



AGREED

General Coordinator

«INFOMATRIX-ASIA»,

«_____» _____202_y.

APPROVED

Chairman of «INFOMATRIX-ASIA»

«_____» _____202_y.

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 2011-2022 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" and Suleyman Demirel University.

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 The themes of the projects are registered By the Republican scientific and practical center "Daryn "(hereinafter-rnrc "Daryn") no later than September 20 of the corresponding year.

2.5 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.

2.6 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 Suleyman Demirel University in **June** 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: Lego Missions.

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 mathematics.

3.5 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: Lego Missions

- a demonstration of robots and competition on missions

Section 1.2. Robotics: Arduino Hackathon

- a demonstration of robots 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.

SECTION 1.1. ROBOTICS:

Lego Missions Category

1. Specifications

1.1. About General

- a. As the starting point, for all tasks, the robot must be fully within the area indicated on the map.
- b. The robot does not need to follow the black lines.
- c. There are **5 tasks** in total.
- d. **The robot must perform tasks at most in 5 minutes.** The tasks do not have order, it is up to the team in which order they want to accomplish them.
- e. The team is allowed to repair/restart/configure a robot only outside of rounds, however during each round the team can only: operate (by hand), change fixings, load and unload objects, set mechanisms, press buttons/sensors, change alignment/orientation of the robot.
- f. The team is allowed to use only ONE robot within each round.
- g. Each team has only TWO tries for one task.
- h. Rules will be reasonably changed. For example, object sizes could be changed. Therefore, it is highly recommended to participate in training sessions (the day before the main competition).

1.2. About score

- a. If a robot returns successfully back to the original position after the completion of a task, that team **gets an extra 50%** of earned points within a task.
- b. If your robot touches other objects which are initially positioned on the map during accomplishing a task you will be **subtracted 25%** of earned score for the task.
- c. If your robot keeps hitting the walls of the arena for more than 2 seconds, you will get 0 points for the task.
- d. All other information about the score system is written for each specific task.

1.3. About the team

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

1.4. Gold medal “The future”

- a. No objects can be manipulated by a player unless it is in the starting area.

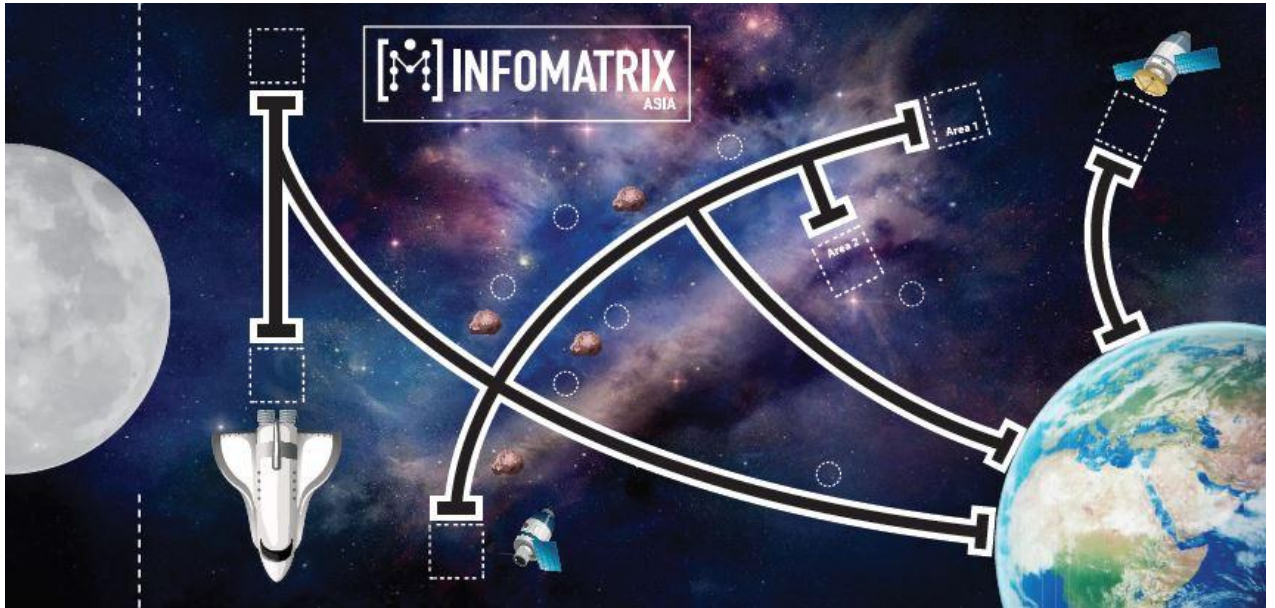
1.5. About the winning team

- a. The winning team will be the one who gets the round with the maximum points or in a case of more than one team having maximum points, the winning team will be the one with the minimum time.
- b. In a case of more than one team having the maximum points with minimum time, one or more rounds will be played, identifying the winner.

1.6. About the LEGO

- a. The robot must fit inside a cube with 25 cm sides.
- b. The robot must only be built with Lego NXT or EV3 pieces.
- c. It is not allowed to use any type of external fasteners such as adhesive tapes, paints, glues, etc.
- d. It is not allowed to use Bluetooth and WiFi.
- e. Any sensors from an official LEGO package are allowed to be used.

2. The Map



The size of the map is 238cm x 114cm .

3. Tasks

There will be in total 5 tasks which represent the main topic of KRC 2022: “Space”. It’s widely known that Kazakhstan has one of the greatest cosmic stations -- Baikonur. This competition can help to better educate participants about the cosmos and the importance of Baikonur.

3.1. Space Station (60 points)

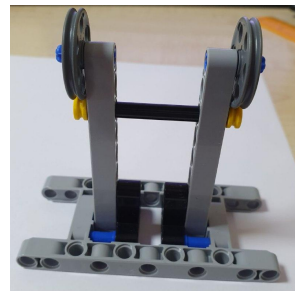
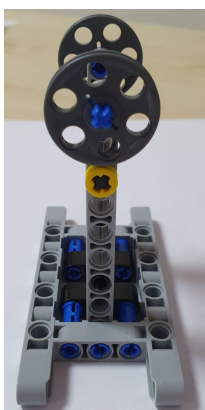
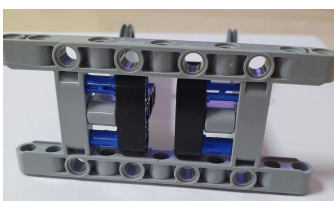
Goal

Reposition the satellite antenna to the Moon area where it will be coupled in the International Space Station.

Score

- Satellite antenna was delivered to the moon area: 60 points

Objects



Height:8cm

Length:8.5cm

Width:4cm

3.2. Satellites (100 points)

Goal

Reposition two Satellite models located on the map to the demarcated area.

Score

- 2 Satellite antennas are delivered to the Area1 and Area2: 60 points

Objects



height:6cm

Diameter of top circle :2.5cm

Diameter of base circle :4.2cm

3.3. Detritus Space (60 points)

Goal

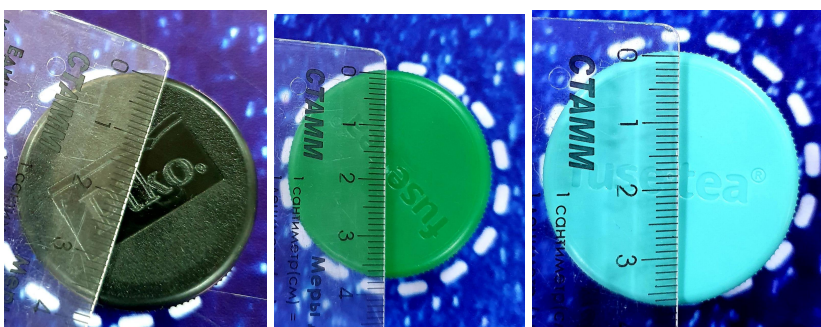
Collect 3 space junks (Debris), represented as bottle caps, and if the bottle cap is white take them to the top of the Moon area otherwise place it below the Moon area

Score

- For each detritus successfully brought to the area: 15 points
- If all detritus are brought to the area: 60 points

Objects

Plastic bottle cap



3.4. Fuel Cell (100 points)

Goal

Move the tennis ball in the container to another empty container

Score

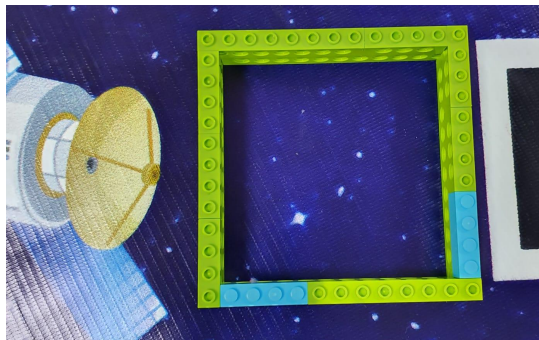
- For each fuel cell completely within the model of fuel deposit: 50 points

Objects

Tennis ball



Container



length=10cm

width=10cm

height=2cm

3.5. Mars (100 points)

Goal

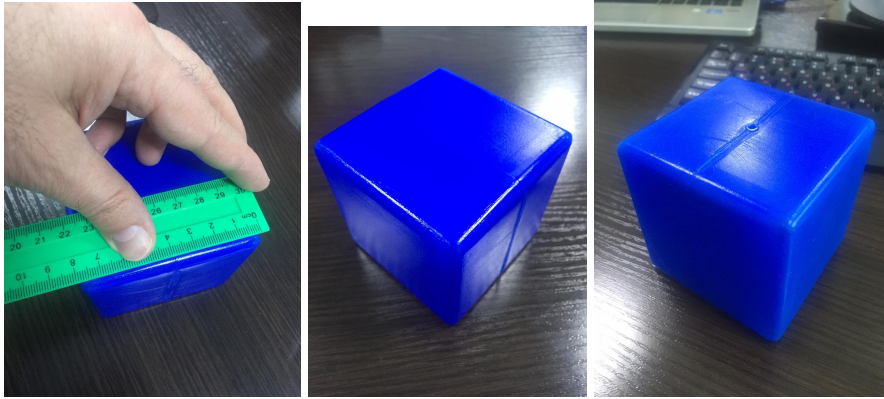
Lift the fuel tank to the demarcated area rocket. There is a 2 cm wall next to the edge of the map

Score

- Fuel tank moved to the rocket area: 100 points

Objects

8cmX8cmX8cm plastic cube



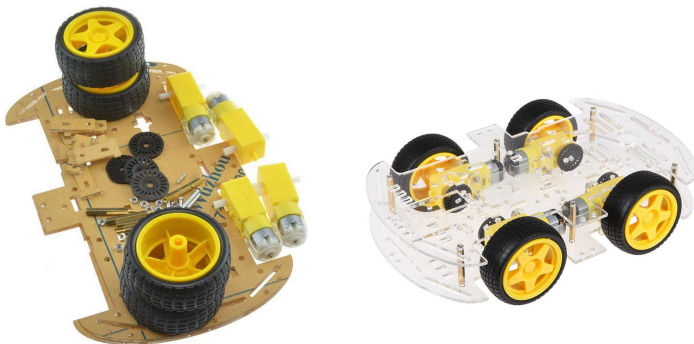
SECTION 1.2. ROBOTICS: Arduino Hackathon Category

Technical Properties

***Send a presentation video of the project where one of the following modules is used. Modules: NRF24L01, L298N, Servo in claws**

1. About general

- a. Each team will be given a special kit for building radio controlled robot car with claws.
- b. After the hackathon starts, you can use a laser machine to cut out another robot body or motorized claws. This can improve your results. To do this, you must be able to use CorelDRAW. But the composition of electronics should remain the same. The total number of motors must be 5 (servo+wheel motor).
- c. There is only one mission.
- d. **5 hours** will be given to finish the project.
- e. **The team is allowed to repair/restart/configure arduino while being checked by committee.**
- f. The team should to bring own laptop for competition.



2. About the team

- a) **Each team must have 3 members accompanied by a mentor/leader for the challenge.** The mentor can be a teacher of an school. The mentor can help students only before the competition.
- b) The Organizing Committee reserves the right to ask any team for explanation of their program/code/idea.
- c) Only team members can design the robot and write the code/program. The use of external sources is prohibited. This can lead to **DISQUALIFICATION**.

d) It is required to come with own specially designed t-shirts which are unique for the team.

3. About the score

- a. There will be single mission and score will depend on time mission finished.
- b. There will be extra tasks to get points such as front / rear light, etc..

4. About the tasks

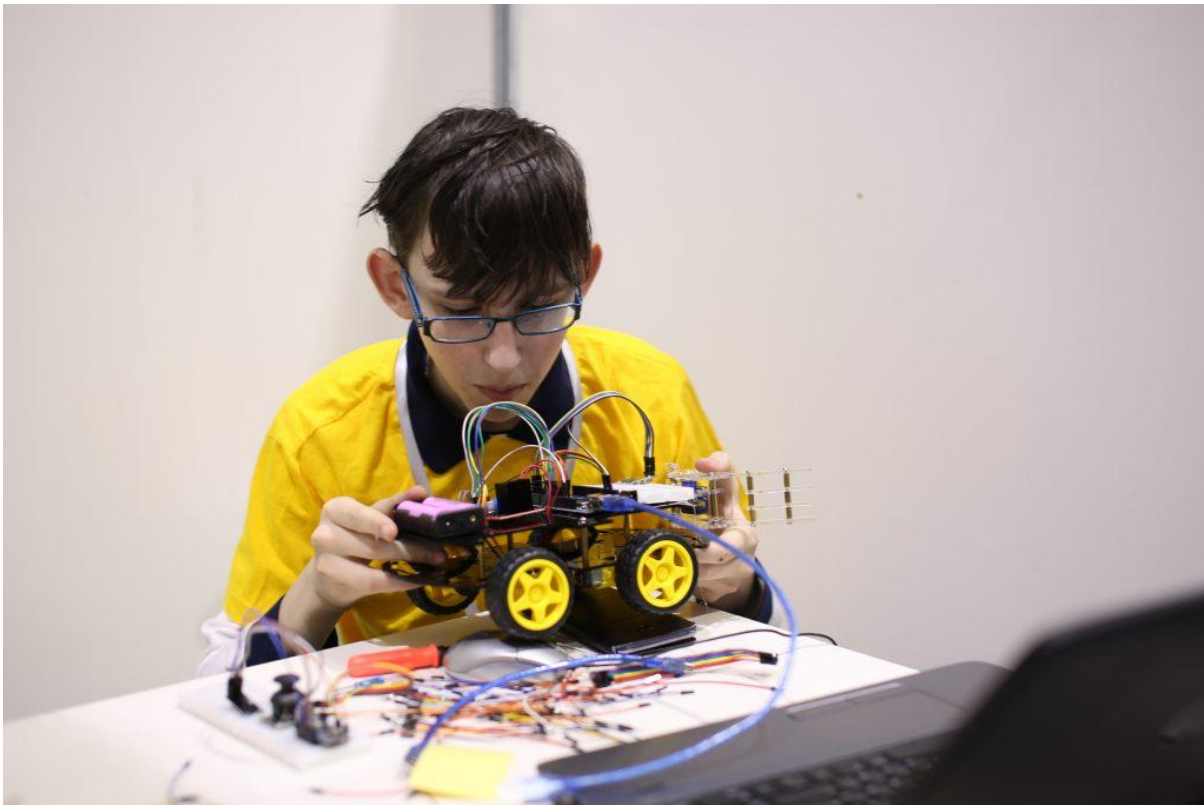
Task 1. Build a radio controlled robot car.

Task 2. Build a remote controller for robot car.

Task 3. Run mission. Collect 3 items from each corner and move them to the central circle.

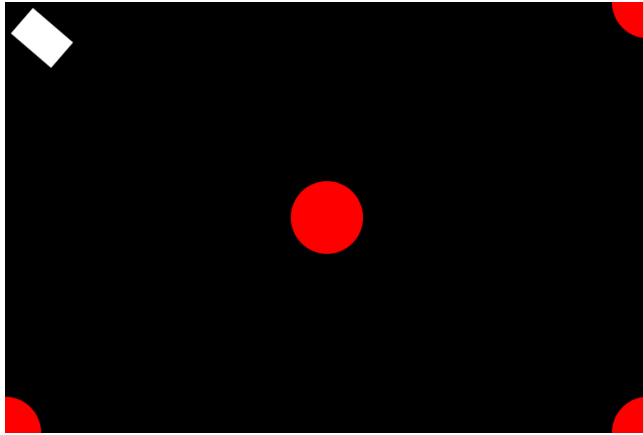
* Will be simple extra tasks.

5. Example car



6. Map

1. Map size 270 * 180 cm.
2. Circle radius 20 cm.



7. Parts list

Arduino UNO x 1

Arduino Nano x 1

Servo sg90 x 2

NRF24L01 radio module 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

Joystick KY-023 x 1

Buttons, wires, LEDs, resistors etc...

8. Recommendations

- a. 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. You can just go to the administration and ask for help, as for each problem you can get -1 point.
- b. To prepare in advance, it is possible to assemble such a robot at school and write a program or think over the design of the robot if you do not like it.

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.*

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.*

SECTION 4. HARDWARE CONTROL SYSTEMS

You are expected to make software that controls or cooperates with an electronic or mechanical device. You are free to choose almost anything! You should try to piece together your own original device, from any possible spare parts and tools you have at your disposal. However, it needs to have a software component which will interact with the hardware parts. In this section, your creativity is as important as your mechanical and programming skills. It is highly recommended to be your project beneficial to people, for instance, provide some service which, in turn, and should facilitate people's lives. The only limit is your own imagination!

Registration criteria:

- Documentation of project
- Video presentation of project(upload video on youtube and send link)
- Booklets

*Do not forget to write on which platform and language you wrote your project

Common criteria:

- Documentation
- Video presentation of project
- Originality/ creativity
- Useful for society
- Stand's design
- Oral presentation
- Demonstration of programming skills

After defense team will get points, which will settle their further involvement in competition. (Participants should have their stands ready before defense day. You are not going to have extra time for that. You should have all the things you need for presentation (ex: computers, chargers, booklets etc.))

Important rules:

- 1) Rules are subject to change.
- 2) Projects from the past or from previous years will be not accepted.

SECTION 5. SHORT MOVIE

Short movie 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.

Short movie section is divided into 2 age categories (grade 5-9 and grade 10-11) and 1 stage for grades 5-9, 2 stages for grade 10-11 including preliminary stage.

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 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 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;

Categories of the section

Grade 5-9, 10-11.

This stage is preliminary, so no points, but a Pass and Fail would be awarded for the

stage.

Stage-1.

Participants, who passed the preliminary stage are allowed to participate in Infomatrix itself. Teams are asked to create a short movie with complete editing and script in 24 hours during competition.

General requirements for the movie:

- Short movies have to fall into one of the following genres: Action, Adventure, Comedy, Drama, Family movie, Horror or Fantasy.
- Teams can prepare script beforehand, but all scenes used in the movie have to be shot during Infomatrix and at least 1 scene have to have logo of Infomatrix somewhere.
- Topic of the movie will be announced 1 month in advance before competition.
- The length of the movie is 5-7 minutes, excluding beginning and ending titles.
- The movie can be shot using any device including smartphones and edited using any video editing software.
- It should be uploaded to Youtube and link should be sent to jury before the deadline.

If participant(s) is late to 15 minutes, their points are reduced by 30%, being late for 30 minutes reduces points by half and no movies are accepted after half of an hour after deadline.

Participants cannot submit movies of last year and make a copy of another video. You can search for ideas, be inspired by someone or use particular style in your shooting or editing, but the script should be subject of your own.

Teams are responsible for bringing all necessary equipment (laptop, camera, microphones etc.), as long as no equipment would be provided by Infomatrix organizing staff.

Participants are awarded Gold, Silver and Bronze medals after the stage among 5-9 grade participants only. A group cannot consist of grade 10 and 11 students.

SECTION 6. MATHEMATICS PROJECTS

Topic

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.

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

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 plagiarise 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 first 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.
2. whether the mathematical principles 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 judge’s questions about their work.