Rules of organization and Regulations of International competitions on computer projects (computer science) "INFOMATRIX-ASIA"

General information

1.1 These Rules on international competitions in computer projects (Informatics) "INFOMATRIX-ASIA" (hereinafter - the Competition) are developed in accordance with the law "on education", the Law "on Informatization", the State program of education development in Kazakhstan for 2011-2023 and define the goals and objectives of the Competition, organizational and methodological support, the procedure for conducting and financing, participation and determining the winners.

1.2 The main purpose of the Competition is to create the necessary conditions to support gifted children and talented youth, including assistance in their intellectual development and professional orientation.

1.3 The main objectives of the Competition are:

- identification, support and development of students who are interested in and research abilities in the field of IT industry;
- development of information technologies and development of new projects based on research activities of students as an effective means of increasing efficiency in the development of the IT industry in Kazakhstan;
- implementation of the idea of continuing education by training gifted students to continue their education in leading domestic and foreign universities;
- development of international cooperation and creative exchange of experience in the field of school education in Informatics;

1.4 These Rules are developed in accordance with the Law "on education", the order of the Minister of education and science of the Republic of Kazakhstan (MES) "on approval of the Rules of formation of participants of international competitions and competitions of scientific projects (scientific competitions) in General subjects" on January 19, 2016 №45 and the requirements for competitions of scientific projects of

1.5 Works are not allowed for the Scientific competition:

- with the use of equipment, access to which is not allowed for adults, where there are experiments with animal abuse in which harmful substances are used for human and animal health (toxic, radioactive, unexplored biologically active compounds with carcinogenic and mutagenic actions; substances pathogenic or conditionally pathogenic for humans and animals; microorganisms, viruses, alcohol, tobacco);
- previously considered and defended at the national competitions.

1.6 International competition "INFOMATRIX-ASIA" is held in English, in connection with which all the necessary documentation and presentation of projects is conducted in English.

1.7 Each project can consist of a team of participants from 1 to 3 people.

Order of organization and holding of Competitions

2.1 The competition is an annual event and is held By the Republican scientific and practical center "Daryn "(hereinafter -" Daryn") of the Ministry of education and science of the Republic of Kazakhstan, International Educational Fund "BILIM-INNOVATION".
2.2 General management of the preparation and holding of the Competition is carried out by the organizing Committee of the Competition (hereinafter - the organizing Committee), which is formed from the leading Kazakh and foreign scientists, teachers of international training centers, specialists of the organization of education.
2.3 The organizing Committee in coordination with the MES develops The rules of the Competition, develops regulations, forms the jury, organizes summing up and awarding of the winners.
2.4 Registration of personal data of the participant is carried out on the website www.infomatrix.asia. In the registration form you must specify:
- for Kazakhstan participants surname, name and patronymic (in Latin and Cyrillic); IIN; name of the section; name of the project; class; school; region/district/city; language of instruction; name and e-mail of the team leader.
- for foreign participants name, scanned version of the passport, the name of the section; project name; class; school; region/district / city; language of study; name and e-mail of the team leader.
2.5 Competitions and selection are held in two stages:
1) the first stage – regional, held at the level of local Executive bodies in the field of education, on the basis of regional competitions of scientific projects on General subjects of the current academic year.
2) the second stage - the international (final) stage of the Competition is held at Nurorda School in Astana city on 28-30th of May this year.

Requirements for the content and design of the work

3.1 Team leader (teacher or other representative of the school) has the right to register several projects, as well as to represent several teams at the same time.
3.2 Teams (no more than 3 people) of Kazakhstan schoolchildren and winners of national competitions of scientific projects from foreign schools aged from 10 to 18 years can take part in The Competition.
Applicants for inclusion in the national team of the Republic of Kazakhstan must be students of grades 9-11(12) from among the winners or participants of the final stage of the Republican scientific competitions in General subjects, or winners or prize-winners of regional stages of scientific projects in General subjects.
3.3 Competitions are held in six sections:

- Section 1.1. Robotics: FLL Challenge.
- Section 1.2. Robotics: Arduino Hackathon.
- Section 2. Computer Programming.
- Section 3. Computer Graphics and Art.
- Section 4. Hardware Control Systems.
- Section 5. Short films.
- Section 6. Applied Maths Projects.

3.4 Documentation requirements:
1) the text of the work should be printed on the computer and presented in MS Word format (in the format .doc/.docx) using the font "Times New Roman" 12 (allowed 14) size A4 and contain:
- title page;
- content;
- abstract;
- introduction;
- research part;
- conclusion;
- references;

2) on the title page are specified:
- full name of the organization where the work is done, city, school;
- surname, name of the author (co-author), class;
- work name;
- the direction in which the work is prepared, section;
- surname, name, patronymic of the head;
- city (where the competition is held), year;

3) abstract (abstract) (no more than 250 words) should reflect the short content of the work, including:
- purpose of research;
- hypothesis;
- stages, research procedure;
- experimental technique;
- the novelty of the study and the degree of independence;
- results and conclusions;

- areas of practical application of the results;
4) in the introduction (no more than 2 pages) are: the relevance of the chosen research topic, the purpose (task) of this work; briefly indicate the methods of solving the problem;
5) the research part of the work (no more than 20 pages) consists of separate chapters (paragraphs) and contains:
- analytical review of the known results on the selected topic, allowing to see the need for this work and to formulate its purpose (task);
- description of methods for solving the problem;
- results and discussion;
- illustrative material (drawings, graphs, photos, drawings.).
6) references to the used literature should be indicated in square brackets. Numbering should be consistent as references appear in the text;
7) conclusion (no more than 1 page) contains the main results of the work and the conclusions made on their basis, recommendations on the use of the results for scientific and practical purposes;
8) the used literature is given at the end of the General list in the following order:
- surname and initials of the author;
- title of the article and journal (for journal articles);
- name of the magazine, book;
- place of publication and publishing (for books);
- year of publication, issue number, pages.
9) each work should be accompanied by a review of the head, which reflects the relevance of the chosen topic, the author's personal contribution to the work, the shortcomings of the work and recommendations for further use of the results;
10) it is recommended to prepare a demonstration material (for the report) to be placed on a stand of no more than 165x125 square centimeters.
3.6 Requirements for the stand design:
- at the top of the stand horizontally you need to place an abstract, the name of the participant, age, name of the school, city, region;
- stand materials reflect the content of the work, decorated aesthetically, include graphics, photographs, drawings, diagrams, which are numbered, conclusions;
- when preparing the content, the main attention is paid to the presentation of the results obtained by the author of the project.
3.7 Requirements for providing video materials:
- all video materials must be filled in on the free video resource YouTube, where a link to this material to provide the place of requirements and/or reflected in the appropriate documentation, on the stand, presentation.
- including to bring on an information storage medium flash disk or HDD.
3.8 Supervisor ensures the reliability and correctness of the results that the work does not contain the results rewritten from theses, master's and PhD theses, reports of research teams. The student must do the work, acquiring new knowledge and skills of independent research.
3.9 Each section goes through
Section 1.1. Robotics: FLL Challenge
- a demonstration of robots and competition on missions

Section 1.2. Robotics: Arduino Hackathon
- a construction of robot and competition on tasks;
All stages of this section are detailed in Annex 1 of this regulation.
Section 2. Programming (Computer Programming):
- project presentation;
All stages of this section are detailed in Annex 2 of this regulation.
Section 3. Computer graphics and design (Computer Graphics and Art):
- presentation of the project, design of the stand.
All stages of this section are detailed in Annex 3 of this regulation.
Section 4.Control systems (Hardware Control Systems):
- project presentation;
All stages of this section are detailed in Annex 4 of this regulation.
Section 5. Short films (Short Movie):
- advanced, where you must to send short movie for review and approval to join the second stage;
- All stages of this section are detailed in Annex 5 of this regulation.
Section 6. Applied mathematics (Mathematics Project):
- interview for 10 minutes;
All stages of this section are detailed in Annex 6 of this regulation.
3.10 In case of submission of work with violations in accordance with paragraph 1.5 of this regulation, as well as in accordance with the Annex to the required section, the Organizing Committee has the right to reject the work from participation.

Prizes and awards

4.1 Participants of the Competition are awarded a certificate of participation.
4.2 The winners are awarded with diplomas of I, II and III. The number of diplomas of I, II and III degree is determined on the basis of the following proportion: 20% of the number of winners are awarded diplomas of III degree, 15% - diplomas of II degree, 10% - diplomas of I degree.

ANNEX 1

Section 1.1. Robotics: FLL Challenge

Online qualification requires the robot to perform a set of 15 tasks, and the criteria is that it needs to complete the odd-numbered tasks (as follows 1, 3, 5, 7, 9, 11, 13, 15 tasks).

All teams must create a video that showcases the robot design and demonstrates the completion of specific tasks assigned by the organizers.

The video must meet the following requirements:

Video quality: The video must be of high quality, with clear images and sound that allow the judges to accurately evaluate the robot's performance. Poor-quality videos may result in a lower score or disqualification.

Video length: The video must be no longer than 10 minutes in length and should include an introduction to the team, an overview of the robot's design, and a demonstration of the robot's capabilities in completing the assigned tasks.

Video content: The video must demonstrate the completion of the assigned tasks accurately and fully, without any editing or manipulation that could be misleading.

Judges will evaluate the videos based on the robot's design, the completion of tasks, and overall performance.

The judges may also evaluate the teams' ability to work together effectively as a team. The ability to collaborate and communicate with team members is essential to succeeding in a robotics challenge.

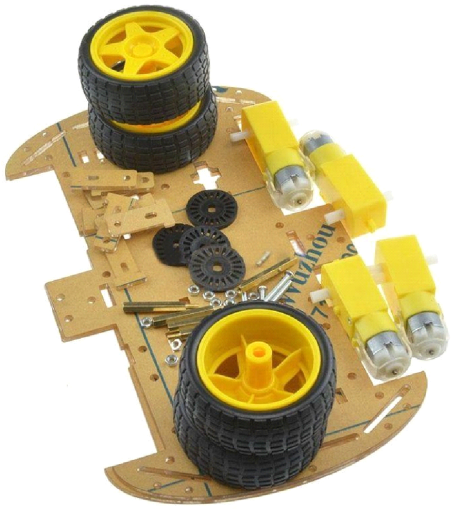
Section 1.2. Robotics: Arduino Hackathon

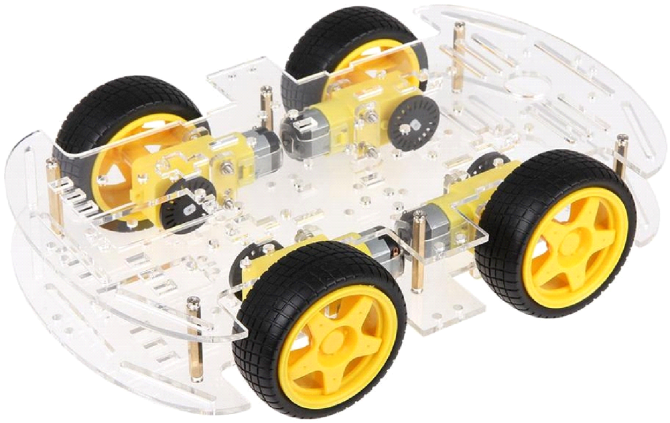
Technical Properties

*Send a presentation video of the project where all of the following modules are used. Modules: Bluetooth module(HC-05, HC-06), L298N, Servo in claws. You have to upload your project video to YouTube and attach a link. After evaluating your works we inform you about pre-final results.

About general

● Each team will be given a one special kit for building a Bluetooth controlled robot car with claws and line sensors.
● The robot car should have 2 functionality:
○ **First**, robot car controlled via bluetooth and complete mission manually
○ **Second**, robot car should be stand alone and complete mission automatically
● You can reflash robot car after each step
● 5 hours will be given to finish the project.
● The team is allowed to repair/restart/configure the arduino while being checked by the committee.
● The team should bring their own laptop for competition.





About the team

● Each team must have 3 members accompanied by a mentor/leader for the challenge.
● The mentor can be a teacher of a school.
● The mentor can help students only before the competition
● The Organizing Committee reserves the right to ask any team for explanation of their program/code/idea.
● Only team members can design the robot and write the code/program.
● The use of external sources is prohibited. This can lead to DISQUALIFICATION.
● It is required to come with its own specially designed t-shirts which are unique for the team.

About the score

● There will be multiple missions and score will depend on points.
● If teams have the same points score will depend on the time mission finished.

About the tasks

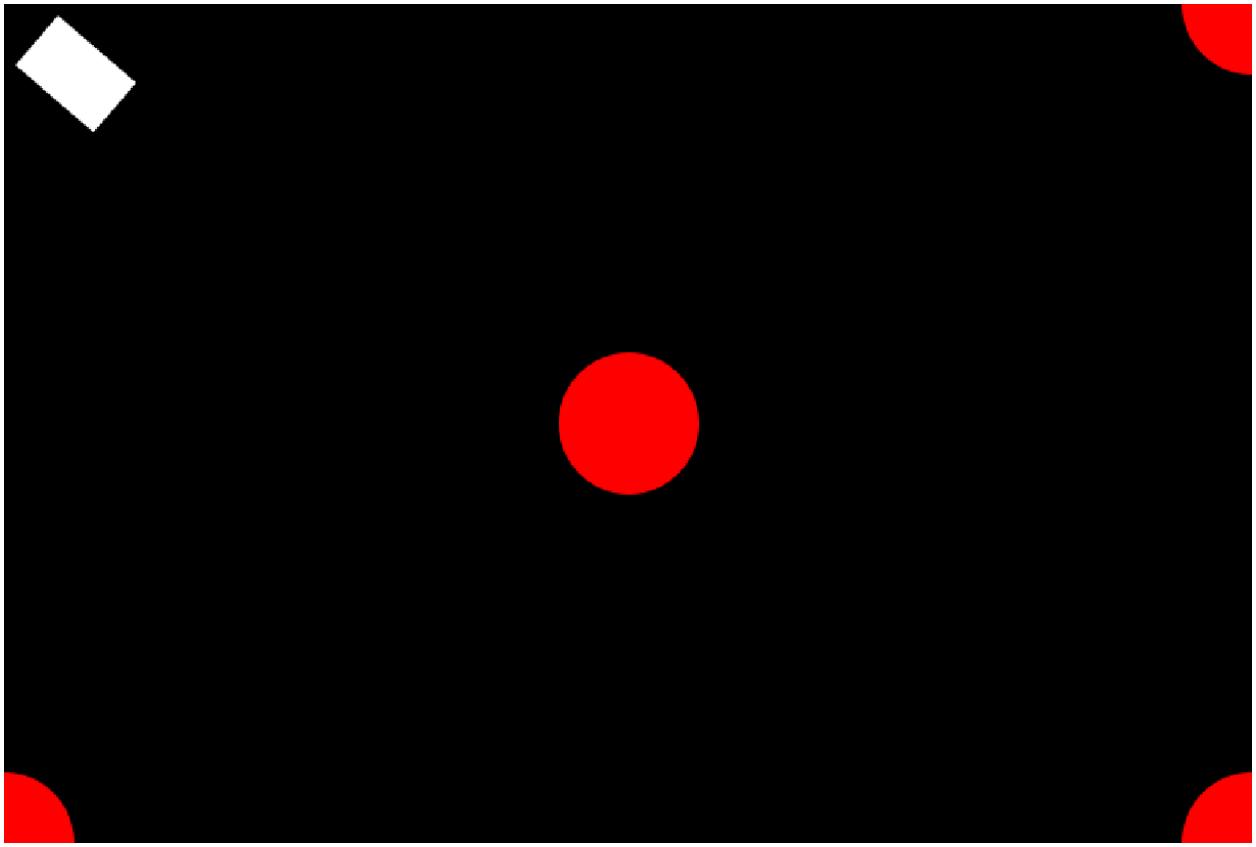
Step 1. Build a Bluetooth controlled robot car.
Step 2. Build a line follower Autonomous robot car.
Step 3. Run mission 1. Collect 3 items with controlled robot
Step 4. Run mission 2. Collect 3 items with autonomous robot

Mission

● During the competition on track there will be 3 target objects which need to be placed on the Start zone.
● First mission: You should control your robot car and collect all target objects as quickly as possible.
● Second mission: You should run your robot car in standalone mode and the robot car should collect all target objects in the Star zone as quickly as possible.

Below figure shown track with one target object as an example

• Map



Example car

- Arduino UNO x 1
- Servo sg90 x 2
- Breadboard x 2
- Motorized claws x 1
- 4wd car assembly kit x 1
- 18650 battery x 2
- 18650 battery charger x 1
- 18650 battery box x 1
- line sensor x 1
- HC-05 bluetooth module x1
- and other parts

Recommendations

• Be friendly and you will be able to help other teams as long as it doesn't interfere with your work. You can't spoil the work of other participants, you can't quarrel, you can't fight.

• To prepare in advance, it is possible to assemble such a robot at school and write a program

ANNEX 2

SECTION 2. COMPUTER PROGRAMMING

You are expected to make an application (web,mobile,desktop) which is significant for society, user friendly and robust (with server side of a high quality). The aim of the category is to test participants in computer programming field. You need to be able to implement various algorithms with data structures and solve challenging problems. You may use any programming language or scripting languages you wish like; C++, Java, Pascal, Python, or PHP.
In order to participate, your project should be accepted by the registration committee.
Registration criteria:
• Quality of documentation (it must be in English)
• Video presentation of project (upload video on youtube and send link)
• Full information about all participants

Common criteria:
• Documentation
• Video presentation of project
• Originality/ creativity
• Useful for society
• Stand's design
• Oral presentation
• Demonstration of programming skills
• Design
• Server Side (how fast it processes queries)
The first stage is about presenting the projects. Each team member must be present, otherwise the work will not be accepted. There mustn't be any delay in the coming of the team to the defense.
The team will have only 10 minutes for defense. You should have all the things you need for presentation (ex: computers, chargers, booklets etc.)). Prepare required presentation slides.

Grading policy for the stage :
1. 50 % complexity
a. 20 % (how good database management system was implemented)
b. 10 % (how good artificial intelligence method was implemented)
c. 20 % (general coding structure and features)
2. 50 % design
a. 30 % (how good UX is implemented)
b. 10 % (color friendliness)
c. 10 % (how good minimalism was implemented)
Important notes:
● Rules are subject to change
● Projects from the past or from previous years will not be accepted in the old view.

ANNEX 3

SECTION 3. COMPUTER ART

Computer art (aka digital art) is an artistic work or practice that uses digital technology as an essential part of the creative or presentation process.
Digital art can be purely computer-generated (such as fractals esentation process. and algorithmic art) or taken from other sources, such as a scanned photograph or an image drawn using vector graphics software using a mouse or graphics tablet.
The following categories of art will be accepted 2D artwork, 3D artwork, 2D animation, 3D animation. you may use any software such as Illustrator, Photoshop, 3D Studio Max and AutoCAD etc. Animations should not more than 5 min long.
Although there is no theme set for this category, the artwork should convey a message on its own.
Registration criteria:
● Video presentation of project(upload video on youtube and send link)
● Information about your project
● Full information about all participants
● The time you spent on the project and the programs used
General criteria:
• Graphical aspect
• Artistic implementation
• Visual Impact
• Message & Idea
• Documentation
• Originality / Creativity
• Oral presentation
• Stand design
• Technical Skills

You need to present your projects in two stages:
1) Stands
2) Presentation for the jury
Each team member must be present, otherwise the work will not be accepted. There mustn’t be any delay in the coming of the team to the defense. The team will have only 10 minutes for presentation, and 5 minutes for question and answers. You should have all the things you need for presentation (ex: computers, chargers, booklets etc.)
WINNERS will be determined by the following criteria:
1) Originality and Creativity
2) Oral Presentation
3) Stand design
Important notes:
1) Rules are subject to change.
2) Projects from the past or from previous years will be not accepted.

ANNEX 4

SECTION 4. HARDWARE CONTROL SYSTEMS

In this section, students present their projects with scientific findings and solutions to real-world problems in front of the judges. The project can be a study from any scientific field or multidisciplinary field. The projects should involve a programming-based approach. A project can be done by one participant or a group of up to three people.

Registration criteria:
At the qualifying stage, every applicant must send us a one-page report with:
- full names of all participants
- the name of the project
- short description
- project results
- link to the program script uploaded on GitHub. The GitHub repository should be well-documented.

The written report must be in English and submitted in MS Word format, (as .doc/.docx file), using “Times New Roman” font size 12 in A4 format.
Participants must not plagiarize the work of others. If the contents of any books or other references are quoted in the report, the details of the sources, such as the names of the books or the URLs of websites, must be indicated.
On the day of the competition, students will be invited to attend 10 minutes interview conducted by a panel of judges. Participants should bring one copy of the printed entire project and prepare a presentation.

Grading Policy:
Projects will be assessed according to the following criteria:
1. which scientific fields does it represent;
2. whether the approaches described/adopted are appropriate and whether the used methods are reliable;
3. whether the project is innovative, creative, and able to exhibit/apply problem-solving skills, critical thinking skills, and creativity;
4. whether the presentation is logical, systematic, and analytical.
5. participants should be able to answer the judge’s questions about their work.

ANNEX 5

SECTION 5. SHORT MOVIE

Short Movie category is a type of visual communication which uses moving pictures and sound to tell a story to people. The aim of the category is to test participant's ability to shoot, direct and edit movies. A movie done for the competition should be complete in terms of technical editing. Submitting music video clips, social video and/or Social experiment is prohibited.

Registration criteria:

● full registration information about them (names of participants, country, team name, etc.);
● upload a 3-5 minute short film to Youtube done by the team with a short description. The movie can be related to any topic.
● Sending movies of last year or videos that are not done by the team is prohibited. Those teams are automatically disqualified from the competition and no member will be allowed to participate with other team.
● The movie should not be complete copy of another video, you can search for ideas and inspiration, but the final script and movie should be a subject of your own.

Common criteria

● Ability to write a complete script;
● Ability to shoot video;
● Video and audio editing skills;
● Originality and creativity;
● Relevant and interesting topic;

ANNEX 6

SECTION 6. MATHEMATICS PROJECTS

Any topic in Mathematics. The project can be a study on a mathematical topic or a study on application of Mathematics in solving a real-life problem. The project must have a programming approach or programming application usage. In best case the project may have working layout of the project.
A project can be done by one participant or a group up to three people.
Registration criteria:
At the qualifying stage every applicant must send us one page report with a:
- full names of all participants
- name of the project
- short description
- project results
- project layout and/or programming code (application) and usage
- upload programming code to Youtube and send a link to registration form

The written report must be in English and submitted in MS Word format, (as .doc/.docx file), using “Times New Roman” font size 12 in A4 format.
Participants must not plagiarize the work of others. If the contents of any books or other references are quoted in the report, the details of the sources, such as the names of the books or the URLs of websites, must be indicated.
On the day of the competition students will be invited to attend 10 minutes interview conducted by a panel of judges. Participants should bring one copy of printed full project and prepare a presentation.

Grading Policy:
Projects will be assessed according to the following criteria:
1. how does the project relate to Mathematics and Computer Science (programming code, or hardware construction, Arduino etc.)
2. whether the mathematical principles described/adopted are appropriate and whether the used methods are reliable;
3. participants should be able to answer judge’s questions about programming code, construction details (Arduino, sensors, etc.)