Faculty of Electrical Engineering and Computer Science

Universitatea Ştefan cel Mare Suceava

Primăria Municipiului Suceava

FUNDAȚIA CREST

The 31st International Computers Contest for Students

HARD &SOFT

Suceava

May 17-24, 2026

hardandsoft.ro


Stefan cel Mare University of Suceava
HARD &SOFT
The 31st International Computers Contest for Students
May 17-24
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JURY

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TEAMS

- Beihang University
- National University of Science and Technology Politehnica Bucharest 1
- National University of Science and Technology Politehnica Bucharest 2
- National University of Science and Technology Politehnica Bucharest 3
- Yuriy Fedcovich National University of Chernivtsy
- Technical University of Moldavia, Chisinau 1
- Technical University of Moldavia, Chisinau 2
- Technical University of Cluj-Napoca
- Technische Universitat Ilmenau
- Odessa Polytechnic National University
- University of Oradea
- Stefan cel Mare University of Suceava 1
- Stefan cel Mare University of Suceava 2
- Politehnica University of Timisoara 1
- Politehnica University of Timisoara 2
- Politehnica University of Timisoara 3

PROGRAMME

May 17	- Team Arrival
May 18, 8.30-9.30	- Check-in, Aula*
May 18, 10.00	- Official Opening, Aula*
May 18, 11.00	- Equipment touching
May 18, 14.00-22.00	- Contest
May 19-21, 9.00-22.00	- Contest
May 22, 8.00-12.00	- Assessment
May 22, 10.00-13.00	- Public presentation, Atrium*
May 22, 16.00-17.00	- Sponsors' presentation, Aula*
May 22, 17.00	- Award Ceremony, Aula*
May 23, 10.00-19.00	- Touristic Program
May 24	- Teams Departure

** E Building, ground floor*

Organizer

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Engineer Andreia-Carmen OPRIȘAN
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Engineer Ionuț CÎMPAN
FI®ESC Student Association

ABOUT THE CONTEST

Hard&Soft is a contest for teams of senior students of Computer Hardware and Software Engineering (Computer Science) who will work on an unseen task over a period of five days. Each team will have four members.
The contest task will focus on topical areas in Computer Engineering and Information and Communications Technology (ICT) that require a close link between hardware and software, it will require teams to demonstrate a broad spectrum of skills in these areas and a capability to design and implement a working system.
A full specification of the task will be given on the first day of the contest.
The task will require the use of specific components and techniques that must be included in each team's solution. Essential components, tools, PCs, programming environments and network/web access will be provided by the organizers. Teams can use their own laptops and other equipment during solution development.
Teams can bring with them or scavenge for additional hardware components to incorporate in their design but these must not substitute for the specified components.
Teams are allowed to use any public domain software during development of, or as part of, their solution.
The contest will primarily be judged at a demonstration to the Jury on the last day of the contest, assessment will also include design documentation, observation of work in progress and the presentation of work at a public demonstration or exhibition.
Teams are normally accompanied by Faculty member(s) as mentor and coach.
Free accommodation for students.

Contestant Knowledge Requirements

The Hard&Soft contest has a focus on topics that require a close link between hardware and software in real world applications of computers and ICT. To be successful teams need to demonstrate a broad spectrum of skills in these areas by creating a well-engineered and imaginative solution to the contest task.

Typical topics included in the task are:

- Microprocessor, embedded system and mobile systems design
- Software and hardware development environments
- Application of structured programming techniques, data structures and algorithms
- Adaption and use of public domain software
- Web programming, HTML, App design
- Graphics, DSP, RFID, secure wireless data transfer
- Interfacing for data gathering and control
- Design with sensors, analogue and digital circuits
- Prototype electronic, electrical and mechanical construction
- Good system design techniques that address all the task requirements
- Presentation and documentation skills for expert and non-expert audience.

HARD&SOFT Contest Basic Rules

1. The contest task and any associated „must use" hardware, software and techniques will be announced at the opening of the contest on the first day. The task specification will be available on line after the Opening Ceremony.
2. Each team will work in a university laboratory environment. All the laboratories will have similar equipment and facilities and will be randomly allocated to the teams in the first day of the contest. The laboratories will be open daily, from 8:00 to 21:00. Hosting staff will be present in each room.
3. Each team will have four members, who must be enrolled students of the university they represent, verification may be requested.
4. Team Coaches and Advisors are only allowed in their team's lab during the first day of the contest (Monday) and during assessments. A Coached and Advisors room will be allocated (D101) with network/internet facilities.
5. Technical Assistance will be available for the contestants in Room C307 for: component distribution, supply of minor components, device programming, report or data sheets printing, small mechanical works, PCB manufacturing and other support.
6. The task will be based on specific hardware, software, and techniques, which must form the core of a team's solution, additional components not obtained from Technical Assistance can be used but these must not replace those specified as the core of their design, teams are advised to obtain jury approval if they are unsure.
7. Public domain software can be used without restriction.
8. Contestants are allowed to use their own laptops and other mobile devices; network and internet access is available on campus.
9. Most activities should be carried out in the team's laboratory. The Jury will track progress by monitoring visits. Teams are honour bound to present work carried out by them alone and executed within the time frame of the contest.
10. Evaluation will be based on scheduled visits to the teams' laboratories: on a minimum of design documentation: and, on the final assessment, as detailed in the task specification on the first day.
11. The jury members may be consulted: in the Jury Room (C206, ext.172), during visits to the teams, or via other message exchange procedure agreed by the jury.
12. Equipment, logistics, and other technical endowments supplied to the team by the contest organisers must be returned on the last day of the contest, after the public presentation.
13. The official language of the contest is English.

PARTICIPATING TEAMS

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1994 Contest Theme

The design and achievement of a system having the functions of an oscilloscopes. The system will consist of a data acquisition module and an IRM PC compatible connected by a data link.

1. The data acquisition module should be able to scan periodic and continuous signals between 0 and 5V within 0 - 1 kHz frequency range. The module will accompany a microprocessor.

2. The data link could be serial or parallel in accordance with the imposed demands of performance. The acquisition module and computer will be on the same table.

3. Data processing will provide results in two windows:

3.1. The graphical window will display the signal just like an oscilloscope, but without movement, and observing the following; the dimensions of the simulated oscilloscope screen on both axes Ox and Oy (to be expressed, and observing the following; the drawing of a 10x10 division - frame within the screen; the user will be able to indicate: time basis (ms/division), signal level (mV/division), position 0 of scale (mV). the possibility of performing a zoom within the graphical window. The measurement start will be ordered by the user. Window renewal succeeds the command.

3.2 The alpha numerical window will display the following:

- the minimum, maximum and average values;
- the lapse of time between the start and the display on the simulated oscilloscope screen;
- the value of between two selected moments on the displayed curve by a graphic cursor;
- the frequency and period of a sample signal.

1995 Contest Theme

The minimal development system for one of the microcontrollers PCB 80C552, SAB 80535, I80C196, SAB8052, PIC16C84, ST6265, 8748/49 and a test application.

1. The development system

The system will have the following features:

• the host computer will be an IBM-PC compatible;

• it has a RAM loaded through PC parallel interface by the microcontroller with a pre-loaded embedded in its PROM.

The development system functions will be accessible from the PC keyboard:

• program loading;

• command for running the programs;

• step by step execution of the programs loaded into the microcontroller RAM

• breakpoints facility;

• when the program is stopped, the state of the microcontroller will be displayed;

• display and modification of registers and memory zone.

2. Test application

The implementation on a microcontroller of a signal generator. The signals will be analogical & periodic, with their forms specified by a program.

This program will transmit the following information to the microcontroller:

- the sample period chosen by the user from a set established by the designer;
- the number of points;
- the list of values for each point, describing a period signal continuously generated by the microcontroller, without a further connection to PC.

The user may specify the forms and the parameters of the signal by:

- a value table, read from the keyboard or from a file (ASCII format, a value per line, in converter units);
- a trigonometrically or polynomial function, chosen by the user from a menu;
- a function graphically edited by the mouse.

1996 Contest Theme

A Local Building Security System

A building has to be provided with a security system that includes a host computer (IBM PC compatible) and local room units. It has to be an open system that allows to increase the number of local units from 2 to 256. The system has a multilevel structure with the following minimal functions:

The host computer:

• will support a data base management system with some

access restrictions. The main information items which are to be stored in the data base are: the access code, the person identity, the room number, the access time interval;

• will provide a user friendly interface with the system manager in order to use the data base;

• will control local the security modules via communication lines; will test and monitor the whole security system.

The local units:

• every room has its own local unit which can work independently;

• will identify a person by his/her unique personal key and will grant the access to the room accordingly with the corresponding time table;

should be able to work in some critical situations like the absence of communication with the host computer, the local power supply falling-down, etc. In such situations,

• the local unit has to grant restricted access to some privileged persons;

• have to indicate their current state outside the room and to signal the access permission by a blinking LED.

In addition to allowing access to the room, a local unit is also provided with at most 8 sensors to protect the room against events like intrusion or fire in the room.

1997 Contest Theme

The contest task is to design, build and test an Autonomous Automated Guided Vehicle (a simple robot) that will follow a reflecting track on a plane surface and turn around and return to the starting end of the track if it meets an obstacle. The final stage of the competition will be to demonstrate the vehicle on a previously unseen pair of test tracks (one easy, one more difficult).

Each team will be provided with the following equipment in addition to that already made available:

- 2x6 volt DC motors & mounting screws
- 2 wheels (pairs of different sizes)
- 1 castor (either wheel or ball bearing)
- 2 infra red detectors for track detection
- 1 micro switch 1
- 4 x "AA" battery holder

Data sheets on:

- DC motor
- Infra red detector
- Suggestions for a test track for use during the development of the vehicle

Each team will design its own vehicle to meet the above mentioned functional specifications. It is suggested that the vehicle's dimensions should be about 200 mm long and 150 mm wide.

1998 Contest Theme

Voice Controlled Vehicle Project

Aim

To design and construct a vehicle that can be fully controlled by human generated sounds.

Vehicle Hardware

The vehicle will comprise a pair of geared DC motors to provide propulsion and steering, a microphone to monitor any sounds, a DSP card to process and analyse these sounds and a motor card to provide adequate power for the motors. Five 1.5V batteries will provide the power source. The main vehicle card is an ADSP EZ-KIT Lite DSP, details of which are given in the Analog Devices books provided.

The motor Driver Card is a custom made board for the vehicle project and provides the following facilities: four high current outputs (6V/500mA) to control the two drive motors; generates a single variable pulse width modulator (PWM) for motor speed control; provides two high current general purpose outputs (6V/300mA); provides a regulated supply for the microphone board. The board is 10 mapped as an eight bit output port.

The Microphone Board amplifies the input from microphone to a suitable level for the codec input of the DSP card.

Software

A control program is required which will monitor any sound produced, and compare them to a set of known sounds stored in memory known as templates. Each template contains the key frequency components of the sound that represents a particular command. If a sound is found to match one of these templates, then the appropriate signal is sent to the motors and the vehicle reacts to the command.

The pseudo-code below show in a simplified form the stages required for the controlled vehicle.

```
while (infinite) do
repeat
   SampleSignal()
until Threshold()
Perform FFT on data
if (* it is a conunand) then
   Output appropriate data
        to motor port
end
```

It provides the basic framework from which the contestants can develop their software.

Development software

- Program editor, assembler, linker
- EZ-Kit Lite Monitor (program that control the DSP card)
- Wave-viewer
- Testout (test operation of motors)
- Sample & Instant (signal capture and FFT)
- Library subroutines for normalisation, filtering, windowing, scramble, FFT, motor control

1999 Contest Theme

Sound Controlled Vehicle Project

Aim

To design and construct a vehicle that can automatically follow a path defined by four different sound sources. You will also design the sound sources.

Vehicle Hardware

The vehicle will consist of a pair of geared DC motors to provide propulsion and steering, a directional microphone to monitor the sounds, a DSP card to process and analyse these sounds and a motor card to provide adequate power for the motors. ADSP EZ-KIT Lite DSP card - this is the main vehicle controller card, details of which are given in the Analog devices books provided.

Motor Driver Card is a custom made board for the vehicle project and provides the following facilities: four high current outputs (6V/500mA) to control the two drive motors; generates a single variable pulse width modulator (PWM) for motor speed control; provides two high current general purpose outputs (6V/300mA); provides a regulated supply for the microphone board.

Software

A control program is required which will monitor the signal

received from the directional microphone, identify the different sound sources and drive the vehicle to each one in turn.
You have complete freedom to design and develop this software as you wish. You also have some freedom to design the sound sources.
Simple sound recognition can be done by comparing the frequency spectrum to a set of known spectrum patterns (templates) stored in memory. Each template would contain the key frequency components of the sound that represents a particular sound source. If a sound is found to match one of these templates, then the corresponding sound source has been recognised. Software is supplied to assist with this, if you wish to use it.
Another approach to sound source recognition would be to use digital filters to analyze the sounds. You may wish to design a more sophisticated system.

2000 Contest Theme

Infra-Red Controlled Vehicle Project

Aim

To design and construct a vehicle that can automatically follow a path defined by four different infra-red sources.

Vehicle Hardware

The vehicle will consist of a pair of geared DC motors to provide propulsion and steering, a directional infra-red sensor to monitor the I-R source, a DSP card to process and analyze the I-R signals and a motor card to provide adequate power for the motors.
ADSP EZ-KIT Lite DSP card - this is the main vehicle controller card, details of which are given in the Analog devices books provided.
Motor Driver Card is a custom made board for the vehicle project and provides the following facilities: four high current outputs (6V/500mA) to control the two drive motors; generates a single variable pulse width modulator (PWM) for motor speed control; provides two high current general purpose outputs (6V/300mA); provides a regulated supply for the sensor card.

Sensor Card

This simply amplifies the signal from the I-R sensor to a suitable level for the CODEC input of the DSP card. You should design and construct thus card. Not more than two op. amplifiers can be used in the card.

Software

A control program is required which will monitor the signal received from the I-R sensor, identify the different sources and drive the vehicle to each one in turn. You have complete freedom to design and develop this software as you wish.
Simple signal recognition can be done by comparing the frequency spectrum to a set of known spectrum patterns (templates) stored in memory. Each template would contain the key frequency components of the sound that represents a particular source. If a signal is found to match one of these templates, then the corresponding source has been recognised.
Software is supplied to assist with this, if you wish to use it.
Another approach to signal source recognition would be to use digital filters to analyse the signals.
You may wish to design a more sophisticated system.
The pseudo-code below shows in a simplified form the stages required for the controlled vehicle.

2001 Contest Theme

Video Camera Controlled Vehicle

Project Aim

To design and construct a vehicle that will be connected to a PC having an USB video camera and will automatically follow a path defined by four different colour sources.
A camera will be mounted looking down upon a rectangular track 3m x 4m and uniform in colour. The camera will connect to a PC via the USB port. The parallel port of the PC will connect to the robot vehicle.
Four “stations” (and the robot vehicle) will be positioned within the track. Each station will have a unique coloured pattern on the top surface, and so will the vehicle.
The PC will analyse the camera image, locate the stations and the vehicle and issue movement commands to the vehicle (move forwards, move backwards, turn left, turn right etc).
Each team may choose the programming language to use

for the PC.
The aim of the competition is for the vehicle to visit each station in turn, as quickly as possible.
The competition will be in two parts:
Part 1 – each team will choose the vehicle pattern independently, but each station will use a pattern specified by the jury. All teams will use the same set of station patterns.
Part 2 – the stations and the vehicle will use patterns chosen privately by each team. One member from each opposing team will be allowed to insert an interfering pattern into the camera's field of view. Each interfering pattern must be submitted before the start of the competition, without knowledge of the private patterns chosen by the other teams.

Software requirements

Teams can use any of programming languages provided by organizers.

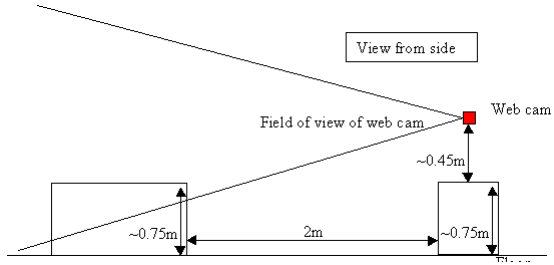
Description of software provided by jury

Software package consists of three modules:
1. ActiveX component "XVideo Video Capture Control 2.0". Installation of this component can be found in ..\ActiveX component\Setup.
2. MatLab's library files are placed on path ..\MatLab library. Copy them to MATLAB directory ..\work and read readme. txt for more details.
3. Visual C++ class CFrameGrabber is wrapper for AVICap window class and is intended for single-frame capturing.

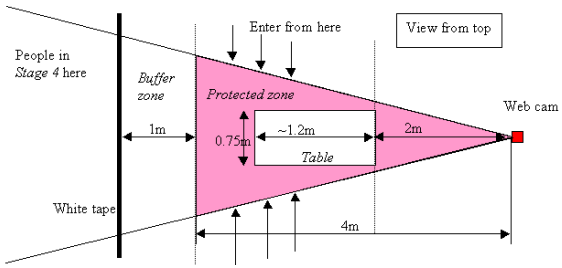
2002 Contest Theme

Intelligent alarm system based on image processing

A WebCam connected to the USB port of a PC will view a defined area.



The system will be controlled by a PIC based entry module designed and built by each team. During the contest the control of the system will be exclusively via this module.
As shown on the diagram, the camera will be mounted about 1.2m from the floor and the objects placed on a table about 0,75m high.
Alarm system should have two levels of alarm: warning alarm (level 1 alarm) and normal alarm (level 2 alarm).



Stage 1:

a) Small object (~1 cm diameter) provided by organisers is placed on the table. System should detect and indicate motion (alarm level 1 should turn on).

b) Larger object (~5 cm diameter) provided by organisers is placed on the table. System should detect and indicate motion (alarm level 2 should turn on).

Stage 2: *Member of team disables alarm, enters protected area, places an object of their choice (with dimensions not greater than 25 cm) on the table and resets the alarm.*

Stage 3: *Attempt by a person from opposing team to enter area from the side (see drawing) and remove the object. The level 1 alarm should turn on while the person enters protected area and alarm level 2 should sound when person touches or tries to remove an object. System should ignore small objects (about 1 cm diameter). The person is not allowed to use any tools except their hands including any type of light sources to saturate web cam.*

Stage 4: *Repeat Stage 3, but with a number of people beyond the buffer zone but in front of the camera*:

Would all teams write a short report (2 pages) and include a copy of their software. Report should be submitted on Friday morning before the competition starts.

2003 Contest Theme

Weather station

The competition is to develop an electronic, on-line, interactive, weather station. The task is to interface to remote analogue and digital weather sensors through a PIC microprocessor transferring the readings to simple microprocessor based web server, SitePlayer. This is, in turn, is controlled and interrogated over the network by a PC based web site that archives and displays the interpreted sensor data with regular updates or on-demand. The web site is also required to offer the option of a trend display of selected readings. The teams will be required to enable some on/off climate control features based on set points, or on demand.

As additions, the web site might calculate and display information that combines sensor readings such as wind chill factor or sunburn index, it may provide simple weather forecasting or may include any other facilities.

All necessary detailed specifications, data, software etc. are supplied on CDROM, installed on your PC hard disk, or in the Appendices.

1. Analog sensors, voltage signal typically 0-5v
   - Inside, outside temperature.
   - Humidity
   - Barometric pressure
   - Wind direction
   - Daylight

Digital sensors, variable frequency or pulse
   - Wind speed
   - Rainfall

These sensors to be interfaced through a D-type connector. During development you must simulate these signals.

2. The sensor signals are to be gathered, transformed and made available over the network by a PIC microcontroller and SitePlayer microserver combination and associated components.

One or more control channels must be implemented that will switch on and off devices to control the local conditions (so affecting the sensor readings) details of which will be given during the competition.

3. The SitePlayer must communicate with a PC where the data from the sensors is to be archived and viewed through a website. This website must display a main summary page with the measured weather characteristics in appropriate graphic form with regular updates. Displays must be calibrated in the usual units for each quantity displayed. The person viewing the page should be able to request an instantaneous update reading. Other pages should display trend (characteristic versus time) information for selected sensors, and display the data in tabular form.

Set points, which must be adjustable through the website, will control the actuation of the control channel(s).

The daylight sensor should be used to give some interesting indication of whether it is night or day (a simple example would be to change the background colour of the page appropriately).

4. Additional tasks

To inform about your additional tasks activity include extra web pages summarizing what you have done, report them in your presentation, and write about them in your report.

4.1 The sensors do not measure all the characteristics of the weather, can you suggest other measurements that could be made, how they may be incorporated in your electronic weather station and how you would minimize the power to enable it to be battery powered.

4.2 The readings from two or more sensors are sometimes combined to give additional information, examples are: wind chill factor, heat index. Include one or both of these on your website (details of the calculation or look up charts are PDF files on the CDROM or installed on your hard disk).

4.3 The daylight sensor could be converted to a sunshine recorder, this is not an easy task partly because the definition of what “sunshine” is not fixed and secondly it is a dynamic quantity so do you record an instantaneous reading or an average value?

Can you propose a way of converting the daylight sensor based on the following rules?

4.3.1 If more than 60% of the sky is cloud free it is sun-shining

4.3.2 Readings at 6-minute intervals are averaged to give an hourly value

4.4 In Appendix 3 is a copy of an old document prepared by the Irish Meteorological Office giving information about simple weather instruments for schools, it gives details of a hygrometer (measures humidity) that can be made from common materials. Build and display a hydrometer based on this design.

2004 Contest Theme

Professors Hunting

The contest task involves designing and developing a University Office Management System, based on simple, low cost components and network and database technologies. The system will allow students to identify those professors who are in their offices and who are available for consultations with students. The system must support a number of types of users, for example, students, professors, supervisors and safety managers. Each type of user will have a set of access privileges within the system. For example, student users may only interrogate the system for the presence/availability of professors; professors may specify if they are not available for consultation, while safety managers may have global access to the system and may optionally allow new users to register.

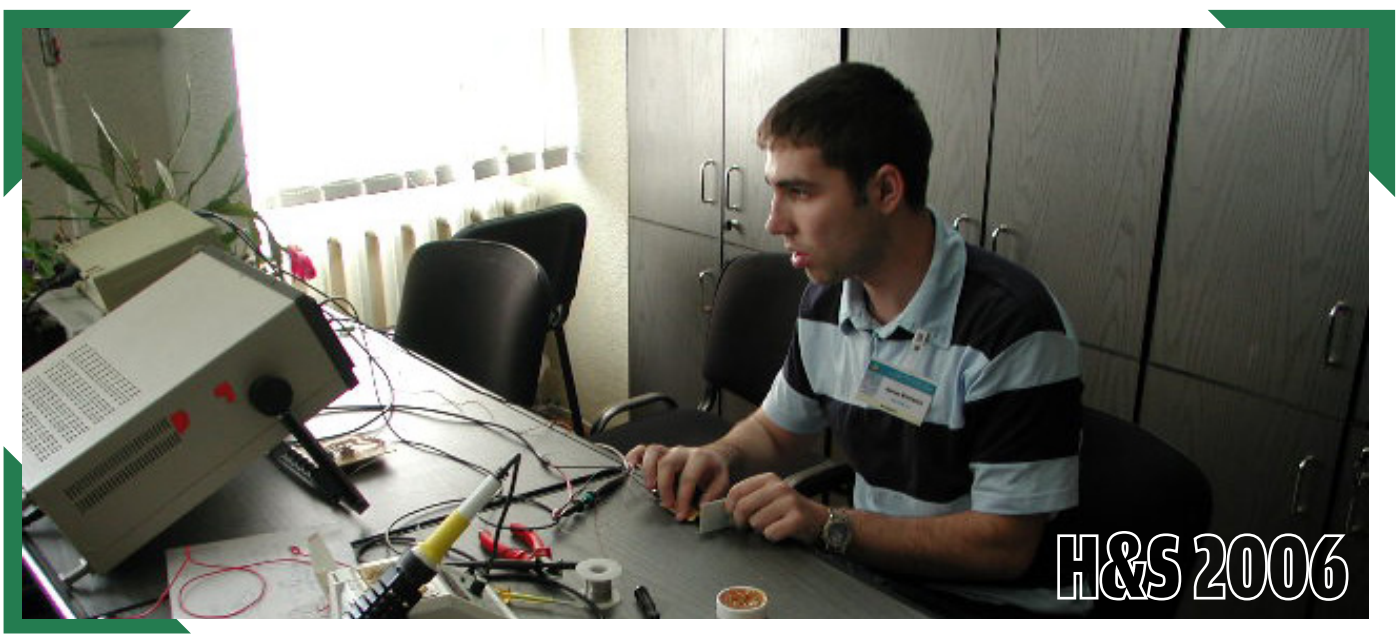
The contestants are required to develop the hardware and software to implement the office management system. The contestants must design and build the hardware to implement the entrance hall node and a single office node. The contestants will be required to prove that the office node can be easily duplicated to allow the system to manage multiple offices. The software system is required to be secure and extensible, allowing new users to be registered simply, and allowing new levels of users to be defined. An attractive and useful user interface is also required.W

2005 Contest Theme

Remote instrumentation, analysis/control and feedback

The contestants will be required to design and build an electronic system linked to a PC where data manipulation will lead to system feedback and user display. Some elements of the system will be remote. Contestants will have open network access but hardware resources will be limited.

The contest theme is focused on elevators systems control.



The contestants have to provide three solutions: a hardware solution, a software solution and a mixt hardware-software solution. The communication between the teams and the jury will take place via a web site. Full specifications and reports will be posted here.

2006 Contest Theme

GRYPHON: Gym Physiological Data Monitor & Record System

The task

Develop a portable device to monitor a person through a series of gym apparatus and keep records, the device should monitor at least heart rate and respiration with instant readout.

Download data to a PC based record system that should generate reports of history, and analysis with good graphics.

You must

Incorporate the following devices or techniques:
RFID, Wireless link, AVR Butterfly.
Submit a brief daily diary report on-line.

You get

A kit of hardware parts, how you use (or don't use) them is up to you.

A standard working area, with tools and lab equipment for hardware development and two networked PCs.

Some shared facilities are available, such as RFID tools, microprocessor programming.

There are (limited) component stores.

Teams are free to use other components and resources.

How to win!

This is a straight forward contest, judging will be based on originality, creativity, functionality. The team judged to have provided the most complete and imaginative solution by 10 am Friday will win.

2007 Contest Theme

Competition Tasks

This year the jury set the participating teams three tasks, which required the teams to undertake both hardware and software development tasks. The students had laess than four days to accomplish these tasks, so not only was a high level of expertise required, it was also necessary for the groups to work well as a team and to plan their projects well. The tasks were:

Part 1: Funny Voices

Set up a real time voice altering system in the Blackfin, with at least one effect. The students must provide a live demo.

Part 2: ECG

For ECG, electrocardiogram, electrical signals are normally picked up by electrodes attached to the skin on the chest, good electrical contact is essential as the signals are small. The power of DSP for real-time filtering and conditioning means that a good signal can be obtained using simple hand held sensors.

Design and build an ECG system using simple hand held electrodes capable of displaying the full detail of the ECG waveform. Signal processing should be done by the Blackfin; the graphical display may be from the Blackfin or on a PC.

Part 3: Air Guitar (or Air Drums)

Make a real-time "performance system" based on detection of the movements of a solo performer (air guitar, air drums, dance, or other physical body movements). Music or sound synthesis must be triggered and modified by detecting the movement of the "performer", a graphical display may be generated to enhance the effect.

You can extend its capabilities in any way you like; your solution may be heavily dependant on hardware or may be mostly software. It may involve PCs but the DSP must be carried out by the Blackfin and be (mostly) real-time.

A final requirement is that RFID must be used somewhere in a meaningful way in Part 2 or Part 3 of the project.

2008 Contest Theme

Computer as Electronic waste - toxic and long lived pollutants in landfill

- more and more of it

Recycle - lots of it ends up in China, Africa, India where reclamation is crude and life threatening. Often not recycled but dumped! Legal and public pressure forces big companies to accept back old product and governments to introduce recycling Schemes (e.g. WEEE in Ireland)

Reuse - local - give it to a school but do they want it?

Resell - Lots of users don't need the latest thing and would welcome a cheep second hand alternative - but how do you know what you're buying?

Charities, companies refurbish and send to "poor users" or to third world. Limited capacity relies on volunteer labour to test and refurbish.

But much bigger potential market if quality can be assessed and guaranteed.

That's the competition task:

How do know a second use PC is worth buying?

It may have been misused, it may have belonged to a gamer who over-clocked it and stressed the CPU, it may have intermittent fault or a BIOS problem, or other non-fatal problems.

Second Life for PCs Your task is split into four parts:

Discover what information may be available from your PC that could be used to assess its health, how to get at this information, decide which factors are important in determining a PC's second-user quality, and how to present this information in a meaningful way to a potential customer who will not be a computer expert.

What additional information, data or controls does your team consider important in assessing or improving the second-use value of a PC. How would you add this capability to your second-use valuation? (Your solution here may need additional hardware or software to be added to the PC when new or may use special hardware/software to make an assessment later.)

Make proposals for any additional data gathering, tests, or controls that you feel would be desirable but are beyond the time and resources available during the competition.

Show your work to the public in the Hard & Soft Exhibition held early afternoon on Friday.

2009 Contest Theme

OneX - Making On-line Experiments accessible for teachers and students

In many disciplines at school and university students conduct experiment to learn key fact hands-on. Teachers expend considerable effort to make these experiments doable and meaningful. Our contest task is to use the power of the ordinary PC with a specially designed interface, to

enhance the experiment experience for students, to make designing and setting up experiment easier for the teacher, and to show off our work in a spectacular way to the public.
There are four interlinked parts to the task:
1. An inexpensive microcontroller based interface for real world analogue and digital signals, linked to a PC via USB; the OneX box.
2. A web browser based environment for carrying out experiments, and for teachers to design and set up experiments. This environment should suitable for students and teachers from any discipline and require minimum computer literacy skills; the OneX environment.
3. Two, or three, demonstration experiments from different disciplines. One, described below is compulsory, one must be interesting and attractive (spectacular) for the general public. The third is optional, your opportunity to show special skills; OneX experiments.
4. Full on-line documentation for OneX.
To achieve high marks teams must pay balanced attention to all four parts of the task.
The Jury will assess your efforts by three means: first, we will visit you in your lab on Wednesday to look at work in progress and again on Friday morning (or possibly late Thursday afternoon) to see you finished (or nearly finished) work, second, your contribution to the public exhibition of your work early on Friday afternoon and finally, your submitted on-line “documents” that supports your design and experiments.
Here follows a more detailed description of the elements of the task:
The OneX box should provide sufficient programmable analogue and digital input and output signals to link to a wide range of experiments and should connect to the PC via USB. It may be used in conjunction with other PC peripherals such as web cams, scanners et cetera.
A key requirement is that the OneX box should be inexpensive; to encourage this you will be supplied with a PIC from the PIC 18F2455 family which costs only about €5. (You are allowed to use other devices if you wish, but your solution must still be inexpensive.)
A second key requirement is that the OneX box should be as idiot proof as possible, you must pay attention to protecting its input/output circuitry from damage and to providing easy to use and easily identifiable connections to the experiments.
The web browser environment to activate the OneX box

must isolate the user from all programming, and preferably provide an attractive graphical interface. A teacher should be able to set up a new experiment and enter the experimental and analysis procedure that the students must follow easily, and it must be capable of allowing the teacher the option of local or remote experiments, or experiments that the students set-up for themselves. The system must also archive experiments for re-use, enable students to submit their work for assessment, and allow the teacher to give feedback and keep a grade-book. (Note that you are free to base your work on any open source tools that may useful.)

To demonstrate the capability of your system you will develop two or three sample experiments from different disciplines. One must be the temperature measurement and control experiment outlined below and one must attract the interest of the general public preferably in a spectacular way, the third is optional and is included to enable you to demonstrate special or original features of your design.

2010 Contest Theme

SoNDa: Sensor Network for Data: Explore!

Your task is to demonstrate the capabilities of modern wireless mobile devices to act as sensors or sensor controllers as part of a system for data gathering, analysis, interpretation and delivery via internet or web based services. The keywords are: wireless, sensors, communication. The choice of application(s), sensors, their interfacing, web services, internet based processing, and user interface is entirely up to you. There are no restrictions on the mobile platform, programming languages or operating system you adopt. However, the Jury will be looking for novel ideas that you have developed into working systems, and remember you should make your work accessible and interesting (spectacular?) to the audience of the public exhibition on Friday.

The outline requirements are:

Sensors: The mobile device must be able to discover and associate its sensors, with no, or minimal, user GUI interaction. The sensors may include any of the mobile devices own components.

You should assume that other sensors and mobile devices are in the same area. Smart strategies for how to ensure that the mobile device and its sensors are correctly associated will add to the usability.

Additional sensors can be connected either wirelessly or wired to the mobile device as appropriate.

Power Consumption: Particular consideration must be given to the power consumption of the mobile part of your

system (processors, sensors, wireless technologies and usage modes).
A Power Meter indicating battery levels and instantaneous power should be considered to show the impact of any low power strategies adopted.
Minimum User Intervention: Alternative strategies to manage the data collection from the sensors should be considered and their tradeoffs understood before implementation. A key design aim should be to minimise user intervention and to automatically connect and reconnect without undue wastage of resources. The application should gracefully degrade and recover when sensors are moved in and out of range.
Careful consideration should be given to simplifying the installation of the application on the mobile device.
Wireless Security: Data integrity and security should be considered.
Robustness: The application(s) you choose to run on your system should illustrate the power and robustness of the communication architecture adopted.
Issues such as scalability and co-existence should be considered.

Additional Information: Note that additional sensors may be hard wired through serial, or usb, interfaces to enhance the capability of a low functionality mobile device linked wirelessly to applications hosted elsewhere.
It is probable that you will consider a Bluetooth based solution given its near ubiquitous deployment in mobile phones and portable devices, and the use of standardised APIs such as Java JSR-82. However, Wifi alternatives or proprietary communication technologies are allowed. The use of web services is optional but if adopted code generators for developing the service and the client may be used.
The focus of your design should be to identify the necessary classes and APIs to be developed and implemented. The Jury will expect to see: interaction diagrams, to document the major interactions among the objects or classes: state diagrams, to denote the states of the connection and the application life cycle e.g. if Java is adopted, the MIDlet states should be handled.
There are no restriction on the application area(s) you choose other than those imposed by the nature of the contest and the contest rules, some potential areas are: environment, health/fitness, navigation and positioning, movement

and activity detection, logistics, games, social monitoring, multiple user interaction, audience participation, music and entertainment.

2011 Contest Theme

EN-ECO

Your task is to develop an energy measuring and monitoring system for any personal environment, the purpose being energy audit, energy efficiency, minimisation of energy use, waste energy recovery. Your system may also control energy input and use in that environment.

- Monitoring of Energy to ensure efficiency
- Any personal environment
- Your system should itself use minimum energy

Typical applications could be: assessment of the environmental impact of an activity, matching energy usage to appropriate energy source, micro-analysis and optimisation of energy usage, off-grid living, analysis of alternative energy generation, waste energy harvesting, reduction of energy input to house, small business or other personal environment, optimisation of energy needs of a hobby or sport, energy used in education or training.

To demonstrate your mastery of the Hard and Soft arena your system should include remote / mobile sensors, remote / mobile applications, communication links using different media or networks, data gathering, storage, organisation, analysis, interpretation and display.

The hardware of a least one part of your system must be designed and constructed as part of the task.

At least one remote / mobile sensor must need no battery to operate.

At least one part of the human interface of your system must be on a mobile device.

You must use the supplied OM11042 or equivalent in your design.

An energy audit and demonstration of energy minimisation in your design is required. The only restrictions are those imposed by the nature of the contest and the contest rules.

2012 Contest Theme

OLLA (On-Line Laboratory)

Using the embed microcontroller supplied construct a remote access on - line lab accessed and supported by a Moodle environment

• The lab is to have two experiment sets: OLLIC: Instrumentation & Control and OLLFREE: experiment(s) you choose.

OLLIC:

On-Line Lab Instrumentation & Control Series of experiments to illustrate key topics, signal capture, signal conditioning, control loop, set point, PID control. Based on a simple temperature controlled "oven". Suggested topics to include are in the full specification. The topic instrumentation & Control was chosen because it is a common component of university programmes in computers, electronics and applied physics (you will have studied it but it's not your specialism). The level of detail should be suitable for 3rd students.

OLLFREE:

Your free choice of experiment(s), on a different topic that is common in university programmes: computers, electronics, applied physics using the same mbed core as OLLIC

The Jury will expect

Experimental set-up is controlled by the mBed with require little or no human intervention. User interface through a Moodle LMS, (Each team has its own course site. The Jury do not expect you to write full experiment text, outlines/notes are OK so long as your intent is clear).

Wireless and/or mobile data and control used somewhere in your design.

Your design, both hardware and software, to be inexpensive, easy to set–up and maintain and easily expanded with more experiment

All features of your design to make a direct contribution to the experimental set-up, the learning, or be associated with the management, maintenance, or expansion of the system.

A final requirement: You may use only equipment and components supplied or approved by the contest organisers. (You are allowed to use your own laptops and smart devices.)

Moodle

To enable you to concentrate of the hard and soft aspects of your task and minimise the "courseware" writing each team has been given a Moodle course environment, access to and activation of your OLLA solution must be through this.

The Jury also have a Moodle "course" for the contest, further information about the task and contest is there.

2013 Contest Theme

Task20/50

The basic technical challenge of Task20/50 is to control the helicopter from the RaspberryPi and capture video from the camera in real time. The system must be capable of autonomous target seeking behavior. An additional microcontroller can be used. The RaspberryPi must be the main controlling device. The targets are simple black-on-white geometric shapes in a defined space.

The work evaluation is focusing on the aspects below.

1. Technical assessment based on design documentation
2. Basic demonstration of controlled flight and target recognition
3. Autonomous target seeking demonstration

As basic functional assessment the control of flight has to be demonstrated (take off, fly straight line, hover, return and land). The flight must be controlled from the RaspberryPi and all team members must be out of direct sight. No specific times or distances are specified but each step must be clear.

For target location the next actions are necessary: take off find and clearly identify target (e.g. full screen image, or fly to object and hover) return and land. The target is a simple A4 black-on white geometric shape at about chest height mounted vertically.

The autonomous target seeking is based on a timed flight to visit three from four targets in a pre-specified order. Mapping and practice flights are allowed, but total max flight time is one battery charge (about 7 minutes). The system must time stamp take-off, three target times, and landing. Targets are placed between 1 and 3 meters above ground in a test area with no more than 8 meters square.

2014 Contest Theme

Exploring an exoplanet

The space telescope Kepler has been searching for planets orbiting other stars, exoplanets, that could be earthlike. They orbit their sun in the "Goldilocks Zone" where conditions are "just right" for Earthlike planets to exist: Sun like star or red dwarf, Earth size rocky planet, Orbit in the Goldilocks

Zone - possible liquid water &atmosphere. Kepler has found several candidates.

The task for H&S 2014 is to explore an exoplanet in our "Goldilocks Lab". You will build a remote controlled rover and search for Earthlike characteristics to show that our exoplanet is "just right". There are some compromises, our goldilocks lab is rather smaller than a planet and we can't wait for the thousands of years radio communications would take.

What Equipment are we giving you? Radio Controlled Rock Crawler, RaspberryPi, RasberryPi camera, Various sensors. Your design can also include: A second slave microcontroller, Other components as available from the
technical assistance lab, Any free/open source software.

The Jury will favour solutions with a minimum of additions.

What can you expect the lab to be like? A square area approximately 3x3m with an earthlike terrain, probably some obstacles your rover can't climb, containing features you would expect to find on earth.

What to look for? Earthlike climatic conditions, Surface topgraphy (basic mapping), Liquid water, Evidence of running water in the past, Variations in surface temperature, Metalic minerals (There are many more possible features but the contest is limited to these).

Your rover (autonomously or under remote control) must:

1. explore the Goldilocks lab making a basic topographical map
2. measure climatic conditions
3. look for at least one other feature from the list
4.One of your sensors must be built from 1st principles (e.g pn junction thermometer, build your own metal detector ...)

Teams will be Judged in three areas: System design and achievement, 2. Performance in the lab, 3. Working and final documentation

Details of marking breakdown, documentation requirements and lab access and schedule will be given later.

2015 Contest Theme

Treasure Hunt - Wearables go Walkabout

Build a "wearable" system for:

- Orienteering
- Biometric data gathering
- Electronic treasure hunt

Orienteering - Follow a course round Campus moderated by

RFID and reported by Twitter.

Biometric Data Gathering - The system will monitor and record biometric data from the orienteer and gather environmental data: Heart rate, Respiration rate, Body temperature, Number of steps, Distance travelled, Air temperature, Humidity, (extras?).

Electronic Treasure Hunt - At each orienteering way-point the system must autonomously identify and measure a "Treasure".

What are we giving you:

- Intel Edison with Aduino breakout board
- RFID sub-system
- Sensors for biometric and environmental data
- Sensors to identify and measure "treasures"
- What will you do:
- Build a battery powered wearable prototype robust enough to be carried round the orienteering course
- Gather biometric data from the orienteer and monitor the environment
- Autonomously identify and measure a key characteristic of "treasures"
- Gather and record data that will authenticate the journey using RFID (Start, finish and each Way-point)
- What will you do continued:
- Communicate progress using Twitter through the campus Wi-Fi
- On return to base, download all data in a specified format and send to the Jury
- At your base display your progress and data (enhanced in anyway you like) to the public
- How will the Jury test your work:
- On Friday morning teams will set up a base. Two members of the team will follow the orienteering course, one of them being monitored for bio-data.
- Progress moderated by RFID, at the start, finish, and at each way-point a tag will be read, the data and time-stamp recorded and Tweeted
- At each way-point your system should identify and measure the treasure (You have max 10 mins for this)
- On return download all data in a specified format to the Jury
- The Jury will look at your display for the public
- Further details and rules on Wednesday

Treasures and characteristic to be measured will be selected from this list:

- Audio sound: fundamental frequency
- Pulsed ultra-sound: pulse rate
- Hot or cold surface: temperature
- Magnetic field (+/-650 gauss) field strength
- Two colour visible light: blink rate, mark/space ratio of each colour
- Infra-red data in a standard format: identify data
- Nothing: (necessary to ignore noise and spurious signals)

Twitter - Each team must set up a Twitter account in the format:

teamnameHardnSoft2015 e.g. Suceava1HardnSoft2015 Teams must follow the Jury @ HardnSoftJury.

2016 Contest Theme

IoT-Home Hub (Internet of Things - Home Hub)

Build a Universal Home Hub system!

Steps:

1. design the system
2. build the Home Hub based on given hardware
3. choose two home application areas and build demo IoT networks for them
4. carry out a compulsory task that represents a typical home IoT application
5. report your work to the Jury (demos, reports, Q&A)
6. show your work at a public fair on the last day

Guidelines:

1. Designing the Universal Home - Your first task is to design a Universal Home Hub system, part of which you will implement. Your design, reconfigurable and expandable, should be capable of working with any home IoT application.
2. Building the Home Hub - Your Home Hub should be accessible locally, preferably through its own GUI, through the house router by WiFi to Android devices via an App, and to PCs and other devices across the internet via a web browser. There should be a remote secure “service mode” for software updates and for future sensor calibration and configurations.
3. Home Application Networks - Choose two home application areas, for each design and build demo networks of IoT WiFi connected objects. Each network should adequately show the possibilities for the application area, within the limits of available hardware. Where batteries are used, pay proper attention to low power. Design and carry out a power audit. If your applications involve mains driven devices consider simulating them using leds or other means. You may need to reconfigure your system to demonstrate each application, design so that you can do this quickly.
4. Compulsory Task - This is in addition to your two application areas. Design an application to detect a fall by a vulnerable family member, report it to a carer, and confirm their response.

Available devices:

- for the Home Hub: choice of Raspberry Pi or Intel Edison (or both)
- for the Home Application Networks: ASPDuino (Arduino UNO with ESP8266 WiFi), Arduino sensor kit (30+sensors)
- RFID, camera, PIR, ultrasound, smoke/gas sensor, gyro/accelerometer, 2line LCD display
- you may use any open source or free software
- you may use your own smartphone/tablet/laptop/webcam.

2017 Contest Theme

Techno-Bike

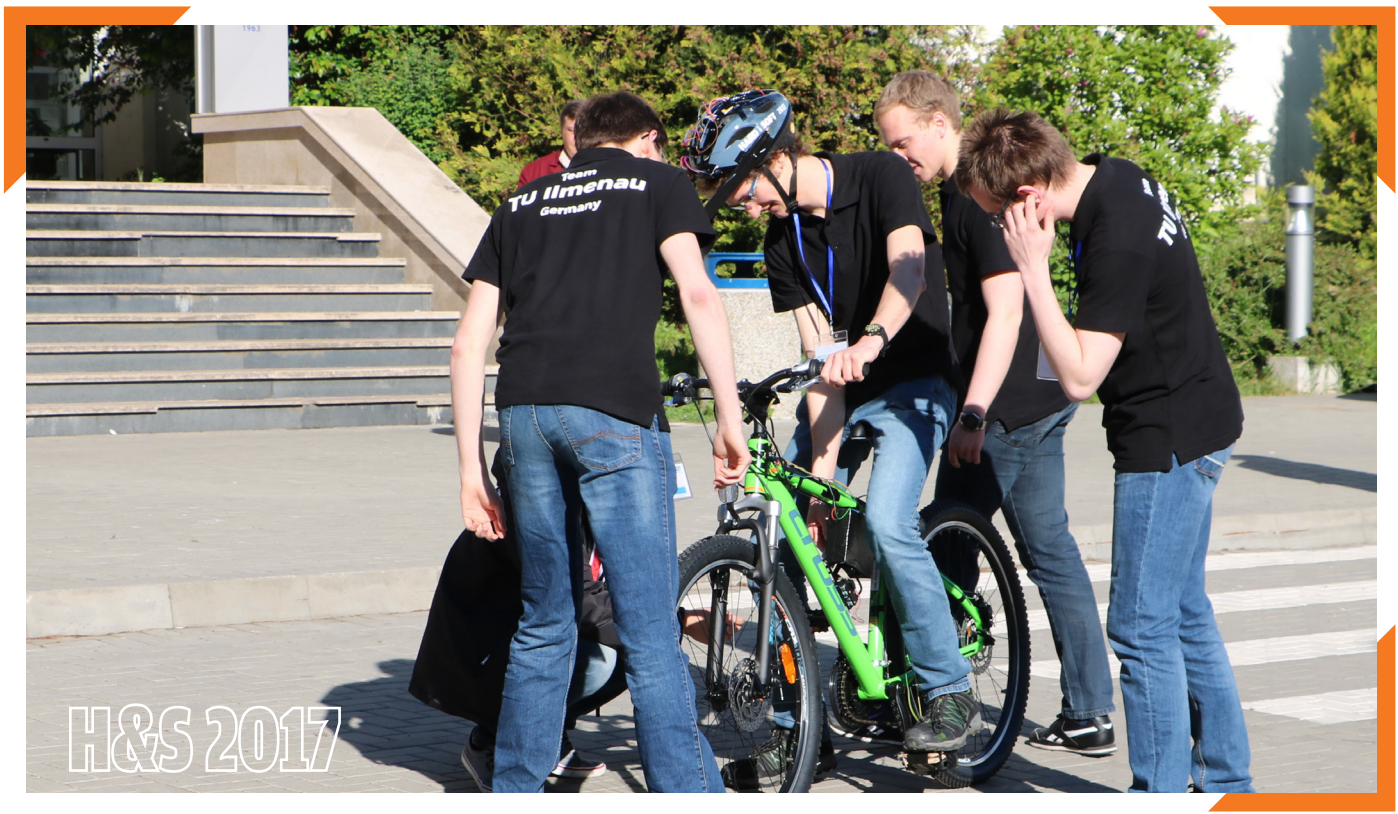
H&S2017 will explore how micro-computer based technology can measure, record, analyse, document, and communicate information about a journey taken by bicycle.

Using a bike has three elements: rider, bike, and journey. You will explore all three.

Your design will be based around an Intel Genuino 101 mounted on a bicycle helmet and will gather data about the rider, the bike and the journey with the assistance of an Android smartphone and communication with a PC/tablet home base. A wide range of sensors and other components will be available.

The Jury will expect to see the principles of good engineering design applied, in particular: design features should serve a real purpose as part of an overall design strategy. There should be efficient use of available battery power, and proper attention paid to wireless data security.

Your system must be attached to the helmet or the rider. Anything mounted on the bike must be easily and



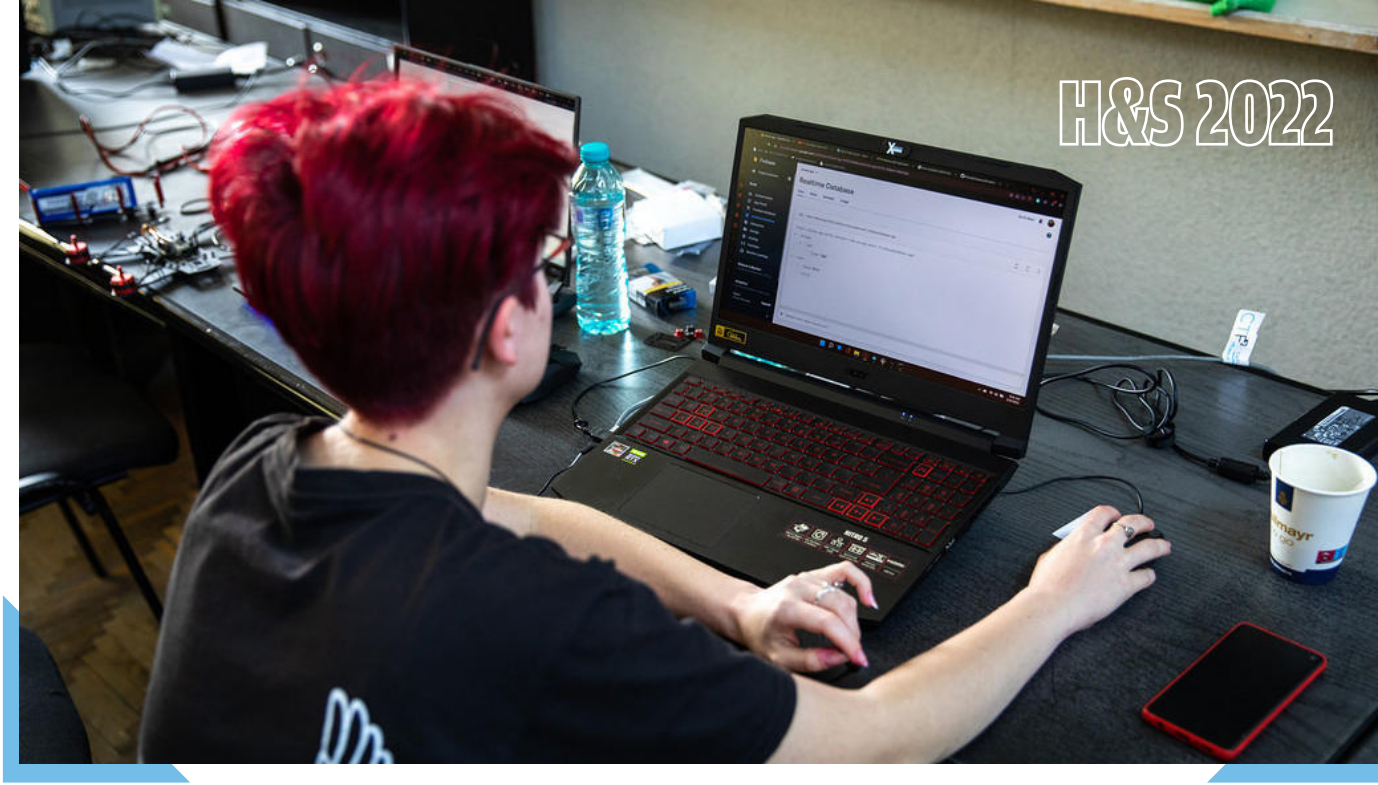
quickly removed.
The exact nature of the data gathered about the rider, the bike, the journey, and its use is for you to decide.
The contest will be judged in three ways, design brief and final summary documentation: a Jury lab visit mid-week: and, a final test and public demonstration on the last day.
For the final test a team member will ride the bike round a specified circuit with intermediate points verified by reading RFID tags, communicating in real-time with the team's home-base where progress will be recorded and displayed on a tablet, laptop or PC.

2018 Contest Theme

Remote, no Moving Parts, Weather Station

The core characteristics of the weather that weather stations measure and record are: temperature, humidity, barometric pressure, wind speed and direction and rainfall.

Traditional sensors for wind, weather vane and cup anemometer, and rainfall, tipping bucket, have moving parts these must be replaced with no moving parts alternatives.
Battery power with solar charging is obvious and a system design for power conservation is needed.
The weather station data is to be sent (Bluetooth, WiFi, GMS as appropriate) to a base station for archiving, processing and display and must be available through an App on Android mobile devices.
Your remote location, no moving parts, Weather Station for Hard and Soft 2018 will have at its core an ESP32 from Espressif and you are given a BME280 temperature, humidity, barometric pressure IC. These you must use in your design. Additional components we anticipate you may need are provided and others are available from H&S Technical Assistance. Your design must not contain more than 20% hardware not provided by H&S. (if in doubt ask the Jury.)
You may use any open source software, development



system, libraries etc.
Additional weather sensors, design for severe weather operation, meaningful derived quantities, user friendly data display etc. will attract higher marks and be used to resolve tie-breaks.

2019 Contest Theme

IoT4U Internet of Things directly serves You

The task is to design, build, and demonstrate an autonomous mobile toy or assistance device. Teams are free to choose a way of implementation as a toy for a child, adult, or pet, an educational toy, an assistance device for a child with special needs, an assistance device for a disabled, infirm, or elderly person.
The teams have at their disposal two different ESP32 development systems, a simple wheeled chassis, servos and motor and drive IC, extensive sensors kit which includes gyro/accelerometer and camera.
Competitors may use any open-source software, development systems, libraries. Mobile devices, Android smartphones or tablets can also be used.
The evaluation will take the originality of the achievement through the novelty correlated with the coverage of the theme requirements, the complexity and level of hardware and software knowledge thus demonstrated, the practical realization and validation of the functionality according to the theme specifications.
The final judging takes place on the last day of the competition, Friday, when the teams will present the product made in a public exhibition.

2022 Contest Theme

The Sky is the Limit

The proposed theme for the 2022 edition was to build a drone and to design its control system so that it can move along a route marked by a system of radio beacons, each point reached being identified by recognising a QR Code with a built-in camera.
The main components provided to competitors are a drone kit with CC3D flight controller, ESP32-CAM DevModules

and a DWM1001 Development Board for locating a moving or fixed target. The drone must be controllable via a web interface, but it can also move autonomously by reading QR Codes associated with each checkpoint, which once scanned specify the next checkpoint to be found.

For the evaluation, the jury ponders the proposed solutions, the hardware design of the system and its functionality in terms of the ability to interact with the drone via a web server and a suitable interface, the ability of stable flight with altitude maintenance, the autonomous movement along Anchor reference points, the scanning, and the interpretation of QR Codes that provide the coordinates of the next checkpoint, respectively Code.

Other considerations in the judging process are the design based on the use of principles of good engineering design, so that the design features match the most realistic implementation solutions and are part of an overall design strategy, the appropriate use of all the construction elements provided to the teams, the provision of the security of wireless communications, and the efficient use of available battery capacity.

Final judging takes place on the last day of the competition, when the teams demonstrate the functionality of the product they have created during a public presentation. It is expected that the designed drones and the control systems allow controlled flight in a defined area and along a route marked with anchor markers and QR codes, as well as automatic flight tracking and monitoring.

The jury's evaluation will also consider the designs' originality in terms of novelty in relation to the requirements of the theme, the complexity and level of hardware and software knowledge, the practical implementation and validation of the functionality according to the theme specifications, as well as the technical and engineering approach to achieve the proposed objectives.

2023 Contest Theme

Where Green Meets Speed

The H&S 2023 competition requires competing teams to construct an electric vehicle utilising specified hardware components, with the option to include a restricted number of extra parts.

Teams are provided with a collection of gadgets and modules that allow them to build a compact electric car. The

vehicle must be powered exclusively by environmentally friendly energy sources. Participants are given specialised controllers for the purpose of capturing and charging energy in super-capacitor storage devices, together with Wi-Fi communication interfaces.

The vehicle must have the capability to be operated remotely using wireless technology, either through a secure web interface or a mobile application. The device must execute precise movements and function autonomously, without relying on other sources of energy. Energy management is a crucial aspect to take into account. If desired, the vehicle can be designed to autonomously go through an obstacle course scenario.

The evaluation will assess the originality of the implementation in relation to its novelty and adherence to the theme requirements. It will also consider the complexity and level of demonstrated hardware and software knowledge, as well as the practical implementation and validation of functionality based on the theme specifications. Additionally, the evaluation will consider the engineering technical approach used to achieve the proposed objectives. Assessing energy management and ensuring secure communication are crucial elements of the evaluation.

The final judging takes place on the last day of the competition, which is Friday, when teams will present their achievements during a public exhibition.

2024 Contest Theme

Smart Home System

What you have to do:

- Build a smart parking access system; based on the camera feed, an algorithm should decide if the house guest can enter or not the garage/parking.
- Automatic control of the blinds based on the sun position.
- Maintain a constant level of luminosity inside the house. The natural light will have priority over artificial one.
- Green energy management -> storage of extra/unused solar energy.
- Implement a monitoring and management backend / application.

The jury expects you to:

- Apply the principles of good engineering design, in particular design features that should serve a real function and be part of an overall design strategy.
- Include all key HW elements received (BeagleBone Green WiFi, Camera, RF-Id, Linear Motors, Barrier – Concept, Solar panels, Battery pack).
- Pay attention to the security of the smart house.

- Good management of the green energy.

How will the jury assess your work?

- A brief design PDF document by 10:00am Tuesday by email to Jury Email.
- Jury visit of about 15 minutes to your lab on Wednesday to view work – in progress.
- A final summary PDF document by 8:00am Friday by email to Jury Email.
- Final test and public demonstration on Friday morning.

Criteria for final test:

- Brief design document and summary PDF document are delivered to Jury Email.
- Green energy management.
- Security concept.
- Algorithm for luminosity control.
- Monitoring and management backend / application.

2025 Contest Theme

Smart Wheels: Navigating the Future with Analog Sensors and Ethical Hacking

The Smart Wheels 2025 competition tasked teams with designing and building an autonomous RoboCar capable of navigating a randomly constructed physical maze using analog sensors and on-board, real-time decision-making.

Each entry had to stream operational logs — including timestamps, estimated position, and key events — to a custom cloud platform, and demonstrate tight hardware–software integration using the provided kit (Raspberry Pi, sensors, camera, MicroROS board) and ROS2-based control.

Teams were required to detect and respond to a variety of environmental cues: static and dynamic obstacles, vibrations, magnetic fields, and the presence of alcohol. From Thursday onward, an ethical-hacking phase allowed participants to probe their own systems and the cloud platform to identify and report vulnerabilities; any attempt to exploit discovered weaknesses or engage in black-hat behavior resulted in immediate disqualification. Crucially, once a run began the RoboCar had to operate entirely autonomously — no human intervention or external processing was permitted.

The competition emphasized practical, purposeful design: every component choice needed to serve a clear strategy, with meaningful use of all kit hardware. Energy-aware design and efficient power management were mandatory so robots could complete the course without unnecessary consumption. Submissions were evaluated not only on successful maze completion but also on the security and reliability of logging, the robustness of sensor fusion and AI-driven decision logic, and the overall system integration.

Key milestones included submission of a design PDF, jury lab visit to review progress, and a final report PDF, followed by a public demonstration and final testing. The jury's final assessment prioritized full autonomy, comprehensive use of kit components, secure real-time logging and ethical vulnerability testing, energy efficiency, and adaptive, intelligent navigation behavior.

H&S 2024

1994

Ranking	Jury
1. Bucuresti	**President**
2. Timisoara	John MILNER, City University, London
3. Suceava	**Members**
4. Lille	Bernard TOURSEL, EUDI Lille, France
5. Iasi	Levis DEVOS, EUDI Lille, France
6. Oradea	Daniel JOLLY, EUDI Lille, France
7. Cluj Napoca	Jean-Michel DUTHILLEUL, EUDIL, Fr.
	Ion FATU, U. P. Bucuresti
	Cornel POPESCU, U. P. Bucureşti
	Florin HOZA, Universitatea Tehnica Iasi
	Stefan KAKAS, Universitatea Oradea
	Tudor-Ion MURESAN, U.T.Cluj-Napoca
	Ioan MARZOLEA, U. P. Timisoara
	Adrian GRAUR, Universitatea Suceava
	Vasile GAITAN, Universitatea Suceava
	Stefan-Gh. PENTIUC, Univ. Suceava

1995

Ranking	Jury
1. Bucuresti	**President**
2. Cluj-Napoca	John MILNER, City University, London

1995

Ranking	Jury
3. Timisoara	**Members**
3. Iasi	Jean Michel DUTHILLEUL, EUDIL, Fr.
4. Chisinau	Daniel JOLLY, EUDIL, France
5. Lille	Bernanrd TOURSEL, EUDIL, France
6. Suceava	Jose OLIVEIRA e SA, PORTO, Portugal
7. Porto+Suceava	Cecilia REIS, PORTO, Portugal
	Gheorghe PENTIUC, Univ. Suceava
	Vasile GAITAN, Univ. Suceava
	Sergiu NEDEVSCHI, U.T.Cluj-Napoca
	Janosi TIBOR, U. T. Cluj-Napoca
	Florin HOZA, U. T. Iasi
	Stefan POLI, U. T. Iasi
	Victor MORARU, U. T. Chisinau
	Ioan MARZOACA, U. T. Timisoara

1996

Ranking	Jury
1. Cluj-Napoca	**President**
2. Suceava 1	Oleg BREKHOV, Moscow Aviation Institute
3. Chisinau	**Members**
4. Bucuresti	Michel DEBLOCK, EUDIL, Franta

1996

Ranking	Jury
5. Suceava 2	Jean Michel DUTHILLEUL, EUDIL Fr.
6. Vinita	Ioan FATU, U.P. Bucureşti
7. Timisoara	Vladimir MESYURA, U.T.Vinnytsa
8. Iasi	Ioan MARZOACA, U. T. Timisoara
9. Lille	Victor MORARU, U. T. Chisinau
10. Oradea	Cornel POPESCU, U. P. Bucuresti
	Radu Emil PRECUP, U. P. Timisoara
	Nicolae ROBU, U. P. Timisoara
	Alexandru VALACHI, U. T. Iasi
	Vasile GAITAN, Univ. Suceava
	Gheorghe PENTIUC, Univ. Suceava

1997

Ranking	Jury
1. Suceava 1	**President**
2. Bucuresti	John MILNER, City University, London
3. Iasi	**Members**
3. Chisinau	Oleg BREKHOV, Moscow Aviation Institute
4. Oradea	Ioan BRINZAS, U T Timisoara

1997

Ranking	Jury
5. Suceava 2	Jean Michel DUTHILLEUL, EUDIL Fr.
6. Moscova	Vasile GAITAN, Univ. Suceava
7. Craiova	Stefan HEGYESI-KAKAS, EUDIL Fr.
8. Lille	Sylvain KARPF, EUDIL, France
	Marian LUNGU, Universitatea Craiova
	Gheorghe MARIAN, Univ. Craiova
	Sergiu NEDEVSCHI, U. T. Cluj-Napoca
	Gheorghe PENTIUC, Univ. Suceava
	Andrei PITIS, U. P. Bucuresti
	Mircea POPA, U. T. Timisoara
	Otto POSZET, Universitatea Oradea
	Dan Victor RUSU, U. T. Cluj-Napoca
	Corneliu TRISCA-RUSU, U.P. Bucuresti

1998

Ranking	Jury
1. Iasi	**President**
2. Suceava 2	John MILNER, City University, London
3. Craiova	**Members**

1998

Ranking	Jury
4. Bucuresti	John HILL, City University, London
5. Timisoara	David STYLES, City University, London
6. Suceava 1	Darius MIKALAUSKAS, City University, London
7. Chisinau	

1999

Ranking	Jury
1. Timisoara	**President**
2. Bucuresti	John MILNER, City University, London
3. Suceava	**Members**
4. Craiova	John HILL, City University, London
5. Iasi	David STYLES, City University, London
6. Chisinau	Darius MIKALAUSKAS, City University, London

2000

Ranking	Jury
1. Bucuresti	**President**
2. Timisoara	John MILNER, City University, London
3. Suceava 2	**Members**
4. Suceava 1	Oleg BREKHOV, Moscow Aviation Institute
5. Cernauti	Jean Michel DUTHILLEUL, UST de Lille
6. Iasi	Darius MIKALAUSKAS, City University, London
7. Chisinau	

2001

Ranking	Jury
1. Brasov	**President**
2. Iasi	John MILNER, City University, London
3. Suceava 2	**Members**
4. Suceava 1	John HILL, City University, London
5. Vinita	Jean Michel DUTHILLEUL, UST de Lille
6. Chisinau	Darius MIKALAUSKAS, City University, London
7. Bucuresti	
8. Cernauti	
9. Novi Sad	

2002

Ranking	Jury
1. Suceava 2	**President**
2. Timisoara	John MILNER, City University, London
2. Suceava 1	**Members**
3. Bucuresti	John HILL, City University, London
4. Brasov	David STYLES, City University, London
5. Chisinau	Darius MIKALAUSKAS, City University, London
6. Novi Sad	
7. Cernauti	
8. Iasi	

2003

Ranking	Jury
1. Brasov	**President**
2. Suceava	Timothy HALL, University of Limerick
2. Iasi	**Members**
3. Bucuresti	Ciaran MACNAMEE, University of Limerick
4. Vinnytsa	Dorel PICOVICI, University of Limerick
5. Oradea	Kevin JOHNSON, University of Limerick
6. Craiova	
7. Timisoara	
8. Cernauti	
9. Novi-Sad	
10. Chisinau	

2004

Ranking	Jury
1. Bucuresti	**President**
2. Suceava 1	Timothy HALL, University of Limerick
3. Brasov	**Members**
4. Iasi	Ciaran MACNAMEE, University of Limerick
5. Chisinau	Dorel PICOVICI, University of Limerick
6. Suceava 2	Kevin JOHNSON, University of Limerick
7. Oradea	
8. Novi Sad	
9. Galati	

2004

Ranking	Jury
10. Cernauti	

2005

Ranking	Jury
1. Timisoara	**President**
2. Beijing	Timothy HALL, University of Limerick
3. Chisinău	**Members**
4. Bucuresti	Cathal McHUGO, University of Limerick
5. Brasov	Kevin JOHNSON, University of Limerick
6. Suceava 2	Claudine LECOCQ, E.P.U. de Lille
7. Suceava 1	
8. Craiova	
9. Iasi	
10. Cernauti	

2006

Ranking	Jury
1. Suceava 1	**President**
2. Bucuresti	Timothy HALL, University of Limerick
3. Iasi	**Members**
4. Cluj-Napoca	Ciaran MacNAMEE, University of Limerick
5. Timisoara	Cathal McHUGO, University of Limerick
6. Nis	Claudine LECOCQ, E.P.U. de Lille
7. Galati	
8. Novi Sad	
9. Chisinau	
10. Craiova	
11. Oradea	
12. Cernauti	
12. Suceava 2	

2007

Ranking	Jury
1. Beijing	**President**
2. Timisoara	Timothy HALL, University of Limerick
3. Novi Sad	**Members**
4. Iasi	Claudine LECOCQ, E.P.U. de Lille
5. Chisinau	Ciaran MacNAMEE, University of Limerick

2007

Ranking	Jury
6. Bucuresti	
7. Cluj-Napoca	
8. Galati	
9. Suceava 1	
10. Cernauti	
11. Suceava 2	
12. Limoges	
13. Craiova	
14. Rodez	

2008

Ranking	Jury
1. Chisinau	**Honorary President**
2. Iasi	John MILNER, City University of London
3. Timisoara 2	**President**
4. Bucuresti	Timothy HALL, University of Limerick
5. Galati	**Members**
6. Suceava	Maurice O'CONNELL University of Limerick
7. Craiova	Claudine LECOCQ, E.P.U. de Lille
8. Timisoara 1	
9. Oradea	
10. Beijing	
11. Novi Sad	
12. Cluj-Napoca	
13. Limoges	

2009

Ranking	Jury
1. Timisoara 2	**President**
2. Suceava 2	Timothy HALL, University of Limerick
3. Novi Sad	**Members**
4. Cluj-Napoca	Tom COFFEY, University of Limerick,
5. Bucuresti	Sean McGRATH, University of Limerick
6. Galati	Laurent GRISONI, E.P.U. de Lille
7. Oradea	Claudine LECOCQ, E.P.U. de Lille
8. Chisinau	John NELSON, University of Limerick
9. Suceava 1	

2009

Ranking	Jury
10. Cernauti	
11. Timisoara 1	
12. Moscow	
13. Vinnytsia	

2010

Ranking	Jury
1. Bucurestit	**President**
2. Timisoara 2	Timothy HALL, University of Limerick
3. Novi Sad	**Members**
4. Iasi	Joe GRIFFIN, University of Limerick
5. Timisoara 1	John NELSON, University of Limerick
6. Suceava 1	
7. Chisinau	

2010

Ranking	Jury
8. Sarajevo	
9. Cernauti	
10. Suceava 2	
11. Oradea	
12. Limoges	
13. Cluj-Napoca	
13. Vinnytsia	

2011

Ranking	Jury
1. Bucuresti	**President**
2. Timisoara	Timothy HALL, University of Limerick
3. Suceava 2	**Members**

2011

Ranking	Jury
4. Suceava 1	Ciaran MacNAMEE, University of Limerick
5. Chisinau	Hussain MAHDI, University of Limerick
6. Cernauti	John NELSON, University of Limerick
7. Iasi	
8. Moscow	
9. Cluj-Napoca	
10. Novi Sad	

2012

Ranking	Jury
6. Suceava 2	
7. Oradea	
8. Chisinau 2	
9. Iasi 2	
10. Chisinau 1	
11. Cernauti	
11. Novi Sad	

2012

Ranking	Jury
1. Suceava 1	**President**
2. Timisoara 1	Timothy HALL, University of Limerick
3. Bucuresti	**Members**
4. Timisoara 2	Ciaran MacNAMEE, University of Limerick
5. Iasi 1	Pat COMAN - University of Limerick

2013

Ranking	Jury
1. Bucuresti 2	**President**
2. Chisinau	Timothy HALL - University of Limerick
3. Suceava 2	**Members**
4. Ilmenau	Ciaran MacNAMEE - University of Limerick
5. Timisoara 3	Kevin JOHNSON - University of Limerick
6.-7. Cluj-Napoca	Claudine LECOCQ - Universite Lille 1

2013

Ranking	Jury
6.-7. Suceava 1	Jean-Michel DUTHILLEUL - Universite Lille 1
8. Cernauti	Florin PRUTIANU - ServiceXpert GmbH, Munchen
9. Oradea	Bogdan Nicolae FOICA - ServiceXpert GmbH, Munchen
10.-11. Timisoara 1	
10.-11. Iasi 1	
12.-13. Bucuresti 1	
12.-13. Timisoara 2	
14. Iasi 2	

2014

Ranking	Jury
1. Bucuresti 1	**President**
2. Ilmenau	Timothy HALL - University of Limerick
3. Timisoara 2	**Members**

2014

Ranking	Jury
4. Chisinau	Ciaran MacNAMEE - University of Limerick
5. Bucuresti 2	Kevin JOHNSON - University of Limerick
6. Iasi 1	Florin PRUTIANU - ServiceXpert GmbH, Munchen
7. Suceava 2	Kristijan VIDEC - ServiceXpert GmbH, Munchen
8. Timisoara 1	Bogdan Nicolae FOICA - ServiceXpert GmbH, Munchen
9. Oradea	
10. Cluj-Napoca	
11. Cernauti	
12. Iasi 2	
13. Suceava 1	
14. Iasi 2	

2015

Ranking	Jury
1. Suceava 2	**President**
2. Bucharest 1	Timothy HALL - University of Limerick
3. Bucharest 2	**Members**
4. Ilmenau (Special Prize for Inventiveness)	Ciaran MacNAMEE - University of Limerick
5. Timisoara 2 (Special Prize for Excellent Treasure Identification)	Kevin JOHNSON - University of Limerick
6. Oradea	Jean Michel DUTHILLEUL - Universite Lille 1
7. Vinnytsia	Bogdan Nicolae FOICA - ServiceXpert GmbH, Munchen
8. Timisoara 1	Alexandru NASALEAN - ServiceXpert GmbH, Munchen
9. Novi Sad	
10. Chisinau	
11. Chernivtsy	
12. Cluj-Napoca	
13. Suceava 1	
14. Iasi 1	
15. Iasi 2	

2016

Ranking	Jury
1. Cernauti	**President**
2. Timisoara 2	Timothy HALL - University of Limerick, Ireland
3. Bucuresti 1	**Members**
4. Ilmenau (Special Prize)	Ciaran MacNAMEE - University of Limerick, Ireland
4. Bucuresti 2	Dorel PICOVICI - Institute of Technology Carlow, Ireland
5. Novi Sad	Stephan PFENNINGER - ServiceXpert GmbH Munchen, Germany
6. Timisoara 1	Sorin BULCEAG - ServiceXpert GmbH Munchen, Germany
7. Iasi 2	Jean Michel DUTHILLEUL - Universite Lille 1, France
7. Cluj-Napoca	
8. Iasi 1	
9. Suceava 1	
10. Oradea (Special Prize for Product Oriented Design)	
10. Suceava 2	

2017

Ranking	Jury
1. Cluj-Napoca	**President**
2. Bucuresti 1	Timothy HALL - University of Limerick, Ireland
3. Suceava 1	**Members**
4. Vinnytsia (Special Mention)	Ciaran MacNAMEE - University of Limerick, Ireland
5. Ilmenau (Special Mention)	Stephan PFENNINGER - ServiceXpert GmbH Munchen, Germany
6. Cernauti	Sorin BULCEAG - ServiceXpert GmbH Munchen, Germany
7. Novi Sad	Jean Michel DUTHILLEUL - Universite Lille 1, France
8. Chisinau	
9. Iasi 1	
10. Timisoara 2	
11. Bucuresti 2	
12. Oradea	
13. Iasi 2	
14. Timisoara 1	

2017

Ranking	Jury
15. Hebei (Determination Prize)	
16. Suceava 2	

2018

Ranking	Jury
1. Cluj-Napoca	**President**
2.Bucharest 2	Timothy HALL - University of Limerick, Ireland
3.Ilmenau	**Members**
4. Bucharest 1 (Special Prize "Mount Washington")	Ciaran MacNAMEE - University of Limerick, Ireland
5. Suceava 1	Jean Michel DUTHILLEUL - Universite Lille 1, France
6. Vinnytsia	Claudine LECOCQ - Universite Lille 1, France
7. Chisinau 1	Nicolae Bogdan FOICA - ServiceXpert GmbH, Munich

2018

Ranking	Jury
8. Novi Sad (Special Prize "Fight Spirit")	Neta OLSAROVA - ServiceXpert GmbH, Munich
9. Oradea	
9. Timisoara 2	
11. Suceava 2	
12. Timisoara 1	
13. Chernivtsy	
14. Chisinau 2	
15. Iasi	
16. Hebei	

2019

Ranking	Jury
1. Ilmenau	**President**
2. Cluj-Napoca	Timothy HALL - University of Limerick, Ireland
2. Novi Sad	**Members**
3. Bucuresti 2	Ciaran MacNAMEE - University of Limerick, Ireland
3. Suceava 1	Felix A. HIMMELSTOSS - University of Applied Sciences Technikum Wien, Austria
4. Chisinau 1	Heinz-Dietrich WUTTK -, Technische Universitat Ilmenau, Germany
5. Timisoara 2	Jean Michel DUTHILLEUL - Universite Lille 1, Francet
6. Timisoara 1	
7. Bucuresti 1	
8. Suceava 2	
9. Vinnytsia	
10. Oradea	
11. Chisinau 2	
12. Iasi	
12. Cernauti	

2022

Ranking	Jury
1.Chisinau	**President**
2. Timisoara 1	Nicolae FOICA, ServiceXpert GmbH, Munich
3. Cluj-Napoca	**Members**
4. Bucharest 2 (Special Award: Technical Solution)	Hansjörg KOEGEL, ServiceXpert GmbH, Munich
4. Suceava 1 (Special Award: Never Give Up)	Sören STEIN, ServiceXpert GmbH, Munich
5. Bucharest 1	Detlef STREITFERDT Dr. TU Ilmenau
6. Suceava 2	Maryam SAREBAN ZADEH, TU Munich
8. Timisoara 2	

2023

Ranking	Jury
1. Timișoara 2 (ETC)t	**President**
2. Iași	Nicolae Bogdan FOICA - ServiceXpert GmbH, Munich
3. București 1	**Members**
4. Timișoara 1 (AC)	Jaime FELLER GOUDIE - ServiceXpert GmbH, Munich
5. Suceava 1	Swornim SHRESTHA - ServiceXpert GmbH, Munich
6. București 2	Vlad VOICULESCU – Cognizant Mobility GmbH, Munich
7. Cluj-Napoca	Ladislau MATEKOVITS - Politecnico di Torino
8. Chișinau 1	Oliver FAUST - ARU Cambridge
9. Chișinau 2	
10. Odessa	
11. Suceava 2	

2024

Ranking	Jury
1. Chisinau 1	**President**

2024

Ranking	Jury
2. Bucharest 2 2. Cluj-Napoca 2 2. Hebei 2 5. Chisinau 2 6. Timisoara 1 7. Cambridge 8. Bucharest 1 9. Timisoara 2 10. Iasi 1 11. Odessa 12. Iasi 2 13. Suceava 2 14. Chisinau 3 15. Suceava 1 16. Timisoara 3	Nicolae Bogdan FOICA - Cognizant Mobility GmbH, Munich **Members** Constantin Teodor ARDEIU – Cognizant Mobility Romania Ciprian Sorin TELETIN – Cognizant Mobility Romania Denis ARDELJAN – Cognizant Mobility Romania Ladislau MATEKOVITS - Politecnico di Torino, Italy Daniel MOGA – Technical University of Cluj Napoca, Romania

2025

Ranking	Jury
1. Ilmenau 2. Bucharest 1 3. Cluj-Napoca 4. Bucharest 3 5. Timisoara 1 6. Suceava 2 7. Timisoara 3 8. Bucharest 2 9. Timisoara 2 10. Chisinau 2 11. Habei 1 12. Habei 2 13. Suceava 1 14. Chisinau 1 15. Iasi 16. Odessa	**President** Sorin BORA - Cognizant Mobility România **Members** Oliver FAUST – Anglia Ruskin University, Cambridge Ciprian Sorin TELETIN – Cognizant Mobility Romania Alexandru-Ștefan HUGYESZ – Cognizant Mobility Romania Radu-Andrei CIOCHINA - Cognizant Mobility Romania

Notes


H&S 2014


H&S 2025

The 31st International Computers Contest for Students

HARD &SOFT Suceava

May 17-24, 2026

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Suceava Town Hall | Suceava City Council

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