
	13:30 – 14:30 Getting to the city	15:00 – 15:30 Testing and Evaluation		15:00 – 15:30 Testing and Evaluation	
	14:30 – 15:30 Opening	15:30 – 16:00 Presentation		15:30 – 16:30 Presentation	
	15:30 – 16:00 Photo Session			16:30 – 17:00 Free time	
	16:00 – 17:30 Ljubljana tour	16:00 – 18:30 Visit of ZOO		17:00 – 18:30 Awarding Ceremony Official CEOI Closure	
16:00 – 19:00 Arrival and Accommodation	17:30 – 19:00 Getting to the Dormitory	18:30 – 19:00 Getting to Čad		18:30 – 19:00 Getting to Dormitory	
19:00 – 20:30 Dinner	19:00 – 20:30 Dinner	19:00 – 21:00 Dinner at Čad		19:00 – 20:30 Dinner	19:00 – 20:30 Dinner
20:30 – 21:30 GA Meeting	20:30 – 24:00 GA Meeting	21:00 – 21:30 Getting to Dormitory	20:30 – 24:00 GA Meeting		