



# TABLE OF CONTENTS

|   |            |
|---|------------|
| <b>1. TEAM – Circuit Dealerz.....</b>                     | <b>4</b>   |
| 1.1. Local values and needs.....                          | 5          |
| 1.2. CNPR robotics club .....                             | 18         |
| 1.1.1. Programmatic documents.....                        | 18         |
| 1.1.2. Patrimony .....                                    | 22         |
| 1.1.3. A little history of our team.....                  | 24         |
| 1.3. Team members.....                                    | 33         |
| 1.4. Mentors and supporters.....                          | 61         |
| 1.5. Team structure .....                                 | 76         |
| 1.6. Status of the members and volunteers.....            | 101        |
| 1.7. Knowledge - the foundation of our team .....         | 103        |
| 1.7.1. Erasmus Project.....                               | 106        |
| 1.7.2. Meeting the US Ambassador .....                    | 112        |
| 1.7.3. IG Sbiera book reception.....                      | 115        |
| 1.7.4. Code Camp USV.....                                 | 117        |
| 1.7.5. How to build a mini FM Emitter.....                | 119        |
| 1.7.6. Hackaton – Hacking Health 2018.....                | 120        |
| 1.7.7. Science conference.....                            | 131        |
| 1.8. Collaboration in the FIRST system.....               | 132        |
| 1.8.1. Collaboration with FTC Teams.....                  | 132        |
| 1.8.1.1. Iasi Special Event.....                          | 133        |
| 1.8.1.2. Iasi Demo.....                                   | 136        |
| 1.8.2. U.S. Air Force Invitation.....                     | 137        |
| 1.9. Volunteering .....                                   | 140        |
| 1.9.1. Education Park.....                                | 140        |
| 1.9.2. Charity ball.....                                  | 144        |
| <b>2. THE BUSINESS PLAN AND MARKETING PLAN.....</b>       | <b>151</b> |
| 2.1. Halloween Fundraising.....                           | 178        |
| 2.2. Thanking our sponsors.....                           | 179        |
| <b>3. PROMOTING FIRST AND STEM VALUES – OUTREACH.....</b> | <b>182</b> |
| 3.1. In our High School.....                              | 184        |
| 3.1.1. Mega Freshmen's School – RoboFun Workshop.....     | 184        |
| 3.1.2. Back to school Workshop.....                       | 193        |
| 3.1.3. Open Doors Day.....                                | 196        |

|  |            |
|--|------------|
| 3.1.4. Official opening of the robotics lab and Centenary Celebration..... | 200        |
| 3.2. To Future Generations.....  | 207        |
| 3.2.1. Bosanci School.....   | 207        |
| 3.2.2. Number 3 Middle School.....   | 211        |
| 3.2.3. Moldovita School.....   | 213        |
| 3.3. In our local/regional or even national community.....                 | 217        |
| 3.3.1. RoSEF Contest.....  | 217        |
| 3.3.2. European Researchers' Night.....                                    | 219        |
| 3.3.3. DaVinci Contest .....   | 220        |
| 3.4. Teachers who coordinate robotics and inventics clubs .....            | 224        |
| 3.4.1. Book publishing.....  | 224        |
| 3.4.2. Lycee Jean Bart.....  | 226        |
| 3.5. On Social Media.....  | 231        |
| 3.5.1. Facebook.....   | 231        |
| 3.5.2. Instagram.....  | 237        |
| 4. ROBOT EVOLUTION.....  | 241        |
| 5. GAME STRATEGY.....  | 248        |
| 6. ROBOT DESIGN.....   | 256        |
| 7. ROBOT INTELLIGENCE.....   | 287        |
| 7.1. AUTONOMOUS PERIOD.....  | 288        |
| 7.2. TELE-OP PERIOD.....   | 300        |
| <b>ROBOT INNOVATION.....</b>   | <b>308</b> |

# **1.TEAM**

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**Circuit Dealerz**

## 1.1.Local values and needs

"Petru Rares" National College in Suceava is a school unit especially concerned with the quality of education provided to its students. In fact, the principle of quality, although one integrator, is the first listed in the presentation of all the principles that govern the entire activity of the college. (According to Institutional Development Plan of the National College "Petru Rares" Suceava for the period 2015-2019). These principles, derived from Law no. 1/2011 - The Law of National Education, are:

- **quality principle** - under which educational activities relate to benchmarks and good national and international practices;
- **relevance principle** - on the basis of which education meets the needs of personal and social-economic development;
- **efficiency principle** - based on which to achieve maximum educational outcomes, by managing the existing resources;
- **transparency principle** - embodied in ensuring the full visibility of the decision and the results, through their regular and appropriate communication, in conjunction with the principle of substantiating decisions on dialogue and consultation;
- **principle of social inclusion;**
- **principle of centering education on its beneficiaries**
- **principle of parental participation and accountability in college education;**
- **principle of the pupil / student's right to opinion as a direct beneficiary of the education system.**
- **public accountability principle** on the basis of which educational establishments and institutions are publicly responsible for their performance
- **equity principle** - on the basis of which access to learning is carried out without discrimination;

In Romania there is a law of the quality of education provided by educational institutions. According to this law, schools are assessed periodically. For example, "Petru Rares" National College was graded as EXCELLENT after the latest evaluation of quality in what extracurricular activities are concerned. We achieved the same grade for educational research (both teachers and students). This grade is quite rarely achieved in Romania, as it implies the existence of innovation in the respective field.

**From the point of view of the global description, the following are important:**

"Petru Rares" National College is the biggest theoretical college in the county of Suceava, with 1,200 students attending. The characteristic of our college is the fact that all the profiles and specializations are different from one another, in order to cater for the diversity of requests coming from middle school students and their parents. Thus, the college includes humanistic profiles specializing in Philology and Social Studies, and Scientific profiles specializing in Mathematics-Information technology and Natural Sciences. Many of these function as bilingual classes in English, French and German.

All the graduates from our college further their education in the country or abroad. The Domains our graduates choose are very different, but the vast majority go for engineering and IT.

Another feature of the college is that it is concerned with the holistic development of the civic spirit as a prerequisite for the quality of the learning activity and the future success of the graduates. This is in fact the implementation of an O5 objective of the Development Plan for the period 2015-2019, as it results from the extract below.

**O5 / A1** Achieving civic education of pupils and education in the spirit of values in a concerted way, through all the disciplines of education, not only the specialized ones (history, civic education, etc.), as well as in non-formal educational activities

| <b>Actions to reach the goal</b>  | <b>Performance indicators (achievements)</b>   | <b>Human resources, materials, time</b>   |
|---|--|---|
| 1. Designing and implementing a strategy for the development of civic competences through school disciplines (language and communication, science and informatics) or by generalizing the key competences of each of the subjects concerned (e.g. - "protecting oneself and others" becomes "nature protection through science"), or through the development of specific extracurricular activities | <p>Increasing students' attachment to eternal values (respect, responsibility, equity, honesty, loyalty, empathy, commitment to democratic ideas, etc.) to the detriment of conjunctural values (those imposed by micro groups or those corresponding to a short phase of society development)</p> <ul style="list-style-type: none"> <li>-developing a climate of respect for oneself and others, manifested by fewer behavioral problems in and out of school and through a positive school culture</li> <li>-developing a climate of improved interpersonal relationships that will enhance the security of the school's educational environment</li> </ul> | <ul style="list-style-type: none"> <li>-Human Resources: Language, Science and Computer Teachers and Teachers who coordinate college activities</li> <li>-Material resources: budget after writing a guide and printing it</li> <li>-Research time: 2017-2018-2019</li> </ul> |
| 2.The annual accomplishment of a joint action-pupils and teachers aiming to increase pupils' civics and their involvement in school and community life  | <ul style="list-style-type: none"> <li>-the development of the students' critical thinking and their degree of their involvement in the civic life of the school and the community, by designing, developing and evaluating the civic activities</li> <li>-Share students' employment opportunities to complete high school or university studies in parallel with continuing studies as a result of the fact that civic activities are counted as volunteer hours</li> </ul>  | HR: CNPR Teachers -<br>Material resources: CNPR budget and budget created by the activities themselves<br>Time resources: 2015-2019   |
| 3. Annual pupils' self-assessments for the purpose of analyzing the skills they should develop and develop in the next school year  | <ul style="list-style-type: none"> <li>-increasing school performance by at least 10% through a better self-discipline, from one school year to another</li> </ul>   | Human Resources: Teachers<br>Material resources: -<br>Time resources: 2015-2019   |

The way the college's robotics club, with the name "CIRCUIT DEALERZ" conceives and carries out its entire activity, centered on the promotion of FIRST values, is fully in line with the 05 objective, contributing to its fulfillment

Another characteristic feature of our college is the way in which we combine the formal, curricular activity with informal, extracurricular activities. There are 10 clubs in activity, of which the inventions and innovations club and the scientific club NEXUS have been activating for over 10 years. The robotics club is actually an offspring of the inventions club. The multitude and variety of the educational informal activities in our college is one of the reasons for which many middle school students choose to come to our college.

It is about developing the ability of teachers to be able to identify pupils' training and development needs (the acquired interdisciplinary competence, but above all non-formal), on the one hand, to their students, to improve themselves in the field of action in line with the students' development staff, and on the other hand it is related to the capacity of the college to support the logistics of these activities. The objectives of the College's Strategic Development Plan for the period 2015-2019, which address the two issues are:

**03 / A1** Developing the competencies of college teachers for counseling students on personal development issues as a prerequisite for integration into the European workplace (managing the future and increasing the quality of life).

| <b>Actions to reach the goal</b>   | <b>Performance indicators (achievement)</b>   | <b>Human resources, materials, time</b>  |
|--|---|--|
| A1 Running courses with the subject of personal development  | The areas of personal development of teachers identified as necessary for them to guide students through their personal development: self-knowledge, development creativity, interpersonal relationships, emotion management, proactive behavior development, etc | Human resources: 15 college teachers<br>Material resources: European funding<br>Time resources: minimum 5 days |
| A2. Applying newly acquired skills for personal development  | Developing an organizational culture in the field of personal development in the future   | Human resources: 15 college teachers<br>Material resources: no funding<br>Time resources: permanently          |
| A3. Creating a set of working materials with the students in the field of personal development, adapted to their needs | Building a differentiated work strategy, depending on pupils' personality traits and their intentions to integrate into the labor market, supported by the necessary logistics.   | Human resources: 15 college teachers<br>Material resources: European funding<br>Time resources: 2019           |

## Notes

The way the members of the robotics club interact with each other and their communities corresponds to how the mentor of the team coordinates the entire personal development activity of the student members.

The notebook made annually by the CIRCUIT DEALERZ robotics team is one of the working materials that can be used as an example of good practice in the personal development of students.

**01 / A2** Improving the college's material base to be able to support integrated educational approaches (bilingual learning, inter-disciplinary learning, learning that has "natural" learning points, computer-aided learning)

| <b>Actions to reach the goal</b>  | <b>Performance indicators<br/>(achievement)</b>   | <b>Human resources,<br/>materials, time</b>  |
|---|---|--|
| A2. Arrangement of educational areas (mining, meteorological station etc.), which will be places for the development of integrated lessons of biology, geography, chemistry, physics etc.                                   | Arrangement of:<br>-3 soil modules at sight with plants at the surface,<br>an experimental area for physics and chemistry,<br>- meteorological status, with all necessary facilities<br>- therapeutic (with different textures from meter to meter)<br>-the flower garden with the cure, together with the proper labeling of the plants<br>-the semi-amphitheater.           | Human resources: the coordinators of the methodical commissions of physics, chemistry, biology, geography, informatics<br><br>Material resources: budget complementary to the college budget<br><br>Time resources: 2 school years       |
| A3 Equipping the modern college's scientific laboratories, replacing those that are out of use, with materials that are not part of the mandatory endowment, but which can support integrated learning and school research. | -the number of scrapped teaching materials and the number of new materials replacing the scrapped materials<br>- the superiority of the technical parameters of the new materials compared to the technical parameters of the disused didactic materials<br>- the number of teaching materials supporting the school research activity (3D print exponent, virtual lab, etc.) | Human resources: the coordinators of the methodical commissions of physics, chemistry, biology, geography, informatics<br><br>Material resources: budget complementary to the college budget<br><br>Time resources: 2 years of schooling |

**Notes:**

1. The recent appointment (October 2018) and the endowment of the robotics laboratory contribute to the accomplishment of the scientific endowment of laboratories to support integrated educational approaches.
2. Setting up the outdoor playground with a 4mx4m stage (which has been redesigned and arranged to accommodate the standard carpet size of the FTC matches) also contributes to the achievement of the scientific endowment of the laboratories to support educational approaches integrated.
3. The 3D printer, which was a priority in the year of writing of the PDI, in 2015, was accomplished by the NGO Natie Prin Educatie that endowed the club with one.

Yet another characteristic of our college is the fact that the teachers conceive and offer a wide variety of optional courses, meant to broaden the students' horizons and, in particular, to ease the development of cross-curricular abilities. For example, an optional course, based on the structure of educational research, was "Science between hazard and catastrophe", in which the students and teachers proved that the developments of current technology are in relative proportion with an increase in the vulnerability of the area, just like 100 years ago. This theme included a sub-theme, "Virus and Viruses", in which they proved that the computer virus has the same features as the live one, with the exception of the same way of transmission, at least for the moment. The final products of this course competed on a national level and received a prize in the form of a multi-touch laboratory in which the students, especially those studying IT, can produce educational software.

At the moment, we are working on writing an optional course on robotics (curriculum and manual attachment) and studying at college level the possibility of offering the robotics course with the curriculum status at the school's decision.

| <b>Actions to reach the goal</b>  | <b>Performance indicators<br/>(achievement)</b>   | <b>Human resources,<br/>materials, time</b>  |
|---|---|--|
| 1 Achieving local partnerships in the field of safety in and out of the school environment, learning and respecting the legislation of the country, gradual assumption of social responsibility by students | -Partnerships with the Suceava Police, the National Anti-drug Agency, the National Agency for Preventing Trafficking in Persons, etc.   | Human resources - CNPR teachers<br>Material resources - no resources<br>Time-partnership resources with running time of at least one year  |
| 2. Making partnerships with the role of volunteer activities by students and teachers   | -Partnerships with NGOs, Placement Centers, churches, etc.  | Human Resources -<br>Material Resources - The President of the Volunteer Club, the College's Educational Advisor<br>Time-partner resources with a maximum validity of 1 month  |
| 3. Making partnerships between college and other educational or non-educational structures, with the goal of joint projects, impacting on all partners  | -Partnerships with other schools or institutions with local / regional / national media / with the County Center for Conservation and Valuation of Folk Tradition and Creation Suceava, Bucovina Cultural Center, Suceava Cinema, | Human resources - teachers responsible for implementing partnership projects with tradition or new ones.<br>Material resources - budgets for the college budget<br>Time-varying time resources, depending on the duration of the partnerships implementation |

| <b>Actions to reach the goal</b>   | <b>Performance indicators (achievement)</b>   | <b>Human resources, materials, time</b>   |
|--|---|---|
| 1 Writing, submission and implementation of ERASMUS +, KA1 individual mobility projects (pupils and teachers) in accordance with identified needs analyzes   | the number of written projects<br>- the number of projects submitted on time<br>- the number of projects that have earned their funding<br>- the number of people who made mobility<br>- the number of projects evaluated following their completion                        | Human resources - responsible for European projects and writing teams, project implementation,<br>Material resources - project budgets<br>Time resources - 2 years for each project |
| 2. Writing, submission and implementation of ERASMUS +, KA2 partnership projects (pupils and teachers) in accordance with needs analysis identified  | - number of written projects<br>- the number of projects submitted on time<br>- the number of projects that have earned their funding<br>- the number of activities carried out in the context of mobility<br>- the number of projects evaluated following their completion | Human resources - European college project manager and writing teams, project implementation, Material resources - project budgets<br>Time resources - 2 years for each project     |
| 3. The re-establishment of international partnerships without European funding, with adequate partners, to meet common educational needs, targeting high levels (multicultural education, career guidance education, multilingual education, etc.) | - the number of activities carried out within international mobility partnerships<br>- Numerous activities carried out remotely, with an international impact   | Human resources - European college project manager and writing teams, project implementation<br>Material resources - project budgets<br>Time resources - 2 years for each project   |

In order to achieve the national, European and international openness of the college, with all the benefits that come from here, the most important being, of course, to connect our pupils with other education systems and other learning methods than those traditionally practiced in college, the college has developed a relationship strategy, based in particular on projects. This is stipulated in the Institutional Development Plan 2015-2019 as follows: 02 / 4. Participation in European and international projects (with and without funding, with and without mobility)

Note - The FTC competition enters the lead line to meet 02 / 4 target indicator 3, previously presented.

Also in the spirit of 02 / Axis 4,

The college has been running exchange programs with European countries through Erasmus projects. These projects contribute to an increased broadening of our students to the world, helping them to become more flexible and to interact with students their age from different parts of Europe. The current themes we are working on right now, as part of different projects, are as follows:

1. **The development of citizenship education via all the school subjects and extracurricular activities.** The Erasmus + project of the KA2 type with the abbreviation CIVIC and the European code 2017-1-FR01-KA219-037281\_2 is in progress, has 8 partners from 5 countries and although it is not finished, it expects that at the end of its implementation (according to CNPR students)):

- we will raise awareness of social issues, especially involvement in support for needy people, in finding solutions for risk-prone people, etc.
- we will help increase the number of young people involved in activities meant to support the economic growth of the region (as a factor of local and regional stability)
- there will be an increase in the number of activists for NGOs and political organizations etc.
- there will be an increase in the level of education and culture of the citizens, and in the way they respond to educational and cultural events
- there will be an improvement of the young people's attitude towards their birthplace
- there will be increased interest in the area from foreign investors (who regularly focus on a sense of local community).

2. **Scientific and technical education through innovation activities - a project which combines scientific and innovation abilities- possibly with European funding.** The project aims at combating the almost general fear of speedy technological advances/ its harmful effect on humanity, and it enhances confidence in the individual and collective inventiveness.

In the year 2019 an ample project, like Erasmus + KA2, was completed, which had a 3-year development period. The name of the project is "A New Energy for New European Citizens", and the European Union Code is 2016-1-FR01-KA219-024161\_1. Students have been connected with this project to a great many things related to renewable energy (technical features, production and exploitation features, costs, ecology, etc.), and it expects the impact of its implementation on CNPR students to be high.

**3. Education through the man-nature connection- a project which is under development annually, started from the concept of durable development, with a focus on the educational side. So far, as part of this project, there has been built an open-air classroom including an educational gazebo, a therapeutic lane, a herb garden, and a weather station. All these are located in the college park and can be accessed by a large audience. The next stages include activities to be conducted in the area, logistic operations and the expertise of those who are going to use them.**

From this perspective, the college has implemented a project called "Give a chance to today's young people and the nature of tomorrow" using private funds provided by Reiffelsen Company through the Reiffelsen Community program. The educational park was built in the open air and 19 volumes of teaching and methodical books were published, referring to the activities that can be performed in the outdoor educational park. Many of the activities related to the building of the park were carried out voluntarily, among the volunteers being the members of the robotics team CIRCUIT DEALERZ.

The college is currently facing a major problem, that of learning space. There is a group of laboratories and a research center under construction, but construction was stopped due to lack of funds. When the building is finished, the educational process- in terms of facilities- will definitely improve.

The future group of laboratories and the glass pyramid lighting system of the research center.

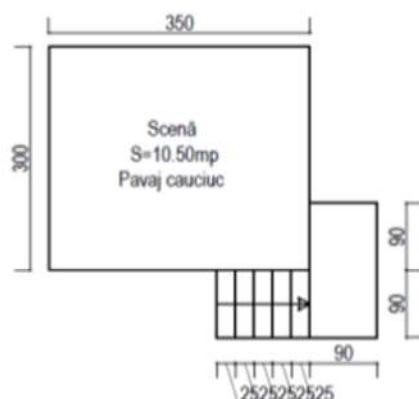


The outdoor educational park partially solves this need for space, for lessons that have the theme of urban ecology, or which have park areas as teaching materials, or which are logically fitting with the park's facilities. Partially, when the weather is good, the problem of space can be solved by simultaneously running some didactic activities of 6 classes of students.

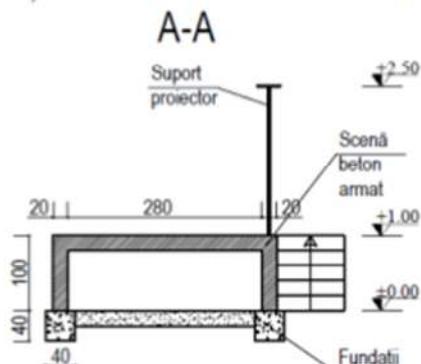
Initially, the project of the high-school educational park included a scene area of 3 mx 3.5 m. But, due to the fact that a number of Demo games of the robotics team could be held in this area, or more, local competitions can be carried out, the 4mx 4m sculpture has been reshaped (with all the difficulties that have come from here) and today the scene is a robotic outdoor arena (something new, nonexistent elsewhere). This will be fully exploited during the warm season for team outreach activities. The park was put into operation in October 2018, the Circuit Dealerz team carried out a large number of volunteer hours for the educational parks, described in the chapter specifically dedicated to this.

Detail of the scene of the educational park, with the initial dimensions of the scene

### PLAN SCENĂ

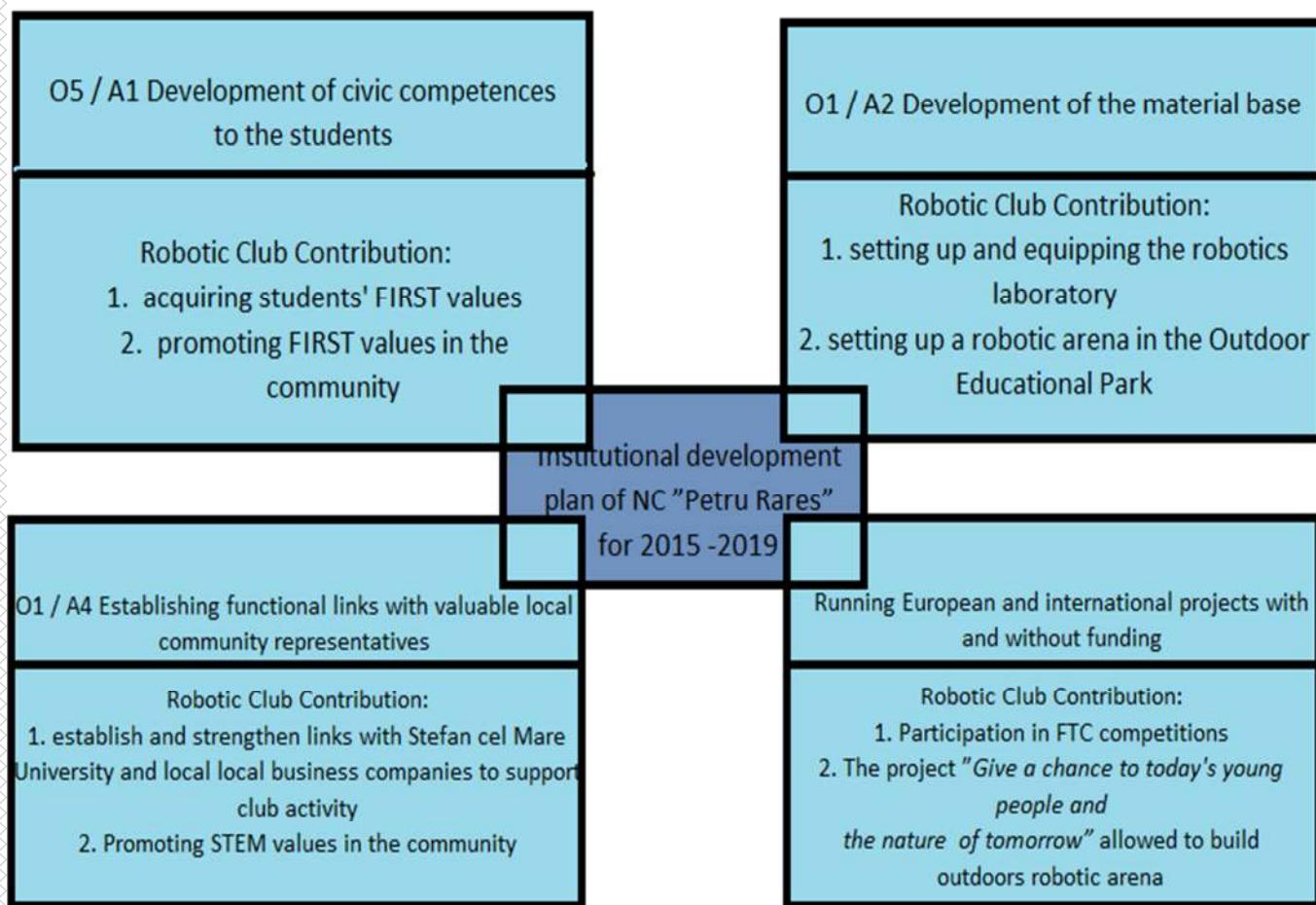


### SECȚIUNE TRANSVERSALĂ A-A



## Conclusions

Although, when the programming documents (e.g. when the local and regional educational needs intertwined with the college's educational, logistical and human resources capacities to draw up the institutional development plan), the robotics club not yet functioning, it was found that the activities within the club contribute to the achievement of the results indicators of the development plan of the current PDI. The areas where the robotics club contributes are:



## 1.2. CNPR robotics club

### 1.1.1. Programmatic documents

The future development strategy of the CIRCUIT DEALERZ team is structured according to the following guiding axes:

#### A. Short term - one year

1. Formalization of the whole activity in accordance with the school legislation in force (elaboration of the club's program, its approval, running the activities according to it, reporting the activities for internal feedback, as well as being included in the representative documents of the high school)
2. Continuous value increase of the team (personal value - measured by competencies developed individually and group value - measured by team cohesion)
3. Ensuring the reserve of potential members (among volunteers and members of other clubs - the club of inventions), who develop competencies at the same time as the team members.
4. Making a "smooth transfer" of skills in 2019 when the team members in the 11th grade will withdraw next year to take over the baccalaureate
5. Training a large number of outreach activities in the college's outdoor educational park, in the specially designed arena.

#### B. Long-term - 4 years

1. establishing long-lasting partnerships with the Stefan cel Mare University and with SC ASSIST SOFTWARE SRL in Suceava for support, especially technical, when it comes to blocking points
2. Establishing a network of loyal supporters of the team (volunteers, former high school students who can collaborate remotely with the team, the EXCELCIOR Association of the students of the college students, etc.)
3. Increasing the prestige of the CIRCUIT DEALERZ team in and out of school, for the double promotion (of the team itself and of the college in the communities of future students)
4. According to an optional course of robotics and his proposal to be accepted as CDS by the college curriculum committee
5. Encouraging club activity in the rewarded areas ☐Think award ☐Design award ☐Innovate award

In the light of the above, we have been attaching THE PROGRAM OF THE ROBOTIC CROSS, subject to direction approval in Sept 2018

**«PETRU RARES» National College Suceava  
Approved- head teacher**

**Mrs. Daniela DUNGEANU,**

### **Educational project**

#### **Robotics workshop, school year 2018-2019**

##### **Argument**

##### **Developing period – school year 2018-2019**

**Venue** – robotics laboratory „Petru Rares” National College Suceava

**Project partners** – “Stefan cel Mare” University Suceava

**General aim** – developing students' cross-curricular competences

##### **Specific competences:**

- achieving the design of a robot depending on the functions it has to perform.
- enabling the robot with intelligence
- putting it to the test
- applying the robot's manoeuvre
- participating in contests of this kind in order to earn experience while competing with other
- good cooperation among the team members of CIRCUIT DEALERZ
- spreading the information regarding the activity of the robotics workshop inside the school and the local community of Suceava.

##### **Contents –hard, soft:**

##### **Activities**

| No. | Activity   | Venue   | Deadline/Period                         |
|-----|--|---|---|
| 1.  | Building up the team, electing the representative elements (name, logo, slogan)  | Robotics laboratory   | September 2018                          |
| 2.  | Delegating responsibilities inside the team (3D modelling, assembly, software, PR)   | Robotics laboratory   | October 2018                            |
| 3.  | Registration of the team in the FIRST competition – Romania  | - Robotics laboratory   | November 2018                           |
| 4.  | Building up the communication strategy between CIRCUIT DEALERZ team and the local community  | Robotics laboratory   | November 2018                           |
| 5.  | Working meetings of the 4 subgroups in order to create the robot, building it up and enabling it with intelligence; implementing the communication program with the local community. | Robotics laboratory, practicing on the stage in the educational park. | November-December 2018 - - January 2019 |
| 6.  | Taking part in different local competitions in order to have the robot tested and trained.   |   | February – March 2019                   |

|    |  |   |            |
|----|--|---|------------|
| 7. | Participation in the national contest FIRST Romania, March 2019  | Bucharest   | March 2019 |
| 8. | Potential participation in FIRST- USA 2018   | USA   | April 2019 |
| 9. | Spreading the information about the experience and the obtained results by the team CIRCUIT DEALERZ during the year of activity (2018-2019). | Activities on the stage in the educational park. Participation in 2 local TV shows. | May 2019   |

**Mentor** Mrs. Anca GRECULEAC, deputy teacher.

#### **Departments:**

1. Design 3D
2. Hardware
3. Software
4. PR
5. Project management

#### **Methods of disseminating the results**

- in accordance with the strategy of local communication CIRCUIT DEALERZ- community (volunteering for the Christmas Show of the college, volunteering for the organization of the educational park, volunteering for the National Strategy of Community Action, volunteering for orphan children on Easter, cross-border collaboration with Romanian-speaking people from Ukraine and the Republic of Moldova etc. )

#### **Methods of monitoring and evaluation**

- modular evaluation for items and activity sub-groups
- filling in feedback forms after each modular evaluation
- individual and group final evaluation (comparing the results based on prognosis)

#### **Risks**

- disagreement between the design, the hardware and the software
- lack of funds to finish the construction of the robot, to put it to practice, or to participate in competitions

### **Quality markers**

- **markers for the team's cohesion**
- **progress markers for the achievement of informal abilities concerning: the conception of the robot, its construction, enabling it with intelligence and implementing the communication programme with the local community**
- **communication markers- the CIRCUIT DEALERZ team and the local community of Suceava**

### **Quantity markers**

- **the number of meetings of the team members (at least twice a month), recorded with minutes, records etc.**
- **the number of hours of work in each department**
- **the number of partnership contracts (over the 2018-2019 school year)**
- **the number of views on the team's Facebook page**
- **the amount of evidence (brochures, badges, personalized t-shirts, logs etc.)**
- **the number of radio and TV appearances, press conferences etc.**

**Mentor, Mrs. Anca Greculeac, deputy head teacher**

## **1.1.2 Patrimony of the Robotics club**

1. Since autumn 2018, the club has a dedicated location, pretentiously given the name "the robotics lab". This was one of the goals of the business plan elaborated for the 2017-2018 season, which could not be accomplished then, but was delayed by several months. Until the laboratory was set up (room 28), the club's activities took place in different locations, some of them personal and some of them not. The arrangement was done through the voluntary work of the club members.
2. The club owns a complete TETRIX kit, which we have been continually completing by purchasing good quality parts.
3. The club owns a number of tools and devices which allow the manufacture of parts for the construction or finishing / repairing of parts required for the assembly of the robot.
4. The club manages the income and expenses budget through the "EXCEPIOR Association of the parents of the pupils of the Petru Rares Suceava National College". It is envisaged in the business plan of the 2018-2019 season to set up our own association that would give us financial independence and enable us to carry out other operations that were not realized until now.

The club's room is also one of the most precious places for some of the members, especially Vlad and Victor.

The way that our club room evolved from Vlad-Andrei Cojocariu's point of view:

The place in which we work is very important to me and being a member of the assembling team, I spend a lot of time working on the robot in there. Me and my fellow teammate, Victor Macovei have an obsession with it being clean, tidy and organized. However, the place we worked in has changed over the time and it took some time to get where it is right now. At first we had a really small room which was actually an infirmary but we somehow managed to work there. There was a bed, a drawer and a table with two chairs. Later the team had the idea in mind of moving everything from the school to a garage owned by Victor's father.

After a lot of switching back and forth from place to place we finally got a room in the school's hostel, dear old room 28. We've all become very close to this room as we spent a lot of time in it building our robot but not only that, building our, we've started to know each other better, laugh together, argue and all sorts of stuff that can happen between team mates.

The only thing we had in that room was a drawer and a table, and so with the new room we had a meeting discussing things we need for it, and just like that we started bringing things we didn't need from our homes to make it feel like home.



During the FTC Relic Recovery, we've let the room as it is, there were a lot of problems with the walls, snuffs weren't working, tables were scratched, the door was very old but we didn't mind it as we were more concerned with the robot. We thought that the room did not matter as long as we do our job but we couldn't have been more wrong, going back I recall always not having enough space for the arena or not having space for the entire team to be there, and all that called for a change, and one has been made.

After last year's contest we've drawn a lot of lines, and one has been made about our working place. The summer ended and we've made a plan, we had to paint the walls, using the white paint, change the parquet and furnish it with better furniture. The room got brighter and so did our ideas, we've spent more time in there as it was more welcoming, we started spending most of our time working on the robot because of the schedules, and it really is now our second home. On the 28<sup>th</sup> of November, while celebrating the centenary and opening of the club we had a lot of people joining: teachers, the Emeritus Rector of University "Stefan cel Mare", class mates, and members of other clubs, we took the opportunity to celebrate the opening of the new room in the same day with the centenary.

This room "28" is very important to all of us, we go there weekly, if not daily for work. For us that room is more than that, it is our way of expressing what we love doing by sharing our ideas and ideals, robotics means a lot to us and so does that place.

### **1.1.3 A little history of our team**

In the first year, the team was called IMPULSIVE, had 15 members, most of which were in the 11th grade, respectively 12th, had two adult coordinators and 2 student mentors who were the heart that beat intensity in everything that has been achieved. The two mentors have grown in abilities at the college's Invention Club, and have a large number of national and international inventions, produced with heavy work, all by combining hard and soft the work in the club was enormous and the enthusiasm of the beginning was a good catalyst

And the results exceeded expectations. The IMPULSIVE team of:

- Build two performing robots
- Has won the INSPIRE AWARD Grand Prix at the FTC 2017 national competition in Bucharest
- Was one of the teams that represented Romania at the FTC international competition in St Louis.



The images below speak for themselves about the joy of these successes.

The size of the hall, the number of participants, the scale of the whole event has made us dizzy.



Although it was late evening, the FTC Bucharest competition kept us awake and enthusiastic



At the national competition FTC Bucharest 2017, we met the former students of CN Petru Rares Suceava



Image from the FTC Bucharest 2017 Technical Inspection ... which includes the first robot with the lucky number 0044.



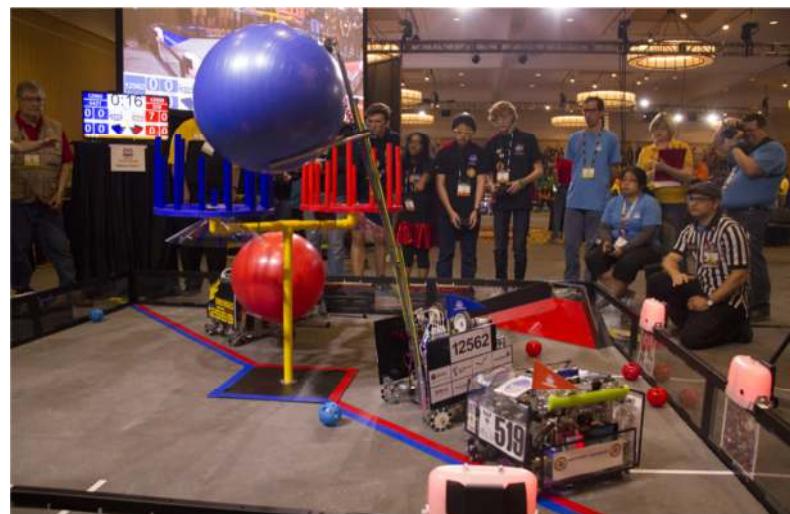
Image from the interview of the Romanian team in the FTC St Louis competition. There is our robot (with competition number 12652) and the Engineering Notebook we had at that time.



The Pit of the IMPULSIVE team from the 2017 St Louis, USA, with and without guests.



Just at the first match, the slide of the robot got damaged, problem which had to be solved. Unfortunately, its operation was not perfect until the end of the competition.





The FTC St Louis 2017 competition was an opportunity to discover America in the short free time we had

After returning from the USA, the team remained with only two members, Dragos Salagean and Matei Barba and the team was about to be abolished. But we succeeded in reinventing it under a new name, CIRCUIT DEALERZ, with an almost completely new composition and new rules for the

building departments, for the collaboration between them and the recruiting of new members and volunteers. The team has become a learning lab, where its members have become friends, who know both the positive and the weak parts and can rely on what is good to blur the perfectible. The team number has always remained the same: RO 044.

The following images depict the team winning two different award under different awards.



**Its members now believe with all the strength that they  
are able to reiterate IMPULSIVE's performance and  
even exceed it.**

The metamorphosis of the CIRCUIT DEALERZ team is briefly described in the recommendation that the adult mentor of the team made to the mentor student Dragos Salagean for the Dean's List nomination.

### *General presentation*

*After having worked 26 years in the domain of education, I am able to objectively assess Dragos SALAGEAN as one of the most outstanding students that "Petru Rares" National College has had. He stands out because of a remarkable blend of both personal qualities, which he develops systematically, and academic qualities, shaped formally and informally. He is part of a class that contains students selected through a national exam and whose general mark is higher than 9.00 (in Romania 10 is the highest mark). Dragos is passionate about real studies: mathematics, physics and information technology and, as a result, he has excellent marks at these subjects. Moreover, he participated in a multitude of scientific activities (contests - for example: National Olympiad for 4 years consecutively), some competitions are in the area of non-formal education (for example: contests in physics, such as PROFIZICA PROCOPIU contest, Cygnus contest, information technology and invention).*

*Dragos SALAGEAN has an extremely developed social dimension, based on good group communication, organizational skills, and a great spirit of justice. He is also endowed with remarkable imagination, which helps him to find, in many cases, some of the most ingenious solutions. As a result, he succeeds in making his colleagues (and not only) work with a view to organizing and participating in a great number of activities (groups who suddenly join scientific camps, self-development camps, camps for juniors, etc). Everything seems to flow whenever he brings his contribution.*

### *Short account of the connection between the robotics club of "Petru Rares" National College and Dragos SALAGEAN*

*Ever since the first year of its existence, the team of the robotics club, called Impulsive, has invited Dragos to join as a permanent member. At that time, Dragos was the youngest, only 14 years old. Most of the other members of the club were 18, with remarkable results especially in the domains of inventics and innovation, which has made the team be relatively mature even if it was just in its beginning. On that structure, the team was a real laboratory for the development of technical skills, as well as cooperation, ingenuity and responsibility taking for all its members, including the very young ones, such as Dragos. The results of the first robotics team of our school were spectacular, considering the novelty of the activity for its members. It won the INSPIRE prize at FTC competition in Bucharest, and it represented Romania at St Louis international championship, 2017 edition. Upon return from this international event, the team remained with only two of its initial members as the others graduated or decided to pursue different academic interests requiring competences from other fields of knowledge (Law, for example).*

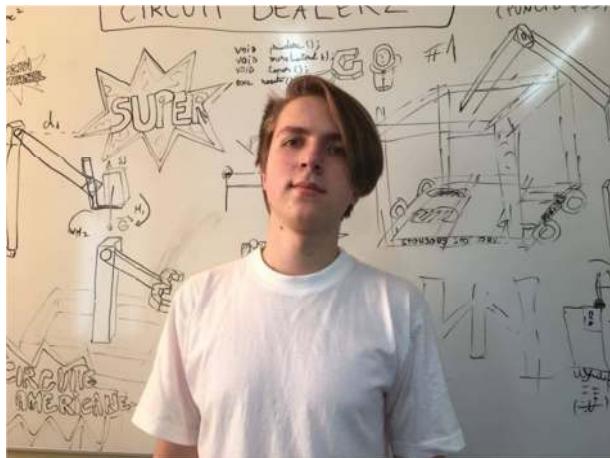
*This was a difficult moment to overcome as the general opinion of the remaining members of the team inclined towards giving up participating during that competitive season with a view to training new colleagues, so as to reach the maturity the team once had. But Dragos was a then a good catalyst and, making the necessary effort, together with the mentor of the team, volunteers, technical referents, contributed to the creation of the new team called CIRCUIT DEALERZ. This also succeeded in bringing together local scientific and technical values, established a powerful connection with "Stefan cel Mare" University of Suceava, Electric Engineering Faculty and Computer Science, companies active in the region in the IT domain. Moreover, this created the favourable context for the successful organization of numerous popularization of science activities in general and robotics in particular, as well as a wide range of charitable events.*

*A space has been identified and properly equipped to become the location of the robotics club. This is where the students assembled the 3 prototypes of the robot with which the team competed in regional contests, reaching the national stage. The team won the FTC final of Bucharest 2018 Connect Award, the Second Prize and the Judges Award, First Prize. This represented the fact that the new team of the College is already very powerful, with a great future, having the potential to obtain better results due to hard work and devotion to its projects.*

*At present, Dragos is the student mentor of the team, his main contribution being the supervision of all functional departments. However, in many situations, Dragos was willing to help and put in more effort, working together with the students from the departments where his duty was only that of mentoring. This was what helped the whole team meet its deadlines and achieve the necessary transfer of competences. As a result, Dragos earned the respect of his colleagues. We hope that the next competitive season will be very fruitful for the team, with achievements that will motivate students to further create and make a difference. When Dragos graduates, pursuing University education, this whole experience of the robotics team will certainly prove extremely beneficial.*

*Considering the above mentioned facts, relying on my teaching experience and also on the 13 year experience I have as deputy head teacher of "Petru Rareș" National College (rated EXCELLENT as a result of the evaluation conducted by the National Ministry of Education, with 1200 students who all pursue university academic programmes in Romania and abroad), as coordinator of all non-formal activities of the school, including the inventics club, and as mentor of the robotics team CIRCUIT DEALERZ, I wholeheartedly nominate Dragos SALAGEAN for the Dean's List Award."*

### **1.3. Team members**



#### **DRAGOS SALAGEAN – PROJECT MANAGER**

##### **Introduction**

I am a 17 years old member of the team Circuit Dealerz. My role in the team is Project Manager. This is my third year in this team and I'm proud to be a part of it. I worked on everything from Design to Hard to working on PR, but now my main role is organizing the team and helping departments in case we encounter difficulties.

##### **Education**

Currently, I am an eleventh grader at the "Petru Rares" National College. I have participated and won prizes in various National Contests such as Informatics, Chemistry, Physics and Mathematics.

##### **Activities**

I have been involved in a few alternative activities, such as managing a site for a film festival, I have also participated in two film festivals, one national, Video Art, and another international, UNICA. Because in gymnasium I have mostly participated only in Contests and since I started highschool my main focus has been FIRST, I have not participated in a lot of volunteer activities. However, because of the outreach activities we had with the team I cannot wait to participate in more volunteer activities once I go to University

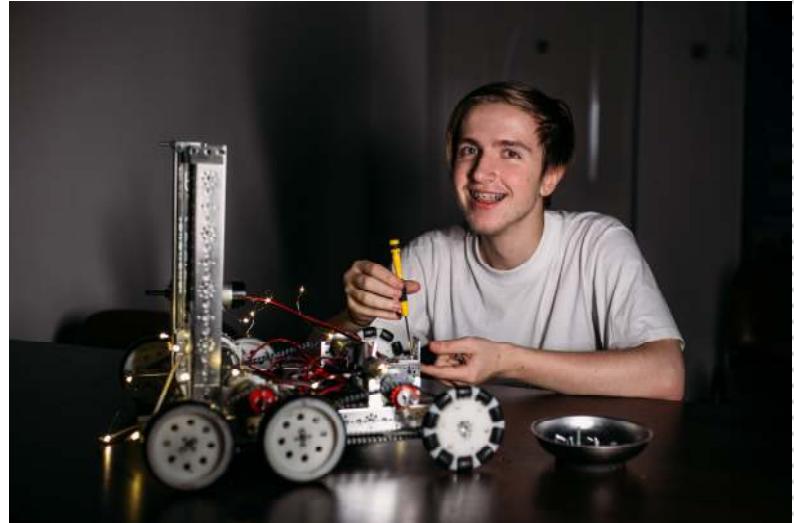
##### **Skills**

I'm a capable speaker of German. I am quite fluent in English, and I also am confident in my programming skills in C, C#, Java, PHP, CSS and Phyton. I have developed skills over the participation in this competition in 3D design (Creo and Solidworks mainly). I have basic knowledge in Data Analysis. I also know how to edit Video and Audio Clips (in Adobe Premiere Pro and Audacity).

## DRAGOS SALAGEAN

### Introduction

Hi! I'm Dragos, the guy who always knows everything, or at least tries to learn everything. This is of course a bit of an exaggeration, however it's not that far from the truth. Over these three years I have spent in this team and this competition I have developed a lot of skills, both social and technical, and I have also bonded a lot of friendships with members of teams all over the country. While the first two years I was more competitive, this year I am participating mostly with the intent of preparing the ground for the future new members of the team and forming them.



### Hobby

I love playing video games, anime, reading books and robotics, of course. I am not a very sportive person, I am bad at most sports, I tried basketball and volleyball, but I have not succeeded at either of them sadly, and because of a lack of time, I gave up.

### Dreams and goals

I am not certain dream or goal for the future, I have however quite a few plans laid out for every option.

In the future, I think want to pursue a career in Programming/ Computer Science, but I am also inclined to become an Engineer.

### Motto

"Success is the ability to move from one failure to another without loss of enthusiasm." - I strongly resonate with this because most of my successes actually came from failing again and again until I finally succeeded.

## MUNTEAN TUDOR EMANUEL- PROJECT MANAGER



### Introduction

I am almost 18 years old and I have been studying at "Petru Rares" National College Suceava since I was in the fifth grade. I am a member of my high school's robotics team since the last season (called Relic Recovery) when my role in the team was to attract as many sponsors as possible. This year I am the team's project manager and the only driver of our beloved robot.

### Education

Right now I am an eleventh grader at the school I mentioned above, part of a mathematics-computer science-English (bilingual) class. During recent years I have taken part in numerous contests and school Olympiads that relied on mathematics and physics, the best achievement so far being first place in the county stage at a Physics Olympiad.

### Activities

I have been practicing handball for 8 years and I have won: 2 gold medals, 3 silver and 2 bronze ones; all of them were won within the final tournament (national stage). During the years I have also won some individual trophies such as "tournament's top scorer" or "tournament's best defender".

I have also been involved in two Erasmus exchange programs, one in Poland and one in Turkey, activities in which, being forced to communicate in English I have improved my language skills and had realized that I knew how to talk English better than the individuals from the other countries involved with the school internship, a fact that gave me self-confidence.

A few other activities which I have been involved in are: the school's Freshmen Ball and the Charity Ball where I was considered the main organizer of the event. The Freshmen Ball is a 4-hours long spectacle which combines multiple performing arts such as: theater, singing, dancing, as well as elements from modeling and beauty contests with the purpose of choosing the Miss and the Mister of the college from 10 freshman boys and 10 freshman girls who compete in order to show their talent and beauty. The Charity Ball, similarly to the Freshmen Ball, is a 4-hours long spectacle which also combines multiple performing arts, but unlike the Freshmen Ball, its sole purpose is raising funds for different charitable causes. Furthermore, during the summer holiday I worked as a waiter in a restaurant owned by a friend's family, learning how to earn money, but also how to talk to people in order to make them feel comfortable and enjoy your company.

### Skills

My level of English is C1 (soon I will obtain the Cambridge certificate too) and I am also a handyman. I really like crafting and I have improved my abilities by having worked a lot, not only in the charity ball's design department, but also in my house or in my garden.

## MUNTEAN "EMI\MANOELO" TUDOR EMANUEL

### Introduction

Wazzaaaaaaaaapp??! Most people call me Emi but I like to call myself Manoelo everytime I say something stupid or just when I do nothin' but be, you know , " chillin'...killin'... " (movie quote, look it up). My role in the team is to give very precise deadlines in order for everyone to do their job, like my math teaching...except from the part that I am not teaching anything, I just give homework.

I have been in the team for 2 years and I like a lot that I have no less than 5 classmates in the team because we can skip school together pretending we are working at the robot. Kiddin' again (that's Manoelo). I really enjoy that our teachers support us and let us work during their classes that we find boring (don't tell them that).



### Hobby

When it comes to hobbies, I enjoy a lot watching any kind of sports, from football or handball to snooker or motorsports. My passion is handball and once I have been in love with it, but now I really want to focus on my education and reflect on what I want to become. I also enjoy cooking and I have sympathy for the indian kitchen, tikka masala being my favorite dish.

### Dreams and goals

As I said, I have an affinity for Indian food and my dream is to open some Indian restaurants in Romania.

I want to graduate and become an airline pilot, I can see myself flying all the time and discovering new places, visiting another cities as Madrid, Los Angeles, Brasil or Ciudad de Mexico.

Also, I would love to have an E Class Mercedes Benz 2017 as a personal asset as I like cars a lot, Mercedes being my favorite brand.

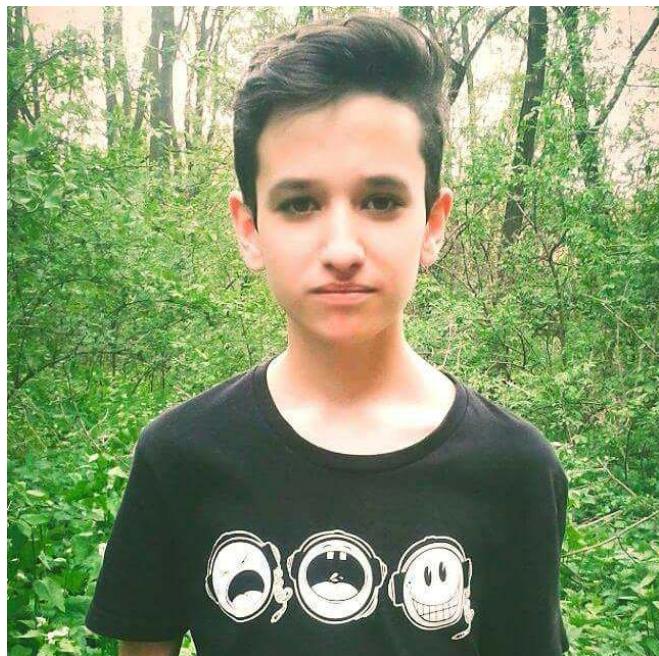
### Motto

"Be the dumbest in the room"

I like this quote a lot and I am guiding myself by it. I think that we have to be proud of ourselves, but never pleased. Some say that our limits should touch the sky in terms of what one is able to do; this is where I come into play and say "what limits?"

Work hard to live your dreams!

## MOCANU MIHAI – 3D DESIGN



### Introduction

I am a 16 years old member of the team Circuit Dealerz' 3D Design Department. I am new in the team, this being my first year, but, even though I have not been a member in this team for a long time, I can surely say that I am proud to be a part of it. I mainly work on the design of the different parts that we need to fabricate and I also work on the assembly of the robot, but from time to time I also help the other departments with their work if I can.

### Education

Currently, I am a ninth grader at the "Petru Rares" National College. I have participated and won different prizes in various Contests for Informatics and Physics but also in some Olympiads such as English and Physics.

In the future I plan on improving my physics and programming skills, hoping that it would help me with my future career and also be of more help to the team.

### Activities

Excluding the projects and activities that were related to the robotics club, I have not been involved yet in any major ones, but I am looking forward for the different projects that I might stump upon in the future, hoping that they would help me develop and become a better individual.

### Skills

I'm confident in my English skills and I have basic knowledge in programming (C++). I also have some knowledge of Video and Image Editing, but I do not consider it to be good enough to rely on at the moment.

## MOCANU "MISU/MIHAITA" MIHAI

### Introduction

Hello there! Quite a few people call me using different nicknames, the most used one seems to be Misu, but others also call me Mihaita. Being new in this team, it means that I have the opportunity to learn a lot of new things. That's why I wander around the older team members, from different departments, trying to absorb as much information as I possibly can.

Although I've only been in this team since the start of this season, it has helped me change and develop as a person. I truly believe that, since the start of the year, I've changed a lot and I'm happy that I had this chance. I am amazed when I think of the new opportunities that I will experience thanks to our team and thanks to this competition.



### Hobby

I've never really had a favorite hobby. Excluding robotics, I usually spend my free time playing video games or just going out with my friends, although sometimes I like to go for a walk alone or just with my dog so that I can relax.

I also don't have a favorite sport, it depends on my mood. Most of the time I either play basketball or volleyball. Although I've never really been a big fan of soccer, I sometimes play it so that I can hang out with my friends or just to pass the time.

### Dreams and goals

I'm not really sure what I want to do in the future as a career. I would love to be able to have a stable job in research related to a physics field, but I think that it is too unstable and hard to get into after you have just graduated a physics university, having no experience. That's why I'm thinking to get a job as a programmer in the future, being more stable and knowing that I would be able to support a possible future family better.

### Motto

I think that life is too short to live by a certain way, by a certain motto.

## TANASE ALBERT CRISTIAN – 3D DESIGN DEPARTMENT



### Introduction:

I am a devoted member of the 3D Design Department in the Circuit Dealerz team. Being my second year in the team, I had the chance of acquiring knowledge regarding the field of robotics while sharing with others the lessons I learned and the values of a FIRST type education.

### Education:

I am in the 11th grade at the National College „Petru Rares“ in Suceava, with a specialization in Mathematics Informatics bilingual English. Through the years, I had the opportunity of taking advanced courses in Mathematics and Physics organized for students in order to prepare for olympiads and contests alike. Consequently, with the help provided by my mentors, I managed to win several prizes at both national and regional competitions in the field of Physics, Mathematics and Robotics.

### Activities:

I have been a member in a local club of the International Non-profit Organization „Interact“, which aims to help those in need through volunteering work. For the past 4 years, together with my colleagues, we have been raising funds in order to help different charitable causes and organised events for the local community. „Freamat de Speranta“ is our most successful show, where the club invites teens in order to perform in front of the audience in the hope of gathering as many donations as possible. Not only did we help someone to improve their life, but also we promoted local talent. Apart from these, we organise contest for movie directors through the event “We Like to Movie“ and other talent show.

I am also a member since the 9<sup>th</sup> grade of National College’s “Petru Rares” Basketball team, playing as a Point Guard. During the year we participate in numerous competitions, where we compete against other High Schools in our county, but also in other several championships.

### Skills:

As a member of the 3D Design Department, I know how to use different applications such as Sketchup, Solid Works and Creo, all meant for virtually constructing a robot. Apart from this, I have basic knowledge in programming using C++ and I am an advanced English speaker.

## TANASE „ABE” ALBERT CRISTIAN

### Introduction:

Top 'o' the mornin' to ya! I have been part of this team for two years now as a member of the 3D Design department. I developed a better understanding of how to work on a such a complex project in a team. Unexpectedly, this competition had a paramount role in my development and my high school years. Not only did it teach me so much about a domain that I was previously unaware of, but also it sparked an interest for robotics that I wish to follow as a specialization during college. Apart from this, throughout the seasons, I had the opportunity of meeting new people who share the same interests, either in the camps or during the competitions, while strengthening the connections I had with my team colleagues.



### Hobbies:

I am a creative person, loving to combine the arts with science. I love listening to music and no wonder is the fact that one of my biggest passions is playing the guitar, something that I have been learning by myself for 2 years now. It is so much better to sing the songs that I love. Apart from this, I am also a “sportaholic”, as I am part of the high school’s Basketball team and, depending on the season, I find myself unwinding while playing tennis or skiing. Needless to say, robotics is now another passion of mine. There is no better feeling than seeing all your hard work being literally brought to life!

### Dreams and Goals:

One of my everlasting dreams is to study in the United Kingdom, not only for the top universities I can find there, but also for the rich cultural life. I am sure that being admitted to a prestigious college along with hard work in the years to come will assure me a bright future. I would love to study Mechanical or Electronic Engineering because both of these fields have tangencies with robotics. Apart from these, I would love to have the chance of travelling around the world with my closest friends during my College years.

**Motto:** “You may delay, but time will not” – Benjamin Franklin

I like to think of this quote as a metaphor for acting before is too late. During our lives we meet so many crossroads where just one choice can change completely our future. For this reason, people should not be afraid to take risks and most importantly, invest their own time in themselves for a fulfilled life.

## VICTOR MACOVEI – HARDWARE DEPARTMENT



### Introduction

I am a 17 years old member of the team Circuit Dealerz' Hardware Department. This is my second year in this team and I'm proud to be a part of it. I mainly work on the Hardware Department, but from time to time I also help others with their work.

### Education

Currently, I am an eleventh grader at the "Petru Rares" National College. I have participated and won prizes in various National Olympics such as Physics and Mathematics.

### Activities

The three characteristic activities that could be used to describe my life so far are swimming, robotics and academic work.

I have been practicing swimming for almost 7 years and represented my town several times in national contests. Other than that, I mainly focus on improving my Informatics and Physics skills in order to participate in various contests. The experience I gained from these definitely helped me a lot while working with the robotics team.

Another activity I was involved in was ERASMUS, an exchange-of-experience-type project. My correspondent was a 19-year-old student with whom I became very close friends. Although a Physics-oriented activity, I had the opportunity to both visit Opole and learn about different ways to generate green energy.

### Skills

I'm confident in my Engineering skills and I also have knowledge in programming (C++ and HTML), Video/Audio Editing Software (such as Vegas and Audition) and I also know how to use a mixing console to a certain extent. I have also been practicing professional swimming and won several silver medals in the Olympics.

## VICTOR MACOVEI

### Introduction

Hello there! My main job regarding the robotics team is assembling the initial parts according to the instructions given by the design department. Unfortunately it is easier said than done. The main quality our department demands is the ability to improvise. As many times the parts used in the 3D design don't resemble the reality and many others break and become unusable we have to rapidly come with ways of replacing them.



### Hobby

I can't say that I have a favorite hobby per se, but I like playing video games, watching movies, reading and well, robotics otherwise I wouldn't be here. I enjoy playing video games and listening to music. I am still in search for a table tennis partner.

### Dreams and goals

I am still not sure whether I should choose either Physics or Informatics in the future, but I know I want to spend a happy and carelessly life.

### Motto

Think of an anthill and how easy it is to destroy it with minimal consequences. That is what we represent on a universal scale. When you realise nothing really happens, the universe is yours.

## RUSU ILIE ALEXANDRU – HARDWARE DEPARTMENT



### Introduction

I am a 17 years old fresh member of the team, in the Circuit Dealerz Hardware Department. As it's my first year taking part in the robotics activities I'm eager to make as much progression in a short period of time as I am considered to be one year behind.

### Education

At the moment, I am studying at "Petru Rares" National College from Suceava, with inclinations towards whatever includes Mathematics, like Physics or Informatics, but also I'm keen to learning English.

### Activities

Besides many hours of assembling and improvisations for the robot, my life is a composition of a daily coding schedule together with learning for school and practicing guitar. Often I find myself searching on internet different stuff ,mostly news ,but also for new information and at the end of the day, if there is any time left I'd have some time for myself when my brain goes idle and have some fun in some video games.

Where the fun begins is the Summer where I try to attend as many festivals, as a volunteer if possible, such as "Rockstadt Extreme Fest" or "Celtic Transylvania" . Even though these can be seen as just fun these festivals have been my way of getting to know other amazing people from the other side of the country from which I claimed knowledge as they were several years older than me.

### Skills

What I am confident in is my skill in using Audio/Video Editing Software (Adobe Premiere Pro) and the Accounting Software called "Mentor" in which I worked for a while helping my mother . I believe the ease with which I learned how to use these is due to my ability to make fast logical deductions.

## RUSU "Roacheru" ILIE ALEXANDRU

### Introduction

Greetings! I am known in the team as "Rusu" which could be translated to "the Russian one" and considered the one who is worshiping the devil as I am the only one listening to heavier styles of metal, but it really came like a shock to my teammates when they found out I know better than them the genres they are listening to.

Being in the team for several months now I can say I have no regrets about it .It simply made me part of a new little family that is slowly growing as we spread the word about it, and that thought me some essential yet simple actions with common tools such as the hammer or the screwdriver that I am sure will come in handy in my future development.



### Hobby

Here for sure is playing guitar ,thing that I got into because I was amazed by the performances of my favourite artists on stage and therefore I started learning their songs and when I actually made it to being able to play a full song I started imagining myself in front of hundreds of spectators even though I was on my chair. One funny thing is that, learning some stuff about cables and connectivity from my robotics experience, I was able to fix my guitar whenever I needed to.

### Future plans

Well, being that type of guy that wants to break free I would love being able to travel all day long on a cruiser motorcycle ,but in order for that to happen I need to build my path towards it by working hard until I get to the point where money won't be a problem.

Most likely the jobs I will apply for will be in the domain of programming, but who am I to predict what life has prepared for me.

### Motto

"OUR Passion , they wouldn't Understand !" this should refer to metalheads and the fact that not everybody can understand why some of us like the metal genre, but thinking about it , it can be found also in the passion for robotics as many think this is just a waste of time.

## GEORGEL HLOSCIUC - HARDWARE DEPARTMENT



### Introduction

I am 16 years old and I am a member of the Circuit Dealerz team, I am part of the assembly department, I especially deal with the cabling and wiring parts. It is my second year in this team.

### Education

I am currently a eleventh grade student at the National College "Petru Rares", on the mathematics - computer science profile.

### Skills

I speak English at a medium level, I know how to program in C ++, I've learned to use 3D editing programs like Sketchup, Blender and Autodesk.

### Activities

I've always been interested in art and that's why I also went to the Video Art club.

## **GEOGEL "GEO" HLOSCIUC**

### **Introduction**

I am Geo, the calm and always happy guy in the team. Now after a year in this team I can say that it has changed me in a positive way: I have developed my teamwork skills and this is essential in the future if I will choose to pursue a career in IT. On top of that it made me it gave me the motivation I needed in order to give it my all.



### **Hobby**

I can say that I like to draw, this makes me relax, but I like to spend time with my friends. I like to watch movies, especially action movies, but sometimes I also read poems. But my greatest passion will always be robotics.

### **Dreams and goals**

In the future, I want to pursue an IT career, but if that does not work I will want to move to a career in theater or architecture.

### **Motto and conclusion**

"If anyone ever mistaken me, it means he tried to do anything new." - Albert Einstein

I am a sociable person, I work very easily in a team and work very easy from a practical point of view. I like movies very much and I like to program 3d.

## CEZAR MIRONESCU - HARDWARE DEPARTMENT



### Introduction

I am a 17 years old member of the team Circuit Dealerz' Hardware Department. This is my first year in this team. I work on the robot hardware, but from time to time I help my teammates with other stuff.

### Education

Currently, I am in the tenth grade at the "Petru Rares" National College. I have participated in a contest of IT called DaVinci where I took mention.

### Activities

I am a volunteer at "Petru Rares" National College. I help our system engineer by fixing and setting up the computers from our school. Currently I have around 400 hours of volunteering.

### Skills

I know basics in programming(C++ and Java) and basics of electronics.

## CEZAR MIRONESCU

### Introduction

Hello there! I am into science and I like to build stuff. Currently my main goal is to learn electronics and to be able to make my own electronic devices.

This is my first year in my team. I like my colleagues and I think we make a great team. In my opinion our robot is able to face all other teams.



### Hobby

I used to be a dancer and go to competitions in which I competed with lots of children. My most valuable outcome is the first place at the Romanian Dance Championship.

### Dreams and goals

I have nothing planned for future, but I'd like to visit another continent.

### Motto

"Genius is two percent inspiration, ninety-eight percent perspiration." I like this motto because to me it says that you can do anything if you study it with passion.

## MATEI BARBA – SOFTWARE DEPARTMENT



### Introduction

I am Matei Barba, a 17 years old member of the team Circuit Dealerz' Software Department. This is my third year in this team and I can say that I am one of the veterans of the team because I was also a member of the team Impulsive (team founded in 2016) which won the Inspire Award I and went to America to represent Romania.

### Education

Until high school, I have studied in the middle school from my village, but now I am proud to call myself a student of the National College "Petru Rares" Suceava in the tenth grade. Until now I have no awards at the national level competitions, but I have won a couple of prizes at the county phases of national contests.

### Activities

For a couple of years I am participating in a national religious choir divided in four voices(soprano, alto, tenor, bass). Even if I was a child when the choir was formed, I was recruited to sing the bass voice. Also, my father is organizing an local choir made by youngsters from all the county and I am helping him in administrative problems.

Unfortunately, I have not any leadership position, but as a regular member I put my entire soul in everything I am doing.

### Skills

In the few years of high school I have succeeded to evolve my programming language, my team work and also the knowledge horizon. During this time I tried to focalize my attention on C++, Java and English.

## MATEI BARBA

### Introduction

Hello everyone! Most people know me as Matei Barba, the guy from Bosanci ( a village near Suceava) because of my pride of being from village and not from city. With hard work and perseverance I succeeded in being accepted as a pupil of the Petru Rares National College, the best high school in Suceava, and also as a member of team Impulsive (the actual Circuit Dealerz). My purpose in this team was to make the robot come to life, but now I have under my tuition two new members in the Software Department. This year is my third year in this team and I am proud to call myself a member of it. This team helped me achieve my biggest achievements and also develop my skills in programming and team work.



### Hobby

About my hobbies I can say a lot. I love to do a lot of things, but if I were to choose, I would say that alongside robotics, my passion would be the table tennis. It is my favorite sport which I learned from my father and I think that this is why I love it so much. Also, mathematics is the class which enjoys my the most, being another passion inherited from my father.

### Dreams and goals

I can say that I have most of my life planned out and I just want it to go accordingly, but one can only hope since most things don't play out the way you think they would. In the future, I want to pursue a career in Programming/ Computer Science, but if that doesn't pan out the way I anticipated, there are always alternatives. Also, dream of mine is to visit another country, like the eccentric Japan or maybe live the American dream, well, in America. I don't have one defined dream, I like to live the present and to enjoy the things that I have in this moment. But, it is always good to have a plan for the future. So, my goals would be to qualify in the final phase of the FIRST Tech Challenge again and to have the second chance to visit America. Also, I would like to apply to the great universities from UK like Oxford, Cambridge or Imperial.

### Motto

"Behold, I stand at the door and knock. If any man hear My voice and open the door, I will come in to him, and will sup with him, and he with Me." (Revelation 3,20). My whole life is turned to God and I like to see how He is present even in the smallest things in this world. My only hope in life is to live it doing the Will of the Lord. I know that He wants me to be a light in this dark world and I am trying to be the best in everything I do, so nobody could say that I am a naïve person considering my beliefs, nobody could deny my faith, the precious thing I hold and will hold onto.

## MATEI SPOIALA-SOFTWARE DEPARTMENT



### Introduction

I am a 16 years old member of the team Circuit Dealerz' Software Department. This is my first year in this team and I'm very happy to be a part of it. I

### Education

I am an tenth grader at the "Petru Rares" National College. I study mathematics-informatics bilingual English.

### Activities

I have not been involved in activities worth mentioning, however, I am focusing on robotics right now and I hope it's going to be one of the most important activities I have done so far.

### Skills

I have basic knowledge in programming (Java, C++), photo and video editing (Photoshop, Vegas, After Effects) and how to set up an audio system.

## Matei "Matt" Spoiala

### Introduction

Hey! I am Matt. I am from the Software Department, but I also help the other departments. It is my first year in the team and I am already very excited for what happened until now and for what will come. I always wanted to see a robot and always wondered "How does it work?", I just dreamt that I will take part in the making of one. I am a fast learner and I already learnt some new things from all the departments.



### Hobby

In my free time I play video games, I listen to music, draw, edit photos, play guitar and robotics, of course. I have always liked technology and being a part of this team is like a dream for me.

### Dreams and goals

I can't say that I planned anything concrete for my future, but I have some visions. Most of the time, I improvise.

In the future, I want to pursue a career in Programming, game developing or animation. I feel that making a game combines all of them and I really hope I can play a part in creating a game. If not, I will make one only by myself.

### Motto

"If the facts don't fit the theory, change the facts."

## ANTONIA BARBA- SOFTWARE DEPARTMENT



### Introduction

I am a 14 years old member of the team Circuit Dealerz' Software Department. It's the first time I take part in this contest and I can say I am lucky and at the same time proud to be in this great team. I usually work on the robot programming part, but sometimes I try to help the PR department.

### Education

I am a ninth grade student at "Petru Rares" National College, at the English Mathematics-Informatics profile.

### Activities

When I was 6, I was afraid of water and my father sent me and my brother to swimming lessons. So I am not afraid of the water anymore and now I can say swimming is my favorite hobby. When I was 8, I wanted to learn to play piano because my brother was taking piano lessons. 'Hmmm. Playing piano is easy. I'll handle it, that's what I was thinking. But after a couple of piano lessons I said 'Oh, God! Is so hard! I give up. This is not for me.' But my family, especially my brother, supported me a lot and with their help I continued taking piano lessons for three years. Now, I have a passion for music thanks to my family. In the fourth grade, my teacher organized an activity with artistic moments of my class. Me and a colleague decided to perform a theater play. That's how my passion for theater was born. In the eighth grade, I participated in a six girls team at the "Sanitarii Priceputi" contest, organized by the Romanian Red Cross. We won the 1st place at this contest at the county stage. This contest taught me not only to give first aid, but also to work in team, to listen to others and to know what to do in critical situations. Of course, this contest sparked my curiosity and my ambition to know more about first aid. Recently, I have submitted a request to be a volunteer at Red Cross Suceava and in a few days I will know if they accepted my request.

### Skills

I am an ambitious person. I have potential and team work spirit. I know how to work under pressure and to have patience. I like getting involved in various activities, but I also like to help others

## ANTONIA BARBA

### Introduction

Hey, I'm Antonia and I'm one of the two girls of the team. I am at Software Department and I help Matei at programming robot. It was a big challenge for me to get in team and I'm glad to be in this amazing team. All the members of the team received me with open arms and they all are very nice, being a united team and collaborating with each other.

### Hobby

As I said, my favorite hobby is swimming. Beside this, other hobby is music: playing piano or guitar; drawing: I love drawing, I usually draw when I'm bored or when I have time. Also I like watching serials or movies, but I don't have time for this because of school. I like spending time with my friends, going out for walk in the evening because then outside is a little cool and is quiet and i like this, walking through nature.



### Dreams and goals

When I was a child, I wanted to be veterinarian because I loved animals a lot. If I saw a cat in the middle of the street, I took her home. 'You are always bringing cats home' mom said. I had many cats, but now I had only one who have two years and I love her a lot. Now, I am thinking to pursue a career in Programming, but also I would like to be psychologist or a doctor. I think that the dream of my life is to work as a psychologist, to work with kids about their problems, their fears, their dreams. As I said, I like to help others so I want to change something in someone's life, to make the world a better place.

### Motto

"each day presents you a good opportunity to make the world a better place." I think that we should change us and before the world. If we are good with each other and if we help each other we should change a thing in this world. Just a word can make somebody happy or can destroy somebody.

## TEODOR MOROSAN – PR



### Introduction

I am a 17 years old member of the team Circuit Dealerz' PR Department. This is my second year in this team and I'm proud to be a part of it. I mainly work on the Engineering Notebook, but from time to time I also help other departments with their work.

### Education

Currently, I am an eleventh grader at the "Petru Rares" National College. I have participated and won prizes in various National Olympics such as English and Romanian, but also Biology and Chemistry.

### Activities

I have been involved in a few volunteer projects and activities, one of them being MagicFest, a national theater festival that lasts for 10 days, in which people from all over the country come to do theater in English. It's an amazing event, in which I participated twice now and I am proud to say that last year I was Chief of the Technical Department. Another activity which I am involved in is GROW, a non-profit project made by AISEC and Scoala de Valori which involves people coming from any part of the world to teach us about all kinds of things, like their customs, lives, their problem solving skills in different situations and so on. A few other projects I volunteered for were the school's Freshman Ball and most notably, the Charity Ball. Both were one of the biggest projects I've been in so far, not including robotics and FTC. **The Freshman Ball** is a 4-hours long spectacle which combines multiple performing arts such as theater, singing, dancing, as well as elements from modeling and beauty contests with the purpose of choosing the Miss and Mister of the college from 10 freshman boys and 10 freshman girls who compete in order to show their talent and beauty. **The Charity Ball**, similarly to the Freshman Ball, is a 4-hours long spectacle which also combines multiple performing arts, but unlike the Freshman Ball, its purpose is raising funds for different charitable causes (as a result it emphasizes on the theatrical parts more, having a touching story that would warm the people's hearts before Christmas). I volunteered as a member of the Circuit Dealerz team, alongside Blindu Andrei and Munteanu Emanuel.

### Skills

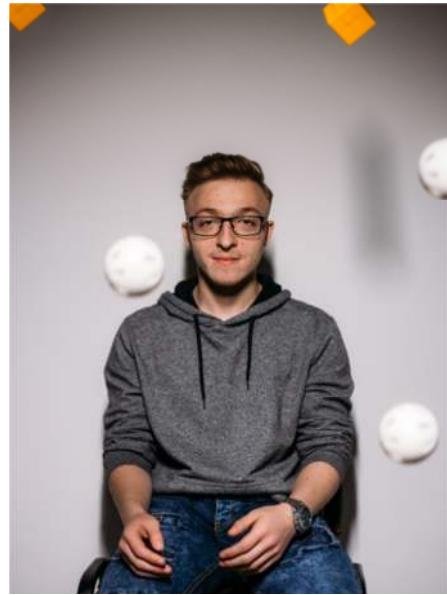
I'm confident in my English skills and I also have basic knowledge in programming (C++ and JAVA), Video/Audio Editing Software (such as Vegas and Audition), 3D modeling in Creo and Sketch-Up and I also know how to use a mixing console to a certain extent. I have also been employed during summer as a waiter and as a bartender, and I have a little knowledge regarding that, especially the former.

## TEODOR "JOHN" MOROSAN

### Introduction

Hello there! Most people know me as John and I am the guy that is constantly monitoring his teammates like he is from FBI and is writing down even the movement of their eyebrow. Well, not really, but you get the idea that I go around asking everyone what they are doing and for what purpose. This is all done with a good reason though, and that is to write whatever happens in the Notebook.

I've been in this team for 2 years now and I can say that it's one of the biggest things that I've ever done and I think it also had the biggest impact in my life overall. One of the most memorable moments in my life happened here, inside this team and during this competition. Thinking back, I had never envisioned myself seeing a robot so soon in my life, yet here I am, actually building one and taking part in a competition that has brought me more than I could've imagined. Without it, I don't think I would be the person I am today.



### Hobby

I can't say that I have a favorite hobby per se, but I like playing video games, watching movies, reading and well, robotics otherwise I wouldn't be here. I prefer to spend my free time either with my friends or working on something. As for sports, I have tried basketball, but since I am nowhere as tall as an NBA player, I only play it when people call me to play a match. The same goes for volleyball (not taking into consideration that there is a libero position). That said, I do go the gym and try to live as healthy as I can.

### Dreams and goals

I can say that I have most of my life planned out and I just want it to go accordingly, but one can only hope since most things don't play out the way you think they would. In the future, I want to pursue a career in Programming/ Computer Science, but if that doesn't pan out the way I anticipated, there are always alternatives. Also, dream of mine is to visit another country, like the eccentric Japan or maybe live the American dream, well, in America.

### Motto

"God is our father and we are His children, in His playground. Therefore, we must and can only play" This is something that can be interpreted in many ways, however, what I think it means is something on the lines of "Carpe Diem", living life carefree, as if we were just playing around.

## MIRUNA DRELCIUC- PR



### Introduction

I am a 15 years old member of the team Circuit Dealerz' PR Department. This is my first year in this team and I'm proud to be a part of it. I wanted very much to be a member in this team and I worked hard to get here.

### Education

I am in tenth grade at the "Petru Rares" National College. I have participated and won prizes in Olympics Competitions such as Biology and Chemistry.

### Activities

One of my biggest passions is volunteering. Even if in our city there are not a lot of activities which require volunteers, I apply for each of them because it is a method to meet diverse mentalities and maybe help entire communities. The most important volunteer experiences I had are in the organizations Club LEO Bucovina, New York Crew, Salvați copiii and Interact Bucovina Club in which I am an active volunteer and where I participate at events every time. These non-governmental organizations are based on one of the most powerful values in somebody's life, charity. So they make events where people work together to make dreams become real. A few other projects I volunteered for were the Freshmen's school where I worked with new comers in the National College "Petru Rares". Also, years ago, I volunteered at the deployment of the International Olympiad of Astronomic and Astrophysics organized in Suceava. "Let's do it, Romania!" is a project I was involved 3 years consecutively.

Another activity which I am involved in is GROW, a non-profit project made by AISEC and Scoala de Valori which involves people coming from all around the world to teach us about everything they consider to be important in the self-developing of somebody.

One of the best experiences I had so far is Erasmus + project, "A New Energy for New European Citizens" where I had contact with groups of students from France, The Netherlands, Germany and Poland. We had a great time together and learnt various things from each other. This experience improved my knowledge about other cultures and mentalities and this is why I appreciate it so much.

### Skills

I have skills in communicating and writing and I am confident in my English skills. Talking in public on different topics is another activity I succeed in easily. I also have basic knowledge in biology and psychology of self-developing.

## "MIRUNICA" DRELCIUC

### Introduction

Hi there! Most friends of mine call me Mirunica or Miru and I am the girl who notices whatever happens in the team to write in the Notebook. This is the first year in the team for me and I hope it will not be the last. I am sure the participation in this competition will help me develop my skills in communicating, socializing and will improve my perspective. For me, one of the most important things in a human's life is diversity. I don't like routine and repeating basic activities. I like creative stuff and staying around creative people from whom I have things to learn.



### Hobby

I don't have a favorite hobby but in my spare time I like to read, watch movies and go out with friends. Travelling is one of my passions because I am keen on learning new things about other regions and their history and culture. I usually travel with my family but recently I have started travelling with my friends more often. I like how adrenaline feels in my body when I experience something new. I get happy walking and seeing happy faces outside and every significant gesture gives me pleasure. I enjoy a wide range of occupations from taking long walks in nature to dance and party. I can set my mode for any kind of activity, from a relaxing one to an electric vibe. I enjoy spending time with my family and pets and listening to music. I also like adventure like climbing mountains or scuba diving. I do running and gym anytime I organize my time to be able to do these. I have tried to play basketball and handball but it has not ended with success.

### Dreams and goals

I have planned my life as I considered it to be great for me and I hope it will go as good as it can. I am aware of the fact that there will be not so pleasant parts in the course of my life but I am prepared to transform them in experiences that will help me in the future.

In the future, I want to pursue a career in Medicine, but I still have time to reconsider my idea. I will like to learn playing guitar but I will have to organize my time better to be able to do this. Visiting different countries and having a lot of memories in the course of my early life is another goal I have in my mind.

### Motto

"Life is how you make it" is the motto I like the most because my opinion is that life is a matter of perspective and it is as good as you try to see it in a good way.

## ANDREI-SAMUEL BLÎNDU- PR



### Introduction

Hi, I'm 17 year old and for the last 2 years I can proudly say that I have been a member of Circuit Dealerz. I am managing the PR Department, mainly focusing on outreach activities, sponsorship deals, social media and working on the Engineering Notebook. If necessary, I also get involved in helping other departments.

### Education

My education started at my local school in Bosanci where I achieved various prizes at national Olympiads and contests, most notably the second prize in the national phase of the Romanian language Olympiad. I am currently in the 11<sup>th</sup> grade at the National College "Petru Rares" Suceava, where I participated and obtained prizes in contests and Olympiads such as English, Physics, Biology and an interdisciplinary Olympiad involving physics, chemistry, biology and geography.

### Activities

I took part in one Erasmus student exchange programme which involved travelling to Poland alongside some of my classmates and spending a whole week travelling around the city Opole, but also meant that the polish students that hosted us came the other way around in Suceava, with us hosting them.

I also participated in science related activities such as the Masterclass in particle physics at the University of Suceava and the European Researcher's Night in Suceava. Another project that took up a big part of my time this year was The Charity Ball organized by the 11<sup>th</sup> graders of our school, which me alongside Teodor and Emi from the robotics team decided to take part in. Excluding the Freshman's ball in which I participated as a member of the technical team, this event I was part of the show itself, participating in the theatrical play as a faun, the mythical creature.

### Skills

I am happy with my ability to communicate with people and manage situations, as I have advanced skills in English and basic knowledge in French and German. My most valuable trait is in my opinion my versatility, judging by the fact that I can handle problems in various domains, even domains that don't have things in common. I lack any fear of talking in front of large audiences and I am comfortable in doing so, which also ensures my abilities to convince sponsors to support our cause.

## ANDREI-SAMUEL "BLANDU" BÎNDU

### Introduction

Yeah so hi. I'm Andrei for new acquaintances, Sam for the teachers at Petru Rares, Blîndu for close friends and Blandu for that part of my friend group who constantly makes fun of me for having my name misspelled like that. I also get called Blindu or Raul by my friends in Bosanci because they know my love for FCSB's striker Raul Rusescu will never fade away... I also have some other nicknames but I would prefer not mentioning them, because they all intend to make me feel bad for the fact that I am 194 cm tall (6'4). I'm really skinny and I seem to not be able to get any fatter anytime soon, but trust me after I'll start hitting the gym I'll become the beast I was intended to become since my birth. I'm thankful for this whole FTC Romania contest because it got me into robotics and the STEM domains, and even convinced me to pursue a career in these certain domains.



### Hobby

I'm an absolute football fan, the real football, as some of you may call it "soccer" bleah. I'm an Bayern Munich and Arsenal supporter, and I watch the majority of their matches. FCSB and Foresta Suceava are also two of my timeless loves. This got me into playing football and I still do so, my best position being goalkeeper. When I'm with my friends and we play casually I like showboating and playing striker, but with our college's football team in tournaments and more intense matches, I play in goal because my height and reflexes grant me a place in the first team.

### Dreams and goals

I'm most definitely convinced that once the baccalaureate passes, I'm going to pursue becoming an student in London. One of Computing or Physics will be the domain I will study, but I am still not convinced yet. The only thing that I'm convinced of is that I feel the call of The Emirates Stadium and that my cousin will surely help me manage this situation.

### Motto

" You can build a thousand bridges but give a wrong answer in front of the whole class, you'll always be remembered as <<that stupid guy>> ". A deeper meaning is don't focus on what people say, concentrate on what you think is best for you.

## **1.4. Mentors and Supporters**

### **ANCA GRECULEAC - MENTOR**

#### **Education**

Physics Faculty, 5 years «Alexandru Ioan Cuza» University of Iasi.  
1987-1992

M. A. Academic Programme «Communication and Public Relations», «Stefan cel Mare» University of Suceava, Letters Faculty, 2005-2006

M. A. Academic Programme «Management and marketing» Technical University «Gh. Asachi» of Iasi 2007-2008



#### **Activities**

- teacher of physics at "Petru Rares" National College, Suceava

-supervising and controlling functional departments of "Petru Rares" National College, especially those referring to continuous training of teachers, nonformal education, ensuring and supervising the quality of educational processes, public acquisitions.

-bilingual teaching of physics to bilingual Romanian-French mathematics – informatics classes

-coordinator of methodology, School Regional Inspectorate

-adults and youth training programmes (continuous training) as part of nonformal education programmes such as: trainer of participants in summer camps – For example the METAMORPHOSIS summer camp, in scientific education programmes for youngsters such as NEXUS-T-SV, coordinator of scientific events such as RoSEF, etc.

-volunteering activities as coordinator of the Volunteering Club of "Petru Rares" National College Suceava

-didactic research activities, with results published in :

Books and journals:

**Editorial Team (together with prof insp. CIOBICA CARMEN GINA, prof. GRECULEAC ANCA, prof. CAPBUN DANA), Physics and Chemistry Journal "VOLTA JOULE", nr 1-10, 2004-2010**

**GRECULEAC ANCA** "The collaborative competitive method in ICT", Suceava 2012, Published by Little Lamb, ISBN 978-606-648-050-5

**GRECULEAC ANCA VIORICA, DUMITRASCU GABRIELA**, "Smart learning spaces and the feeling of togetherness", Suceava 2015, ISBN978-606-744-028-7

**GRECULEAC ANCA, SALCIUC LAURA, MIHAI ERHAN**

„**Counselling for personal development**“- Course for adults with interdisciplinary elements of theory and practice, Published by "George Tofan", Suceava, 2016, ISBN 978-606-625-209-6

Scientific articles:

**GRECULEAC ANCA** "INVENTION AND INNOVATION – FORMS OF INTERDISCIPLINARY EDUCATION AT "PETRU RARES" NATIONAL COLLEGE SUCEAVA, CONNECTED TO THE STUDENTS' SECURITY IN THE SCHOOL ENVIRONMENT", article in "Smart learning spaces and the feeling of togetherness", Suceava 2015, ISBN978-606-744-028-7

**GRECULEAC ANCA** "Curricular openings on subjects proposed by morphological theories of the Science of Complexity", article in "Smart learning spaces and the feeling of togetherness", Suceava 2015, ISBN978-606-744-028-7

**GRECULEAC ANCA**, "Project-based learning" in «Science and Complexity», Suceava 2009

**GRECULEAC ANCA**, article "Towards inter and transdisciplinarity", in "Interdisciplinarity and complexity" Suceava 2010

**GRECULEAC ANCA** article "Time in the time of an interdisciplinary summer camp" in "Time in its complexity", Suceava 2012

**GRECULEAC ANCA, CIOBOTARIU MIHAELA** article "Monitoring functions of forest spaces of Suceava town with the help of NOVA 5000 System", in "Earth is crying- Save her!", Rovimed Publishers , ISSN2457-6174, 2015

-coordinating European projects of the college:

Erasmus + Projects of the College are as follows :

"Developing teachers' competences with a view to counselling students for personal development", code 2014-1-R001-KA101-001326

"New perspectives on authentic learning through the use of natural spaces in transdisciplinary manner", code 2016-1-R001-KA101-023553

"A new energy for new European citizens", code 2016-I-FR01-KA219-024161\_4, with partners in France, Germany, Holland, Poland

"CIVIC - Cooperation Innovatrice Vers l'Interdisciplinarite Civique", code 2017-I-FR01-KA219-037281\_2, with partners in France, Italy, Portugal, Poland

-coordinator of Robotics and Inventics Clubs of the college

Examples of results of Inventics Club activity:

### National Contest ROSEF:

- 1. Scalar Waves**, authors Ioana GRECULEAC, Tudor Petracovici, Second Prize
- 2. Medical game for revealing movement deficiencies**, Veronica Ieremie si Alexandru Coltuneac, Third prize
- 3. Capturing solar energy (mass solar radiation) and transforming it into electricity** Vlad Lazar si George Bejinariu, Third prize
- 4. Speech solutions for disabled persons**, Alexandra Manciu, Serban Slincu, Second Prize
- 5. System for monitoring cardiac rhythm**, Ungureanu Andreea, Honourable Mention

### Innovation Contest "Da Vinci", Bucharest

- 1."Phenomenological simulations with applications in Earth Physics", Team CNPR (Bejinariu George, Lazar Vlad), Honourable Mention.
- 2."Medical analysis of body posture and movement deficiencies through the innovative game SPACEMAN". The Move Team (Ieremie Veronica, Alexandru Coltuneac), First Prize.



### International Contests

**Olympiad of Environmental, Engineering, and Energy projects ISWEEEP SUA** - International Sustainable World – Energy, Engineering and Environment Project Olympiad 2016

1."Alternative Solution for Speech Disorders", Alexandra Manciu and Serban Slincu, silver medal.

**INESPO** - International Environment Sustainability Project Olympiad

"Real Time Home Security Alert System", Pavel Vlad, Lavric Ionatan, silver medal, 2014

**"The social dimension of attention"**, Alexandra Manciu and Serban Slinca, silver medal, 2015.

## ESE – European Science Expo

**„Subliminal overlimits”**, Authors: Andra Tofan, Alfred Tarca, 2014

**“Phenomenological simulations with applications in Earth Physics”**, Authors George BEJINARIU and Vlad PAVEL, 2016

The clubs' inventive and robotics clubs are the most powerful scientific clubs of the college, supporting each other by:

- the interference of the human resource (many members of the inventory club are volunteers of the robotics club (Antonie Grigoras, Morar Tudor, etc.), of which, one is a member - Mironescu Cezar,
- joint activities,
- offering solutions in blocking situations, especially

For example, one of the works completed in January 2019 within the inventive club was Glasses of Happiness. The paper was awarded the third prize at the Romanian Science Engineering Fair in September 2018 and obtained the right to qualify for one of the international phases of the RoSEF (Isweeep, INTELISEF, or MILSET in the United Arab Emirates). The summary that was sent in order to qualify for a particular contest, among the listed ones, is the following:

### **The Glasses of Happiness**

"Author's names:

1. Greculeac Ioana-Ruxandra, "Petru Rares" National College of Suceava
2. Petracovici Tudor, "Stefan cel Mare" National College of Suceava

Name of the coordinator: Prof. Greculeac Anca-Viorica, "Petru Rares" National College Suceava

In accordance to the new approaches, there is a one-to-one correspondence between happiness and success. The vast majority of people are happy because they succeed (at an exam, solve a problem, make somebody smile etc.). But there is a growing minority at the moment, who thinks it succeeds precisely because of happiness. Being happy, you are more communicative, you can interact better with people around you, you can be more creative and willing to see the good side of things, you can help people around you spontaneously, try to solve things in a non-confrontational manner.

Happiness is a complex feeling, involving fundamental emotions, which is related to the brain chemistry that operates the so-called hormones of happiness. In order to induce, preserve, and intensify this beneficial state, people can learn to manage the chemistry of the hormones of happiness that will, as far as possible, provide them with a desired state, a state they can be conscious of and can explore for their benefit.

From this perspective, the present piece of work builds and tests a device similar to glasses which, by wearing and communicating with the personal phone, can induce the brain, in a self-

accepted manner, virtual realities. These, well chosen and customized according to each person in question, will be long-distance friends both having the role of monitoring and enhancing the goodwill of the person wearing the glasses, as well as an alert role in case the monitored biological functions exceed certain limits considered normal.

The "Glasses of Happiness" is an encapsulated system of classic eyewear that contains a module at one of the glasses' straps, in contact with the wearer's skin, in order to collect biological information. These are interpreted by the attached electronic system and, depending on the outcome, decides what message / messages the bearer of the glasses should receive from their own phone. Messages aim especially at the excitement of specific sensations (such as images that simulate or induce the idea of enveloping, hugging) that are accepted as realities by the brain and lead to the release of one or more hormones. In case of a touch-sensitive sensation of protection, the body releases oxytocin, a hormone that leads to creating / increasing the state of intimacy and trust, reduces stress and contributes to strengthening the immune system.

The entrance data of the bearer should be initialized and recorded (temperature, pulse, skin humidity, all in the normal state, when the subject does not show any intense emotion), because depending on their variation, the results of the somatization of the strong emotions are interpreted. The novelties and, at the same time, the difficult elements of the work are:

1. Establishing the type and number of sensors that, by complementing the information they have passed, allow a meaningful interpretation of somatic information, so as to allow identification of the fundamental emotion that led to the reactions, or of the group to which that emotion belongs.

2. Effective interpretation of sensor data.

3. Calibration of the "Glass of Happiness" in the sense of identifying the manifestation of the emotion identified, in order to determine the intensity of the response that the bearer of the glass will receive.

4. Establish a "bank" of possible responses that transcend cultures and uses (but may be customized, but depending on them) and be accepted and accepted by the eyewitness's brain as realities.

Possibilities to continue the topic approached:

1. Refinement of the types of emotions that are approached (not just the fundamental ones, or the groups of fundamental emotions that give similar reactions).

2. Expansion of the emotion test base (number of volunteers).

3. Refine the type of response the phone gives to the wearer of the glasses.

Addressability of "happiness glasses": The market for selling such a "product," from the perspective of a comprehensive marketing analysis, is very large, targeting basically everyone. But with a reasonable focus, the market addresses to teens, busy people, who are usually affected by stress, over-emotional people or those who are worried about anxiety and mild depression. The product price, depending on the finishing quality, can vary between 20 and 80 euros."

**The robotics club mentor submitted an application in January 2019 to participate in a thematic workshop at CERN, Geneva. The justification for submitting this application is centered on the idea that the level of technical training of the population actually determines the standard of living and the quality of social relationships. "As it follows from the things written below (the proliferation of STEM knowledge is important to achieve by any means - formal or non-formal):**

*"As physicist and high school teacher, I wish to learn what is new about the experiments performed at CERN, about the manner in which fundamental research is done there and the method used for interpreting scientific data. Being convinced that the scientific culture of young people is essential for their future, no matter what profession they will embrace, and in awareness of the fact that this is a vector of stability and social prosperity, on which the future of nations depends, I wish to cooperate with other teachers in the effort to identify new educational resources and methods for teaching and learning physics. These methods are more complex than the present ones, as they have the potential to make science more attractive, to stimulate students' curiosity, improving their motivation, and making them willing to dedicate their adult life to scientific exploration. If this is not something that constitutes an option for some students, I wish to cooperate with other teachers so as to identify the best methods to convince young people that they need to develop at least a minimal scientific culture, so as to raise awareness and later have the ability to ask questions and find answers that are informed, logical, clearly articulated and demonstrated.*

*For 4 successive editions I have selected students and have participated in MASTERCLASS type activities organized by « Stefan cel Mare » University of Suceava and CERN. Each edition has been a real success as the students are different for each event and have had the opportunity to learn new things about scientists' efforts to uncover the mysteries of matter and energy. In the morning of the MATERCLASS day, the students had a lecture about elementary particles, and in the afternoon they analyzed real data obtained by the LHC accelerator from CERN. After that, they interacted with students from other countries and positioned their results on a common interactive map. The scientific emulation generated by this event among students was significant every year and, as a result, a waiting list has been created for students willing to contribute during the following year's event. However, the students have asked questions for which I did not know the answer, questions related to the way activity is organized at CERN, with the results obtained, enquiries related to the academic option one should pursue if they decided to work there, whether they should obtain a physics degree, etc. This is another important reason why I have decided to submit the present application."*

And the dissemination plan for the CERN application centers on the idea of transmitting knowledge to students in predominant informal structures and using the investigation as a basic process, as follows:

"I will disseminate knowledge and skills acquired during the ITV2019 camp, particularly during physics lessons, for the unit on elementary particles, using educational resources and methods learnt at CERN. I expect students will become more receptive towards scientific content presented in this manner and, more than that, I estimate an increased sensitivity concerning the role of fundamental scientific research in the extension of scientific culture and general development of society.

Secondly, I will organize knowledge workshops during the Creativity Week (known in Romania as the different school week), in which students can enroll irrespective of their age, and do guided activities for learning about the universe, space, time and the history of elementarity in relation to matter.

Thirdly, I will organize a regional conference for teachers of physics, with formative and informative didactic aim concerning fundamental scientific research conducted at CERN.

Last but not least, I will organize a workshop on elementary particles during the METAMORFOZE summer camp, to which I have contributed for the past ten years. In the latest edition of this summer camp numerous students from disadvantaged areas of the Suceava region were invited to participate, aspect which will be reiterated during the next event.

I will conceive a modular set of 5 learning units on 3 age categories (secondary school, low level high school, superior level high school), with a duration of approximately 2 hours for each module. While studying these units, students will discover knowledge related to matter and antimatter, about how the notion of elementarity has evolved, about the way in which research is conducted in this domain at present, about the latest discoveries such as the Higgs boson, the dark photon, gravitational waves, which have intrigued the scientific community. There will also be a special unit dedicated to particle accelerators. A special field of knowledge will include the notions of universe, time, space, mass, as they are seen from the perspective of present day physics. The methods used for the discovery of information will be diverse, mainly collaborative for younger students, collaborative and competitive for secondary school students, and investigative for high school students. I will also conceive a tuition system so that older students can offer the necessary assistance to their younger colleagues. The learning units will include information and know how skills developed during the ITV2019 camp. Using these learning units will also lead to their improvement, therefore they will be valuable resources for other teachers. The first testing of these units will be achieved during the METAMORFOZE camp and as part of the Creativity Week school programme."

## MACOVEI SILVIU – MENTOR

### Introduction:

I am the Technical Mentor for Circuit Dealerz team. This is my second year in this position. Last year I was more of a „consultant” for the team members, not fully immersed in the project. This is the first year I participated and helped the team since day one.



### Education

I am an Software Engineer. I graduated „Stefan cel Mare” University in Suceava, Automatics and Applied Informatics specialisation.

Since 2015 I'm working as a developer at ASSIST Software SRL in the Mobile Department.

### Activities

Since university I've participated in many projects and contests designed for students. Most of them were about creating, designing and programming robots. I've won many national contests in creating autonomous robots and developing smart autonomous solutions.

At ASSIST Software I was involved in summer internships designed for students who wanted to learn Android Development.

Last year, my company had an innovative solution for helping the high-school team. Besides a material donation the company proposed a „knowledge & expertise” donation. Me and a few colleagues were approached for helping the high-school team with feedback regarding their robot and project. I was the best candidate for this: I have a degree in computer science and automation, I have participated in similar contest and manage to win, I was familiar with tutoring teenagers, I konw Android development plus I wanted to be involved.

### Skills

On the “hard” side of things, I have some experience in designing and creating a robot. I worked mostly in programming robots using Arduino and Raspberry Pi controllers. My biggest strength is my knowledge of mobile development (more than 3 years of Android Development).

## Hobbies

I have science as a passion. My first love was programming, followed by biology and chemistry. Even now I sometimes wonder what if I followed these fields instead of computer science. I love to read about all STEM fields and have love exact sciences.

In my spare time I play video games, listen to good music, watch science shows and sci-fi movies. I found out I have a lot of these subjects in common with the team members and we frequently engage in talking about our mutual interests. Sometimes we even talk about FTC and the robot too.

## Dreams and Goals

Speaking in the context of the contest, I want to lead the team members to victory. But most importantly I want to teach them tips and tricks of the trade I'm in, giving them a head start and showing them bits of what means to work in an IT company. I have no doubts they will all grow and become stellar figures in their fields.

Even if I'm in a mentor position, I consider myself an equal team member and a friend.

## Motto

"I am not a teacher, but an awakener" – Robert Frost

Actually, I am not their teacher. I only show them the way to achieving success. I'm not teaching, I'm just showing the best paths to obtain their goals and to learn. It is their will and choice putting them on the paths. I'm not a teacher, I'm just a guide.

## Supporters of the team

### Serban SLINCU - Oxford University Student

Student of the college between 2013 and 2017 at a Mathematics-Informatics bilingual English-Romanian class, has accomplished many things, professionally speaking

During high school he had many results at national competitions and olympiads, as well as at international competitions. Thus, together with his colleague and friend Alexandra Manciu, he obtained:

- silver medal at INESPO (Olympics of Environment and Sustainability) 2015, with the theme "The social dimension of attention"

- Silver Medal at ISWEEP 2016 International Environmental Projects Competition, Huston USA, with the theme "Alternative Solution for Speech Disorders".

Currently he is a student of the prestigious Oxford University, along with Alexandra, the Faculty of Computer Science.

He supports us from a distance, through mentoring on the soft domain. Here is a sample of support.

"Modify: TLOP: move the overthrow AUTONOM: move the rotation recognition Set: rotation (sensors) latching Add: refactoring (modules / classes) scoring movement initialization github concepts oop First, the software team should learn the concepts of OOP and how to use Github. That would mean looking for some examples on the internet and trying to follow them manually using a computer. It does not take much time and will be of much use later.

Secondly, the code must be refactorised. The reason for this step is to make keeping and expanding the code easier. In other words, from the current version, only TLOP, a basic part, some kind of API, will be separated, which will develop a new TLOP version and a first version of AUTONOM. That base will consist of several classes (modules), each representing a particular stage in the sample: scoring, movement, intilation. Each class will contain all the functions that could be used in the code later. For example, for movement, there should be functions of: \* stop\_movement () \* move (distance) \* move (steps) \* move (power) (I do not recommend that there are only these functions) decisions will be made at the team level regarding the sensors placed on the robot and the way the movement will be performed, the TLOP and AUTONOM parts will choose from the API the functions necessary to implement other functions only necessary to TLOP or AUTONOM, respectively. As an example, if it is decided that only ultrasonic sensors placed on each side of the robot at the front and rear will be used, the move (distance) move mode (TLOP mode) and the to move using power (move (power)) of the same class for AUTONOM mode. According to my calculations, although I do not recommend giving you total justification, the learning phase should take 2 days, the development of the 3-4 day base and the development of the two modes, TLOP and AUTONOM, for 2 days. The time required depends on how well students understand the concepts and how quickly their intuition forms. If they need extra stuff, I recommend them to try Google / Youtube."



## Remus PRODAN - Professor USV

"Stefan cel Mare" University of Suceava, Faculty of Electrical Engineering and Computer Science, Department of Computer Science, Electronics and Automatics

Since 2001 he has worked as doctor chief engineer. His main activities and responsibilities are:

Research activities, teaching courses and applications to disciplines

- "Programming Computers and Programming Languages".

- "Object-Oriented Programming".

- "Numerical Processing of Images".

- "Advanced Parallel Algorithms".

- He is the Director of the High Performance Computing Laboratory - the USV's Data Center, clusters, operational safety, information security, and energy-optimized operation.
- He is a member of the competition contests for filling positions at the University level.
- He is a member of doctoral guidance boards.
- He is a permanent member of the admission committees at the University.
- He is a member of commissions for the evaluation and awarding of public procurement contracts in various projects.

The teacher supports the CIRCUIT DEALERZ team by allowing and guiding the design, printing and checking the functionality of some parts in the lab that he coordinates at USV.



## Adrian GRAUR

He was the Emeritus Rector of the Stefan cel Mare University of Suceava

Professor of the University, PhD Mentor having the following responsibilities:

- Tutorship in PhD Students in the Field of Electronics and Telecommunications Employer Stefan cel Mare University, Faculty of Electrical Engineering and Computer Science,

-Activity type Teaching and Research

Supports the CIRCUIT DEALERZ team in that he can advise on blockages. For example, Mr. Adrian Graur has recommended the collaboration between the Circuit Dealerz team and the laboratory of Professor Remus Prodan.

He attended the college robotics laboratory's escape ceremony and held a mobilizing speech for all members of the team.



## Vlad OTROCOL

- a former student of Petru Rares Suceava National College, member of the first school research team, then NEXUS-T-SV,

He had the most volunteer hours in the history of the Volunteer Club of CN Petru Rares Suceava

-responsible program within the company

-supports the team especially in the field of encouraging them to embrace future technical careers and by intermediating the sponsorship relationship between ASSIST SOFTWARE and the robotics team CIRCUIT DEALERZ.

organized OPEN DOORS ASSIST at CN Petru Rares in May 2018 to promote science and engineering among young high school students. It was a great event.



## Miruna Palaghean

A 16-year-old teenager in Suceava County, with an IQ of a genius, is among the most intelligent 2% of people in the world, being recently admitted to the elitist organization of the brightest minds of the planet - Mensa. Miruna Elena Palaghean is a 10th grade student at the "Petru Rares" National College of Suceava, in the Mathematics-Informatics class, bilingual English.

Her level of intelligence and IQ of over 131 have been certified by a 45-question test by Mensa International, the Raven matrix type, which, statistically, can only be solved by two percent of the world's population .



A curious and creative child Miruna Elena Palaghean leads an ordinary life, goes to school, does her homework, attends school Olympics, and spends her spare time reading in English. She is a polyvalent child, she loves the exact sciences (computer science, mathematics, physics) but also English, excels in drawing in coal and has a well-developed musical ear and rhythm. And the clues about her extraordinary qualities came early. She learned to read alone around the age of five, and a year later she was reading her childhood stories alone. The mind of observation, creativity, logic, and especially Miruna's curiosity have been insatiable since she was still a child, as well as the desire to know, so parents have often been put to the test because of the girl's questions. Specifically, the gifted children have a superior understanding ability, can quickly articulate the details of a situation by deducting, tackle problems on multiple paths, and offer unexpected solutions. She asks many challenging questions, gets bored quickly, and is shy, her "shell" being the one who offers her comfort in dealing with others. She often takes refuge in her books in English, a language she has been reading since she was a child. Furthermore, Miruna holds the Cambridge C1 Advanced Certificate of Excellence for Internationally-Recognized English Language Skills since 7th grade.

### About 130,000 members worldwide

At school, Miruna has excellent marks, learns lessons easily, and over time has proven his skills in many competitions and Olympiads.

But because the school and society in general do not particularly help the gifted children to capitalize on their potential for true value, the teenage parents have sought a framework in which Miruna develops, evolves, and contacts with valuable people.

So they found information about Mensa, Miruna being scheduled for testing at the end of November (45 questions in 20 minutes). The results came two months later, testifying her as part of the smartest people.

As for Miruna's future plans, the teenager wants to study computer science in the United States, preparing to take the American Baccalaureate.

Mensa was born in Oxford, UK in 1946, in order to identify and connect people with a very high degree of intelligence. Periodically, members have meetings and activities.

At present, the organization now has about 130,000 members in more than 100 countries around the world. Most members come from the United Kingdom and the United States of America, where Mensa has been operating for a long time.

## **1.5. Team Structure**

The robotics team Circuit Dealerz of "Petru Rares" Suceava which activated in the season 2017-2018 lost a number of 6 members during the summer vacation, mostly due to professional reasons. It was

The withdrawal procedure on request with or without the loss of the volunteer status has been decided. The team could therefore fructify the previous experiences of its members, who in turn, by continuing the collaboration with their former team mates they have done activities in accordance with the team's plan, having the desire for such activities. One of the students had initially given up on the volunteer status as well, but eventually came back and completed the quiz to select the volunteers. So, the structure of the old team is the following:

| Name                   | Birthday   | Current status  |
|------------------------|------------|---|
| Barba Matei            | 09.06.2001 | <b>Reinvested titular member</b>  |
| Martin Serban          | 27.01.2001 | -Retired on request due to his implication in the team of students working on an european project related to regenerable energy/energy sources.   |
| Morar Tudor            | 01.04.2002 | -Retired on request due to the need to focus on the activities of the Innovation and Inventions club, where he already won prizes at national stage. He participated at the new project of volunteer selection and is now a volunteer |
| Blindu Andrei          | 20.11.2001 | <b>Reinvested titular member</b>  |
| Muntean Tudor Emanuel  | 20.04.2001 | <b>Reinvested titular member</b>  |
| Tanase Albert Cristian | 25.10.2001 | <b>Reinvested titular member</b>  |
| Macovei Victor         | 01.01.2002 | <b>Reinvested titular member</b>  |
| Hlosciuc Georgel       | 13.04.2002 | <b>Reinvested titular member</b>  |
| Jucan Adriano          | 13.06.2000 | -Retired on request due to the need to prepare for the National Exam Bacalaureat  |
| Morosan Teodor         | 18.07.2001 | <b>Reinvested titular member</b>  |
| Cojocariu Vlad         | 27.04.2001 | <b>Reinvested titular member</b>  |
| Paduraru Cristian      | 07.10.2001 | -Retired on request due to a different professional orientation.  |
| Salagean Dragos        | 05.06.2001 | <b>Reinvested titular member, with the new status of student-mentor</b>   |
| Moldovan Andrei        | 23.01.2001 | -Retired on request due to a different professional orientation.  |
| Stanciu Catalin        | 13.01.2001 | -Retired on request due to the need to prepare for the National Exam Bacalaureat  |

|   |           |
|---|-----------|
| <p>Doamna Director,</p> <p>Subsemnatul Colectiv Vlad-Andrei din clasa<br/>a XI-a G doresc sa continute sa fac parte<br/>din echipa de robotică a scoli.</p> |           |
| Data  | Semnatul  |
| 21.09.2018  | Gy        |
| <p>Doamna Director,</p> <p>Subsemnatul Mihorean Teodor elev din clasa XI a<br/>doresc in continuare sa fac parte din echipa de robotică<br/>a scoli.</p>    |           |
| Data  | Semnatura |
| 21.09.2018  | Dm        |

Here is an example of the application submitted by previous members of the team to request thier participation on the team for this season

Subsemnatul Mironescu Gheorghe,

eleve în clasa a X-a H, vă rog să analizați cererea mea de înscrisere în clubul de robotică Circuit Dealerz ca titular. Solitați pe care le consider importante și care cred că mă recomandă sunt: cunoștințe de programare în C++ și Java, cunoștințe de design pentru diverse dispozitive, cunoștințe de retelistică, cunoștințe de electronica și automatizări, calitate de lucru în echipă, sociabil.

Activități la care am participat și pe care le consider relevante: 600 de ore de voluntariat în domeniul de retelistică și calculatoare în Colegiul național „Petru Rareș” sub coordonarea doamnei Moisoiu Diana, participare și calificare în finala concursului DaVinci sub coordonarea doamnei Greculeac Amea unde am obținut mențiunea I.

Mentionez că sunt dispuși la 8 ore de efort pe săptămână. Îmi doresc să participe la activitățile clubului și să contribu la activitățile acestuia.

Către echipa Circuit Dealerz

Semnatură:

Mironescu

Here is an example of the application submitted by students that want to be part of team Circuit Dealerz, where they specify their experience in STEM related fields, but not limited to that. The application must also contain the number of hours they volunteered for, as well as the number of hours they are able to dedicate weekly.

With the purpose of filling the missing spots in the team, there was a public announcement on the school's website as well as on social media. The announcement was the same as in the previous year "In view of the participation of "Petru Rares" National College's robotics team in the FTC competition, it is necessary that it completes its composition with new members. For this, the willing students of the college, 7 to 12 graders, can apply by submitting their application forms at the schools secretariat until 06.10.2018. In the application should be specified their experience in STEM related fields such as Math, Physics etc. and according activities"

Therefore, the steps were:

1. Submission of the applications at the school's secretariat. An example of the application form can be found on the previous page.
2. Meeting the possible members with the leaders of each department for an initiation in what the club activities are about
3. Possible members opting for a specific department
4. Creating a mentoring program for possible members, coordinated by department leaders
5. At the end of the mentoring program, each possible member received a task related to the department they desired to be a part of
6. Organizing a public interview where the 6 missing members were selected.

In the interview the willing students presented the fruit of their labor. The jury was composed of the old members of the team, and the department coordinators asked questions, evaluating the answers given by the students. Through voting, the final structure of the team was decided.

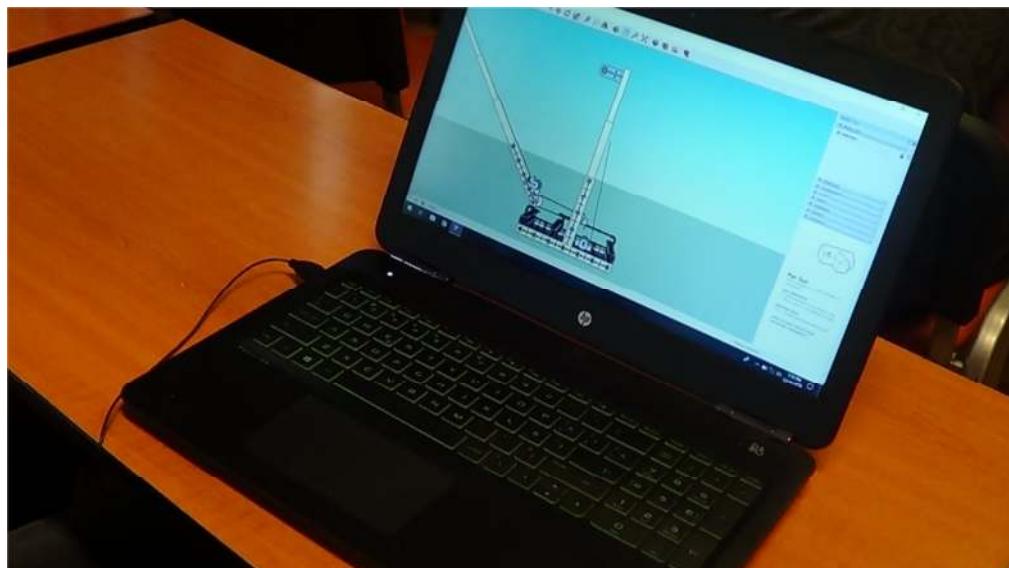
The screenshot shows a search results page for "robotica" on the website of Colegiul Național Petru Rareș Suceava. The top navigation bar includes links for Contact, Portal, Acasă, Despre noi, Examene, Activități extrășcolare, Gânduri de olimpic, Moodle, Orientare școlară, and Anunțuri. The main content area displays a search result titled "REZULTATE PENTRU: 'ROBOTICA'" with two entries:

- 28.11.2018** Inaugurarea sediului clubului de robotică
- 04.10.2017** ANUNȚ DE SELECȚIE CLUBUL DE ROBOTICĂ

On the right side, there is a sidebar titled "ULTIMELE NOUTĂȚI" with several news items and social media links.



The students were nervous before the interview, however they were soon relieved to find out how friendly the jury acted , making them act more natural and not as stressed.



For the selection of volunteers of team Circuit Dealerz, an announcement was made on the usual channels such as the school's website, posters in the whole school. A test was conducted in the form of a questionnaire. This was done relatively late, after the opening of the team's laboratory. In fact, in the questionnaire completed by the students, one of the questions was related to the robotics club's opening event. In this way, it was checked whether the willing student followed the activities of the team and participated in its representative events. Here are some questionnaires completed by volunteers, selected for the interesting answers they had given.

CIRCUIT DEALERZ TEAM

Name..... *Nesu Matus*  
 Age..... 15  
 Class..... 9E

**Quiz to select club volunteers**

How did you find out about the robotics club of the "Petru Rares" National College in Suceava?

*At the end of the summer holiday I found out on the Facebook of school summer school. Warm! Really interested in it till now the title Robot Fun... I began to think hard about it. After we I immediately wanted to join in this robotics club.*

Why do you want to become a volunteer / future member of the CIRCUIT DEALERZ robotics team? What qualities do you have for this?

*Finally, I've made friendships with some of the Robotics Club members. I went 2 weeks at Robot Fun this summer so I know a bit and always robots, circuits, the model are very cool. Besides I like very much IT and I think I am creative, and you must be creative when you are must create robots.*

What is robotics? What knowledge does anyone need to work in this area? Write an essay / draw a drawing and explain it / write a sequence of code etc to demonstrate that you have minimal knowledge in this area.

*Robotics is the subject that studies robots, makes them moves from function and as one. It's the future. Knowledge depends on the area, here are forces in Circuit Dealerz, like 3D Printer, PR and Hard Hard - you must know all the components. So you must know Java, 3D Printer. Must be creative, know how to work Sketchup, PR - creative.*

Have you attended or read about opening the robotics club? Which aspects did you resonate the most?

*As I said, I some have good friends in this Club. As first of Dealerz they informed me about all the stuff. I didn't know what they are doing so I attended at the beginning in the 2<sup>nd</sup> room. There were important people. The VJ is head master. It was Romania's day, no all were there in traditional clothes. It's cool!*

CIRCUIT DEALERZ TEAM

Name. Gătăru George.....  
 Age....16.....  
 Class..10.E.....

**Quiz to select club volunteers**

How did you find out about the robotics club of the "Petru Rareș" National College in Suceava?  
 ....It wasn't actually that hard to find out some information about our school's robotics club. It has a lot of popularity and some of my friends are involved in its actions. Also, I read articles about the prizes it won at international competitions.....

Why do you want to become a volunteer / future member of the CIRCUIT DEALERZ robotics team? What qualities do you have for this?

I think that I really could do a good job when talking about how to promote our club's actions. I can make speeches in other areas such as: safety, details, and so on, and my knowledge in multicurricular activities and the ability to represent them are a good chance even for the robotics club to be given promotion in other areas of information.

What is robotics? What knowledge does anyone need to work in this area? Write an essay / draw a drawing and explain it / write a sequence of code etc to demonstrate that you have minimal knowledge in this area.

Robotics is a science that is able to link all the other topics of science. Because any robotics needs science (biology, chemistry, physics...) and some computer skills. In my opinion, you need passion, and some knowledge in mechanics and informatics.

Have you attended or read about opening the robotics club? Which aspects did you resonate the most?

I attended the opening of the robotics club. In my opinion, the moment when it underlined the importance of the opening, because we celebrated the 100th anniversary of Romania. I agreed with the message the club is members transmitted, and as a member of the debate club, I sent my salutations of this event. I was impressed by the efforts made in order to create a lab for robotics.

CIRCUIT DEALERZ TEAM

Name... Petru Ingrid - Cristi.  
 Age... 16  
 Class... X E

**Quiz to select club volunteers**

How did you find out about the robotics club of the "Petru Rares" National College in Suceava?

I have seen many posts on Facebook and on the school's official website about the club. Also, walking in the physics laboratory, I got the chance to see the members of the club personally working on their robot, the one they went to multiple contests with.

Why do you want to become a volunteer / future member of the CIRCUIT DEALERZ robotics team? What qualities do you have for this?

I would like to help the team and the club in any way I can. I believe their activities and passion for robotics should be supported and this club plays a big role in the students' development. I am a social, hard-working person and I enjoy working in a team as well as working alone.

What is robotics? What knowledge does anyone need to work in this area? Write an essay / draw a drawing and explain it / write a sequence of code etc to demonstrate that you have minimal knowledge in this area.

Robotics is a combination between physics, computer science and programming. To work in this area, one would need to have thorough grip at least one of these subjects. Personally, I am interested in physics, in mechanics especially.

Have you attended or read about opening the robotics club? Which aspects did you resonate the most?

The robotics club has been promoted well in our school. I took part in an Erasmus exchange programme at the beginning of the school year and the members of the club, part of which were also in the exchange programme, made a beautiful presentation about the club in front of the students. Also, I've seen the members of the club sell circuits and stickers in the school to gain some money for their projects.

CIRCUIT DEALERZ TEAM

Name... RITAULESCU EDWARD  
 Age... 16  
 Class... X-E

## Quiz to select club volunteers

How did you find out about the robotics club of the "Petru Rares" National College in Suceava?

I found about the selected club of the "Petru Rares" National College in Suceava from my colleagues and from the Facebook page.

Why do you want to become a volunteer / future member of the CIRCUIT DEALERZ robotics team? What qualities do you have for this?

I want to become a future member of the CIRCUIT DEALERZ because I've always liked construction and building things and I am also very good at technology and computer science.

What is robotics? What knowledge does anyone need to work in this area? Write an essay / draw a drawing and explain it / write a sequence of code etc to demonstrate that you have minimal knowledge in this area.

Robotics is a branch of engineering that involves the conception, design, manufacture, and operation of robots. This field overlaps with electronics, computer science, artificial intelligence, mechatronics, and nanotechnology.

Have you attended or read about opening the robotics club? Which aspects did you resonate the most?

I attended and also read about the robotics club. I see that the club won many valuable prizes at well-known competitions. The ambition of the members impressed me and I was also impressed by the effort made in order to create a lab for robotics.

CIRCUIT DEALERZ TEAM

Name... Palashun Miruna  
 Age.....16.....  
 Class.....X-E.....

**Quiz to select club volunteers**

How did you find out about the robotics club of the "Petru Rares" National College in Suceava?

I first heard of the robotics club last year when they participated at a contest in the US. Ever since, I have seen the club advertised in school.

Why do you want to become a volunteer / future member of the CIRCUIT DEALERZ robotics team? What qualities do you have for this?

I have always been interested in robotics and AI. I enjoy problem-solving and like writing code. I know C++ and am learning to learn Python. I have participated in the National Olympiad of Informatics last year and I have worked with an Arduino. I am patient, creative, a good team worker and enthusiastic about working with robots.

What is robotics? What knowledge does anyone need to work in this area? Write an essay / draw a drawing and explain it / write a sequence of code etc to demonstrate that you have minimal knowledge in this area.

Robotics is a branch of science that deals with building a machine and then writing a code to build it to live with the main purpose of making labourious tasks and dangerous work less. To successfully build a robot one needs to know how to code, connect electronics and wires, and apply Physics formulas to ensure a machine is efficient. Have you attended or read about opening the robotics club? Which aspects did you resonate the most?

I have unfortunately been unable to attend the opening of the robotics club, even though I wanted to.

## CIRCUIT DEALERZ TEAM

Name... *Nicu Tudor*  
 Age... *16*  
 Class... *7H*

## Quiz to select club volunteers

How did you find out about the robotics club of the "Petru Rares" National College in Suceava?

*I found out about the robotics club about a year ago in 2017 when I was looking for some interesting activities to do outside of school at which I could gain knowledge related to robotics.*

Why do you want to become a volunteer / future member of the CIRCUIT DEALERZ robotics team? What qualities do you have for this?

*The main reason behind my wish to become a volunteer for this robotics club is up-to-date knowledge. I want to develop skills related to hardware, I want to have a good understanding of the basics of programming a robot to do and I want to further develop my programming abilities. The ability to learn fast and in position would be, first of all, my capacity of quickly learning new skills, as well as a strong understanding of programming.*

What is robotics? What knowledge does anyone need to work in this area? Write an essay / draw a drawing and explain it / write a sequence of code etc to demonstrate that you have minimal knowledge in this area.

*To put it simply robotics is a field in which software and hardware engineering meet. Basically, writing code on a set of hardware in a set of instructions telling the card what to do.*

Have you attended or read about opening the robotics club? Which aspects did you resonate the most?

*I have attended the opening of the robotics club, which took place in the main workshop of the club. This event inspired me to the most important, in my opinion, having a dedicated space for working in peace and quiet, and I am really happy for the club to finally getting this well deserved workshop.*

CIRCUIT DEALERZ TEAM

Name... Lupu Stefan  
 Age... 15 years  
 Class... 12<sup>A</sup>

## Quiz to select club volunteers

How did you find out about the robotics club of the "Petru Rares" National College in Suceava?

I find out about the robotics club of the "Petru Rares" National College in Suceava in the week named "Scoala de bani". When I found discovered the magic of robotics.  
 In my opinion, robotics is future.

Why do you want to become a volunteer / future member of the CIRCUIT DEALERZ robotics team? What qualities do you have for this?

I want to become a volunteer or future member of the CIRCUIT DEALERZ robotics team because I like this science who is in my opinion is future. I want to become a member because I like that this gift. And this club can serve to combine this like passions in one. I am very team lover. I am very interested in this type of science. I'm good at math and IT.

What is robotics? What knowledge does anyone need to work in this area? Write an essay / draw a drawing and explain it / write a sequence of code etc to demonstrate that you have minimal knowledge in this area.

In my opinion, the knowledge that anyone needs to work in this area is math, design etc. makes me include circuits using.

Have you attended or read about opening the robotics club? Which aspects did you resonate the most?

I read about opening the robotics club by a post on facebook and from Dragan. I resonate with the post. I like robotics a lot. Whatever, I want to participate with robotics club at FTC.

## CIRCUIT DEALERZ TEAM

Name..... *Georgas Antenea*  
 Age..... *13*  
 Class..... *4 - VII - A*

## Quiz to select club volunteers

How did you find out about the robotics club of the "Petru Rares" National College in Suceava?

*I find the robotics club at the "Petru Rares" National College from teachers and the college website.*

Why do you want to become a volunteer / future member of the CIRCUIT DEALERZ robotics team? What qualities do you have for this?

*I want to become a volunteer / future member of the CIRCUIT DEALERZ robotics team because I like electronics, to make, disassemble, repair it in my free time as a hobby. I like to make electronic circuit like a concept and like a prototype on final circuit.*

What is robotics? What knowledge does anyone need to work in this area? Write an essay / draw a drawing and explain it / write a sequence of code etc to demonstrate that you have minimal knowledge in this area.

*The robotics is the field of science and technique what study the mechanic system, electronic information and mixed system and the factors in the society to replace partial or total human in the technological process. At first you need to know the basic symbols of a simple circuit (resistance, diode, led etc) and step by step by the complex element (transistor, modules etc), in final minimal*

Have you attended or read about opening the robotics club? Which aspects did you resonate the most?

*Yes, I was attended about the robotics club opening and the aspect what resonate me was the partners and behaviour of this club.*

## CIRCUIT DEALERZ TEAM

Name..... *Nesu Matias*  
 Age..... 15  
 Class..... 9E

## Quiz to select club volunteers

How did you find out about the robotics club of the "Petru Rares" National College in Suceava?

*At the end of the summer holiday I found out on the school's site about summer school. I won it really interested in this till I saw the title Robo Fun. I never had heard about it before so I immediately wanted to join in this school club.*

Why do you want to become a volunteer / future member of the CIRCUIT DEALERZ robotics team? What qualities do you have for this?

*Firstly, I've made friendships with some of the robotics club's members. I went 2 weeks at Robo Fun this summer, so I know a bit and always robots, circuits to make me say wow! Qualities: I like very much IT and I think I am creative, and you must be creative when you must create robots.*

What is robotics? What knowledge does anyone need to work in this area? Write an essay / draw a drawing and explain it / write a sequence of code etc to demonstrate that you have minimal knowledge in this area.

*Robotics is the subject that studies robots, makes them moves from function and as on, it's to the future. Knowledge: depends on the area. There are four in Circut Dealerz: soft, 3D Design, PR and Hard. Hard - you must know all the components. Soft - you must know Java, 3D Design. Must be creative, know how to work Sketchup. PR - creative.*

Have you attended or read about opening the robotics club? Which aspects did you resonate the most?

*As I said, I now have good friends in the Club. Also Albert Br. Dices, as they informed me about all the stuff. I really like what they are doing so I attended at the opening in the 09 room. There was important people like Valeriu head master. It was Romania's day so all were others in traditional clothes, except Mr.*

## CIRCUIT DEALERZ TEAM

Name... Sereina Andrei... Suceava  
 Age... 16...  
 Class... X E...

## Quiz to select club volunteers

How did you find out about the robotics club of the "Petru Rares" National College in Suceava?

I've heard from some classmate talking about the club...  
 and I've seen some posts on the highschool webpage also.  
 I've been walking through the highschool hall a poster about  
 the club.

Why do you want to become a volunteer / future member of the CIRCUIT DEALERZ robotics team? What qualities do you have for this?

I want become a volunteer because from childhood I was  
 interested in electronics and recent I've had to assemble  
 a computer doing all the connection on the mainboard.  
 I also know a bit of c++ and I've done a few application  
 with that.

What is robotics? What knowledge does anyone need to work in this area? Write an essay / draw a drawing and explain it / write a sequence of code etc to demonstrate that you have minimal knowledge in this area.

Well, for me robotics is a combination of electronics  
 and programming languages. For example in C++ I know  
 plenty of algorithms but a simple one is and this check  
 if a number is even. And the code goes like this:  
`int n; cin >> n; if (n % 2 == 0) cout << "par" else cout << "impar"  
 return 0;` A simple code that checks if a number is even  
 and will show a message.

Have you attended or read about opening the robotics club? Which aspects did you resonate the most?

I attended at the opening of the club. In my opinion  
 the opening was very exciting because I like a lot this  
 kind of stuff. I'm raised with a brother that  
 knows and teach me this kind of stuff about 4 years  
 ago and that club made a effort to create  
 a robotics club.

CIRCUIT DEALERZ TEAM

Name... GRECULEAC IOANA LUXANDRA  
 Age... 16  
 Class... 10F

## Quiz to select club volunteers

How did you find out about the robotics club of the "Petru Rares" National College in Suceava?

I found out about the robotics club when I saw a poster on a wall in our school and I was really keen on discovering what lies behind this club.

Why do you want to become a volunteer / future member of the CIRCUIT DEALERZ robotics team? What qualities do you have for this?

I would like to become a volunteer because I think this club will develop my abilities and widen my horizons in science. I am good at working in a team and I am ready to contribute with anything required by the other members of this club in order to improve and develop its achievements.

What is robotics? What knowledge does anyone need to work in this area? Write an essay / draw a drawing and explain it / write a sequence of code etc to demonstrate that you have minimal knowledge in this area.

Robotics is a wide subjects that includes more than one ability because if you work with robots you need to be knowledgeable both in hard and soft techniques and also to have communication skills and be able to develop fruitful relationships through the ROSEF Contest. I was qualified at an international science contest in 2013 my project consists of an prototype that contains an Arduino mega plaque and several sensors.

Have you attended or read about opening the robotics club? Which aspects did you resonate the most?

I have read about opening the robotics club on the internet and I like most the idea of making a robot which can do a lot of things. What attracted me most is the fact that such a small device can perform such a multitude of tasks, reflecting the technology and imagination at the same time.

(\*)sensors. I can say I have the minimal knowledge in programming this plaque and also in C++ programming.

## The interview from a volunteer's perspective - Miruna Drelciuc

As a new member, I had to work hard to get in the team. Since the first contact with the members of the team, my desire to become part of them was getting bigger and bigger. When the Facebook page, Circuit Dealerz, had posted the date and time when the interview for getting in the team was going to take part, I became enthusiastic and I could not wait for it. I prepared emotionally for the interview and when the day came, I lost my courage. I was thinking I will not succeed and I will be disappointed of myself. But then, I remembered the good days I spent in the freshmen's school and I felt better. After all, what could I lose? It will always be better to live with the thoughts that you risked, even if you won or not, than living thinking about what you had not tried and regretting those moments. So I said myself it will be okay and went to take the interview.

It was not a tense atmosphere, it was better than I expected it to be. I got calmer than before and started focusing on what I had to do. Firstly, I had to fill in a paper with some questions. It was not a hard work to do but I wanted to make a good impression to the other members and the mentor. Some questions were demanding a long answer but I managed to do the task in time. My self-confidence was getting bigger and bigger as I heard laughs and people from the team joking.

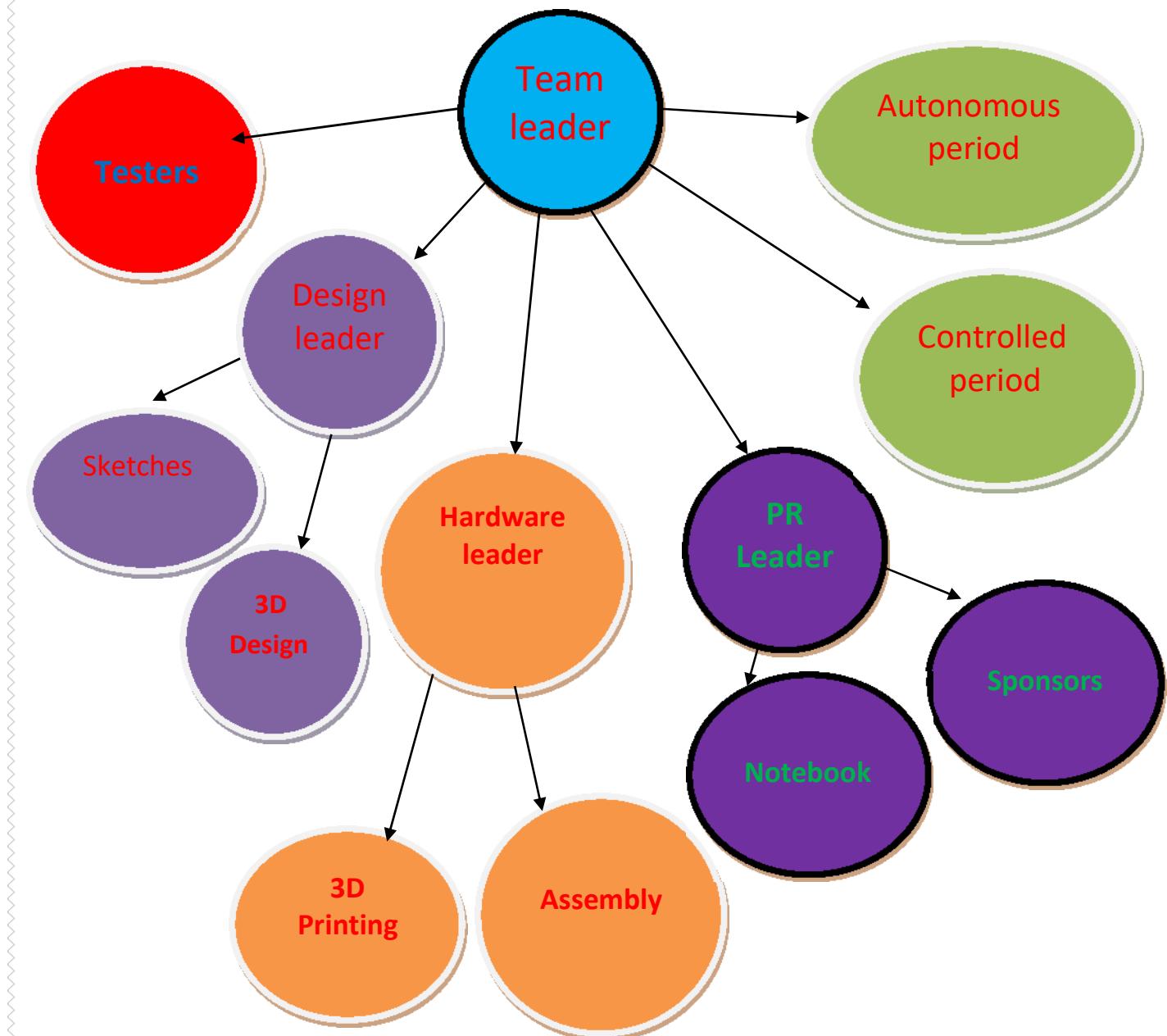
The next and final step was the interview itself with our mentor. I was asked about my implication in the team until that point. I explained I worked hard to handle with Public Relationship department and wrote a lot about the activities I took part in. I was also asked about the reasons for which I want to become part of the team. There was a long answer because I am passionate about it and I can talk all day about my passions. The mentor was smiling so I hoped everything was going to be okay.

I found one of the happiest news in my life 30 minutes after the interview. I was going to be a member of this team and this was what I wished the most for the last 3 months.

Now my life as a member is really exciting, I love what I do and the people around me and what can you wish more than that?

After the selection of the new members, 2 big issues came up:

**Problem 1 - eventual reorganization of the team, in relation to the functional structure of the previous season (2017-2018), which is presented below:**



## Problem 2 - Checking whether the current structure of the team corresponds to students' development needs, their physical structure, and their ability to work.

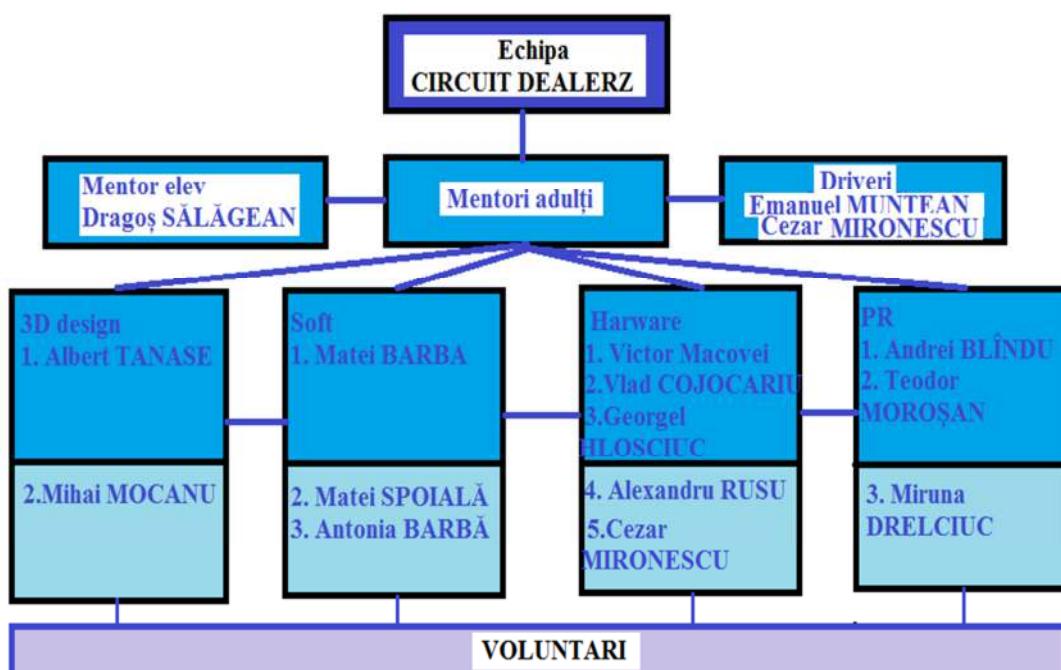
### Solving problem 1

The first issue was addressed in several stages. One of these was a tumultuous meeting of the entire team, discussing in particular what was good and what wasn't in the structure of the last season (the third structure, which corresponded to the activity with the longest length). It was decided that the major deficiency of the team's functionality in the season 2017 -2018 was the collaboration between the departments. At the same time, it was decided to change the departments for the following members:

| Name             | Department of season 2017-2018 | Department of season 2018-2019      |
|------------------|--------------------------------|-------------------------------------|
| Dragos SALAGEAN  | Soft                           | Project management – student-mentor |
| Georgel HLOSCIUC | 3D                             | Hard                                |
| Emanuel MUNTEAN  | PR                             | Project management - driver         |

Another stage was the beginning of working on the robot on the old structure. Two weeks later however, a new team meeting was held ( 3rd stage) and it was decided to reorganize it by creating a new department with the name Project Management – made by the student-mentor of the team Dragos Salagean and the experienced driver Emanuel Muntean.

This way, the structure of the actual team is the following:



This structure includes both the members of the departments and the way in which the departments work together. The project management department has committed itself that when a crack in a department occurs, take over the problem, in order to remedy it. If the crack is irreparable, this department has committed itself to actually carry out the department's work until the problem is resolved.

This layout proved to be effective because it allowed for many blocking problems to be solved. Thus, the team mentor's recommendation for the student-mentor of the team for inclusion in the Dean's List was written:

*"At this moment, Dragos is the student mentor of the team, his main role being the supervision of the activities of all its functional departments. But it has often happened that, for various reasons (voluntary or involuntary), Dragos worked side by side with the students in the departments he should have merely mentored. In this way not only have some deadlines been saved, but a real transfer of skills has been achieved and Dragos has won the actual respect of the members of the entire team."*

In the previous competitive season, especially due to the fact that the team had only 2 experienced members and 13 students were new members, the problem of structuring the team was raised according to the following factors:

1. The desire for development and learning of each newly elected member (which is very important, because the most precious result of the robotics club's activity is related to the new skills that the students develop and their self-esteem)
2. Previous work experience in a non-formal learning team, competitive experience, forging self-discipline and will,
3. Student native facilities
4. Their wishes for future professional fulfillment.

To manage this problem, in the previous season, the psychological testing of the whole team was carried out in a complex manner. The first part was represented by the self-evaluation and the second part by the actual assessment made by the school psychologist. The form after which the self-evaluation was carried out was the following (according to the same sheet, the evaluation of the new members of the team for the season 2018-2019 was made):

First name and last name: .....

### ***Self-evaluation Sheet***

For the purpose of increasing our team's cohesion, we need to know you better and you need to know yourselves better. Because of this we will have you complete the profile presented below, evaluating yourselves as objectively as possible on the following scales. Answer as honestly as possible, assessing the way you really are, and not the way you would like to be. Thank you!

#### ***I THE COGNITIVE ASPECT - Cognitive skills (knowledge):***

1. Analytical thinking (the capacity of the person to identify logical rules and apply them to problematic situations, in well-specified, as well as less systematic conditions)

I believe I have analytical thinking

|             |        |         |      |           |
|-------------|--------|---------|------|-----------|
| Very little | Little | Average | Much | Very much |
| 1           | 2      | 3       | 4    | 5         |

2. Analogical transfer (the capacity of a person to find similarities in a new, problematic situation and a familiar situation in which the conditions of the environment are ever-changing)

|             |        |         |      |           |
|-------------|--------|---------|------|-----------|
| Very little | Little | Average | Much | Very much |
| 1           | 2      | 3       | 4    | 5         |

3. Working memory (The capacity to simultaneously operate with multiple types of information)

|             |        |         |      |           |
|-------------|--------|---------|------|-----------|
| Very little | Little | Average | Much | Very much |
| 1           | 2      | 3       | 4    | 5         |

4. Cognitive interference (The capacity of a person to deal with ambiental and distracting stimuli, which can negatively affect performance)

|             |        |         |      |           |
|-------------|--------|---------|------|-----------|
| Very little | Little | Average | Much | Very much |
| 1           | 2      | 3       | 4    | 5         |

5. Spatial skills (the capacity to analyze spatial relations between the elements of a space, creating an adequate mental image of it and then recognizing the respective space from another perspective)

|             |        |         |      |           |
|-------------|--------|---------|------|-----------|
| Very little | Little | Average | Much | Very much |
| 1           | 2      | 3       | 4    | 5         |

6. Decision-making skills (the capacity of a person to make a decision based on the rational analysis of information, with a focus on analysis rather than intuition)

|             |        |         |      |           |
|-------------|--------|---------|------|-----------|
| Very little | Little | Average | Much | Very much |
| 1           | 2      | 3       | 4    | 5         |

#### ***II. THE SOCIO-PROFESSIONAL ASPECT***

1. I work well

- a. in a bigger team(over 4 people )
- b. in a smaller team( 2- 3 people)
- c. alone

2. My temperament is predominantly

- a. introvert
- b. extrovert

3. I like meeting new people

|             |        |         |      |           |
|-------------|--------|---------|------|-----------|
| Very little | Little | Average | Much | Very much |
| 1           | 2      | 3       | 4    | 5         |

4. I am an organized and diligent person

|             |        |         |      |           |
|-------------|--------|---------|------|-----------|
| Very little | Little | Average | Much | Very much |
| 1           | 2      | 3       | 4    | 5         |

5. I work according to schedule.

|       |           |        |
|-------|-----------|--------|
| Never | Sometimes | Always |
| 1     | 2         | 3      |

6. I tend to be at a loss in stressful situations

|       |           |        |
|-------|-----------|--------|
| Never | Sometimes | Always |
|-------|-----------|--------|

/                  2                  3  
*7. I feel comfortable when I have to speak publicly*

*Never              Sometimes              Always*  
 /                  2                  3

*8. I accept other people's arguments, but I make decisions based on my own judgement*

*Never              Sometimes              Always*  
 /                  2                  3

### **III. FUTURE PLANS**

*1. I have set a goal professionally (e.g. to work for the NASA, to do research etc.)*

*Not at all              I'm still considering it      Certainly*  
 /                  2                  3

*2. I know what my objectives are*

*A. short term .....  
 B. medium  
 term .....  
 C. long  
 term.....*

*3. I am aware of the steps I have to take in order to achieve my professional goal.*

*Not at all      I'm still considering it      Certainly*  
 /                  2                  3

*4. My main quality which can help me to succeed professionally  
 is.....*

*5. The limitation which might prevent me from succeeding professionally  
 is.....*

*6. On a professional level, my guiding principle is(e.g. positive values - competence, collaboration, performance e.g. negative values pragmatism) ....*

*7. On a personal level my most important value is .....*

*College psychologist, Popescu Nicoleta*

|                        | Moldovan Andrei | Salagean Dragos | Stanciu Catalin | Blindu Andrei | Tanase Albert | Macovei Victor | Barba Matei | Cojocaru Vlad | Hlosciuc Georgel | Jucan Adriano | Paduraru Cristian | Martin Serban | Muntean Emanuel Tudor | Morosan Teodor |
|------------------------|-----------------|-----------------|-----------------|---------------|---------------|----------------|-------------|---------------|------------------|---------------|-------------------|---------------|-----------------------|----------------|
| Anlaytic thinking      | X II            | X III           | X III           | X IV          | X I           | X II           | X III       | II            | I                | X I           | X I               | X II          | X IV                  | X IV           |
| Analogical transfer    | X II            | X III           | X III           | IV            | X I           | II             | III         | X II          | X I              | X I           | X I               | II            | X IV                  | X IV           |
| Working memory         | X II            | III             | X III           | X IV          | I             | II             | III         | X II          | X I              | X I           | X I               | X II          | X IV                  | X IV           |
| Cognitive interference | II              | III             | X III           | IV            | X I           | X II           | X III       | II            | I                | X I           | X I               | II            | IV                    | X IV           |
| Spatial skills         | II              | III             | X III           | X IV          | X I           | X II           | III         | II            | I                | X I           | I                 | X II          | X IV                  | IV             |
| Decision-making skills | X II            | X III           | III             | X IV          | I             | II             | X III       | II            | X I              | X I           | I                 | X II          | X IV                  | X IV           |

Note: The name of the students that requested their retirement from the team have darker background, and the student Morar Tudor is missing from the evaluation above.

Considering the stucture of the team in season 2017-2018, the distribution of cognitive components on departments is as follows.

|                        | 3D Design Department I | Hardware Department II | Software Department III | PR Department IV |
|------------------------|------------------------|------------------------|-------------------------|------------------|
| Analytic thinking      | XXX                    | XX                     | XXX                     | XXX              |
| Analogical transfer    | XXXX                   | XX                     | XX                      | XX               |
| Working memory         | XXX                    | XX                     | X                       | XXX              |
| Cognitive interference | XXX                    | X                      | XX                      | X                |
| Spatial skills         | XX                     | XX                     | X                       | XX               |
| Decision-making skills | XX                     | XX                     | XX                      | XXX              |

After the team had again 15 members, it was decided that the new members take the same test, in order for the team to become a true laboratory of personal and group development, on one hand, and on the other hand, for the team to be able to bring out the best of their abilities.

|                        | Drelciuc<br>Miruna | <b>Salagean<br/>Dragos</b> | Barba<br>Antonia | Blindu<br>Andrei | Tanase<br>Albert | Macovei<br>Victor | Barba<br>Matei | Cojocariu<br>Vlad | Hlosciuc<br>Georgel | Mocanu<br>Mihai | Rusu<br>Alexandru | Mironescu<br>Cezar | Muntean<br>Emanuel<br>Tudor | Morosan<br>Teodor | Spoiala<br>Matei |
|------------------------|--------------------|----------------------------|------------------|------------------|------------------|-------------------|----------------|-------------------|---------------------|-----------------|-------------------|--------------------|-----------------------------|-------------------|------------------|
| Analytic thinking      | X II               | X III                      | X III            | X IV             | X I              | X II              | X III          | II                | I                   | X I             | X I               | X II               | X IV                        | X IV              | X III            |
| Analogical transfer    | X II               | X III                      | X III            | IV               | X I              | II                | III            | X II              | X I                 | X I             | X I               | II                 | X IV                        | X IV              | III              |
| Working memory         | X II               | III                        | X III            | X IV             | I                | II                | III            | X II              | X I                 | X I             | X I               | X II               | X IV                        | X IV              | III              |
| Cognitive interference | II                 | III                        | X III            | IV               | X I              | X II              | X III          | II                | I                   | X I             | X I               | II                 | IV                          | X IV              | X III            |
| Spatial skills         | II                 | III                        | X III            | X IV             | X I              | X II              | III            | II                | I                   | X I             | I                 | X II               | X IV                        | IV                | III              |
| Decision-making skills | X II               | X III                      | III              | X IV             | I                | II                | X III          | II                | X I                 | X I             | I                 | X II               | X IV                        | X IV              | X III            |

I – 3D Design department

II-Hardware department

III-Software department

IV –PR department

After restructuring the team and the departments, the cognitive components of corresponding departments are the following:

|                        | Project Management | 3D Design Department I | Hardware Department II | Software Department III | PR Department IV |
|------------------------|--------------------|------------------------|------------------------|-------------------------|------------------|
| Analytic thinking      | XX                 | XXX                    | XX                     | XXX                     | XXX              |
| Analogical transfer    | XXX                | XXX                    | XX                     | XX                      | XX               |
| Working memory         | XXXX               | XXX                    | XX                     | XX                      | XX               |
| Cognitive interference | XXX                | XXX                    | X                      | XX                      | X                |
| Spatial skills         | XX                 | XX                     | XX                     | X                       | XX               |
| Decision-making skills | XXX                | XX                     | XX                     | XX                      | XXX              |

# Circuit Dealerz Code of Conduct for MEMBERS



This Code will define the acceptable behavior standards of the members of the Circuit Dealerz robotics team's members, as well as their rights and obligations.

A member of Circuit Dealerz shall always:

- Interact and collaborate with the other members of the team
- Respect the deadlines and be involved a minimum of 1 hour per day in achieving their respective tasks in the department they are in.
- Talk and behave respectfully towards the mentors of the team.
- Participate in team voting and take part in all of the proposed meetings of the team.
- Honor the need for confidentiality of the information regarding bank account details and private information that shouldn't be disclosed to the public.
- Promote the competition and the team on their social media.
- Avoid any harmful behavior towards other teams such as sabotaging their robot or providing misleading information.
- Support and announce other teammates in case another team needs help.

A member of Circuit Dealerz has the right to:

- Enter and use the tools and kits in the robotics laboratory inside the college's dorm(room 28).
- Use the University of Suceava's 3D printer by talking with our correspondent prof. Remus Prodan
- Acces the team's Instagram and Facebook page with the obligation to only post relevant pictures and text, meaning that self-promotion and any other form of using the page in own benefits is totally prohibited.
- Vote when taking a decision.
- Take part in any DEMO, regional or other team events, official or organized by other teams.
- Request preparation and advice from other older members of the team in their respective department.
- Take part in any meeting with the team and propose improvements or new ideas for the Engineering Notebook or for the robot itself.
- Not take part in a team meeting if he provides a worthy reason.
- Refuse a task if it's considered understandable in a session of team voting which excludes the requesting member of the team.

# Circuit Dealerz Code of Conduct for VOLUNTEERS



This Code will define the acceptable behavior standards of the volunteers of the Circuit Dealerz robotics team's members, as well as their rights and obligations.

A volunteer of Circuit Dealerz shall always:

- Interact and collaborate with the other members or volunteers of the team
- Respect the deadlines and be involved a minimum of 2 hours per week in achieving their respective tasks in the department they offered to volunteer to.
- Talk and behave respectfully towards the mentors and members of the team.
- Offer constantly to help and prove to be a working unit in the team.
- Honor the need for confidentiality of the information regarding any information that the members of the team mention is private and shouldn't be disclosed to the public.
- Promote the competition and the team on their social media.
- Avoid any harmful behavior towards other teams such as sabotaging their robot or providing misleading information.
- Support and announce other teammates in case another team needs help.

A volunteer of Circuit Dealerz has the right to:

- Complete a form which states their status as volunteer of the club.
- Enter and use the tools and kits in the robotics laboratory inside the college's dorm(room 31) if they are allocated to the Hardware department and only with the supervision of a current member of the team.
- Use the University of Suceava's 3D printer by talking with our correspondent prof. Remus Prodan, only if they are allocated to the 3D Design department and with the supervision of a current member of the team.
- Access the team's Instagram and Facebook page with the obligation to only post relevant pictures and text, only if they are allocated to the PR department and if their access is granted by a current member.
- Take part in any DEMO, regional or other team events, official or organized by other teams, only if a member is not able to attend the event.
- Request preparation and advice from members of the team in their respective department.
- Take part in the members + volunteer meetings.
- Refuse a task. Multiple refusals lead to losing the status of club volunteer.

## **1.7. Knowledge – the foundation of our team**

The whole team is at the age when learning is second nature. The whole interaction with everything that surrounds us is a way to learn new things. The problem is that what is new must be placed between old knowledge and validated. This is the only way to build our knowledge so that it will be continuously ascending. For this reason, learning is a group problem, because where things are blocked individually, they are unlocked by interacting with others.

On the other hand, what is accumulated in knowledge by some of the team members becomes common to the entire team, because when thinking about the steps to follow or even following, it is used what the whole team knows or knows to do. Often, things learned in non-formal contexts by some of the team members become learning sources for others. Here are examples of non-formal activities (activities that are not compulsory through the school program, but which sometimes have a fairly rigorous organization that aims to achieve certain goals and always give feedback to participants) and to which some of the team members participated in.

### **Participation at FTC 2018**

#### **NATIONAL STAGE OF FTC 2018**

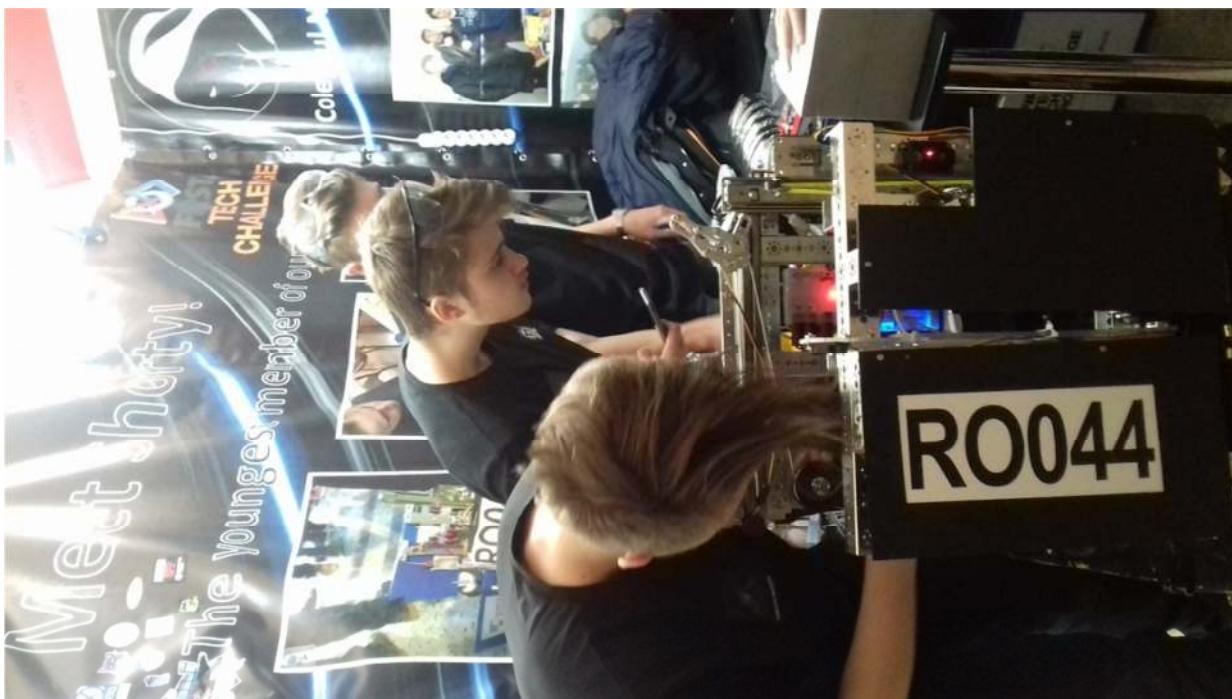
The Circuit Dealerz participated with great joy at the national stage of the FTC robotics competition, Bucharest 2018. This participation was the achievement of the team's work for more than 7 months, as well as the fact that the metamorphosis of the team was possible. With the departure of the 12th grade team members, the team had to rebuilt itself and the desire to equalize the performance of the previous team was on the one hand an impulse and on the other hand a great pressure.

The CIRCUIT DEALERZ team's stand at the FTC 2018 finals in Bucharest





The current student mentor of the team, Dragos Salagean, struggling with Shorty, our robot and member of the team.



Whenever the robot needed to be re-calibrated, Dragos Salagean and Matei Barba were under great pressure.



After our work was done, the fruits of our labor appeared in the form of the 2nd place in Connect Award and the Jury Award. This is the picture taken by the media after winning the Jury Award.

However, the team's participation in the national FTC 2018 was a great lesson for the team, both in terms of teamwork and how the robot can be built.

A GOOD ROBOT IS RARELY DEFECTIVE < IT IS ROBUST AND FLEXIBLE AT THE SAME TIME.

**FOR US, THIS MARKS THE BEGINNING OF THE  
SEASON 2018 -2019.**

## 1.7.1.Robotics in Erasmus+ project

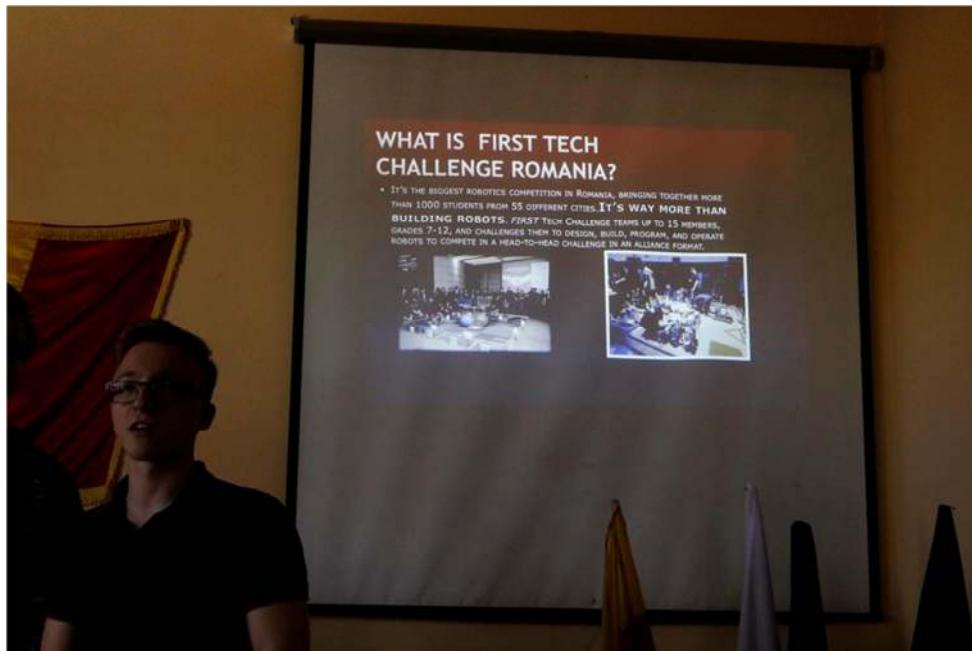
*We can make people's minds bloom of creativity and ingenuity every time we are together and we work hard!*



Six of us took part in Erasmus+ project "A new energy for European citizens" so we decided to present to the other members our club's resolutions and structure. There were present groups of students from our school, France, The Netherlands, Germany and Poland. It was the third day of the project when we made a better image of us to other nationalities. We showed them Romania has innovative students and full of imagination and cleverness minds.



We presented them what FTC competition is and how hard we had to work to get where we are now.



There were representatives from all the departments and each of us submitted their contribution and role in achieving the goals we proposed. We left with a good impression beside and we were happy to inspire and motivate others teenagers and to encourage them into robotics and science topic.



Through this project we succeeded in making the students, the parents and the teachers aware of both the beneficial and destructive power of energy. The students discovered, in an active way, information about how electrical energy is produced in Europe and how much it costs, about the impact of different types of companies that produce energy on the environment, and about the need to invent and develop in the domain of energy. Moreover, it was taken into consideration the development of wide range of competences, abilities and attitudes helpful for the students of the partner schools to take part in discussions and take decisions that may influence the future of their towns as well as their country and, eventually, Europe.

Among the project activities can be listed the following:

- The participation of the students in scientific activities of preparation, the purpose of which was to discuss the problem of energy production and consumption (phenomenology, the technique of production and distribution of electrical energy, the conception of a mini-dictionary with related terms, a scientific summary of possible ways of generating electrical energy)
- Cultural and linguistic preparation (French, Polish, German and English) for the students who will participate in the transnational mobilities of the project.
- Designing the project's website and completing the site with information (the Romanians' responsibility)
- Running the mobilities (transnational meeting in Heerlen, Holland and learning activities in Beaureau, France, in Opole, Poland and in Tübingen, Germany)
- The presentation of the results following the learning activities was conducted in each affiliated school in the preparation phase, during the mobility and after it.
- The use of the results on a curricular and extracurricular level, through well-organized activities, that are addressed to at least three different age groups.
- The dissemination of the results of the activities conducted in the first year and half of the project's implementation.



In the Polish mobility, 4 members of the CIRCUIT DEALERZ team, in the attached photos (left-side), participated. These are Victor Macovei, Samuel Blindu, Albert Tanase and Emanuel Munteanu. It has been a particularly fruitful mobility where learning has been accomplished in particular by visits to cogeneration units of electricity.



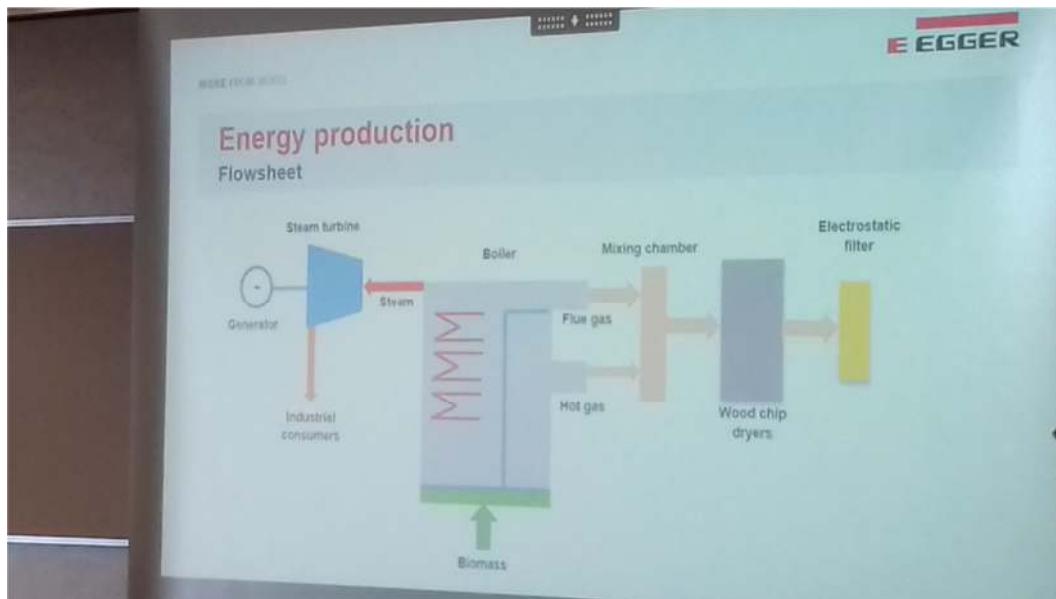
Two members of the CIRCUIT DEALERZ team, Matei Barba and Serban Martin, took part in the French mobility, the latter then retiring from the team. They are in the photo adjacent to extreme left and right positions.

The selection of students for one or another mobility has been achieved through a rigorous selection process specific to Erasmus projects. Students submitted to the selection board a portfolio containing a CV, accompanied by supporting annexes and a number of individual projects related to local reenergizable energy. All members of the Circuit Dealerz team received scoring for the part of the CV that demonstrated the concern for acquiring new concepts in the field of exact sciences (STEM), including through their work in the robotics club. So the work done within the robotics club helped the pupils to be selected in the direct target groups of the Erasmus project, and their participation in the project activities is of added value in the scientific and technical field that has been exploited by the entire CIRCUIT DEALERZ team.

In September 2018, all project partners were present at Suceava as part of their mobility in Romania. It was a very dense week, where the students were hosts (their correspondents were accommodated in their families), participated in the project activities, even at some classes or activities of the robotics club. It was an opportunity to demonstrate to our partners that in Romania there are concerns about finding and exploiting new sources of energy, which will be less polluting and that will be able to increase the production of electricity using classic sources. Although in Suceava

the sun does not shine in the clear sky for many days a year, and the wind does not beat with power only in short periods, all the participants in the project have watched the existing wind turbines, the solar panels, the cogeneration power plant using biomass from Voreni (the largest in Romania), EGGER SA, which has its own power plant, included in the technological process, using green energy.

The visit to EGGER SA was an opportunity to find out in detail how this entraining was designed, built and how it operates today. It was particularly instructive for all participants.  
Renewable energy course at SC EGGER



Students participating in the project, including CIRCUIT DEALERZ team members, listening to the course.



The mobility of foreign partners ended with a beautiful Romanian traditional dance. The last of the dancers in the picture are the members of the CIRCUIT DEALERZ team.



## 1.7.2. Meeting the US Ambassador

April 16, 2018 - a special day in the history of CNPR, as representatives of the US Embassy in Bucharest met with pupils, teachers, but also with the roboTics team.

On April 16, 2018 CNPR was visited by representatives of the US embassy in Romania. This was a great honor for college. In the auditorium, they met with American guests, teachers, students, representatives of CNPR clubs. The discussion was an open one, the students asked questions, among which the most interesting ones were those related to the professional traditions of US officials, how they thought their future starting with school age, how they interacted with people, and the local culture of the regions where they worked, etc. Eventually, the entire planetary geography was reconstituted, but also a geography of the hard work needed to achieve personal goals. The competitive societies with the democratic ones have been antagonized, with pluses and minuses for each.





The IMPULSIVE team, the first name of the Circuit Dealer team, presents to US embassy representatives in Romania the experience of St. Louis, who learned from it and how I think I can make the next lesson in the US.



At the end of the meeting of the robotics team members posed personal questions to the culturally-attached representative of the embassy all of the questions having to do with the pupils' approach to the future.



As the meeting had a profound formative character, we chose to mention it in Chapter I. g „Knowledge – the foundation of the team”

### **1.7.3. IG Sbiera book reception**

In April 2018, a cultural event took place at the Bucovina IG Sbiera Library, where a representative of the US Embassy in Romania, on behalf of its excellence, Ambassador Hans Klemm donated books (literature, travel books, etc.) to the library. In the general presentation, the role of the book has been emphasized in individual formation and perfection, in the ability of people reading to see the world with other eyes, to identify nuances, to be inventive, to be creators, etc.

From the talks, the connections between Suceava County and the USA were invoked, and the participation of the Suceava robotics team at the FTC competition was one of the bridges of the discussion.

From all sides of this meeting, the formative was the most important. For this reason, we have chosen to put this information in Chapter I.g.

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#### **Donatie de carte din partea ambasadorului SUA în România, la Biblioteca Bucovinei**

Vineri, 20 Aprilie 2018 (11:05:00)

de Daniela MICUTARIU  
(citește alte articole de la același autor)

Ambasadorul SUA în România, Hans Klemm, va fi prezent miercuri, 25 aprilie, la ora 9:30, la Biblioteca "I. G. Sbiera" Suceava, unde va inaugura „American Shelf” (Raftul american). Evenimentul este organizat de Ambasada SUA la București și Biblioteca Bucovinei „I. G. Sbiera”. „American Shelf” reprezintă o donație de carte - literatură americană clasică și contemporană, literatură pentru copii și tineret, lucrări de metodici și predările limbii engleze, materiale pentru perfecționarea limbii engleze, continuarea studiilor în SUA, precum și cărți despre politica externă, istoria și geografia Statelor Unite. Colecția oferă acces la resurse despre SUA, cultura și valorile americane. După cum ne-a informat Gabriel Cărăbuș, managerul Bibliotecii Bucovinei „I. G. Sbiera” Suceava, donația va fi oferită de ambasadorul SUA în România, Hans Klemm, și va intra în patrimoniul Bibliotecii spre a sta la dispoziția profesorilor, elevilor și a publicului interesat.





Representatives of different local institutions, as well as pupils, were invited to the event. In the picture is the presence of the US Embassy, CIRCUIT DEALERZ mentor, Miruna Dreliciu (a team member) and a volunteer of the team.

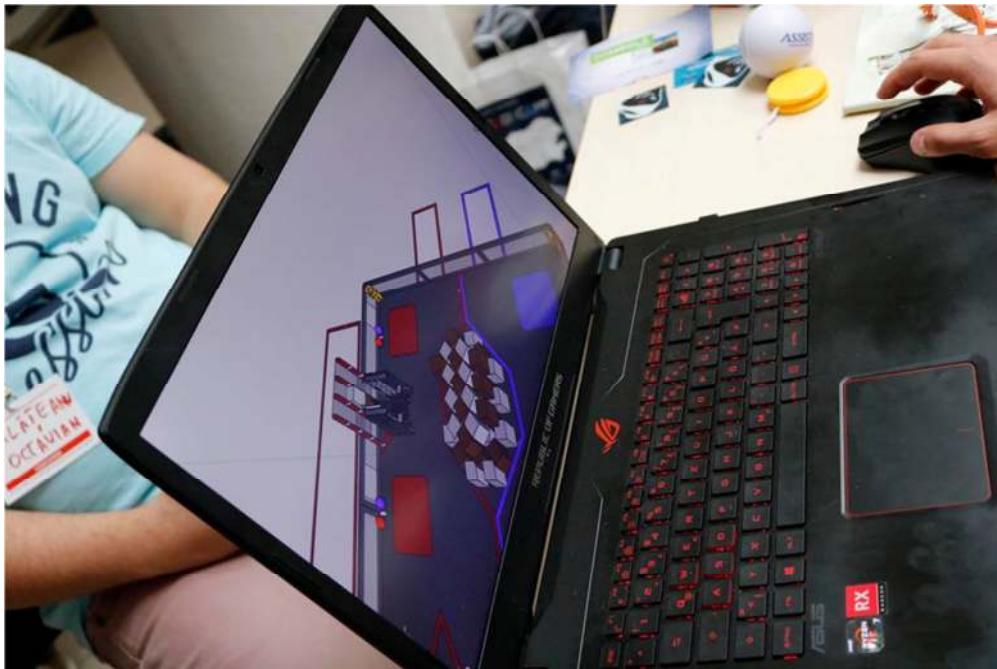


## 1.7.4 Codercamp Suceava

On 20<sup>th</sup> of October 2018, Circuit Dealerz participated at a conference based on IT community and innovation. Codercamp was born in 2008 with a strong desire for better communication among IT professionals and it was encouraged and sustained since its early beginnings by companies and other communities. Codercamp targets and brings together people from all the IT disciplines and who reached all possible career levels: from bright and enthusiastic students and juniors to the more experienced, wise and gray-haired senior and expert participants. The talks and workshops provided by the international and local speakers represent a massive source of knowledge and inspiration for the audience interested in Java, .NET, PHP, JavaScript, Ruby, Mobile, Cloud, Software Architecture, Product Development.



We loved getting in touch with the community of professionals. We created a better image of us for the people around us and found in this project a lot of innovation and inspiration. It's amazing how many things you can learn from people that inspire you.

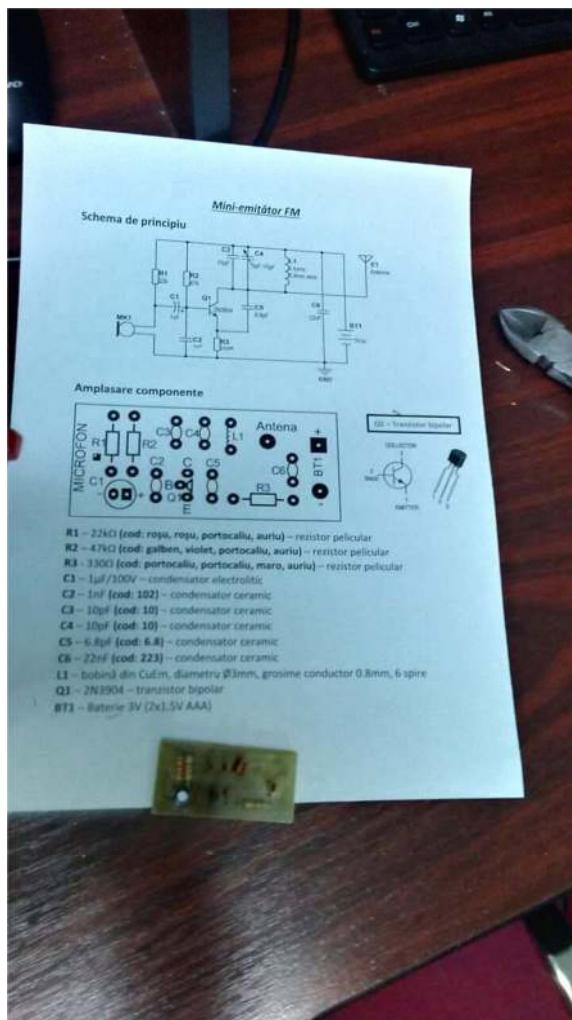


At the event, there were a lot of IT companies that came at The University of "Stefan cel Mare" to raise their popularity and to show the world that it is possible to innovate starting from base knowledge. As communication is the key to success, we discussed on Software topic with companies such as UiPath and Assist which remained pleasantly impressed by our motivation and ambition.



## 1.7.5. How to build a mini FM emitter

We were invited to the university in our county, the university of "Stefan cel Mare" Suceava, for a special Electronics course. We were taught how to run simulations on different programs (for example SpiceNet) and then we were given instructions on how to build a mini FM emitter and after a brief explanation we were split into teams and told to build an emitter. The professor was really trying to make us understand the science behind it and how to use this electronics knowledge in the future. He was always helping us when we were in need of it and when we finished it and it was a bit flawed, he pointed out our mistakes, explained them and taught us how to fix them and avoid future mistakes. The whole activity lasted about 3 hours including the testing the emitters and repairing the flawed ones but it was really worth the while. Not only it was enjoyable, but it also taught us about basic electronics which might be usefull for us, since most participants want to have a future in STEM re



## 1.7.6. Hackaton - Hacking Health 2018

Hi! We are Mathew and Ella and the next few pages will be filled with a story. It all started with only a simple link sent by teacher on a Facebook group that Mathew was part of. It was a link directing to the page of a Hackaton in Bucharest.

Did it spark any interest? Yes, it did, but the realization of the fact that what this Hackaton implied was far greater than what we could offer and the hardships far outweigh our abilities, we put it at the back of our minds. Two weeks prior to the Hackaton, the link appeared again on this group and we took it as sign and began asking ourselves :What ifs...

We started by fully checking, reading and devouring every piece of the Hacking Health's website in order to find out what we were getting ourselves into. I have to admit though the instructions were pretty ambiguous. It didn't seem to have any age limitations, but some examples of skills that were required were terms we never heard of. However, what was crystal-clear was that we needed a team, and we had one. Matthew, as the team leader and Project Manager and I, as the one who did the research and submitted our project application. The second edition of this Hackaton had the next themes, three to be exact: technical solutions for improving innovative medicine and prevention, the digitalization of the health system and the potential of Big Data and Telemedicine. We had two ideas, but eventually chose the one that had the potential of becoming a prototype by the time the Hackaton was finished. And this is how this experience began, by submitting our CVs. And also this:

Cell, tissue, organ, body- terms whose meaning may be vague for many people who do not have deep knowledge of biology. But there is an abstract notion that is understood by all of us- life. It is being offered to all of us as a supreme gift, which creates the illusion that we can take it for granted, forgetting that its unpredictability makes it so fragile. But there are people who have discovered its fragility and learned to appreciate it. These are survivors. They fought or someone fought for them at the edge between life and death , doctors, researchers, computer scientists and donors who turned obstacles into opportunities and crossed the boundaries of logic to create a second chance to life. Their successes are proved by statistics and growing advances in medicine and technology, but to fight the leading cause of global death - cardiovascular disease -there is still place for innovation.

According to the World Health Organization (WHO), 17.9 million people die each year from cardiovascular disease, accounting for 31% of the total deaths globally, and 75% of these deaths are recorded in countries less developed. Romania, although in the process of development, has almost double the European average. Thus, we have sought to find an efficient, easy to use and affordable solutions to maximize the percentage of people who could be saved in the case of a heart attack.

The research, the multitude of options, some almost impossible to achieve, the purpose and the resources have led to what we consider to be the final form of our idea, namely an application that monitors the heart rate of the user and launches an alarm signal in the event of an arrhythmia , using

a device in the form of a bracelet. The device, intended for people with a previous record of a heart disease, registers the heartbeat. When the values are diverted , the user (and one or more close individuals to that person) is advised that the heart is in danger or has a dysfunction preceding a more serious event.

A deeper intrusion into the possible outcomes of this approach has led to the conclusion that it is incomplete. There is a risk that the app may appreciate stress or emotion as an arrhythmia that can lead to a heart attack and may mislead the user. The solution is recording the user's heart rate over a period, the individual being subjected to a variety of different situations of stress, strong emotions, joy, sadness, etc. and then creating an individual profile. Monitoring each of these situations will generate a chart of heartbeats with which to create other graphs of the frequency of heartbeats. Thus, when a heart attack occurs, it will be possible to differentiate it from the usual situations.

Enabling the app involves entering the phone numbers of trusted people that the user can rely on at any time. By default, they will need to have the app on your device. The idea of interconnecting all these people comes from the patient's inability to react at such times. Thus, all people added will receive an alert on the phone informing them that the person being monitored suffers a heart attack. The nearest person in space will receive an additional message stating that he or she is closest to the suffering and has to do everything possible to announce a rescue center or carry it to the hospital.

The applicability and effectiveness of this innovation is:

- Minimum costs: buying a device like this does not involve high costs, and downloading the application is free of charge
- Advantages: the possibility of reducing the number of deaths resulting from cardiovascular diseases
- Simplicity of use
- Discrete form does not cause discomfort throughout the wearing

All because, although relapses in cardiovascular diseases are common, they should not be inevitable. Everything to allow improbability to make our life more beautiful does not end it. Everything to make a change and give the wings a dream. Everything to make sure the body's most important muscle continues to beat. Everything for life.

Behind this piece of writing were long hours of research with our Biology teacher in the laboratory, cold Subway sandwiches, forgotten on the table because of our eagerness to learn some Java Script and a couple of missed classes at school . But everything proved to be worth it when, at 00.01 I submitted the project. I was extremely scared because, as I said, the website was a bit ambiguous and, although it said that there was 1 day left, we didn't know if that day was the last or the next one. Almost trembling, I finished, hoping that it was not too late .Fortunately, it wasn't and our project was taken into consideration. I have to say that I slept like a baby that night, knowing that whatever it is to come, we, as a team had accomplished so much fighting the fear for the unknown and gaining confidence in the abilities we possessed.

Monday. It was the day we were supposed to find out if we were accepted or not for the next round of the competition. Somehow, we both knew that we didn't stand a chance. Maybe, the jury didn't

even look at our project when they saw in our CV that we were high schoolers. In the evening, Mathew and I both checked on each other every 10 minutes if maybe one of us had received an email, be it of rejection or acceptance. And it came. I received it and in less than a second I sent a screenshot of it to Mathew. I was in such disbelief and also so enthusiastic that I started screaming and writing messages spelled so wrong that even I could not read them a second time and understand them. So...it seems that they liked and saw potential in our project.

I have to say though that the excitement didn't last but for a night. The following day we faced the real problems. What we are going to do there? Where are we going to stay, given the fact that we had no relatives in Bucharest and staying 3 nights at a hotel and paying a small fortune was not the most idealistic. One thing was certain...we could not back down now.

The whole week that followed we were in a continuous, frantic rush. We contacted one of the mentors of the Circuit Dealerz Robotics team and asked for his help, because we wanted to make an attempt at building a smartphone app, or at least understanding what it implied. Also, we managed to find a place to stay in Bucharest, so we had an infinite amount of troubles, minus one.

We booked our train tickets and, Friday morning, we set off on our 7-hour journey to Bucharest. Because we were rested and the train was fairly empty, we spent our time talking, Mathew giving me relationships advice and discussing Bucharest and their prejudices about those from "Provincie". If I have to choose a word to describe our journey, it would be "hilarious". The highlight of it was the moment a man came to where we stood and placed a couple of items on our table. First, I was in shock. I thought he wanted to steal something, but still, I didn't know what was going on. After the man left, Mathew told me that it was absolutely normal for this to happen and that the man will come to take back the items that the people didn't want to buy. Very excited at the prospect of a bargain, Mathew bought a set of three pencils, all of them colored differently. The surprise came when we tried them. All of them had blue ink, despite being colored in yellow and green. The hysterical laugh that followed had all the eyes in the train turned towards us, but we couldn't help it.

The whistle of the train arriving to its destination announced us that we were indeed in Bucharest. And what better way to be convinced, than to hear the sweetest "Mancati-as gurita ta" from a man selling his merchandise right near the subway station. After half an hour, we arrived at Mathew's friend apartment and, after making ourselves presentable, we went to Bucharest TechHub, the place where the competition was to be held. There it was supposed to be an informal meeting so the organizers could meet us and the people without a team could find one. We received our badges and went to our places...and our jaws dropped. Only grown-up, serious men and women everywhere. And, when the time came for every team to say a few words about the project, we felt the urge to run as fast as we could out of that room. Software engineers, doctors, students, people with numerous years of

experience in the field of medicine and IT .teams made up of 8+ people and brilliant ideas, and we...two high schoolers. We felt a bit relieved after we found out that there was also a team of high schoolers and one of middle school children. After the teams were presented and we enjoyed some fancy canapés, Cornel, a man working in the IT field approached us. He registered without a team and wanted to be part of ours. After we discussed and told him what other abilities we needed in order to finish the project, we were introduced to Alex, a 9<sup>th</sup> grader, but with a portfolio full of diplomas and prizes in IT competitions. Slowly, our team was growing and our fears began to fade in the light of our excitement of what we were going to accomplish if we united our forces. The night was completed with pizza because Mathew had not eaten anything because that fancy food seemed strange and not really trustworthy. At the bottom of the imposing Palace of the Parliament we witnessed a car race having in the center a Porsche Panamera. Clearly, his owner was from Dorobanti.

The next two days passed like a dream. Everyday started with me begging Mathew not to dress as he usually does, very casually. In the end, we reached an agreement. He could wear anything,

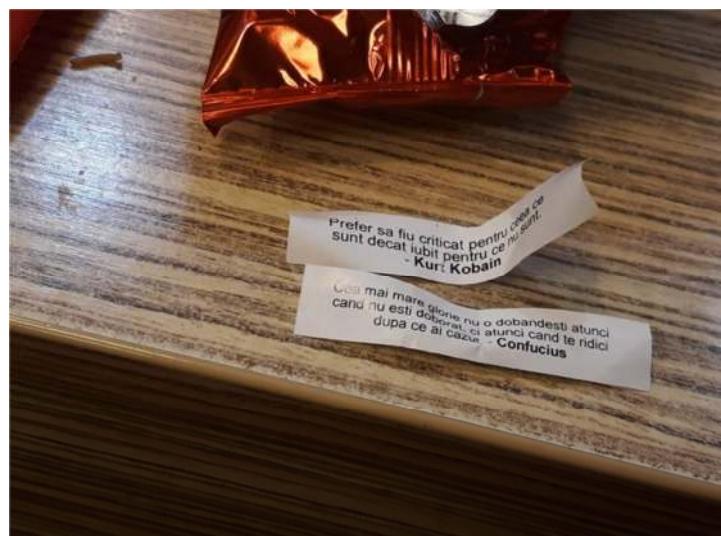


except for sweatpants. The Hackaton was preceded by a couple of speeches held by some of the sponsors and also, His Excellency, Ambassador of the United States of America, Hans Klemm. During breakfast, a doctor who didn't have a team approached us. He wanted to become part of our team, bringing also his ideas alongside ours. At this point, our team was complete and on the doctor's initiative, we changed our name and became 5ToGo IT.



Mathew, Alex and Cornel were in charge of the software part of our project. We began slowly, but confident that, at the end of the two days, we would have something to present before the jury. We filled our chocolate stock and began working. Firstly, the boys in our team made a plan and put together a mini-device that measured the heart rate. Cornel worked on to creating the app from scratch and Mathew and Alex worked on to the code. I was in charge of the presentation. Every step of the way we could ask the mentors for help for everything we could possibly need: marketing or product, hardware and software, ideas for the pitch and so on. As team leader, Mathew checked on us from time to time and made sure that every part of the project was going forward smoothly. Our work was interrupted by small and enjoyable pauses, when we ate, socialized and spoke with the mentors.

Also, we gave an interview to a reporter from KanalD which was extremely intimidating.



We planned on staying awake through the whole night, but eventually tiredness got the best of us. We got home where we finished the presentation and slept for well-deserved 5 hours. The next day, we focused on the last details. The initial app was almost in its final form and both Cornel and the doctor worked on implementing the doctor's idea, which was a questionnaire that verified the patient's quality of life. As the programming part was coming to an end, Mathew assisted me at creating the PowerPoint presentation which was to be the visual support for our pitch.

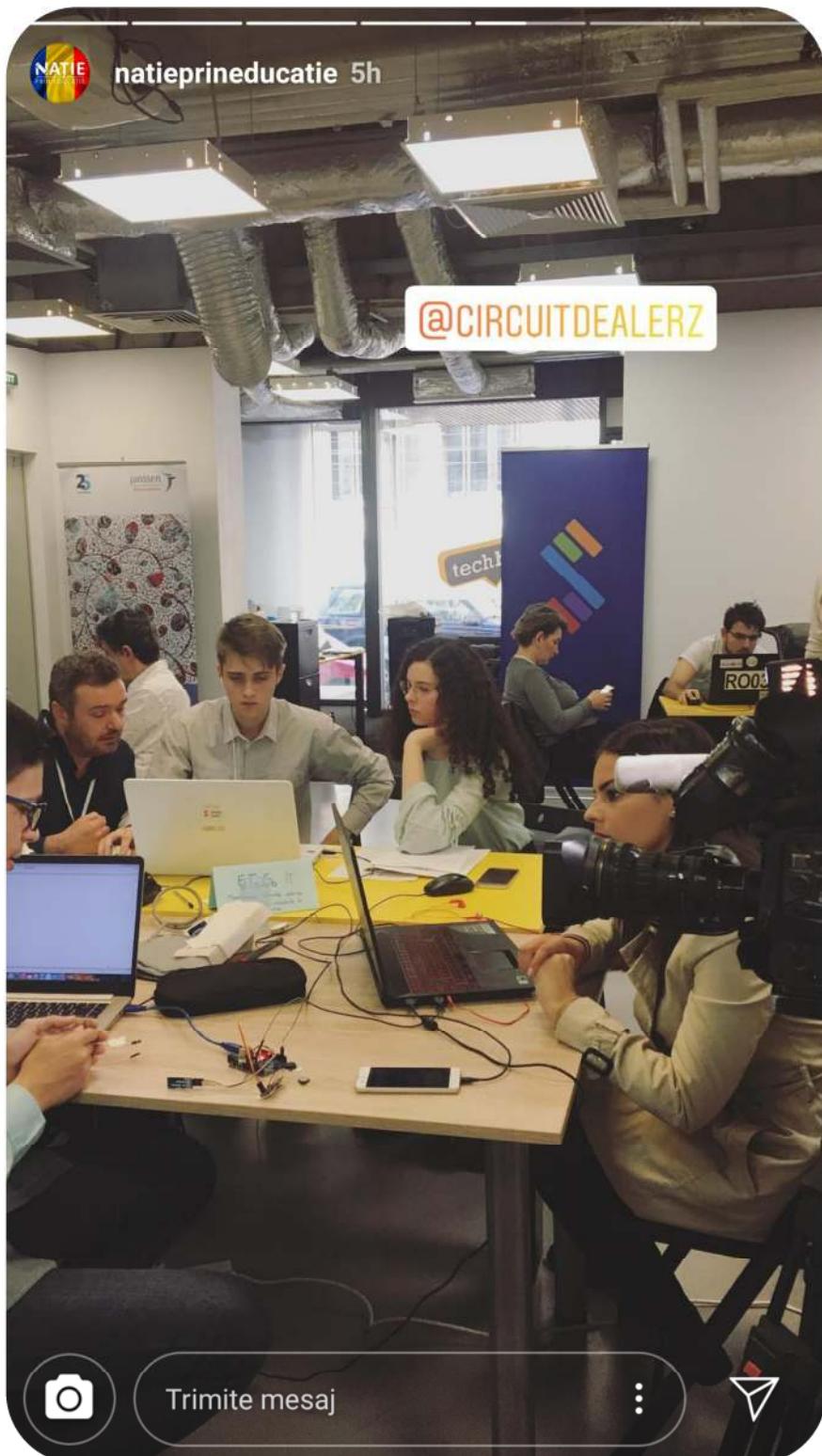
At two PM, when the Hackaton stopped, that's when the emotions started to creep in. We



decided that I was going to give the presentation of the project for about 3 minutes and Mathew was going to do the demo, 1 minute. We draw lots and our lucky number proved to be 7, so we were the seventh team that presented. Anxiously, we waited, sitting on our seats and enjoying the others presentations. You could have cut the tension with a knife, but our team continuously encouraged both Mathew and me until it was our turn to present.

And it finally came. Press, curious eyes, cameras, important people and our fellow team members...they were all watching us. Facing the important moment that was before us, we were suddenly devoid of any emotion and we presented with confidence and seriousness, knowing that, no matter if we won or not, what we accomplished as a team and on a personal level was priceless. Unlike the other teams, we decided that at the end of the presentation, our entire team to join us for the judges to meet all of us and, if the judges had questions that implied knowledge from different fields, the one which knew the subject more deeply to give the answer.





That was our moment to shine and we had no regrets afterwards. Until the judges made their decision, Mathew and I decided to go to have a look around some of the most prominent places that was within a short distance. And what better place to experience the exclusivity of Bucharest than the famous and expensive ice cream parlour, Emilia. As Mathew bragged about having tasted many flavors, I let him choose mine: a delicious mini-bowl of gooey, sticky vanilla gelato on a bed of crispy chocolate graham crackers and a layer of warm Nutella pudding. Then we went to a Chinese restaurant and learned how to eat with chopsticks. Unfortunately, I don't think it became a reflex, because I already forgot how to do it. After a quick look at the planets Saturn and Mars through a telescope, we rushed to arrive at the premiere. The jury was not ready yet, so we still had time to have one last fancy meal and Mathew even slept for a good amount of time.



What followed was a combination of excitement, pride and anticipation. As everyone was tired, the premiere was not very formal. Every member of the jury had a few words to say, congratulating us and pointing out that the decision was extremely hard because every project was valuable and encouraged us to continue, no matter what the result would be. Three amazing teams won the big prizes of 5000\$ from sponsors to continue the project and mentorship for a period of 6 months. We

won the prize for the youngest team, as three of us were high schoolers, and Cornel won the prize for the best hacker. A marathon of photographs followed and, because we couldn't stay any longer, we had to say goodbye to our fellow team members.



When we were on the subway, we had the brilliant idea to look at the tickets and see at which hour our train was supposed to leave. And guess what? We were at a ten-minute distance from the train station and the train was leaving in 5 minutes. A series of hysterical laughs followed, because otherwise I would have cried. The interval of time after we got out of the subway and we were inside

the train station, I don't think our feet touched the ground, but we flied. To our utmost surprise, the train was delayed for half an hour.

As the sun faded, losing its fire and changing its tones into the darkest shade of blue ink, we recalled what we accomplished after this experience.

## 1.7.7. Scientific Conference

On December 4, 2018, the international conference TIME IN PHYSICS was held at CNPR. This event was attended by students, teachers, students's parents, as well as from Suceava, according to the official announcement on the college's website.

As a result, the participation was numerous, and among the students, there were, of course, the members of the CIRCUIT DEALERZ team. It was a beautiful and instructive lesson about the fundamental notions of physics, including the one of the most importance, time.



## **1.8. Collaboration in the FIRST system**

### **1.8.1. Collaboration with FTC teams**

During the Summer Camp we created a strong bond with some of the future members of Esentza Revolution and the members of Fast Forward Future.

With the members of Esentza Revolution we discussed about possible designs of the robot, we helped them with a drive train, told them what a good drive train is about, in other words, we presented them different drive trains. Because it was a new team, we also gave them advice on how to start working on a team and how to build their first robot prototype.

Regarding team Fast Forward Future, we gave them the code we used at the Freshman's school for the Mecanum drivetrain, because it was the improved version and the best we had at the time.

Because we are not the only team in the city anymore, we tried to create a strong bond with the members of team Filatronics, being from the same city and previously knowing some of its members. Our first official contact with this team was when they received their Beginner's Kit and we received our part of the arena. With this occasion, we also wanted to talk a bit about the competition, teach them a few tips and tricks that we also learned from other people or that we learned on our own.

Afterwards, we kept in touch with them, discussing various things about the competition. We also wanted to have a few friendly matches before the competitions, but due to various reasons, we were unable to. Luckily, with the help of Natie Prin Educatie, we were able to play a few matches with not only Filatronics, but also FUSE and Cyliis on the 3<sup>rd</sup> of February at Pallas Mall in Iasi at the Special Event.



### **1.8.1.1. Iasi Special Event**

On the third of February, Circuit Dealerz participated with other three Robotics teams at a demonstrative competition at Iasi. It was a pleasure for us to compete with other teams from our region and to make connections.



We got around to Iasi by train and our mentor, Silviu, accompanied us. We arrived at the place where the competition was going to be and prepared everything for the match. We became friends with the members of CyLiis and Fuse teams, which are from Iasi, and this helped us create a pleasant atmosphere in the games we played.



In the matches we made an aliation with the other team from Suceava, Filatronics and we were the blue ones. The other two teams from Iasi formed the red aliation. Our member, Andrei Blîndu was the commentator of the games and the rest of the team was very proud to see him in that posture.

In the first game we noticed some dysfunctions at our robot and in the time between that game and the next one we tried to fix them. It was a beneficial part in not making many points in the first game as we could realise the problems of the robot and improve its functions.

The numerous public watching us consisted of people of various ages. Robotics is an interesting and mysterious topic for both children and elders, especially for the little ones who were very curious and enthusiastic about our work.



We were really happy to be both on the page of "Nati prin Educatie" and on the PRO TV news, one of the biggest news channel in Romania. Our friend and member, Matei Barba had been interviewed by the PRO TV team and we were glad he had the occasion to speak in front of a huge public who was going to watch the TV or the online news.



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PRO-TV

Video

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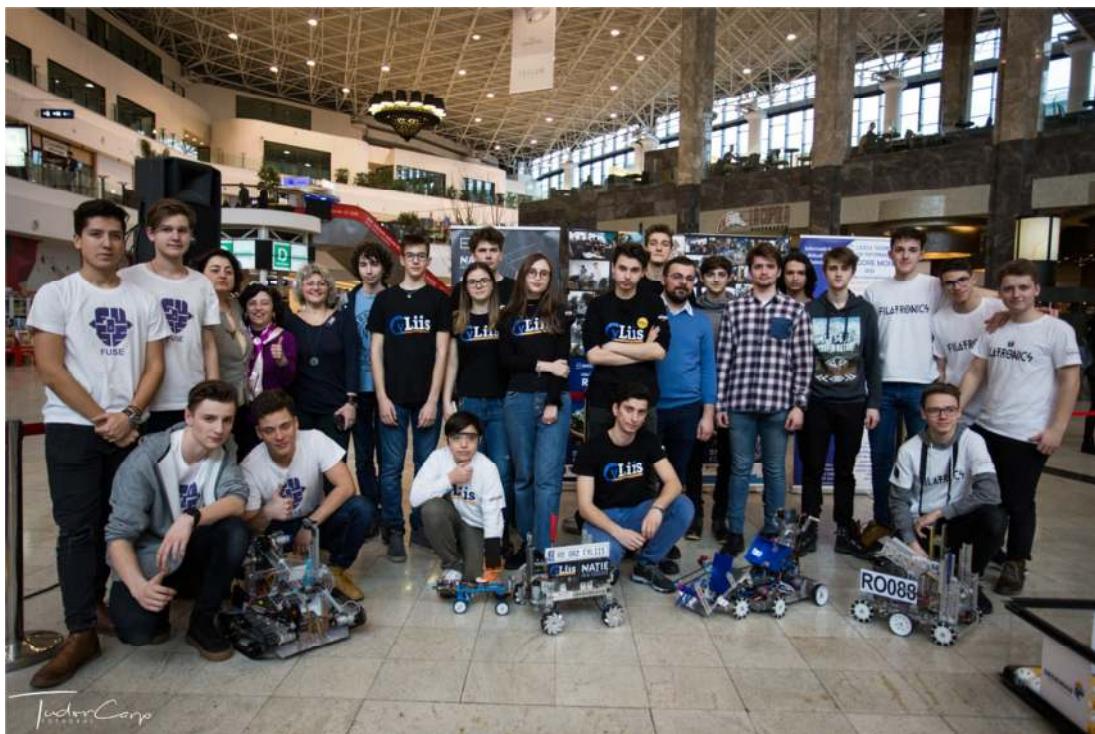
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Pasionați de tehnologia viitorului, zeci de liceeni din Suceava și Iași s-au întrecut în cadrul unei competiții de robotică.



We had an amazing time at Iasi and it has definitely helped us prepare for future competitions. We are looking forward for the next competitions where we will do better!

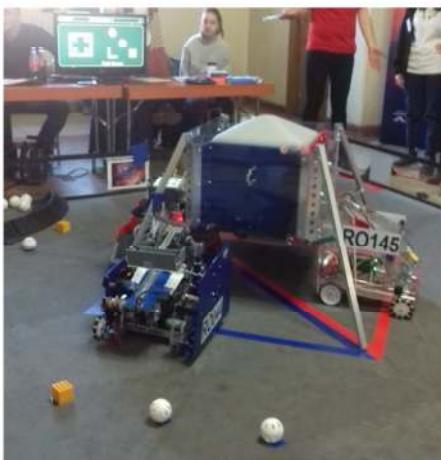


## 1.8.1.2. Iasi Demo

As soon as we arrived at the university where the contest took place we found ourselves surrounded by a friendly and familiar atmosphere, where everybody shared the same passion: robotics.

Shortly after we set up our stand and started reviewing Dezmembrila to check for some last second flaws and we didn't think that there could be so many problems we missed, for example having the servo cable working only when it was in a certain position, or our rake not being able to collect the minerals.

When we managed to fix these issues by adding a platform to the rake and some duct tape to the cable we thought about going in the test arena. Everything went according to the plan, being able to score points with ease, though at one point the time came for something to break.



As the software contained a bug which would make the left back wheel engine not work, the sprocket holding the chain collapsed and left us with half of the movement of the robot in a matter of seconds. The time for matches arrived and yet we had no solution for our wheel and so we entered the battlefield unarmed, but unexpectedly we actually scored points in this difficult situation by pushing the minerals in the corner and protecting it from our high speed opponents. Although it could be said we had a difficult time, all was worth as we had the opportunity to make a lot of fellow teams friends and were able to find out some main design issues.

## 1.8.2.U.S. Air Force Invitation

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FIRST® Leadership Experience for Teachers and Mentors Yahoo/Inbox ★

From: FIRST <firsttechchallenge@firstinspires.org>  
To: ancagreculeac@yahoo.com Date: Feb 7 at 10:10 PM ★

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Hi Anca-Viorica ,

1. Eighth Annual U.S. Air Force/FIRST® Leadership Experience  
2. National Advocacy Conference

**Eighth Annual U.S. Air Force/FIRST Leadership Experience for FIRST Teachers and Mentors**

For the eighth year, the U.S. Air Force is offering a unique three-day leadership program providing FIRST mentors with hands-on leadership training taught by Air Force personnel. Throughout the three-day experience, mentors will attend lectures, take part in team building exercises, and tour a local Air Force Base. The Air Force will select a group of 24 teachers and mentors from FIRST® Tech Challenge and FIRST® Robotics Competition teams who are helping inspire today's youth to

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**When:** July 14 – 18, 2019. Dates could be subject to change based on Air Force operational missions/priorities.

**Where:** Wright-Patterson Air Force Base in Dayton, Ohio.

**Who is Eligible:** FIRSTTech Challenge and FIRSTRobotics Competition mentors who are K-12 teachers and live within the continental United States.

#### **How to Apply:**

- [Complete the online application.](#)
- Applications must be submitted by Friday, May 10, 2019.
- As part of your application, you will have the opportunity to describe in 300 words or less how you have found a better way to get students excited about science and technology, and what innovative techniques you use to help kids learn and stay motivated.
- Chosen applicants will be named by Friday, May 24, 2019.

For questions, please contact Brittany Keegan at [brittany.keegan@gsdm.com](mailto:brittany.keegan@gsdm.com).

### **National Advocacy Conference**

Registration is now open for the 2019 National Advocacy Conference, which runs from June 23 to the 25 in Washington, DC. Students learn how to talk to Members of Congress, and then we send each team out for a day of meetings with Senators and Members of Congress to promote FIRSTand STEM education on behalf of every student in America! In this once-in-a-lifetime experience, students make a national impact and walk away with increased confidence and engagement in our government. All participants registered by April 1, 2019 will receive a pen, tote bag, t-shirt, and game piece signed by Don, Dean, and Woodie and will be entered for a chance to win a private reception at the National Advocacy

Conference! FIRST Robotics Competition teams, FIRST Tech Challenge teams, and individuals are all welcome. Questions, more information, and registration can be found at <http://firstnac.org> or by emailing [staff@firstnac.org](mailto:staff@firstnac.org).

*We can't thank our awesome sponsors enough! Thank you to our Season Presenting Sponsor Qualcomm, our Official Program Sponsor Collins Aerospace, and our Official 3D Augmented Reality/Virtual Reality Sponsor, PTC!*

## **1.9. Volunteering**

### **Educational Park**

In the North-West part of the center the building was arranged an Educational Park, a big lab in the open air, in which can be carried out educative activities and recreation for students. The necessity of the arrangement of this park came from the fact that the connection between the students and nature is huge. As this connection is known to appear very early in somebody's life, the managerial team of the college decided to build the park.

The park also includes a stage with the dimensions of the  $4m \times 4m$ , which will be the place where activities like matches of robotics will be carried out. The stage is situated next to a batter arranged like stairs so the public can watch carefully.



A photo during the arrangement of the park in which the pavement part is used at the batter



With the occasion of the college's educational park being under construction some of the team's members decided that we should volunteer and help out the workers. So we got our construction helmets and our shovels and we went to the construction site, but this was only the first part.

After the batter was strengthened and the grass was equipped, the students of the college planted adapted to mountainous type of herald plants species, with a decorative role. Though these students are also Circuit Dealerz' volunteers .



In the North, the Educational Park is near the gymnasium. After the complete arrangement of the park, the visual impact was clearly visible and to look better, we fell by mutual agreement to paint the wall to be colored and inspire students. As the funds for developing the park were gone, what was realized was nothing else but volunteering.

In the image, the group of students passionate of painting, who under the co-ordination of Miss Ana Maria Fomin, a supporter of outdoor activities, realized the exterior painting of dimensions of the  $16m \times 8m$ . The security of the students was a real challenge, but a success. The work lasted two weeks and at the action participated Ramona Cimpan, a volunteer of the team and Miruna Drelciuc, currently a member of the team.

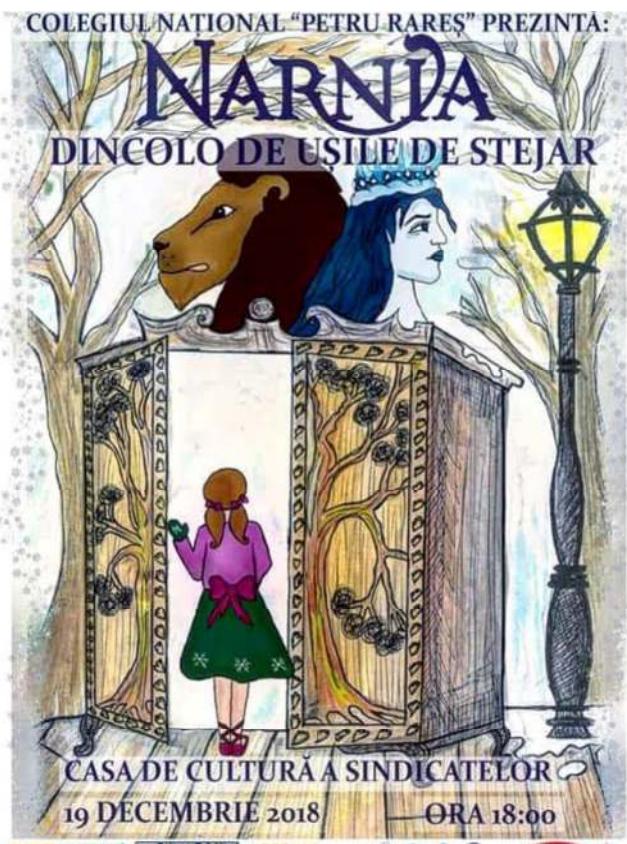


The Educational Park includes an area of renewable energy production, which fuels a part of the illumination of the park. It is a hybrid eolian system and photovoltaic which represents a didactic material for the physics lessons. With this creation, the college participated at the ENERGY GLOBE contest, organized by E-ON Romania, being through the finalist of it. The site of the contest certifies this thing. The photovoltaic and eolian system is a sign at the entry in the institution which reminds all the visitor that without technology, it is hard to our life to exist. The hybrid system is a sign which represents also the STEM values.

*"Narnia: Beyond the Oak Doors"*

National College "Petru Rareș" Suceava has a tradition dating as far back as 2015 of organizing a ball, in a similar fashion of the freshman's one, just before the winter break with the noble aim to help families in need of the college and of the local community with the occasion of Christmas.

This is one of the biggest events our robotics team was partly involved ever, which basically is a 4 hour show put together by a team of 11<sup>th</sup> grade students in front of an audience of over 650 people. By a formal partnership between Circuit Dealerz and the ball's organizers, both parties agreed upon 3 members of our team being directly involved in the organization of the ball during the entire planning of it, in exchange of the ability to promote the team during the event. Emi, Teodor and Blindu were the 3 members of our team



that became organizers of the event: Emi took care of the overall project management and was heavily involved in crafting the set, as well as being one of the main characters in the theatrical play of the ball, and so was Blindu which was mostly dedicated to building the pieces and background decorations, as well as being a major character implicated in the narnian story. Teodor was also an essential member of the crafting team, but most importantly he was the main man of the technical team of the ball, which involved sound checking, arranging an overall sound scheme and taking care of the lights, and he also sacrificed his entire time during the ball to sit in front of the technical mainframe.

Emi was also named the head of the Crafting

department of the charity ball, owing this distinction to a brilliant idea he had. Not only because of this, but also because his previous experience. During September, the first month of school, he also took part in organizing the Freshmen's Ball alongside Teodor, where their contribution to the formation of the decor was essential.



After the presentation of the stage set created by him, "Emi" (as we call him), also proposed a theme that would match perfectly with the rotating platform he had in mind. Extremely impressed by the idea of a 6-meter-diameter circular scene that will rotate, symbolizing the transition to another world, the other organizers voted in favour of the theme proposed by our colleague. As a result, for two months, in our school, but also in the hall where the work for an unique stage set was being done, intense preparations were made for the ball that would be called "Narnia: Beyond the Oak Doors".

Emi argues that the most important thing he achieved after taking part in organizing the charity event was the fact that he improved his leadership skills and that he learned more from his own mistakes than from following other's advice.

"I strongly believe that work ennobles a man and that's why I have never been ashamed to work. I chose to be part of the charity ball team because I saw it as an opportunity to do something I didn't have the possibility to learn at school: carpentry. I can say that I love practical work and maybe that's because when I was little I helped my dad a lot when it came to "men's chores."

I knew since the 8th grade that in our school the students of the 11th grade organize a charity event every year around the Christmas holidays and since then I decided that when the time would come I would contribute to it.

The idea of a rotating platform was taken from a play that I saw at the theatre called "God Dresses Second Hand". I was simply amazed during the show to see that the whole scene is starting to move, and since then this idea was in my head. I proposed it to my teachers and colleagues, but they all told me that this is impossible for a couple of unskilled students to do in a month ... the next day I showed them two drawings and I further explained to everyone how simple everything actually was. In the end, they agreed. We chose a 2.2cm thick scene, a circle of 6m in diameter that would spin in the middle of the performance when children passed to Narnia through the famous wardrobe.



So we set up the battle plan: each plate was supported by six fixed wheels perpendicular to the radius of the circle, so that our scene could do nothing else but rotate.

Unfortunately, the building of the platform was one of the cases when the leader did the job of almost everyone. Out of the 12 members of the department, there were only 2 who have put their back into it. I take part of the blame because I did not let everyone do the job for fear they might mess up and break the materials, or doing the wrong things, and having to go back to them to correct the mistakes. Maybe I should have taught some in order to facilitate my work, but I did not have much time to do so because in addition to the rotating scene, two rotating platforms had to be built, the wardrobe as the essential piece and the walls to be painted the interior and the exterior part."



Fortunately, we have had a lot of time on our hands in the robotics team, so our handyman was able to teach his fellow colleagues in the organizing team how to work with screws and nuts.

"Also, due to the fact that I learned some carpenter tricks while I worked for the decoration, I was able to see a mistake concerning the hardware part of our robot. The two slides that lifted the paddle did not move parallelly and this way the paddle was bending over backwards in a strained position. I told Victor that in order to rectify this mistake it is not enough simply to tie a slider bar, but we must form some diagonals so the sliders could always move concomitantly

Being the coordinator of the charity ball, I noticed that most of the organizers left everything for the last minute and, as a result, we encountered many different problems. Thus, in order to avoid the same thing happening to the robotics team, we always set very precise deadlines and each member works at the same pace as the others and respecting the deadline for not being sanctioned, but also out of respect for the other members of the team.

All in all, I am glad that I managed to accomplish what I wanted to do for the charity ball and that I also managed to work on two fronts and train with the old robot model while also working hard to build the platform that will remain famous in our school. Moreover, the experience has helped me to learn from my mistakes and improve my leadership skills so that the robotics team has no longer faced the situation where the boss does all the work for all members."

Also, from the organizing team of the charity ball there were two other members of the robotics team, also in the crafting department, the two members to whom I they referred in the beginning that they did their job and took the matter into their own hands and coming up with a lot of new ideas, Morosan Teodor and Blindu Andrei Samuel.

### MOROSAN TEODOR

I can't say that I've done something as flashy as the rest of my colleagues and that is to be on the stage, even though I really wanted to. However, I got to do the job only I could do and that is to sit in front of the sound mixing console and lighting control console as I was the only organizer that had experience with operating the consoles.

Doing this helped me a lot in regards to teamwork and communication because everything must be exactly as planned, so I had to constantly ask the performers about the changes that are made and check if everything is all right.

My work as an organizer wasn't only to be the guy who has to stay at the sound and lighting consoles. I was also one of the main guys from the crafting department, working alongside Emi, Blindu and other colleagues. I played a vital role in creating the rotating platform (the one which had the wardrobe on), the magic wardrobe and the other two rotating platforms.

### BLINDU ANDREI SAMUEL



Now I would like to give my point of view on the whole organization and development of the ball as a project. Given the fact that the venue of the show was Casa de Cultura a Sindicatelor Suceava, which is the biggest hall in the county and the place where the city's biggest shows and concerts take place, I realized that the whole thing is more serious than I might've expected.

The first phase of my implication during the organization of the ball was to choose an appropriate department to take part of. I decided it was best to avoid the Financial and Sponsorship team because later on when I would need to go around seeking for sponsorship deals around the city for the robotics team I wouldn't want to be recognized by the local companies as coming for a second time, as I occupy with the PR department in the team.

So I chose to take part of the hard laboring team that implied hard, manly work, such as: crafting, carrying wooden pillars and pieces, and the kind of job that my parents told me I'd do for the rest of my life if I wouldn't study and assure a good future! This meant that after school, I would have to go to a carpenter center provided by the parents of one of the organizers to work, going to Dedeman to buy and carry the materials needed to the center and overall plan the placement of the crafted pieces. Emi did a good job in organizing the boys to work, and with his help and indications I could, alongside Teodor and some other colleagues, craft the entire set of the show! And by that I mean that the men provided by the robotics team were one of the most crucial components during the whole organization of the ball.

I was thrilled to find out that many of the organizers thought that I would perfectly fit the role of Mr Tumnus, the narnian faun, and with no doubts I accepted it. Since I was little, theatrical plays and acting occupied a special place in my heart, so I saw this as a priceless opportunity to show-off my acting skills! Surprisingly, crafting the costume was the hardest job that came up, because my character was a mythical creature half man half goat, so imagining how I could resemble it with the costumes and clothing that I had at my disposal at home and from the sponsors was tiring but fun nonetheless.

In the end I was really happy with how my costume ended up looking: A pair of horns bought at a local shop, fake beard and eyebrows also from there, a red scarf I had at home, the pants from a Romanian traditional bear costume from one of the organizers and the most important piece, two black leather sandals, which I chopped the bottom off them in order to be able to drag a pair of brown socks over them, to resemble as much as possible goat hooves.



## **2. THE BUSINESS PLAN AND MARKETING PLAN**

## Description of the activity

### I. 1. Service / Product

The Robotics Club of « Petru Rares » National College Suceava is conceiving and implementing a training program for its members on different levels (scientific, practical, interpersonal and cultural). As a matter of fact, they « sell » a service to its members (that of interdisciplinary education with the purpose of developing trans-disciplinary abilities) and outside the club, it "sells the image", which is necessary for the achievement of a wide and valuable base of selection.

Answering the question of why the students of the college would be interested in the services offered by the Robotics Club provided us with the following:

- Preparation for a future profession, considering the following statistics (and more)

- Over 80% of the jobs provided between 2015 and 2025 require STEM abilities (Science, Technology, Engineering and Mathematics), according to estimates by National Science Foundation from 2014
- A Romanian employer assesses on average 14 candidates for technical domains before finding the good one, and training an entry-level employee lasts about 8 months, according to a study carried out by Millward Brown in partnership with the Coalition for Romania's Development and e-jobs, in 2015, on a sample of over 400 companies
- Romania trains young people for a future which is different from the one developed countries prepare for. The fiscal value of the IT industry in Romania has went beyond 5 billion euros in 2017 (it doubled over the last 6 years according to ARIES – The Romanian Association for Electronics and Software Industry Transylvania) and will continue to increase over the next years by more than 13%, according to ANIS (The Employers' Association for Software and Services Industry).
- Also, according to ANIS, the shortage of IT candidates is today 40% (6 candidates per 10 new workplaces), and almost 60% of the Romanian 15-year-olds state that, in 2030, they would like to have a different profession from a technical one, so the need for specialists in the technical field is expected to increase.

-The need of the team members for a positive image in the educational community they belong to.

-The need for belonging to an elite group, in which their progress will be monitored.

## I. 2. Position on the market

There are two types of markets:

-The market from which the Robotics Club of the college chooses its members, which is the community of students who want to be part of a club and participate in the selection every school year in September. The 10 clubs compete to select the human resources they are going to work with for at least another school year.

-The market of the external image of the clubs and members, which is important to fuel the first one, previously mentioned.

## I.3. Opportunities for Development

The opportunities for the team's development are really high. The wish to be a member of the robotics club is ever-increasing, which is due to:

-The team's success in 2017 (under the name IMPULSIVE) by participating in the international competition FIRST, in St. Louis

-The team's partial results have created a wave of sympathy and have increased the students' eagerness to become members of the team in the future.

-Wide media coverage of the team's success

## I.4. The objectives of developing the educational service provided by the Robotics Club

The working objectives of the Robotics Club are as follows:

-An increase in the quality of the education provided by "Petru Rares" National College to its students, in general, through the non-formal transcurricular educational approach

-The development of scientific, practical, teamwork and cultural abilities for the members of the Robotics Club

-An enhancement of the positive image of the education provided by our college in the local and regional community, with the purpose of selecting students who are motivated to learn and make an informed choice of a future career.

-The initiation of new institutional collaborations meant to create an economic chain, in which a few links should be educational (middle schools providing human resources to our college, also "Stefan cel Mare" University in Suceava, local companies based on engineering, IT and technology etc.)

## I. Marketing Plan

### I. Justifying the need to create and realize the objective of the project

- a. Describing the uniqueness of the project's objective (for example: the created/modernized/rehabilitated groundwork)
- b. The objective of the robotics club's existence is represented by the creating and functionality of a formalized microstructure in which the cross-curricular competences of the high school students can be developed, for the purposes of making them capable of approaching the future(university studies and labor market) and making them grow in the local community of this prestigious structure.
- c. The college has 4 real profile classes, specialization mathematics-informatics and 2 real profile classes, specialization natural science, for which there are conceived and conducted activities for the purpose of supporting the high school students to complete their knowledge and their developed abilities in a curricular way. The new information are helping the students, on the one hand, to integrate into a whole everything that they have learned at the specialized disciplines in school (mathematics, physics, informatics etc.) and on the other hand, it allows them to obtain new information and skills (new programming languages, teamwork experience, new ways of assuming responsibility and making decisions), which would prove useful in the future. At the same time, the students are creating positive attitudes in regards to approaching the future of technical jobs, given the restraint that young people show in embracing such jobs.
- d. The functioning of the robotics club Circuit Dealerz in the school year 2018-2019 allows:
  - ✓ The collaboration with the University "Stefan cel Mare" from Suceava for creating a local hub(with it's own location and volunteers to assist it)
  - ✓ The collaboration with the other clubs of the college(for example: the Inventions club, the NEXUS club ) for arranging the educative park, situated in the immediate vicinity of the college( as seen in the picture)
  - ✓ Adoption of a new teamwork technique, which would make it more efficient, when comparing it to the one from last year.



➤ The analysis of the competitive market in the project implementation area:

There are two types of competitive activities that must be considered. The first type refers to the offer for extracurricular activities of the high school (the invention club, the NEXUS club, the subject-based excellence school, The Scientific "METAMORFOZE" (metamorphosis) School, the VIDEOART Club,

the English theatre club, the "Little Geographer's" club, the "Friends of nature" club, the bibliography club etc.), which makes the student's choices in extracurricular education diverge in more directions. The students with preoccupations in the science fields have, at the moment of registration (in September of each school year), a great number of choices. For this reason, it is essential that in the robotics club, the students that are more driven by multiple science domains are chosen, those who are willing to make effort and who have previous experience (even if minimal). These must be connected to the FIRST values, kept close to these values and to the rest of the team. The marketing plan must be conceived having this current state in mind.

The second type of competitive activity is the one represented by the presence of a great number of similar teams that will partake in the regional, national and possibly international competitions, on Romanian soil. These teams represent as many collaboration opportunities in the domain as well as competitive, the span of the regional confrontations, national or international. The marketing plan must take into account this collaboration/competition during all of the stages: the conception of the robot's design, the building of the robot, its practice, its training both outside and during the contests.

- The analysis of the array of services and products offered in the implementation area of the project:

The services offered by the robotics club to all of its members:

- the knowledge of conceiving a robot starting with the functions that it must have
- the knowledge of the actual assembly of the robot
- the knowledge of programming said robot
- the knowledge of improving the robot's structure and functionality
- Learning and performing a PR activity
- Learning to assume roles within the team
- Learning to mix the collaborative and competitive attitudes
- Learning the FIRST values

The services offered by the robotics club to the high school:

- opportunities for partnerships with various institutions and educational units (with the purpose of sharing expertise), as well as commercial groups and NGO's (for the logistic, financial and functional support for the club)
- the promotion of the high school's educational values and quality in the local and regional communities

The services offered by the robotics club to the local communities:

- the activity of the club contributes to a sense of pride and accomplishment, brought by the spread of the names of the city, the county, the region, as well as the country.

## 2. The SWOT analysis of the objective in the project's implementation area;

Elements will be described as follows:

- The level of accessibility to the created/modernized/rehabilitated objective:

-considering that the selection for the robotics team was made through an announcement on the high school's website, the rate of accessibility was 100%. Depending on the effort availability and the will to develop new skills, the team's composition has been established with the inclusion of 15 individuals (with the average age of 16), a mentor and a number of supporters, among which 7 junior pupils (12-13 yrs.)

-The hub is open to all the youth of the city, county, as well as region;

-the high school's educational park is open to its clubs, conforming to the external work sheet and in weekends, within the Saturday after-school program and for the external groups, based on booking, in every working day. The stage inside the amphitheater is an ideal place to train the robot, should the meteorological conditions allow it.

- Facilities offered within the implementation area:

-mentoring performed by adults

-technical assistance from the local university

- The fundamental SWOT analysis based on statistically relevant data, referring to the documents from which they were taken, as follows:

|   |  |
|---|--|
| <b>S (strong points)</b>  | <b>W (weak points)</b>   |
| <ul style="list-style-type: none"> <li>-the existence of previous experience and the possibility of further development (the mentor and most members from last year are also present in the 2019 team)</li> <li>-the team's success in 2017, under the name "IMPULSIVE", (taken part in FIRST, St. Louis USA) is a mobilizing element for this year's team, among the wish to equate and go above the former team's performance</li> <li>-the students learn informatics (C++) as a primary school subject</li> <li>-the existence in the high school of a serious expertise in inventions, innovation, interdisciplinary teamwork (following exposure to external evaluation of the high school, it obtained the grade "EXCELENT" in the domains of <i>scientific research</i> and <i>extracurricular evaluation</i>)</li> <li>-the existence of the mentor's concern for the team to discover and implement new methods within the</li> </ul> | <ul style="list-style-type: none"> <li>-the loaded school schedule of the students (7 hour per day of obligatory classes and at least 3 hours for redacting the homework)</li> <li>-the large size of the team (15 students)</li> <li>-the lack of an adequate space within the high school (every room is busy between the hours 8 and 20) and the adjacent spaces don't have the required size</li> <li>-the inexistence of a budget ensured by the high school for purchasing the materials, manufacturing the publicity, travelling to the contest area etc.</li> <li>-the inexistence of robotics (or similar subjects) as a school subject, dues to the theoretical nature or the high school</li> </ul> |
| <b>O (opportunities)</b>  | <b>T (threats)</b>   |
| <ul style="list-style-type: none"> <li>-the opening of the "Stefan cel Mare" University with the purpose of collaborating with the CIRCUIT DEALERZ team and the building and maintenance of the local hub</li> <li>-the sympathy and support from the parents of the CIRCUIT DEALERZ members under the form of allowing the allocation of time and money on the robotics domain</li> <li>-the existence of a national emulation of support and participation in the FIRST contests (regional, national, international). The experience of the FIRST TECH CHALLENGE brings robotics and learning through discovery in the schools of Romania, a project by "Natiile prin educatie".</li> </ul>   | <ul style="list-style-type: none"> <li>-the incompletely known costs, although estimates show high values required for the functioning of the robotics team</li> <li>-the reduced support possibilities from the financial institutions</li> </ul>   |

### 3. Current analysis of the market

In order to select the students that will take part in the robotics club, the targeted market is represented by the students with preoccupations in domains like inventions, innovation, science etc., which aim to complete your knowledge in a systematic manner, as well as enjoyable. It is necessary to proceed with a serious audit of the ongoing activities' value within the club and coverage in the high school, as well as outside it, of the added value represented by the club's activity (presented in intellectual acquisition terms, work skills, attitude and results). A trustworthy source of information in this context is the reasoning behind the students' choice of this particular high school (The "Petru Rares" National College) over the others in the area, albeit similar in some domains, as a result of multiple science-oriented extracurricular activities being offered to them. Another source is the academic options of the high school's graduates (after 10 years of service in the scientific circles within the high school, there has been an increase in the number of students who chose university studies in domains like engineering).

➤ The positioning in the competitive medium

The positioning in the internal competitive medium is done using the focus strategy. The club focuses on the narrow segment of 10th grade students who already have results in the traditional contests in mathematics, informatics, physics etc. or that have taken part in scientific clubs belonging to The Children's Palace in Suceava. The typology of these students makes up the niche that the robotics club member selection is based on. If selecting a second team was needed, that one would not be as valuable as the previous. This means that the team selected first has the property of containing students of irreplaceable values and motivation. The request is made via the completion of a form and attachment of a CV and the actual selection is done by the mentor and by the previous year's team members.

*In the general theory of marketing it is specified that that the company/commercial society must be well aware of the niche segment that it establishes and of that **they must opt for either a domination strategy through costs or a domination strategy through differentiation**. In the first case, the company is specialized in a particular set of customers, looking to take a competitive cost advantage (it is either a big company and has the lowest market place because of the reduced production cost or a small company and sells small quantities to marginal clients, because in this way, the overall cost can be held down). In the second case, the company will select an exigent set of clients under the rate of the differentiation attributes: quality, post-sale service, used technology etc. It is to be avoided the standardized production and more sophisticated products are to be offered, which ensure a particular image to their owners (e.g. Rolls Royce, Mercedes). For this, the company will offer its clients an addition to the price that will go above the supplementary to ensure the*

*differentiation characteristics on the products. So, the company will choose a domination cost strategy through differentiation on a market oriented towards differentiation attributes and a differentiation domination strategy on a market oriented towards the reduced cost of the offered products. The niche strategies are very good for companies that want to enter the market. Based on these, the company will take up a certain type of behavior towards the competition, adapted to the specific medium and internal potential, elaborating a particular strategy with some original elements. M. Porter avoids typical behavior as they risk becoming dysfunctional through banality, as a result of overuse.*

The "CIRCUIT DEALERZ" robotics club is a niche one, based on differentiation, as the robotics club has a year since its founding. The "clients" are the students who are potential members of the club (in small numbers, compared to the other clubs of the high school), but that are willing to make a greater intellectual effort in conceiving fundraising activities, volunteering etc., much more than students in other clubs of the high school.

- The research type used: investigation of the statistical and/or collection of information through direct research

The research has used the data provided by the internal evaluation commission for educational quality, conducted by the "Petru Rares" National College Suceava, gathered based on the completion of electronic feedback forms at the end of the 2017-2018 school year (forms completed by both parent and student) and the data existent in the verbal report of the parents in 2017-2018. All this data tells us that one of the students' main motives for choosing to study at "Petru Rares" High School in Suceava is that this educational unit happily combines the formal education and the non-formal one and that the latter must be diversified and strengthened resource-wise in order to satisfy the ever-increasing number of requests from the students.

In September 2017 another focus group of the robotics team from the previous year was made under the name IMPULSIVE and the following were concluded: the club develops transversal skills (they don't stick to a specific subject or curricular area) that the students greatly need. This requirement has more dimensions: an ideational dimension (the students need support in order to integrate all that they learn into a whole), a practical dimension (students need to develop their ability to conceive, achieve and practice structures that require design, as much as actual handiwork), a social dimension (interaction within the team, role assignment) and a cultural dimension (developed through PR activities, volunteering, competitions etc.)

#### **4. Establishing the general marketing objectives**

In general marketing theory it is specified that marketing objectives must take into account the following:

- selling the existing products,
- commercializing of existent products on new market areas
- developing new products on new market areas.

And, in particular, there can be objectives based on advertising, human resources, prices etc. The objectives must be correlated to the results of the current situation analysis and fulfill the SMART model: Specific, measurable, achievable, realistic, on a certain timespan.

Thus, the objectives of this marketing plan are:

01. Integrally utilizing the expertise and equipment that the club has from the first year of activity in order to sustain, in proportion of 80%, its activity in the second year of finances.
02. Efficient internal structuring of the team, to ensure the achievement of the partial and general objectives of the club (a homogenous, motivated, with great transversal skills, a competitive robot, trained in at least 3 regional/national competitions)
03. Achieving local partnerships (at least 2), that would support the club's activity by intervening in the technical, logistical or organizational bumps.

## 5. Marketing strategies with the purpose of implementing the marketing plan's objectives.

The institution responsible with implementing the action plan is the "Petru Rares" High School of Suceava, through the person represented by the team's mentor, who is the vice-principal of the high school. The general responsibilities of the vice-principal are coordinating the non-formal education activities, and for this reason, coordinating the robotics club is a particularity of this position. The financing sources are represented by the saved budget from the previous year and the sponsorships from this year.

The marketing strategy is based on the 4P marketing mix (product/service, price/value, the selling and distribution strategy and advertising and PR strategies). As for the strategy regarding **product/service, the robotics club offers the following services:**

- the knowledge of conceiving a robot starting with the functions that it must have
- the knowledge of the actual assembly of the robot
- the knowledge of programming said robot
- the knowledge of improving the robot's structure and functionality
- Learning and performing a PR activity
- Learning to assume roles within the team
- Learning to mix the collaborative and competitive attitudes
- Learning the FIRST values

Why would a student of the high school want to take part in this club, more than others?

Because:

- even though it only has two years since its founding, it's an exclusivist club, of local notoriety, won by partaking in the first competition in 2017 in St. Louis, USA;
- The team's size can be much greater than the invention team (where the teams are in groups of 2-3); this can also be a disadvantage if mishandled;
- work and fun are combined
- the possibility of a flexible work schedule;
- There is a mentoring activity (remotely, through the web or up front with the mentor and the supporters)
- the type of ongoing activity (alternating between doing by learning with learning by doing)
- the finality of partaking in the club's activities is one superior to the other clubs (developed skills are multiple and diverse and they can be valued *immediately*, through the participation in the regional, national and international contests, but also *over time* through various other activities)

- the ruleset for participating in profile contests imposes the strict crossing of all steps and the testing of that crossing (selecting human resources, activity planning, achieving the activity, continuous evaluation, improvement, competition and collaboration as well as final audition)
- the club has identity elements that the members decide (name, logo design elements etc), while all the other clubs are fully controlled by the coordinating teacher.

As for the **price**, it's based on the value that the team receives for the offered educational service. This value is greater than other clubs of the high school. Unfortunately, it cannot be directly measured, but can be indirectly estimated through:

- the quality of the application portfolios within the selection process of the team members
- the time that the students are willing to spend working with the team (e.g. in the weekend, about 3 hours a day and in vacations 4 hours a day)
- the financial effort that the students' families are willing to make to support the club's activities;
- the great number of adult supporters that the team has found, compared to other clubs
- the team's ability to convince and the ingenuity, especially in the PR domain; This was proven when there were fundraising activities taking place (a letter was sent to the Christmas charity event and were convinced to donate us a part of the money with the promise to successfully represent the high school).

The offered service (or non-formal education) is a very flexible one, being able to adapt to the student's needs and accepting their work rhythm and the symbiosis with the school schedule. This is another strong point of the club, which leads to the increase in the "price" of this service.

The consumer isn't, however, very sensitive to the price, considering it's a breach service.

The costs of performing activities in the robotics club, however, are great. Working materials include original pieces from the USA and the printed pieces are kept at a minimum, considering these were the first to fail at the national competition. The effort is great from both the students and the mentor with the external support because the activities are demanding, but offer more satisfaction.

In order to affix the price for the activities of the robotics club, some constraints must be taken into account (at the age of 16, the high intellectual capacity is not developed enough and the base lessons in some subjects have not been taught yet), the school rule set, which imposes a limitation to the activity hours, in accord with the approved activity plan of the club, the minimal space that the high school can offer (until December, the workplace of the club has been changed 3 times) etc. Whatever this price is, the members of the club are willing to pay.

In what regards the "**sales and distribution**" (the sale methods and distribution channels) it is taken into account that only members of the high school can become members of the club, with previous achievements in a science field. This must be stated ahead of time so that willing students have time to

prepare said achievements. Also, the skills are "sold" by participating at a great number of regional/national/international competitions and through the mentor activity that they proceed in with the junior team (supporters of the current team, only 12 years of age, who are allowed to assist the meetings of the club). The distribution channels are represented by the one mentioned in the contests' rules.

In regards to the **advertising and public relations** it is established which are the desired effects in the adverts (the increase in the students' wish to become part of the club, as well as the motivation to work more towards the teamwork side). The estimated advertising costs are 10400 RON. The message to which the wanted effects will be attributed to is "Team CIRCUIT DEALERZ will stand above last year's team".

*Two advertising directions are considered:*

-**the services advertising**, which is done through all available means to inform and orient the clients towards the services that the club offers (non-formal, cross-curricular education, in an organized medium, that takes into account the wishes, expertise, time resources and effort of its members).

The advertising has two purposes

1. *the selection of new members* (done in the first trimester of 2019 only if CIRCUIT DEALERZ is incomplete), but mandatory conducted in September 2019 in order to compete in 2020
2. *additional motivation of the current members*

The main advertising channels for the club's education are:

- the ADSERVIO platform, a method of communication between students, parents and teachers. Through the newsletter, the parents are made aware once or twice a month of the club's activities and progress
- the high school's site, through information about notable achievements, in the news section
- the club's Facebook page, through occasional posts
- partaking in TV or radio shows (at least once per month) of the team, or its representatives
- the visibility forms of the structures in which the robotics club performs volunteering activities (members of CIRCUIT DEALERZ have done volunteering work to restore the high school's educational park in its proximity. The financer of this park has thus congratulated the team and advertised it through their own structures).

-the documents signed by the robotics club's representatives, for instance, by the mentor (partnership offers, volunteering offers etc.), which will include marketing elements. These documents are information sources meant for data analysis, internal and external evaluations etc. and for this reason, they will be advertising vectors for the robotics club.

The advertising will follow the club's activity, who, by moving on its principle "from simple to complex", will allow a possible future member of the club to catch up and learn of the compatibilities with his activities and aspirations.

**-the advertising of the "sales" - through the assembly of the actions and means of catching the attention of possible "buyers". CIRCUIT DEALERZ doesn't actually sell anything, but promotes the experience of its members, encouraging them to form their disciples and partake in as many contests as possible. These participations are attributed to advertising events, organized by the club's PR team (posters, flyers, information at the competition stands etc.)**

**6. The action plan for implementing the market strategies**

The proposed actions in order to achieve the marketing plan's objectives are present in the table which displays the marketing budget, with specific details. Also, it contains the time period and the department/person responsible. The general responsible of all the activities is the student coordinator and the team mentor

**7. The budget of the business plan**

| No | Action          | Sub-action  | Oct | Nov | Dec | Jan | Feb | March | Resp.  | Budget    |
|----|-----------------|---|-----|-----|-----|-----|-----|-------|--------|-----------|
| 1  | Market research | Interpreting the data provided by CEAC, the survey in the Freshmen's school etc, <b>Result</b> - relevant statistical data  | x   |     |     |     |     |       | Mentor | -         |
| 2  | Communication   | Posting information on the high school's site, for informational and motivational purposes. <b>Result</b> - stimulating the participation to the selection, increasing the sympathy of the supporters | x   | x   | x   | x   |     |       | PR     | -         |
|    |                 | Redacting the newsletters for Adservio. <b>Result</b> - increasing the supporter's sympathy   | x   | x   | x   | x   | x   | x     | PR     | -         |
|    |                 | Redacting and posting on Facebook to inform and motivate <b>Result</b> - stimulating the participation to the selection, increasing the sympathy of the supporters                                    | x   | x   | x   | x   | x   | x     | PR     |           |
|    |                 | Progressive redaction of the team's notebook and publication in two variants <b>Result</b> - public awareness of the club's activities  | x   | x   | x   | x   | x   | x     | PR     | 1.000 RON |
|    |                 | Redacting promotional materials of the team for participating in FTC <b>Result</b> - the club's promotion in the FIRST community  | x   | x   | x   | x   | x   | x     | PR     | 8.000 RON |
|    |                 | Sending the sponsorship letters. <b>Result</b> - obtaining sponsorships   | x   | x   | x   | x   |     |       | PR     | -         |
|    |                 | Sending sponsorship contracts to "Stefan cel Mare" university and other such local institutions <b>Result</b> - easy access to high level expertise   | x   | x   |     |     |     |       | Mentor | -         |
|    |                 | Redacting volunteering papers for the members of the club <b>Result</b> - Advertising for the team  | x   | x   | x   |     |     |       | Mentor | -         |
|    |                 | Redacting and sending activity reports to sponsors and partners <b>Result</b> - increased sympathy for the club   |     |     |     |     |     | x     | Mentor | 200 RON   |

|              |                  |   |   |   |   |   |   |            |            |
|--------------|------------------|---|---|---|---|---|---|------------|------------|
|              |                  | Organizing a press conference before the FIRST national contest.<br><b>Result-</b> advertising the club's success in the final stages of the national contest |   |   |   | x | x | Mentor     | 1.000 RON  |
| 3            | Event Organizing | Partaking TV shows that will discuss CIRCUIT DEALREZ's club activity <b>Result -</b> Local promotion and support requests                                     | x | x | x | x | x | PR         | 200 RON    |
| 4            |                  | Testing the entire PR activity.<br><b>Result-</b> pointing out the weak points, which will be used as beacons for the next activity                           |   |   |   |   | x | Whole team | -          |
| <b>Total</b> |                  |   |   |   |   |   |   |            | 10.400 RON |

## II. Production Plan

### III. 1. Goods or services?

The Robotics Club offers a complex educational service to its members. This service implies several aspects:

- ✓ The development of cross-curricular abilities in students (skills based on information and research, on searching for answers to questions, assertive communication, role-play, learning how to conceive and implement a project, learning study and innovation techniques, learning how to boost self-esteem based on value and the respect of the group you belong to in community, learning how to promote your own image, learning resource management etc.).
- ✓ The development of STEM abilities, to be later used on the job market
- ✓ The adjustment of personal deficiencies (e.g. the need for efficient time management, for order, for respecting strict rules and deadlines etc.)

### III. 2. What direct benefits are brought to the consumer of said good/service?

- By using the educational service provided by the club, its members experience an increase in:
- The ability to perform self-discovery and become aware of their strong and weak points, respectively, as well as self-esteem and respect from others.
- The degree of safety as a result of belonging to an organized elite group.
- The amount of information in the field of STEM.
- The ability to incorporate knowledge by putting it into practice.
- The ability to positively interact inside groups.-The level of ethical, social and citizenship abilities (manifested, for instance through the wish to partake in and to find solutions to the problems which the society supporting them has to deal with)
- "Petru Rares" National College Suceava is to increase its positive image in connection to the quality of the education it provides

### **III.3. What are the characteristics of the product/service?**

The educational service provided by the Robotics Club is:

- Available on demand (the students apply to become members)
- Flexible (the activities are customized according to the individual growth psychological needs, identified within the initial psychological test, and smaller groups are made in which the total value of the abilities is relatively constant, supporting inter-studying)
- High quality (the abilities developed within the club's activities are far beyond the required level for 16-year-olds, the average age of the group members)
- Supported by the school (e.g. by offering the club an appropriate space for which the school pays for all the utilities)
- Well promoted with the help of its own PR team.

### **III.4. What additional services are offered along with the educational service of the Robotics Club?**

The additional services are:

- A guarantee of functionality of the same team for at least one school year
- A guarantee of participating in the regional and national FIRST competitions
- A guarantee of pardoning absences due to the students' participation in competitions and organized activities
- A guarantee of including the annual activity report of the club in the annual report of the college to the school Inspection Board, the parents' association and the traditional partners, with which the college signed collaboration protocols.

### **III.5. The “production” stages**

Finalizing the lawful operation of the Robotics Club by receiving approval of the curriculum, schedule and list of members of the club by the school head teacher

- Solving the problem of finding a venue for the activities.
- Testing the team members by the college psychologist.
- Identifying the individual needs for personal development of the club members.
- Organizing smaller groups (4), considering the students' wishes and their psychological structure. There will be 3 successive steps in organizing the club (a flat structure, a dual structure and a pyramid structure, to be tested and decided upon the most efficient one)
- carrying out teambuilding activities with the team

- organizing activities to promote the team, according to the marketing plan
- signing partnerships and collaboration agreements (e.g. USV)
- participating in courses and webinars
- planning and organizing the activities for each small group
- performing the activities inside the small groups with a focus on innovation, achieving the interaction between the small groups.
- devising several prototypes of final products for each small group and testing them, choosing the ones that comply with the requests of the beneficiary through the students' and the supporters' votes, the ones which get the best results in local competitions.
- Assessing the progress of the team as a singular functional structure, and of the extent to which the personal weaknesses have diminished
- Performing activities to reduce the costs (e.g. Printing some elements or producing them instead of the originals)
- Estimating the costs for the team on each stage, devising the budget for income and expenses, leveling the budget if this is too low through intensive fundraising, or a loan from the parents' association.
- Estimating the "production costs", a tedious process, because the educational service takes one school year, although the estimated value is above 3000 euros by 19<sup>th</sup> of March.
- Using at least 3 channels to simultaneously promote the existence and achievements of the team, so that the current supporters and the future members could make the minimum effort to come into contact with the information regarding robotics in the college

### III. Management Plan

#### IV.1. Organizing the Robotics Club

The robotics club is structured in the form of an organization that operates on the basis of efficiency, so as to maximize useful effects by minimizing efforts. This is done by working in small steps, discussing the tasks at each stage, analyzing the inputs and outputs by estimating the resources for each step (time, material and financial resources within each team, the student coordinator team and mentor being present) and the expected results for each stage and each sub-team.

Within a flat organizational structure, all students collaborate to accomplish the same task. They are at the same time at the club and work together. Usually, students learn a lot from each other, but the progress in making the final products is rather slow.

Within the collaborative and competitive organizational structure, the team is divided into two sub-teams that each have 4 internal structures (design, hard, soft and PR). They receive the same task at the same time, accomplish them in parallel, and the finest final products are assumed by the whole team, discarding the less optimal performers. This is the competitive collaboration method, which involves the alternation of the diverging stages with the convergent ones, in order to increase the team's continuous performance. The method is published by the team mentor and practiced in more than 10 years of running the College's School of Inventions. It is described in a separate chapter.

Within the pyramid structure, each sub-team is organized vertically on at least 3 levels. Each sub-team has a coordinator, and the coordinator of the entire team has a double role (sub-team coordinator). Organizing within the sub-teams is different depending on the task each person performs. Thus, within the PR sub-group, two different structures are functioning. One is actually working to promote the image of the robotics club and another to fund-raising. But within the other sub-teams, they are working together, but each reports to the next level what has succeeded and what it has failed to do. The mentor receives information in general from the coordinators of the 4 sub-teams.

All three structures will be practiced and the most fruitful of them (in satisfying the students' expectations), along with the team's development stages, will be generalized and will make the frame in which the club in 2018-2019 will be evaluated.

No matter the internal structure of the team, the most important of all is that each student develops, feels accomplished through what they do in the club, continuously improve their capabilities and that in the club there is a positive, motivating climate that would allow the building of trust between the

members. These will be encouraged to innovate and validate their "market" value of their innovations. Responsible for all these is the team mentor.

## IV.2. Planning

The team's vision "Let's be better today than we were yesterday, so tomorrow we can be valuable on the job market".

The mission of the team is to build a team of valuable scientific and interrelated weld able to manage their internal problems and to interact positively with the external environment in order to get as high as possible in the FIRST 2019 competition.

The succession of activities of the robotics club, equated in the final material products, which correspond to the competencies needed to accomplish those tasks are:

| No. | Activity  | Person in charge  | Deadline/Period                         |
|-----|---|---|---|
| 1.  | Creating a team, choosing the representative elements (name, logo, motto)   | Mentor  | October 2018                            |
| 2.  | Establishing responsibilities within the team (3D modeling, hardware, software, PR)   | Mentor  | October 2018                            |
| 3.  | Team registration in FIRST - Romania competition  | Mentor  | October 2018                            |
| 4.  | Building the communication strategy between the CIRCUIT DEALERZ team and the local community  | Mentor and PR department  | November 2018                           |
| 5.  | Subgroup work meetings (4 subgroups) for the design of the robot, its construction, its intelligence endowment and the implementation of the communication program with the local community | Practice on the educational park scene<br><br>Coordinators of the 4 subgroups | November – December 2018 – January 2019 |
| 6.  | Participating in various local competitions to test and train the robot   | Iasi, Cluj, Timisoara, Bucharest / Mentor                                     | January – March 2019                    |
| 7.  | Participation in the FIRST Romania national competition, March 2019   | Bucharest<br>Mentor   | March 2019                              |
| 8.  | Participation in FIRST -SUA 2019  | USA   | April 2019                              |
| 9.  | Dissemination of the experience and results obtained by the CIRCUIT DEALERZ team in the year 2018-2019  | Mentor / PR   | May 2019                                |

### IV.3. Leadership

The governing style of the robotics club is one that is imposed by the following limitations:

- Compliance with school legislation
- Observing the stages of the activities and the imposed deadlines
- Concern over the limitations imposed by existing resources
- The limits imposed by individual and team progress.

It's a permissive style with the previously mentioned limitations. If these limitations are exceeded, then the style becomes authoritative. There are two poles of authority: mentor and student coordinator.

#### IV.4. Decision-making mechanism

Decisions are taken democratically within the team. The mentor has the necessary experience to bring value arguments so as to influence the renunciation of decisions that:

- would lead to erroneous technical solutions
- would be more resource-intensive
- would have little or no educational value
- would block the activity of the team or create tensions within the team.

The decision-making mechanisms are:

- the direct, reasoned vote
- deterministic analysis of the decision. Judging retrospectively, the following steps were taken to establish the internal structure of the team:
  - a). problem formulation - What internal structure is better for the team?
  - b). establishing a coefficient of importance for each criterion:
    - Scientific / Technical Criterion, Importance k = 4
    - Economic Criterion, Importance k = 3
    - The criterion of team progress as a group k = 2
    - The inter relational criterion, importance k = 1
  - c). the technical justification of the decision - the determination of the decision method (e.g. summation method)

For each criterion, a rank is given (rank 1 of the most advantageous and progressive ranks for the other variants).

- d). drawing up the matrix of consequences by including rankings
- e). interpretation of the result - Under the conditions outlined above, the optimal option for decision is variant three.

| Criterions<br>Variants                    | Scientific/<br>Technical<br>Criterion | Economic<br>Criterion | Interrelational<br>criterion<br>(e.g. friends) | Group Criterion | Summary of Rankings                                      |
|---|---------------------------------------|-----------------------|--|-----------------|--|
| Flat team structure                       | 2                                     | 2                     | 2  | 1               | $4 \times 2 + 2 \times 3 + 2 \times 1 + 2 \times 1 = 18$ |
| Competitive<br>collaborative<br>structure | 1                                     | 3                     | 1  | 3               | $4 \times 1 + 3 \times 2 + 1 \times 2 + 2 \times 1 = 20$ |
| The pyramidal<br>structure                | 3                                     | 1                     | 3  | 2               | $4 \times 3 + 3 \times 1 + 1 \times 3 + 2 \times 2 = 22$ |
| Coefficient of<br>importance k            | 4                                     | 3                     | 1  | 2               | -  |

It has thus been established that the pyramidal structure is the one that best suits the team.

#### IV.5. Control and continuous improvement of activity

The prevention of malfunctions is based on the "It is easier to prevent than to treat". When there are indications that things would not work well, analyzes will be made of deviations from the optimal exercise of roles within the team or from excessive consumption of resources, from missing deadlines, or from constructive relationship within the team, for obtaining a relevant quantification of dysfunctions (breaks in the exercise of functions). If these dysfunctions are serious or are expected to be serious and have frequent occurrences, corrective action should be taken. These are processes for returning to situations prior to the occurrence of dysfunctions. It is preferable to carry out analyzes such as those described before the effects are irreversible.

#### V. Financial plan

The financial strategy of the team is to ensure both the financial functioning of the team and the investment in the sustainability of its operation.

The investment goals to ensure the sustainability of its operation are as follows:

- a). team members' loyalty through team co-activities (this year's members will remain members until next year to become centers of future expertise, even if 2 of them will be in the terminal next year and prepare for the baccalaureate exam), therefore entertainment costs should be considered.
- b). carrying out activities that correspond to the personal and professional development needs of the team members, which contribute to creating the certainty that through the robotic activities the pupils construct their knowledge in the future, so it is possible to foresee expenses for checking the scientific, technical, personal development etc. of the team.

- c). creating a nursery among middle school students wishing to become members of the high school robotics team, so one can predict social spending with younger students
- d). creating a positive image in the local community about the existence and results of the robotics team, an image that will help to increase the students' desire to become pupils of the "Petru Rares" National College Suceava, so it is necessary to have a budget managed by the PR team.

## V.1 Income

The main source of income for the team:

-fundraising/ persuading entrepreneurs to become sponsors of the team.

The goals of raising funds are:

- a). loyalty to the entrepreneurs who supported the team last year (e.g. SC ASSIST SOFTWARE SRL)
- b). convince an entrepreneur to combine financial support with ensuring a specialized logistics - work done with SC. ASSIST SOFTWARE SRL
- c). conducting a genuine fundraising campaign in accordance with its rules so that the financiers are reached by the FIRST values and convinced of the quality of the team seen as the FIRST ambassador, and financial support is to be made as a result of these beliefs and not of other motivations (exponents of the parents support the team because their own children are members of the team etc.)

The sponsors for the season 2018-2019 are the following:

|                           |            |
|---------------------------|------------|
| 1. SC EGGER SA .....      | 5.000 euro |
| 2. SC URSĂ MARE SRL ..... | 4.000 lei  |
| 3. SC DAMIENA SRL.....    | 9.930 lei  |
| 4. SC HARIVEX SRL.....    | 1.000 lei  |
| 5. SC ASSIST SRL.....     | 2.500 lei  |

**TOTAL SPONSORSHIPS.....41.132 LEI.....9.786 USD**

The costs of the team until 1.02.2019 are:

Costs for various tools and pieces:..... **6.260 LEI.....1.490 USD**

Other costs..... **4.671 LEI.....1.110 USD**

**TOTAL COSTS .....10.931 LEI.....2600 USD**

## 2.1.Halloween fundraising

Our club made an auto financing event on Halloween day selling Sodas and cookies in the area of National College "Petru Rares". Students were glad to help us donating to encourage robotics and science. We not only sold bought products but also prepared notes for students. They could complete them with a private message and we were to share them to the consignees.



We earned some money to buy new pieces for Hardware department and to save some for renovating the place we work in. We appreciated every honest gesture of help from every student.

This also helped us promote ourselves, as everyone was asking what we were doing and for what purpose and as a result we managed to get people to know more about us.



## 2.2.Thanking our sponsors

The most important sponsor of the team is SC E EGGER SA, who offered the team 5000 Euro, through a contract. The contract was signed between the donator society and EXCEPPIOR Association of the CNPR parents.

MORE FROM WOOD.



Fundația EGGER

### CONTRACT DE SPONSORIZARE

Nr.755 / 17.04.2018

Nr. 21.18 / 16.04.2018

#### PĂRȚILE CONTRACTANTE

**ASOCIAȚIA "EXCEPPIOR A PĂRINȚILOR ELEVILOR COLEGIULUI NAȚIONAL „PETRU RAREȘ” DIN SUCEAVA**, cu sediul în mun. Suceava, str. Mihai Viteazu, nr. 24, jud. Suceava, înregistrată în Registrul Asociațiilor și Fundațiilor prin hotărârea civilă nr.26/I/A12009/2013, CIF: 25817620, cont bancar IBAN: RO31 BTRL 0340 1205 P332 10XX, deschis la Banca Transilvania, Suceava, reprezentată de ec. Robciuc Luiza Cecilia - Președinte, tel. 0751479722, în calitate de **BENEFICIAR**, și

**Fundația EGGER**, persoană juridică română, cu sediu social în Municipiul Rădăuți, str. Austria, nr. 2, cam. 2, jud. Suceava, înregistrată în Registrului național al fundațiilor sub nr. 3548/B/2016, având C.I.F: 35923092 și contul bancar (lei) nr. RO93 RNCB 0241 1499 7180 0001, deschis la Banca Comercială Română – Agenția Rădăuți, jud. Suceava, reprezentată prin dl. Banciu Ioan Lucian, în calitate de **SPONSOR**,

SPONSORUL și BENEFICIARUL, denumite în continuare în mod colectiv și „Partii” au convenit încheierea acestui contract în următoarele condiții:

#### CAP 1 OBIECTUL CONTRACTULUI

**Art. 1.1.** În conformitate cu dispozițiile Legii nr. 32/1994 privind sponsorizarea, Sponsorul transferă în favoarea Beneficiarului dreptul de proprietate asupra sumei de **23.306,00—lei** (douăzeci și trei de mii trei sute sase lei).

**Art. 1.2.** Prezenta sponsorizare este destinată exclusiv pentru sprijinirea activităților și proiectelor educaționale specifice desfășurate de către "Clubul de robotică al Colegiului Național "Petru Rareș" Suceava, cu numele CIRCUIT DEALERZ coordonat de profesor Anca Viorica GRECULEAC.

MINISTERUL EDUCAȚIEI NAȚIONALE

**COLEGIUL NAȚIONAL „PETRU RAREȘ”**

➤ S U C E A V A

str. Mihai Viteazu nr. 24 720059 e-mail: [cnpetruraessv@gmail.com](mailto:cnpetruraessv@gmail.com)  
tel.: 0230-520822 fax: 0330-401178 web: [cnprsv.ro](http://cnprsv.ro)



## Letter of gratitude

In the attention of EGGER S.R.L

Str Austriei nr. 2

725400 Radauti

Romania

The robotics club of the National College "Petru Rares" Suceava, sends all its thanksgiving for your support for our activities in 2017-2018. We address your gratitude with the occasion of the visit of our College in your unit during the Erasmus +, with the title "New Energy for New European Citizens" which wants to educate the teenagers about the ecology of energy.

We remind you about some of the moments of the Robotics Club.

The team consists of 15 members from the grades the 9th, 10th and 11th selected carefully and depending on their previous performances by the mentor, who coordinates scientific and administrative.

Even if it appeared two years ago, the club has already had notable results. One of these is the participation in the scholar year 2016-2017 at the FIRST (FIRST TECH CHALLANGE), the biggest international competition. Through the participation of the time at the national stage of the competition BRD FIRST TECH CHALLANGE POWERED BY VODAFONE, made to select the representative teams of Romania, the team obtained the award "Gracious Professionalism".

Taking all the steps in making the robot, until the participation at the final competition, leads to the improvement of some skills for robotics, such as: making, programming and driving a robot with usual dimensions, but also of some skills for working together and communicating in English and Romanian. These usually are transversal skills, which are not learned in school and help at the developing in a complex personality, with a lot of success in the future.

We thank you again for your support and we promise to you we will promote, with proud, the name of the college, city and our country, in every competition we are going to participate at.



The Robotics Club CIRCUIT DEALERZ,  
Coordinated by Anca Viorica Greculeac,  
Second-in-command "Petru Rares" Suceava



The students in the picture (from right to left: Samuel Blindu, Matei Barba, Emanuel Muntean, Albert Tanase, Miruna Drelciuc and Victor Macovei) went personally at the SC E EGGER SA to transmit the letter of gratitude and to present what robotics represents for them, the way they organize their time and problems and their improving strategy. The public (60 people) followed them. The letter of gratitude was offered to the marketing department of the society.

## **3.PROMOTING FIRST AND STEM VALUES**

## **OUTREACH**

The work in the robotics team is an adventure where all the members and volunteers not only learn how to make a robot but also to build their future. They are creating a good future through the things they do in the team now, such as: acquire skills, realize projections for the team, learn how to be selfless and help the ones around them.

*"FIRST is more than robots. The robots are a vehicle for students to learn important life skills. Kids often come in not knowing what to expect – of the program nor of themselves. They leave, even after the first season, with a vision, with confidence, and with a sense that they can create their own future"*

DEAN KAMEN

#### Mission

The mission of FIRST® is to inspire young people to be science and technology leaders and innovators, by engaging them in exciting mentor-based programs that build science, engineering, and technology skills, that inspire innovation, and that foster well-rounded life capabilities including self-confidence, communication, and leadership.

#### Vision

*"To transform our culture by creating a world where science and technology are celebrated and where young people dream of becoming science and technology leaders."* Dean Kamen, Founder

#### Methodology

Engage kids in kindergarten through high school in exciting, mentor-based, research and robotics programs that help them become science and technology leaders, as well as well-rounded contributors to society.

With joy, analyzing all the outreach activities made by the members of the team, we noticed what a big impact had these on the scholar community and college. Generally, the impact was collected by the members, through discussions or direct questions, or through the feedback papers (some of them are attached at the end of the feedback presentation). In this point of view, not the number of the activities is important but the effect these had on the people.

### **3.1.In our High school**

#### **3.1.1 Mega Freshmen's school – RoboFun Workshop**

##### **40 hours of intense activity**

„Freshmen's school”, the extracurricular activity that took place between 27 th of August- 07 th of September within the National College "Petru Rares" Suceava is one of the main actions that helped us expend our Circuit Dealerz Family. Unexpectedly many children, indulged in the desire to know more and to experience the world that surrounds them were present at the activities run by the members of our group. Day by day, more and more 9th and 10th grade students were joining us. The interest and rumors were growing, making the number of participants getting bigger and bigger so we performed with great pleasure and enjoyment extra activities, making friends and co-operating over the initial program.

##### **Day one**

We had prepared for this event a lot of time and behind our happy faces were tired eyes to make everything perfect. For the last month we met very often because we wanted to make a good impression to the new comers and to attract new people in our team. So, when the big day came, we met in the morning to arrange the lab we were going to hold the activity RoboFun. At nine o'clock the students started to appear. We were not expected them to be so many in number and it was hard for us to arrange them as good as possible for everyone to be able to hear and see us. The number of freshmen who were waiting for us to reveal them some of the mysteries of robotics was very big, almost 40 students. We made the presentation of the departments that were to be looked for by interested students.



The Software group where the robot is programmed for specific commands was presented by the members that compose it. They made the students passionate in mathematics and computing being very curious and interested of what is their role in the team. Matei, the head of the software department told the students a short history of the team and how the team he was in won the Inspire Award and went to the International stage of the competition in America. They explained to the students they work in Java and even if they might be scared of this new subject, it is extremely interesting and easy to learn if they are passionate and work hard. The members of the Software Department said to the curious public that they will dedicate most of their time in helping them understand the program and everything they want in return is seriousness and ambition.

3D Design that builds the robot skeleton on the screen had a lot of fans from the first moments the members talked. The students with an artistic spirit followed the presentation of this department very careful. The story of the robots starts with simple ideas. The members look back at previous competitions or try to come up with something completely new. After that, the robot is slowly being brought to life with the help of the 3D design department, where our members make a model of the robot. It involves both creativity and knowledge about the construction and programming, as all these aspects have to be taken into consideration in order to build a fully functional robot. Then the fun begins, where our imagination drives ourselves to construct the machinery of our dreams.

The Hardware part where the robot is assembled attracted the most the students with a very creative spirit. "It's not at all like a Lego game and sometimes you will feel like the pieces are defective, but when you see your handmade creation working you feel your blood dancing in your veins". Making the image of the robot piece with piece and watching it in action is one of the most beautiful feelings the hardware department members urged the students try to have.

The Public Relationship group is the one that takes care of the team image, the technical notebook and the sponsors. At first it seems a quite simple job but it is as hard as the others. We showed to the students the technical notebook from the last year and they imagined how much passion and creativity we put in writing those pages. Altogether, well organized by co-operative people, the groups described form the departments of Circuit Dealerz which we were glad to present to our freshmen students indulged in the desire to discover the world of Robotics.



## Day two

We hoped we will have to present the robotics team to as many people as the day before. Fortunately, there were with ten students more and all of them were full of enthusiasm to find new things about the world that surrounds them. In the second day of our outreach activity, RoboFun, we decided to show the students videos from First Tech Challenge competition from the previous years. With every need in the videos to succeed in winning the biggest number of points in the game, the students became more and more interested in how we dealt with it. We discussed about our expectations in the games and the robots we made. Images had a great impact on freshmen's impression which started to contain more and more respect for our work. The heads of departments presented the competition experience from their point of view and students had a big desire to experience the same inside of them. They wanted to be the ones who made the name of our high school an important one and to share the importance of sciences such as robotics everywhere they go.

Matei Barba and Dragos Salagean talked more about their experience in America when they team won the Inspire Award. The huge number of preparations they had to do to get there and to get a good impression in America was a factor that impressed the students a lot. Their motivation and passion can inspire lots of people, as our freshmen said. Our mentor, Anca Greculeac, was with us every moment and supported our creativity and inspiration in making freshmen interested in our work. She explained that the most important thing in the competition, in spite of the fact that we have to make a robot which can accomplish all the needs, is working as a team. A united collective where people help each other is the key to success. If the members of a team do not cooperate with each other and are not gentle and friendly, people will not work with pleasure in that place and the results will not be the same. So, the students realized the competition is not completely about the capacity of making a robot with creativity and originality. It is about relationships and common sense; about emotions and friends; about how to act in society and to inspire other people. And the most important thing, it is about working with people, especially in a team.

## Day three

We could not believe our eyes! By bush telegraph more students decided to spend their begging of high school time with us. We did not expect other faces in the next days, but miracles do exist! Together with freshmen who were interested both in innovation and friendship we debuted the second day by helping newcomers to find the department that fitted them. We already knew some of them and before trying to help them finding their best place in a department we made some games to know each other better. One of them was called "Alone on the island" and it was a new thing in freshmen's experience as none of them had a clue about it. They are forever stuck on an island and everything they have with them is a roll of toilet paper. We gave it from hand to hand. Each of the participants had to stop for them some toilet paper, as much as they thought they need to survive in the island. The funny part was that they did not know what was next. They had to tell as many things about them as the number of pieces of toilet paper they had. So, there was a huge surprise feeling on their faces and the ones who were more selfish had to talked the most. After each of them presented themselves, we asked them in which department they would like to be.

The most answers were 3D Design and Hardware for boys, and Public Relationships for girls. As these were not well balanced, we tried to make them to be. The number of new members in each group was not uniform but the departments became balanced in the end. We explained more thoroughly this time all the departments' tasks so that newcomers could be sure about the work they had to do in the place they were. Every member of the team helped two or three students to find the department in which they fitted best. In the team was created a more pleasant atmosphere, correspondence of a united collective. The groups were formed so people who formed them started making stronger connections. Each head of the department explained introductory notions and working methods. After the classes finished, we went outside in a park and we could see how friendships bloom between us. In the end, memories, friends and special moments are everything we leave with, aren't they?



## Day four

Even if in the program of "Freshmen's school" activity was not mentioned RoboFun Thursday and Friday, we fell on mutual agreement to do extra classes for the willing people. The hard department decided to show to students how to create a robot inspired from the 3D Design work. So, these two departments started creating a robot based on the last year competition requirements. It was easy for them because the members of the team had already known how to deal with the tasks as they participated at the competition. The software department was the hardest one to take over so the members from this department helped the new comers understand the Java program and how they have to do the code for the robot. The Public Relationship department discussed about the awards and the Technical Notebook. They explained how they have to structure the Notebook for the awards we could win to be as visible as possible. The most important thing at the Technical Notebook was the number of the activities and their importance and that is the reason we try to make so many outreach events, apart from the fact that it are pure passion and desire in the middle. The Public Relationships department also talked about a new design of the image of the team.

We worked and analyzed together the opinions that came, trying to perfect our inventions with their help.



## Day five

The preparations of our improvised robot and the discussions about a new team image continued in the last day of RoboFun of the first week. The newcomers who managed to do the base of the robot were surprise. None of them thought about how much work there is in the team. We learned a lot of things from each other and realized how important it is to have a new man who can express his ideas and share his creativity with us.

Looking back to the memories and relationships we made the week that just run like the wind, smiles started to appear on our faces. Everybody was sure this experience will have a great impact on the days that will come. Friendships and spontaneously are the things that make our life a little happier. So let's just continue with a smile on our face and amazing people around us. Every little gesture matters and we were glad to have interested students around us who could give us more motivation and creative ideas. We reminded them that for the next week we prepared other activities and that we were looking forward to sharing experience with them again!

## SECOND WEEK, DAY ONE

With high hopes, we waited in the school for the freshmen who in the week before seemed so excited about other classes. We expected some of them to be present and we were surprised to see there came more than in the week before. It seems we made a good impression and people enjoyed our company and our work in the team. As a lot of students had arrived, we fell by mutual agreement to sit in a circle as everyone could see the others in the room. The new comers presented themselves to let us know who they were.



It was an interesting fact for us that all the students were from various profiles. We had interested minds both from the Mathematics-Informatics profile and Social Sciences. We get to the conclusion that the freshmen were interested by a new activity in their life rather than routine and same old things and interests.

Each of us told to the rest in which department they are or would like to be in the future and why. By doing this, we got to know each other better. We told the freshmen stories from our participations at the competitions, about the times we did or did not succeed in winning what we proposed. In this way, they understood in our team life there were not just pink days, but also moments the things went wrong. They appreciated our motivation and ambition to try again and again. All the things that happened get us in the point where we are now, trying to perfect our imperfections and working hard to avoid the mistakes we made.

Our next idea was to ask them to tell us a story from which they learnt something important. It is amazing how people share emotions and some of the best moments from their entire life. We heard a lot of inspirational stories from each of them and on their faces we could see sincerity and trust.

## DAY TWO

In the second day from the second week, we proposed to discuss more about the world's records and to analyze all the opinions that came up. All the brilliant minds around us were indulged in the desire to know more and to help us succeed. They were glad to come up with creative ideas and good vibes.

We organized more games of perspicacity and there came more students. We started being very united and spending time together both at RoboFun activities and in our spare time. We had a favorite activity as a group, Just Dance, because we consider dancing one of the most beautiful things to express our feelings. Just Dance brings us closer to each other and unites us as a group. The students were happy because of our creativity and sense of humor. We continued to play games and have fun. At the same time, we continued to discuss about robotics and the way we can evolve. These have always been the main topics in our conversations. We were glad we met people like them and we guess the feeling was mutual.

Games and smiles made the freshmen think the high school will not be so hard as they maybe had expected. We showed them how beautiful it can be if they know how to spend their time. It is about socializing and making connections, learning individually and also from others as a team. If we will understand the secrets of co-operation and communication we will discover the most interesting things about the world that surrounds us, in a happy and pleasant way.



## DAY THREE

Hand by hand you realize something bigger and more expressive. Idea with idea brought for modernization and evolution we formed an eternal brilliant mind for our team.

In the third and the last day of our outreach activity RoboFun, we made a brief history of what happened in the days that past. We hoped we made a good impression and when the selections would come, we would have a lot of eagers. Robotics must be a new and very interesting and full of mysteries subject in a student's life. FTC competition is maybe one of the best experiences you can have in your life, one of the most beautiful ways to learn a lot of things and meet diverse people, and our students understood this by the activities we held.

The team's experience at "Freshmen's school" cannot be called in another way than an extraordinary blooming. The implication in this activity brought us only benefits. The students that were interested and implicated became our friends and with their help we managed to improve our co-operation and communication skills. We learned how important a creative mind is and how you can shine if you learn to listen to other opinion.

We asked the students to write for us a feedback and the impression they made about our collective and team. The following are examples of these feedbacks

### ➤ Drelciuc Miruna Maria

"The first time I've met the Robotics Club was at The Freshmen's School. I've been pleasantly impressed of the power of the members to keep the classes, being extremely attracted by their co-operability and their desire to share their knowledge formed in the course of their active implication in the Circuit Dealerz team. I've taken the creativity and the ingenious ideas as a model. The attraction to the mysteries of robotics is still getting bigger and bigger. It's true that if you are surrounded by amazing people, all the things start shining!"

### ➤ Cota Sarah

"For the first day, it seemed a little hard for me even if I knew what the competition means. There were some boys that looked superior at us, the girls, but when we started to group into departments, I noticed that the 3D Design team is really my type and everything was getting easier. Day by day, the collective started being more united and my appreciation for it was uncountable. Now, I adore the members and I'm really good friend with every one of them and I'm getting more fascinated of innovation and the world of robotics."

Finally, the best things left after the activity ended are unforgettable memories and priceless friends!

### **3.1.2. Back to school Workshop**

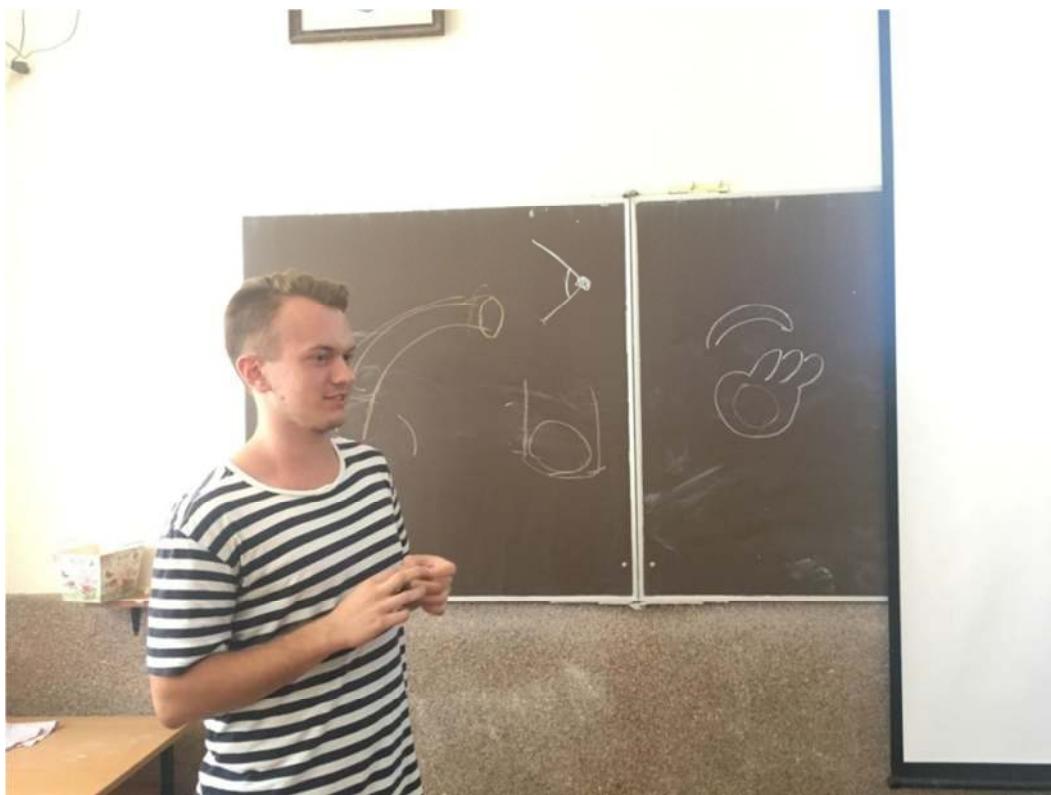
The first meeting after displaying the game was on 15<sup>th</sup> of September. There were present almost all the members of the group, exactly like our expectations. The departments were already formed, so we started working. We discussed with details this year's game and we listened to every participant's opinions. Also, we decided on the matter of the motto of our team, the public relationship group assuring its image. We talked about our team's costumes with personalized T-shirts, being packed of creative and colorful ideas brought up by students with vivid imagination. We have decided about the administration of socializing pages like Instagram and Facebook, which are important for improving our best team's image.



We used documentaries and other videos for making our inspiration fuller about the construction of the robot.



Hardware, Software and 3D Design groups co-operated and as inspiration grows easier when you are with brilliant people, we bloomed from the smallest idea in the purpose of successfulness. The seriousness accompanied us all the way to the end of the workshop, and the amusement and fun felt permanently.



*This way, we made the first workshop in really good conditions, with a positive energy and radiating the happiness of a brilliant idea.*



### **3.1.3. Open Doors Day**

On 14th of January our team made a presentation called "Open Doors Day" in which we explained to the public our departments and goals. The public consisted of students of 10th and 9th grades from our school and some teachers. The aim of the activity was to make the students interested in FTC and robotics in general and also, to grow together and learn from each other, like we do in any other activity like this one. We wanted to make students attracted to what we do. We are able to teach new comers the skills they need to know to do a good job in this team. As others new comers said, we are a united collective and the people who form this team are very kind and friendly, looking forward to share knowledge and experience.

We had 50 minutes to say everything we wanted the public to know about us. The best way to deal with the time problem was to divide it in the 4 departments, so every department had 10 minutes to present their part and 10 minutes was the introduction our mentor made, alongside the project managers. So we began with a short history of our team and the Public Relationship department was the first which talk

The members of this department presented their work in the team and what expectations from this year competition they have.

The department which was the next to talk was the 3D Design one. They explained the work they did to create a stable robot and that they had to do the design twice. It is good we realised the mistakes and corrected them. Salagean Dragos explained the way a person can become a member of the team. He or she can become a volunteer anytime and all he or she has to do is to work hard. Some of the members will not continue to work as hard as before so they will have to be replaced. It is a circuit which does not end if students are motivated and aware of the importance of knowledge and perseverance.

At the software department presentation there was an emotionally speech by Barba Matei. He explained how he fight to remain in this team and how ambitious and preseverent he was. Software was a new topic for him but when you enjoy something, you want to find more about it and start working. He wanted everybody in there to apply as a volunteer because there was nothing to lose. "At the end, you won't regret the times you didn't win, but those you hadn't take the risk."

Hardware was the department which ended our presentation by telling their story and job in the team and by showing to the public how our robot works and having the interested ones drive it. All this experience improved our communication skills and our relationship as a team and we are looking forward for the next one!

After the presentation we interviewed some of the teachers who were willing to tell us their opinions.

## **Interview with the school's laboratory assistant**

### **• "What is your first impression of the team after the Open Doors Day?"**

"You have all my admiration for your work. I know how hard it is to start a thing over. I wish you to reach your goals. I think what you wish the most is to be successful in what you do and by achieving this you will make the name of our college known as well."

### **• "What expectation do you have from our team?"**

"I want to see how are you going to be appreciated at the national level and to see the final of the robot. I am looking forward to seeing your work is appreciated by unknown people, not just teachers from our school and I think you will manage to become one of the most successful teams in Romania."

### **• "What did impress you the most?"**

"Matei Barba was the one who impressed me the most. He impressed me with the way he presented the project and the software part. He was so realistic about the problems the team confronts with. You would not say he has 17 years old because the way he thinks and is aware of the problems and the unpleasant moments he described shows a very mature and responsible mind inside of a teenager body. I admired you all because it is not easy to have such strong motivation. It is not easy to come to school and in spite of the numerous homework and projects to have another activity as robotics is. For this thing you are admirable."

### **• "What is your impression about us as a collective?"**

"I think you are a very strong and united team. You also have Matei and Dragos who have more experience in competitions and can lead you to success. It is better when you have someone with your age to guide and explain you because you become more aware about what you can be on a professional plan. If there comes an adult who tells you what to do, the perseverance will not be as strong as in the other case."

### **• "Thank you for the minutes allocated. Do you want to say anything else about Circuit Dealerz?"**

"I want to wish you good luck and to tell you I believe in students like you who can carry the name of our college and make proud themselves and the people in it."



## Interview with the school's art teacher

- "We noticed you were very enthusiastic of our presentation held on 14 of January, the day of Open Doors. What made you feel so excited?"

"You are amazing! There is such an impressive talent in all of you! Your ambition and perseverance is unbelievable! I am very proud of you because you have the courage to fight for success."

- "Thank you! From the perspective of an arts teacher, how does robotics seem to you?"

"Diversity is one of the main values of a life to be amazing. Being an art teacher, I can see some parts in the design of the robot that reflect passion and originality. It is amazing to find new things about contrasted topics and you took my breath away with your honesty and sincerity."

- "What expectations do you have from our team?"

"I am sure you will be able to reach your goals and to get at the top of the most ambitious and intelligent students. It is visible all of you are passionate about this topic and you found your place in the team. Each of you fits perfectly in the department you are and this can be noticed on your faces when you talk about what you do in the team. This is because when a man talks about his passions, he becomes more excited."

- "What impression have you made of our team as a collective?"

"I guess all of you are good friends with each other and share experiences and emotions together. If you were not good friends, your work would not be as appreciated as before. You always communicate with each other and this is what makes your results so admirable. When you put love and passion in what you do your work starts to get in shape and it will be more successful."

- "Can you give us any piece of advice to achieve our goals?"

"Just work together, like a family. Help each other if there is the case and be strong. You will have much better results if you are united. And also, don't stop learning. Knowledge and practice is the key to success. Continue to learn and exercise and it will be easier for you to get where you want."



### **3.1.4. Official opening of the robotics lab and Centenary Celebration**

With the occasion of the official opening of the team's laboratory, it was decided due to multiple reasons, that we should also celebrate 100 years since the Great Union Day, the most important national holiday in Romania.

This way we had to split it into 2 parts: The celebration of the centenary and the actual opening.

#### **Centenary celebration**

Because it was the most important national holiday, we thought we should dress in traditional clothes. Unfortunately, not all of us had a full set due to various reasons, but we at least had something that would signify that we are Romanians and that we are proud of it. The following picture depicts one of our mentors, part of the team's members, alongside some volunteers.



The celebration began with a few words from Blindu Andrei on what it means to be a Romanian and his opinion on Romania's current state as a country. Also, he described how people feel about the unification and how they should actually feel.



After Blindu's speech, Muntean Emanuel continued in a more formal manner, by reading the Resolution of the National Assembly in Alba Iulia from 18<sup>th</sup> of November/1<sup>st</sup> of December 1918.

### *Rezoluțiuinea Adunării Naționale de la Alba-Iulia din 18 Noembrie/1 Decembrie 1918*

I. Adunarea Națională a tuturor Românilor din Transilvania, Banat și Tara Ugricăescă, adunată prin reprezentanții lor îndepărtăți la Alba Iulia în ziua de 18 Noembrie/1 Decembrie 1918, care să se constituie în Adunarea Națională a tuturor locuitorilor locuite de deșert în Regatul României, Adunarea Națională proclamă în desecbi dreptul inalienabil al națiunii române la întreg Banatul cuprinzintă râurile Neajsoa, Tisa și Dunăre.

II. Adunarea Națională urează teritoriilor său întocmai autonomie și mai la întîmnierea Constituției aleasă pe baza votului universal.

III. În legătură cu moșia, cu principiile fundamentale la alcătuită de Statul Român, Adunarea Națională proclamă următoarele:

1. Dreptul la libertate națională pentru toți popoarele conținute în. Să vorbesc și va instaură actualulă și justă în limba sa proprie, prin introducere din singur și fiecare popor va primi dreptul să reprezinte în corpurile legislative și la guvernare, să trăiască proporțional cu numărul individelor, ca lăsată în-

2. Egalitatea în drepturi și deplină libertate autonomă confesională pentru toate confesiunile din Stat.

3. Organizația său să fie într-o regim civilă democratice pe baza fermei vieții publice. Votul obiectiv direct, egal, secret, pe comunie, în mod proporțional, pentru ambele sexe în vîrstă de 21 de ani la reprezentarea în comunitate, judecători și parlamentari.

4. Desăvârșirea libertății de presă, asocierile se închidere, libertatea propagandă și tuturor gândirilor conveniente.

5. Reforma agrară radicală. Se va face conștiința tuturor proprietăților, în special a proprietăților mari. În baza acestor conștiințe, desfășurându-se în temelii dreptului de a măsora dinții trebuinței, se va da posibilitatea fără nicio sărșire sau cenzură a proprietăților mari, păsani, pădurilor etc. să poată munca ei și familia lui. Principiul condacelor, al acordării politicii agricole, pe de o parte promovarea nivelului social, pe de altă parte protejarea producătorului.

6. Mantuitorii industriei și se asigură să acelase drepturi și avantaje, care sunt legate în cele mai avansate state industriale din apus.

II. Adunarea Națională dă expresiune, dorință să facă ca Congresul de pace să înființească comunitatea națiunilor libere în apărarea dreptelor și libertății să fie asigurate pentru toate națiunile mari și mai deosebite, au în vîrstă să se elibereze războiul omului pe om și să se înființeze punctul de regula cărora vor fi stabilită inter-natinală.

VII. România, adunată în această Adunare salută pe frății lor din Bucovina, scăpată de sub jugul monarhiei Austro-Ungare și unită cu ţara mamă România.

VIII. Adunarea Națională sărbătorește cu bucurie și entuziasmul poporului său în monarhia Austro-Ungarie, anume națiunile cehoslovace, austro-germane, jugoslavice, polone și ucrainene și hotărăște ca astăzi să îl să se aducă la cunoștință tuturor acelor națiuni.

VIII. Adunarea Națională cu smereu se înclină înaintea memoriei acelor bani români, care în acest război și-au vrăjat simbolul genului și înfrângerea ideologică noastră, murind pentru libertate și apărarea națiunii române.

IX. Adunarea Națională dă expresiune multumită și admiraționă să tutorei puterilor aliade, care prin strămoșele lor și puțile cu coracii, împotriva unui dusman pregiu de multe decenii pentru război, au acordat civilității române înălțările barbarești.

X. Pentru conducerea mai degrabă a ofacerilor Adunării Române din Transilvania, Banat și Tara Ugricăescă, Adunarea Națională hotărăște instituirea unui Mare Stat Național Român, care va avea totodată reprezentanță în interesul națiunii române, oricând și preluându-neșașa de toate națiunile lumii, și să ia toate dispozitivile pe care le este necesare în interesul națiunii.

*J. Stefan C. Pop*

*Vice Președinte al Adunării Naționale.*

*K. Laurentiu Dancă,  
Vice al Adunării Naționale.*

Following that, we mentioned a few important personalities that contributed to the unification of Bukovina.

Iancu Flondor  
cu copiii



Iancu Flondor s-a născut și a rezidat la Storojineț

Om politic, urmaș al unei vechi familii de boieri moldoveni, înnobilată de austrieci. Studii la Facultatea de Drept a Universității din Viena și doctor în drept al aceleiași instituții. Locotenent de husari în rezervă, deputat în Dieta din Cernăuți și primar de Storojineț. Principalul lider al Partidului Național Român din Bucovina, în perioada 1902-1910. A jucat rolul principal în organizarea celor două „momente” ale Unirii Bucovinei cu România (27 octombrie și 28 noiembrie 1918 – stil nou). Ministru al Bucovinei cu sediul la Cernăuți (31 decembrie 1918-15 aprilie 1919).

Iancu Flondor (1865-1924)

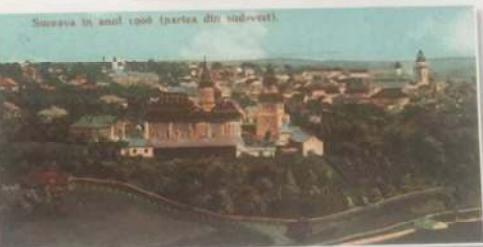
„Sunt gata să jertfesc totul pentru înfăptuirea voinței poporului român din Bucovina”  
(27 octombrie 1918, Cernăuți, adunarea de constituire a Consiliului Național Român al Bucovinei).



Dori (Dorimedon) Popovici  
(1873 – 1950)

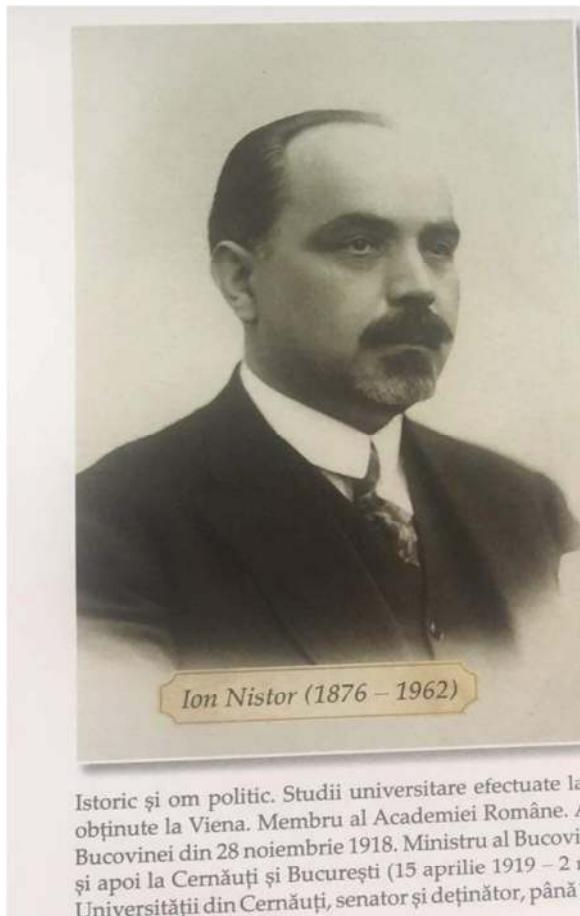
„Marile împrejurări sub care s-au adunat reprezentanții poporului român la adunarea din 27 octombrie 1918 au fost atât de dificile încât nu a fost posibil să se facă alegerile generale pentru Constituanta din întreaga fară. ... Guvernul provizor al fării ar dori să nu lipsească nici un susținător de român de la această activitate, dar trebuind să socotească că nu se pot cuprinde toți membrii poporului în această constituantă!”  
(25 noiembrie 1918, Cuvânt rostit în ședința Consiliului Național Român al Bucovinei).

Cernăuți,  
Mitropolia  
Bucovinei



Suceava, 1906

Jurist și om politic, doctor în drept al Universității din Cernăuți. Director adjunct la Fondul Religionar Greco-Ortodox al Bucovinei, viceprimar al Cernăuțului, politician de vază al românilor bucovineni, deputat în Dieta Bucovinei. Vicepreședinte al Consiliului Național Român al Bucovinei. Ministru secretar de stat pentru Bucovina în 1920 (când a activat pentru înfăptuirea reformei agrare în Bucovina și pentru integrarea acesteia în structurile statului român) și 1926.



„Drept aceea noi, Congresul General al Bucovinei, întrupând suprema putere a țării și fiind investiți singuri cu puterea legiuitoră, în numele Suveranității Naționale, hotărăm: Unirea necondiționată și pe vecie a Bucovinei, în vechile ei hotare până la Ceremuș și Nistru, cu Regatul României”  
(28 noiembrie 1918, Congresul General al Bucovinei).



Istoric și om politic. Studii universitare efectuate la Universitatea din Cernăuți, doctoratul și docența în istorie obținute la Viena. Membru al Academiei Române. A avut un rol eminent în organizarea Congresului General al Bucovinei din 28 noiembrie 1918. Ministrul Bucovinei cu sediul la București (31 decembrie 1918 – 15 aprilie 1919) și apoi la Cernăuți și București (15 aprilie 1919 – 2 mai 1920). În perioada interbelică a fost profesor și Rector al Universității din Cernăuți, senator și deținător, până în 1937, a 7 portofoliilor ministeriale (ministrul).



„Războiul nostru este sfânt... Doamne ajută-mi să fiu tare, să fiu vrednic și neinfricat, spre a putea răsuna lacrimile ce le-au vîrsat ai mei vrem de una sută cincizeci de ani de robie” (August 1917, scrisoare către mama ministrului Alexandru Constantinescu).



Bustul lui Ion Grămadă din Stroești

Fondator al gazetei „Deșteptarea” din Cernăuți, publicist, istoric și militar. Studii superioare la universitățile din Cernăuți și Viena. Doctor al Universității din Viena cu o teză privitoare la participarea românilor la asediul din 1683 al acestui oraș. Datorită convingerilor naționaliste pro-române, se refugiază în Vechiul Regat, înrolându-se voluntar în armata română. Avansat sublocotenent în iulie 1917, cade eroic în fruntea plutonului său de vânători de munte în lupta de la Cireșoaia (27 august 1917).

Afterwards, we read some poems about Romania and Romanians and Dragos concluded the centenary celebration part of the event.

## The official opening of the club's laboratory

The opening began with Dragos talking about the robotics team, how we formed and how we got to the international stage in America in the first season of FTC. He presented how, they were really surprised to have won Inspire Award, because they only did their best and what they thought it was good. Also, he mentions how even though robotics is on a different level in America, we still keep up with them because we at least finished in the first half of the leaderboard.

Next, Matei continued with his speech. He briefly touches on the fact that there is a big difference in the team compositions between the first and second season, how even though most members had quit, he and Dragos really wanted to continue with robotics and decided to form a new team.



He presents how the team from this year wants to achieve the performance of team Impulsive by being a tightly knit, honest and sincere family, where communication is a key factor. "Also we would like to keep in touch with our sponsors and supporters, be in good relations with our mentors and everyone who supports us. On top of that, we would like to make a change in our county, starting off with the young generations by going to different schools promoting robotics and FTC and making them interested in what we are doing. Then there are also the new teams from our county, which have joined the competition and with which we would like to cooperate and be in good terms. Overall, we would like to thank everyone and to make a change in our county, to promote the FIRST values and build up the new generations that are going to take our place."

Afterwards, Emi talked about the future plans and goals of our team. First off, he mentions how our most important goal is preparing the students that participated in the Fresman's school, volunteers and members alike, which have shown interest in robotics. This is because most of the members are going to retire next year because they are going to be preparing for Bacalaureat, an important national exam. The second goal would be getting to the national stage of the competition,

followed by getting a ticket to the international stage, in America. "Until now, this room had also been one of our dreams and we can only rejoice now that we finally achieved it".



Next up, the volunteers and supporters of the team wanted to express their opinions on this opening, centenary and robotics. Most notably, the representative of the school's debating club, George Gaitan, who is now a volunteer of the team, was really proud that the school promotes such activities as robotics and wanted to congratulate us because of the work we do, the achievements we had so far and most importantly he stated that he was going to submit a motion in the debating club related to robotics in our times, its influences and so on.

Following George's speech, Adrian Graur, as the Emeritus Rector of the local university, the University of "Stefan cel Mare" and as a supporter of our team, also wanted to give a speech about his thoughts on what we are doing and how important that actually is in the current society and with the current education system in Romania.



Another of our supporters, Tiberiu Socaciu, a university professor that also teaches at our school, talked about how we could use robotics in the future and what we should expect from it.

Lastly, our Mentors wanted to give a few words, mostly in order to motivate us and give us the boost we need to reach new bounds.



That concluded the Official opening of the robotics club laboratory and the Centenary Celebration but not before playing a bit with our robot and explaining his function to the attendees.

## **3.2. To Future Generations**

### **3.2.1.Bosanci School**

On January 22, several members of our team went to the Bosanci Secondary School to give a presentation to our fellow younger students about the FTC competition. The school we went to holds a special meaning for our team because four of our members studied there.

At nine o'clock, Matei and Antonia's father helped us to carry the robot, the arena, the lander and different pieces to the car. When we arrived at the school, we arranged the class and we mounted the arena and the lander.



Then we connected our robot at the phone and at the gamepad, we verified it to make sure that everything was working as it was supposed to. We played with it and it actually worked until a wheel dismantled from the robot and Victor tried to repair our robot before the presentation.



We held presentations, first with five graders, then six graders and, in the end, with four graders. We started by explaining what FIRST and STEM stand for and told them what this competition was all about.



We explained them what the game was, what the robot should do, what the rules are and the scoring. We showed them a video which explained the game visually, a video presented by Qualcomm.



We asked them if they think that the robots will conquer the world. Some said they would conquer the world, and others would not. They expressed their opinion, giving relevant arguments and an intense conversation about this subject followed.



We showed them the robot which walked through the class, passing in front of each one of the kids in order for them to see it better. Of course, we played a demonstrative game and all of them were fascinated to see the robot in action.



We let them control the robot and they did it with excitement.



At last, we gave them feedback questionnaires and they amazed us with their opinions and answers. They were very excited about our presentation and they told us that they believe in us and that they will keep their finger's crossed for us at the actual competition.



### **3.2.2 Number 3 Middle School**

On the 30th of January 2019, we went to Number 3 Middle School in Suceava to present our team, our school, our goals and most importantly, the FIRST FTC Challenge, hoping that, in the future, they will be interested in joining this competition. Consequently, we can raise awareness about the STEM program in a fun and interactive way.

It was quite an emotional event because some of us have previously studied there. It was our former school and we had the amazing opportunity to meet our old teachers and talk with them while sharing how many great things we have achieved. They seemed so proud!

When we entered the classroom we were greeted by cheerful faces of the young pupils. It was clearly from their smiles that they were surprised, waiting impatiently to find out what was happening. Their teacher, who was also the form teacher of one of our members, kept our coming a surprise so that she can surprise her students.

We entered through the door with a big and black box, that housed the robot, but we kept it's interior a secret for a little while, and with the lander, which was in fully displayed. When we opened the box, everybody was curious what was inside and were trying to catch a sight of what was inside from their desks. When we got our robot out, we could have seen the excitement on their faces. We have later found out from some question papers which they have filled in at the end of our presentation that, for most of them, it was their first time when they saw a robot in real life. We are proud that we were able to offer them such an opportunity.

After installing the lander, we started by presenting ourselves, our team, our 5 departments and what each of us are in charge of doing. We clarified what FIRST and STEM meant. We also talked about Gracious Professionalism and explained to them, that even though First Tech Challenge is a competition, we help each other out, even if we might be enemies in future matches, and that we also keep a close bond with the local teams. We tried to encourage them to do the same with their classmates and work in teams as much as possible.

We have also asked some questions such as "What have you heard about robotics?" and "Do you think that robots will take over the world?" and we got some fascinating answers to both those questions. Interestingly, quite a few children believed that robots won't take over the world and that they aren't afraid of the rapid advances we, as humans, do in this field, robotics. This is truly an awesome news that they support the robotics field. Who knows, maybe some of them will actually work in this field and further improve our ability to create and work with robots!

While we were controlling the robot, they watched attentively, appearing captivated by its moves. Observing their interest, we asked if there was anybody who would love to try to control the robot. At first they were a little bit reluctant to try, but after one girl got the courage to take the controller in her hands, everybody wanted to try.

We were amazed how fast some of them got used to controlling the robot!

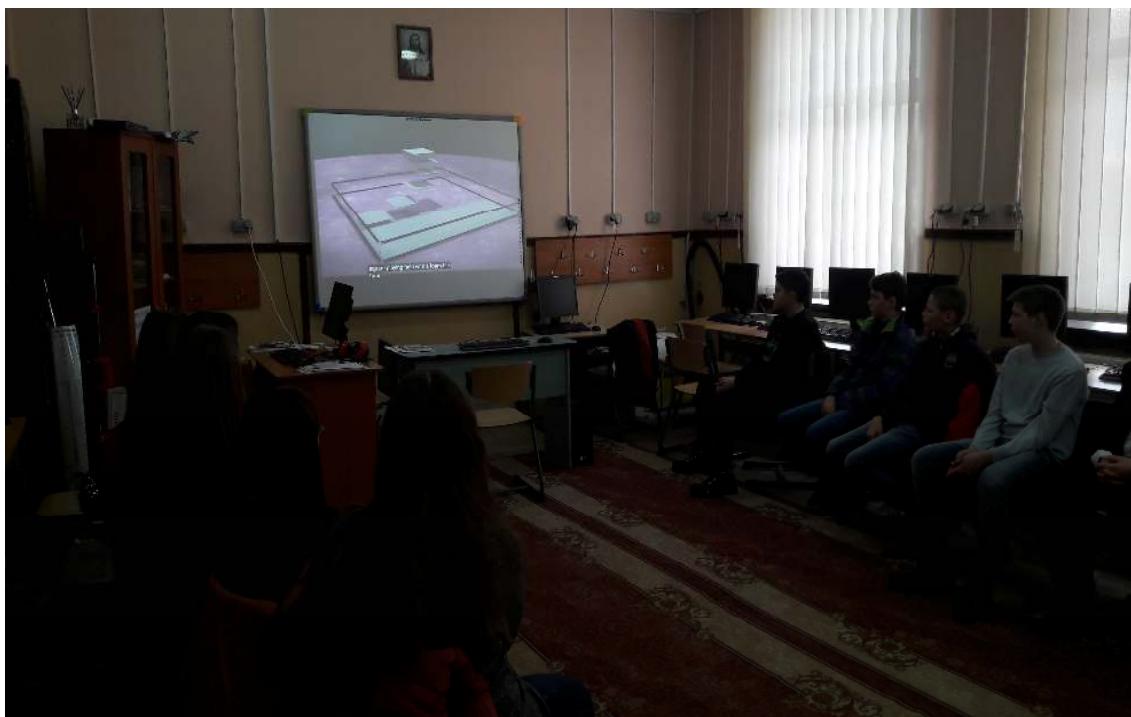


### **3.2.3. Moldovita School**

On the 11th of February, some of the members of our team went on a trip at Moldovita. We presented the topic of robotics, our goals, the FIRST Values and the FTC competition. When we entered the class, we were surprised to see so many beautiful and sincere smiles, faces that were waiting for us to tell them about the mysteries of this topic. The aim of our outreach event was to encourage students to step into a completely fascinating world, to promote STEM values in non-STEM communities and share the experience of FTC in these.

As Moldovita village is at almost 90 kilometers away from Suceava, we could not take the lander and robot with us. However, the students were grateful and happy to discover such a complex topic through discussions, videos and power point presentation.

We begin with a short presentation of what FTC represents and showed them the Rover Ruckus 2019 video. We prepared a PowerPoint presentation and talked about the departments of the team and our experience at the competition. It was a full of emotions experience as two of our members studied here before. It was a pleasure for them to have contact with their old teachers and the fellow younger students. We showed the students photos from our Facebook page, Circuit Dealerz - FTC and they were pleasantly impressed by our ambition to co-operation skills to make things look so beautiful.





In the last part of the event we shared to the students a feedback paper where we asked them in what way this presentation changed their mind when it comes to robotics. The majority of the answers said that this presentation made them see robotics an even more attractive and exciting topic. "If you were in a robotics team, what department would you choose to be in?" was the question that controversialled the little students' minds. They wanted to know about all of them and tried to make a hierarchy in what department to choose. The following are examples of feedbacks from the students

## FEEDBACK PAPERS

Outreach event - Technological high school "Vasile Cocea" Moldovita

Circuit Dealerz- RO044 National College "Petru Rares" Suceava

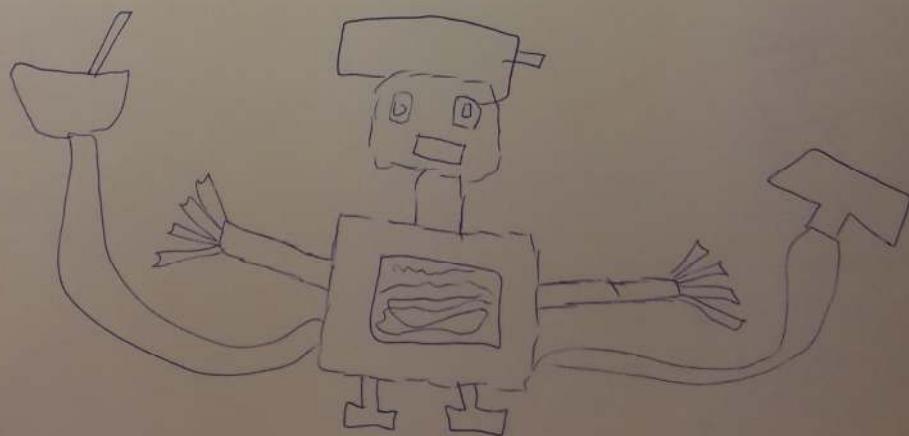
1. What is your first impression about the robotics topic?

După ce am cucerit în cadrul olimpiadei robotica, am găsit cea mai impresionantă parte plăcută. Desi pare destul de greu la început, și că până menține poate valoarea totală.

2. If you were a member in a robotics team, what department would you choose? Why?

If I were a member in a robotics team, I want to be work like to be in the design department, because is very interesting and creative.

3. Draw how you think the perfect robot looks like. Let us know how creative you are!



**FEEDBACK PAPERS****Outreach event - Technological high school "Vasile Cocea" Moldovita****Circuit Dealerz- RO044 National College "Petru Rares" Suceava**

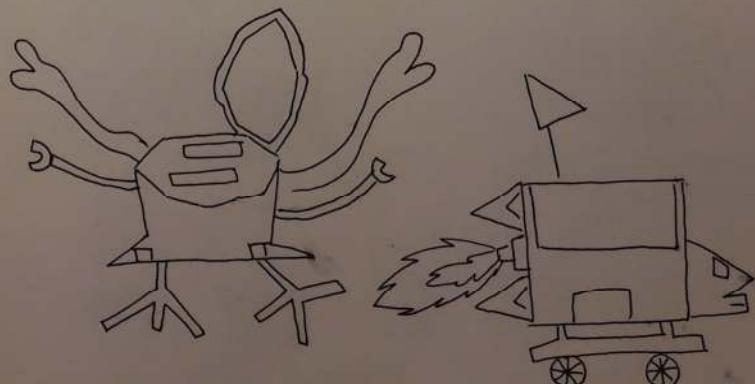
1. What is your first impression about the robotics topic?

Bunătatea mea este că robotică este o activitate bună, care dării sunt grea și îți poate stimula inteligența și te poate ajuta sănătos să creezi un viitor.

2. If you were a member in a robotics team, what department would you choose? Why?

I would be member I would like to be a member of the 3D design department because I find it interesting and exciting

3. Draw how you think the perfect robot looks like. Let us know how creative you are!



All in all, it was a special event for us and we were happy we promote the name of our high school and of the competition in other communities. We learned again what working as a team means and how little souls inspire everyone opened to new experiences!

### **3.3.In our local/regional or even national community**

#### **3.3.1.RoSEF Contest**

Our mentor is a member of Cygnus science society- Unesco center. In this quality is carried out a series of activities to popularize the new conquests of the science and technique. This happens through the children from distant communities, isolated or disadvantaged ones. An activity like this is a camp which prepares the contest of invention RoSEF 2018, conducted in August at Vatra Moldovitei. The village is situated in mountains and the children from there are still attached on the local values and keep all the traditions. It was an interaction with great value where the trainers held workshops based on topics like astronomy, chemistry, the future electricity, innovation and robotics- (workshop made by the mentor of Circuit Dealerz). The students offered a show full of emotions and great value, give us bread and flowered wreath as a thank-you for the carried out activity.

The Physics Inspector of Suceava County, opened the activities of the camp of the RoSEF contest.





Photo with all the participants of the camp: students, volunteers, trainers and parents Photo during the last scientific workshop of the camp



The participants who were offered flowered wreath as a thank-you sign.

### 3.3.2.Europeean Researchers' Night

In every last day of the September month, Suceava County, together with many others cities from Europe, host the activity "The Researchers' Night". It is a successful activity which carries out on the University of "Stefan cel Mare" Suceava's esplanade and it brings together lots of people. In the last years, as a result of the many prizes won by the National College "Petru Rares" Suceava (innovation, invention and robotics) it had a big number of stands at the activity. In 2018 this number grew to 8. Generally, the students who present something to the public, usually do practice demonstrations of present short videos and films. The public is usually consisting of students accompanied by their parents or teachers.



In this image, Matei Barba, the head of Software department, explains to a group of students how a robot is programmed.





The real construction of the robot is much more attractive. The 3D Design department, having Albert Tanase as a leader had a lot of spectators.

Not only the members of the team exposed something at the event, but also the youngest volunteer of the team, Antonie Grigoras, who's dream is to be a member of the team when he gets into high school.

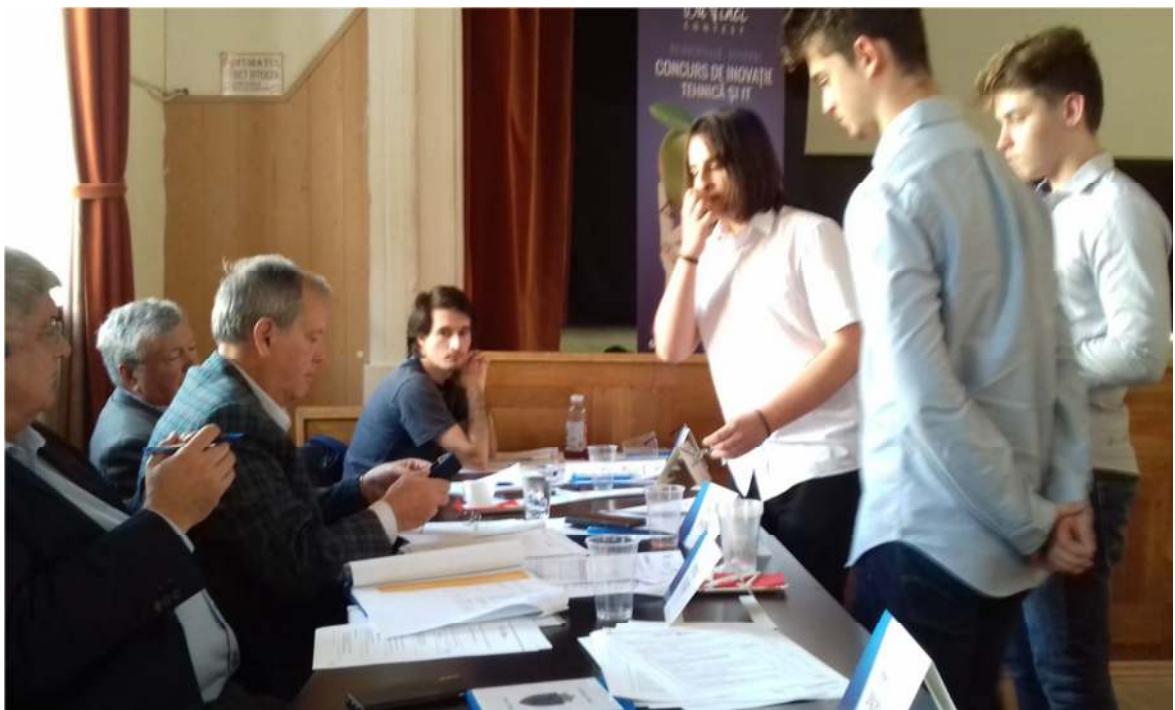


### **3.3.3. DaVinci contest**

Every year, since the first time when DaVinci contest appeared, the National College "Petru Rares" Suceava sends representatives. This is a method to promote the STEM values, and a form of interaction between passionate students (whose entries are free). The students present in front of a valuable jury, coordinated by Mr Dumitru Prunariu, the single cosmonaut of Romania.



In the image, the team formed of Cezar Mironescu, member of Circuit Dealerz, Tudor Morar, ex-member of the team, now a volunteer, and Iustin Paulencu, present their work based on the possibility of realized the smart glassed which can allow the drivers to communicate with the exterior without letting the hand off of the wheel.



The jury is testing the glasses presented in the contest by the team from Suceava



The team won a mention in the DaVinci contest 2018. The image is during the award ceremony, on the stage of the College Gheorge Lazar Bucharest



### **3.4. To Teachers who coordinate robotics and inventics clubs**

#### **3.4.1. Book Publishing**

The mentor of the robotics club published in 2018 the volume "Innovative projects of pluri / inter / transdisciplinary learning units for didactic activities in the field of science" at "George Tofan" Publishing House of the Teaching Staff House Suceava, in which are presented a number of lessons / learning units written by the author as a support of lessons held on different occasions (scientific camps, lessons in the week otherwise, lessons in the direction of coordinated clubs or simple lessons in the physics curriculum, but interdisciplinary approach ).

The eBook is addressed to science teachers who work in an interdisciplinary manner, or who want to discover this way of working. Because the surrounding reality is not simple and it can not directly constitute "didactic material" for learning the sciences, pluri-inter-transdisciplinary approaches are beneficial, on the one hand, because it includes realities in the learning process, on the other hand introducing the student to individual / group research / research. The book also addresses teachers who co-ordinate clubs of inventions or robotics (eminently interdisciplinary fields), as an example of practice, as it is written in the introduction, reproduced below.

"As a result of the latest information explosion (proven by the duplication of the knowledge volume every 10 years), the openness of contemporary societies, the need for permanent learning required by social and political developments, the unity of the surrounding reality, the need for redefinition of the general culture (which currently embraces humanist culture, scientific culture and technological culture), it is absolutely necessary to rethink the way in which children learn about them, the surrounding world, and how to become fit in the labor market. It is obvious that the approach must be an integrative one that develops high skills in children, educating discovery, cooperation, evaluation practice, project learning, etc.

A possible integrative approach is the design of formal and non-formal curricula, on the multidisciplinary, interdisciplinary and transdisciplinary. A multidisciplinary approach, for example,



involves dealing with a phenomenon, a process that is fundamentally a discipline, from a perspective of several other disciplines, bringing additional information to the discipline in question, favoring it exclusively. Thus, for example, the complex phenomenon called LIGHT, a physical phenomenon, can also be approached from a biological perspective (the characteristics of the luminous receiver, the formation of images in it, the visual defects, etc.) and from the artistic perspective (the characteristics of light, color, etc.) linguistic (the great number of words in the family of light, multiple spheres of significance of the word, materialized in consecrated expressions or in multiple figures of style, or only in the characteristic of a literary text to be bright), from the perspective of multiple religions (which, as a rule, binds the light of fundamental human values-good, truth, justice, or even from the beginnings of the world) and even from mathematical, computer, technical, psychological, etc. perspective.

The interdisciplinary approach is, from a teaching point of view, a form of cooperation between different disciplines, regarding a particular process, the complexity of which can only be addressed by convergent action. The conceptual and methodological apparatus of several disciplines is used in interconnection to address complex, typically pressing problems. From a practical point of view, an interdisciplinary approach solves problems that definitely outweigh the fields of competence of a science (the treatment of rare diseases) Transdisciplinarity tends towards unity of knowledge, being the great turning point of the 21st century (Basarab Nicolescu). The transdisciplinary approach places the individual learning processes, the needs, the interests of the pupils at the center of the general interests of humanity, based on the principle of discovery learning (empowering students in relation to their own learning and the problems of the contemporary world) The proposed learning units have both multidisciplinary approaches and interdisciplinary approaches, related to the internalization of fundamental concepts (time, light, energy), with the creation of tools, devices and / or techniques that can support the human being in situations between the most difficult or inconvenient situations, or making critical judgments about certain complex situations. They can be used both in classrooms, but especially in scientific camps, weekly school activities, project activities etc.

All learning units have been tested, in whole or in part, in different learning situations (some of which are specific, such as inventive clubs or robotics activities) and the conclusions have been inserted in the content so that the form presented is the most effective from a teaching point of view, useful to other colleagues who want to apply and amplify them "

The book was endowed with the library of the Suceava Teaching Staff House, of the Petru Rares National College Library in Suceava. It was presented publicly within the Physics Teachers' Circle, held at CN Petru Rares Suceava in the first semester of the school year 2018-2019.

### 3.4.2.Lycee Jean Bart

Our mentor, Anca Greculeac, who was involved in a student-exchange project with a French High School, Lycee Jean Bart, wanted with this occasion to promote inventics, FTC and robotics in general with the help of the French representative teacher, Benoît. The following e-mails represent a part of their conversation, focusing on the aforementioned subjects.

Forwarded Message -----

**From:** FIRST <firsttechchallenge@firstinspires.org>  
**To:** "ancagreculeac@yahoo.com" <ancagreculeac@yahoo.com>  
**Sent:** Thursday, January 17, 2019, 10:07:35 PM GMT+2  
**Subject:** Championship Waitlist and Jump Start Registration for Rookies

Not displaying correctly? [View online](#)



Hi Anca-Viorica,

1. [FIRST®Tech Challenge Jump Start](#)
2. [FIRSTech Challenge World Championship Waitlist](#)

#### **FIRST®Tech Challenge Jump Start**

Our FIRSTech Challenge Jump Start program is now open! If you know anyone that is interested in joining FIRSTech Challenge but feels like it's too late in the season to get started, let them know about Jump Start! Registering now gets you up to four months of additional time to practice robot building, coding, and programming without the pressure of a competition.

Each \$275 FIRSTech Challenge Jump Start Registration includes:

- \* Full credit towards a 2019/2020 season registration (\$275 value)
- \* Access to the FIRSTTech Challenge discounted (and reusable) kit of parts
- \* Manuals, guided materials, fundraising tools, and a ton of other helpful resources
- \* The opportunity to attend local events as a spectator and meet other coaches and participants
- \* Access to the extensive FIRSTAlumni network - \$80 Million in scholarship and internship opportunities from over 200 providers

If a team needs additional help, we also have needs-based grants available, up to \$500 per team. Let your friends and family know about Jump Start!

#### **FIRSTTech Challenge World Championship Waitlist**

Our FIRSTTech Challenge Championship Waitlist is open! The deadline to apply is February 14, 2019. Learn more about the details of our lottery system and notifications in [our latest blog post](#).

*We can't thank our awesome sponsors enough! Thank you to our Season Presenting Sponsor Qualcomm, our Official Program Sponsor Collins Aerospace, and our Official 3D Augmented Reality/Virtual Reality Sponsor, PTC!*

---

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**OUR VISION:** *"...to transform our culture by creating a world where science and technology are celebrated and where young people dream of becoming science and technology leaders."*  
— Dean Kamen, Founder



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-----E-mail d'origine-----

De: Anca Greculeac <ancagreculeac@yahoo.com>  
A: bpdepret@aol.com <bpdepret@aol.com>  
Envoyé le: Ma, 22 Jan 2019 17:41  
Sujet: Fw: Championship Waitlist and Jump Start Registration for Rookies

Good evening.

I was saying I'm coming back with information about robotics and invention. I coordinate in my school two clubs attend the profile described above.

The Invention Club is working on a program that I have been working on for over 10 years and where school research works. Some of them lead to novelty elements, others only have a role to develop at competent students in documenting, imagining an experimental approach, scrutinizing and verifying results, testing the market, etc. International results came just after 5-6 years. If you are interested, I can attach to which international competitions I access.

The robotics club is new, has just over 2 years of being. Although there are many robotics competitions, I work in the First Tech Challenge (FTC), with the annual US final. Although it is difficult, work in this system is done with support (mentoring from the FTC network) and students are progressing in many directions, not just in robotics (teamwork, assuming responsibilities, developing a business plan, activities PR, etc). I attach an electronic document that can be helpful in this regard.

If you want more information, I'm happy to be at your disposal!

I am very glad that our student exchange project is progressing well. Petronela was extremely excited, and messages from students; photos, etc. show that students live a unique experience of their teenage years. Thank you for this opportunity that you have really made.

---

Regards, Anca Greculeac, Suceava

Dear Anca,

Thank you so much for all the details about robotics and invention clubs. It looks like you're well involved in these works allowing students to learn so much about physics, electronics, computing...that is not always taught in class. I would definitely be interested in developing such a club in Lycée Jean Bart! For now there is a lot of change to expect in the next few years in our education system, with new specialties and new curriculum in every course! I think we'll have to be patient and wait a couple of years before we could organize this kind of scientific preparation, but I'll do my best to see what is possible to be done!

For the last 3-4 years I've been organizing Science workshops for pupils in 10th year to make them discover new fields like computing, astrophysics, electronics...I work with Arduino to build our own systems and to control them by computing in C. It's a good way to mix physics, electronics, computing and fun!

Since this year I've been preparing a group of 12th year pupils to our engineering classes by teaching them how to compute in Python and especially how to simulate physics problems: flight of a water rocket, oscillators, any system ruled by a differential equation...my son Arthur is actually in this class and wants to be an engineer! I've always found very interesting to teach children new areas!

I look forward to reading from you soon.

Take care.  
Kind regards

Benoît

Good evening,

I really enjoy the information from you. The meeting between physics and computer science is extremely beneficial. And if one person can do both, it's great. Unfortunately, I am not at the level I want in informatics and I have to rely on helpers in this area. Sometimes this comes from students, many of them doing pretty well. But not always, in the economy of an activity, relying on students to make programming a device is the best thing. Also, programming must be learned "scientifically."

Instead, as far as invention is concerned, I can run protocols that lead to new things, and some protocols belong to me. I usually start school studying and then I see if something new comes out (or not). But there are situations when I block myself and this, apart from being a lesson, is frustrating. Because this also affects the budget of the inventics club.

For example, I'm working on a scientific theme called Glasses of Happiness and after I abandoned it three times, now I managed to finish it and this work is qualified at EU CES, a European inventors contest.

We do not study robotics in school, but we started out as an extra-school club activity. And now I have a lot of the time involved in teaching and coaching.

And now a joke about how your son wants to be an engineer.

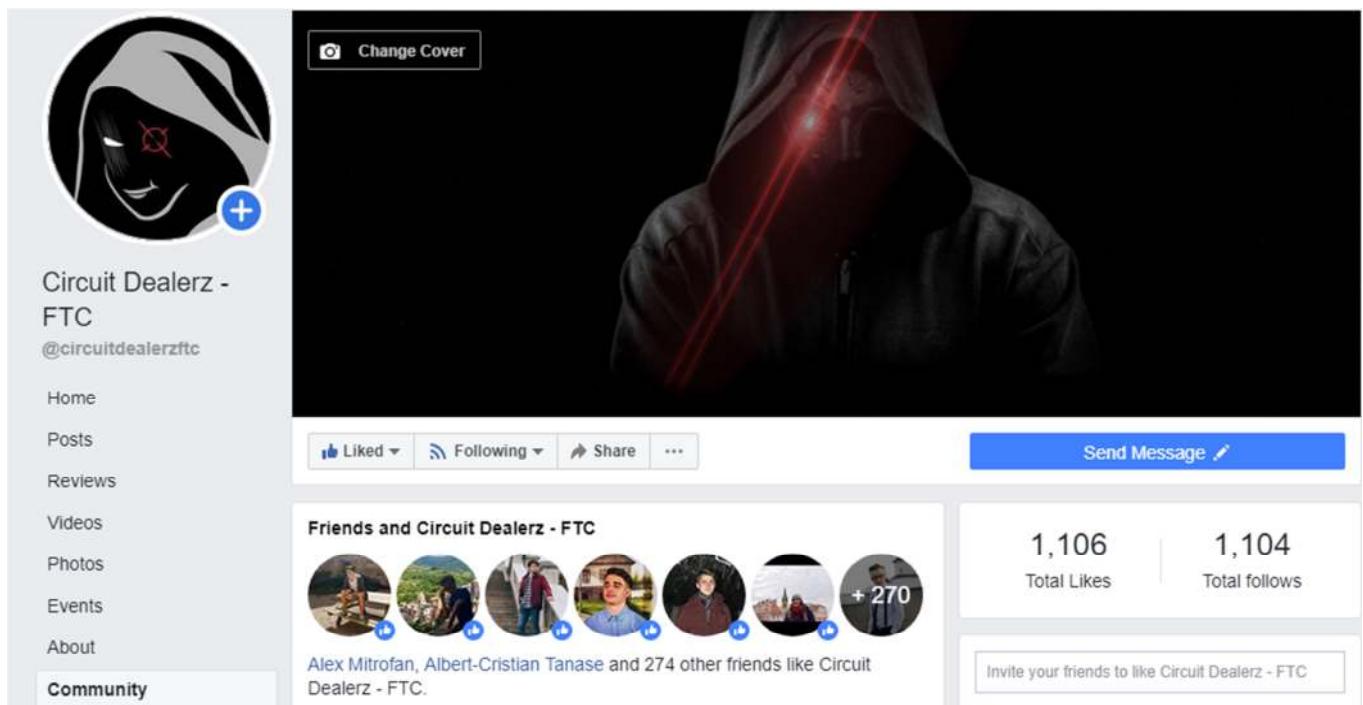
Saturday was the international day of the engineer.

"Who's your real friend?  
The lawyer hopes you will have trouble, the doctor hopes that you get sick, the teacher hopes that you are ignorant????, just the engineer wants you to prosper, to build houses for you to live healthy and happy for a long time. So hug the engineer next to you He's your only friend!"

Keep in touch, Anca

## 3.5.On Social Media

### 3.5.1.Facebook



It was, unexpectedly, a flourishing season for our team's facebook page. Not only did we reach a higher reach and reactions on our posts, but the total likers counter of the page almost doubled, and it shows no signs of losing pace soon! From a huge milestone of 605 likers that we had reached before heading to the Bucharest National Competition last season, we have gone as far as passing the 1000 milestone and peaking currently at 1106 likers. This number basically proved us that at least one in one hundred citizens of Suceava have liked our facebook page, which should mean a lot more have heard about it. After a long debate that assured the fact that the facebook page should be built on the basis left over last season, another obstacle came upon the front of our eyes: changing the identity of the team. It looked like a revitalization of our name and colours wouldn't be that bad after all, but after further analysis of the concept of rebranding we concluded that by changing our identity we would be losing supporters.

The old fanbase would be in great disadvantage, as the old Circuit Dealerz they knew would't appear to be a complete different face from the one they loved and knew. All the popularity gained up to that point would be lost in the space of only minutes, so we decided by not changing the logo and the mysterious and shady persona we embraced that we will not lose our fanbase. And this thing was strongly reflected by the fact that our veteran fans still viewed and reacted to our posts, the biggest

of them all definitely being our teammate's mother Maria Salagean, which we can proudly announce as our number 1 fan. She loved reacted the entire collection of photos posted by our page, commented on most of them, and even liked a post before I was able to delete it, as it was posted by mistake.

The first post of the season was the one announcing our schedule for the Freshmen's School activities undergone in National College "Petru Rares". What's interesting is that this post got obtained significant traffic to the RoboFun activity, 2 whole weeks in which the club worked with the soon to become students of the school. The funny part is that in the photo in the post, presenting the first day of the activity, in front of the class at the blackboard was Mihai Mocanu, which later became a member of the team! Having acquired numerous volunteers, likers, supporters and even members, the post which promoted the most popular activity in the Freshmen's School proved to be one with the most important roles of the year!



**Circuit Dealerz - FTC**

Published by Andrei Blîndu [?] · 3 September 2018 ·

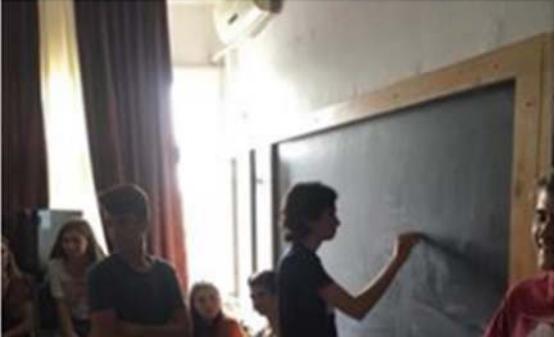
Circuit Dealerz revine, și revine în forță!

## RoboFun



Echipa Circuit Dealerz vă invită să participați la cursurile de robotică din școala bobocilor Program

|  |   |
|--|---|
| <b>Prima Săptămână:</b><br>Între orele 11:00 - 13:00<br>Luni, 27 August:<br>Prezentarea echipei, a concursului TC și cursuri de modelare 3D; | <b>A doua săptămână:</b><br>Între orele 11:00 - 13:00<br>Luni, 3 Septembrie<br>Prezentarea echipei, a concursului TC și cursuri de modelare 3D; |
| <b>Martii, 28 August:</b><br>Introducere în programarea unui robot, java și comenzi de bază;   | <b>Martii, 4 Septembrie:</b><br>Introducere în programare robot, java și comenzi de bază;   |
| <b>Miercuri, 29 August:</b><br>carea lucrurilor învățate prin construirea și controlarea unui  | <b>Miercuri, 5 Septembrie:</b><br>Aplicarea lucrurilor învățate construirea și controlarea unui   |

Bosanci did it again! If last year, when our team obtained a sponsorship deal from the mayor of Bosanci, the post announcing this partnership got a record 3600 people reached and 50 likes. But records are set to be broken! This season, after our team had a 1 day long presentation at the local school in Bosanci, as part of the many trips to local schools we made that week, the post presenting the event got a record-breaking 5700 people reached and over 50 likes, which makes it our most successful post, statistically, in the entire history of the team! But if the likes and the engagement weren't already too much, the most important thing that we learned at the end of the day was that people were always there for us. This post was full of overwhelming and heart-warming comments, and in all the groups in which we shared the post we were openly welcomed, receiving the support we so badly craved.

Liked ▾ Following ▾ Share ...



5,774 People reached      2,722 Engagements

Boost Post

Like Comment Share

Viorica Morosan, Andrade Livia Antoneac and 52 others      1 Comment 11 shares

An important social media event, popular among most of the robotics team in the country, was the Black and White Challenge initiated by team Xeo from Alba Iulia. The concept was pretty simple, 7 photos black and white, posted consecutively in 7 days, with no caption or any other further explanation to them. At the end of each day, when a team posted a black and white photo, they had to nominate another team to participate in the challenge. We were nominated by our local friends at Filatronics, and by Esentza Revolution, an old friend from last season, which we cannot thank enough, equally. Well, if we didn't have the chance to explain them then, we may as well explain them now.

In the second day we posted a photo of the old team, before the Bucharest National Phase of the competition, respecting the rules.



The sixth day was the one in which we realized how boring and bland a black and white photo looks.



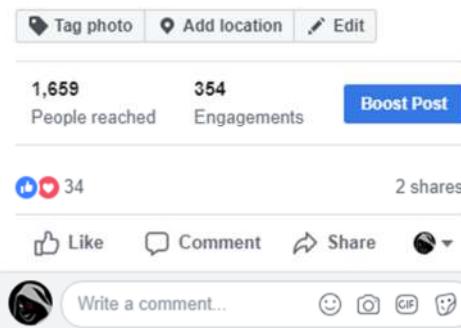
So we decided to break the rules and bring in a bit of colour to our photo.

The seventh and final day of the challenge was a perfect opportunity, in our view, to pass on another message along the general idea of the movement, that is to put a price on memories. So we thought it was best to post a photo of one of the girls which the members of our team participating in the college's charity ball visited and donated to.



 Circuit Dealerz - FTC  
Published by Andrei Blîndu [?]  
Page Liked · 20 January · 20

Final Day of the #blackandwhitechallenge  
We nominate Natie Prin Educatie, all the teams implicated in FTC Romania and anyone seeing this post to take 15 minutes off their busy lives and help the ones in need.  
This challenge has been exceptional for us and we see it as a movement on many levels.  
No explanations needed.



I felt a bit empty at the end of the challenge, as it almost became a part of my day, talking from the perspective of a PR member who always had in mind: "What photo should I post today? What photo would go great on a black and white style?". Only when I reached the end of the challenge I actually realized how much fun it was to do this posts, and taking part in this movement surely did more than inspire people. It assured the fact that our team is in touch and keeps up the pace with all the popular trends of the other robotics teams! But wouldn't it be nice for once to feel like your team started something on their own, rather than share the brilliant idea of others?

That's how we decided it was right to begin our own little event called #MeetTheTeam , in which we aimed to go deeper than presenting people the team Circuit Dealerz, but the members as individual working units of the group. We thought it would be interesting for the public to see who are the persons behind the robot, and in which certain department do they work in.

Even if the event didn't involve nominating and interacting with other teams, we loved the idea to show the faces behind the shadowy masks of the hoodie guys at Circuit Dealerz.



Circuit Dealerz - FTC  
Published by Andrei Blîndu [?]  
Page Liked · 5 February · 61

Starting our #MeetTheTeam event!  
First up we have Victor Macovei from the Hardware department.

Tag photo Add location Edit

414 People reached 61 Engagements Boost Post

Mihai Mocanu, Alex Mitrofan and 24 others

Like Comment Share

Write a comment...

Another social media event we are planning to do after #MeetTheTeam ends is #ThrowbackFriday, an event with the aim to post and relive some of the best memories along any season of First Tech Challenge, but most importantly an opportunity to post the Deleted Scenes and maybe not so formal photos, but funny to look at, which were not previously shared. It doesn't have any strict rules, just offers a team the liberty to get out of the formal zone of a serious page of a robotics team, and post something to laugh at that maybe didn't make it in other posts every Friday!

Our facebook page has become at this point a giant archive of all the memories starting from day 1 as Team Impulsive and up to this date as Team Circuit Dealerz, and it represents a big chunk of our history, that's why we are so proud of it and promote it everywhere.

## 3.5.2. Instagram

**circuitdealerz**

Editează profilul

**RO044 Circuit Dealerz**

Meet National College "Petru Rareș" Suceava's robotics team  
Circuit Dealerz! 🏆  
[www.facebook.com/circuitdealerzftc](http://www.facebook.com/circuitdealerzftc)

|         |               |             |
|---------|---------------|-------------|
| 19      | 590           | 53          |
| postări | de urmăritori | de urmăriri |

Making an Instagram account for the team was something we managed to do at the very beginning of the season. Even if our long love Facebook served us good as the only page of the team, it felt like there was time for an update. Instagram as an app is taking the world by storm, and I could say that currently is more popular than facebook among young audiences, which definitely meant that pushing our team's name and activities in the Instagram zone was a must. The Instagram page is mostly in sync with the facebook one, and generally speaking at a first glance you could say it is definitely a replica of it. But the engagement system is totally different.

Firstly, with the help of our kind volunteers who promoted the page, we became not only the most followed club of the school, but one of the most followed Instagram page of a robotics team in the whole country! We once reached an amazing number of 604 followers, which progressively got lower because we decided that as a team, the page should only follow members of the team and volunteers.

As Instagram functions basically on a "I follow you you follow me" system, some people unfollowed our page, but are still able to view or share our posts, as we are a public profile, open for anyone interested in us.

Considering the fact that the youth is far more active on Instagram than on facebook, the difference between likes on facebook and insta is gigantic. Keeping in mind that as a facebook page with 1100 likers you only get 50 likes on a post, you would expect Instagram to be a place where obtaining likes on posts is extremely hard. Well actually, we got far more likes on Instagram than on facebook, with 500 people less, judging by the numbers.

The most liked post on Instagram is from the presentation in front of the Erasmus exchange students from countries like Germany, France, The Netherlands and Poland, which reached an incredible number of 205 likes. Considering the number of people in the room at the time and the fact that we especially asked the students to follow us on Instagram, as facebook isn't that used that much abroad anymore, we could say it has all the rights to be our most liked picture on Instagram. Compared to the 50 likes received by the most liked photo of us on facebook, it shows how much

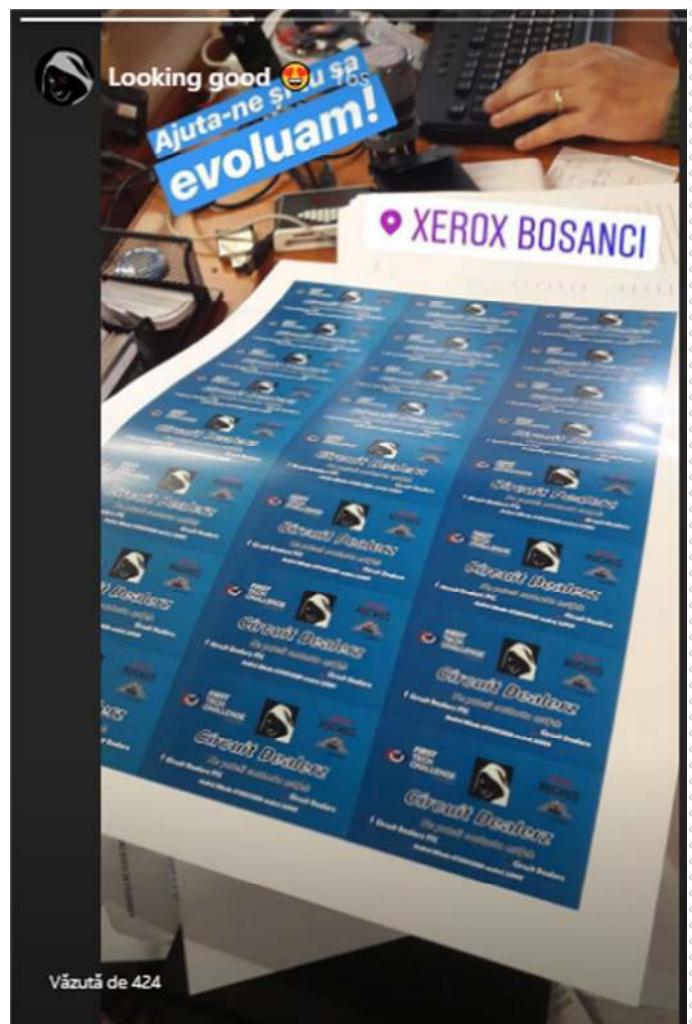


ground our team really conquered this season in the local community and not only.

Another important photo on our Instagram is the one made when we travelled to the Mall Demo in Iasi with our special guests for the day, Greta and Tomek, the latter being one of the polish students who attended our conference in the auditorium. Motivated by the fact that our team's member and good friend of his birthday party was coming up, talking about Victor of course, and that he was inspired by our team during that presentation, he travelled 900 km to assist us at the Demo.



Another big difference between Instagram and facebook is that it is exclusively made to be used only on a phone, which makes it an app you get on multiple times a day. Also Instagram stories, meaning the photos that you post and disappear after 24 hours, have been a great way to interact with our fanbase, meaning that at most events we organized we posted a story showing informally what the team was doing in a normal day. Natie Prin Educatie always reposted on their stories the stories they enjoyed most from the teams all over the country, so through our stories we always dreamt of being reposted by them and we did! Through a story confirming our outreach event at general school number 3 in Suceava. Our most viewed story was seen by 424 persons, and is actually the first story ever posted by the team, showcasing freshly printed flyers.



## **4. ROBOT EVOLUTION**

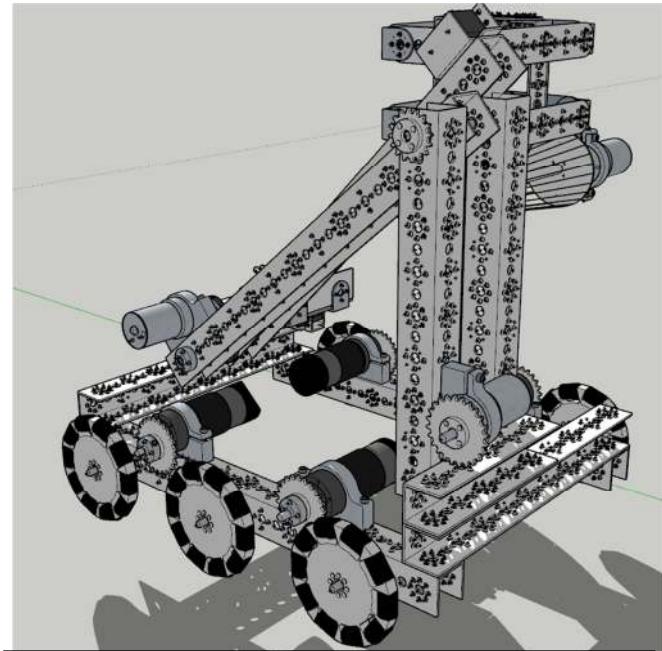
## Creating R.E.L.U.

For R.E.L.U. to become what it is right now we have gone through a gradual process of designing, building, reviewing and improving. Here are the steps we have taken to build our robot.

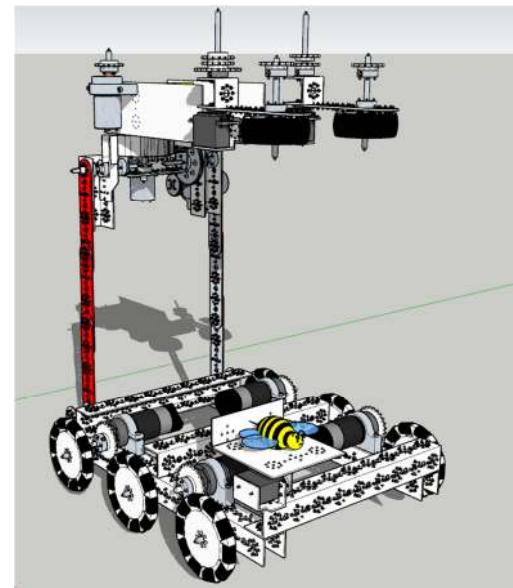
### R.E.L.U. in September

We have spent this month mostly looking at designs of robots from previous years and designed our robot. Mihai has been the first to propose a design. Mihai's first design was capable of scoring a good amount of minerals due to the fact that the arm it had was able to expand inside the crater, which meant we did not have to go inside the crater in order to collect minerals. We did not like however, the momentum the motors had to defeat in order to move the arm around and the fact that it would have been very hard to program in a reliable way. There was also the problem that this robot has not been designed with the idea of hanging from the Lander in mind, this meant it would be unnecessarily difficult to add a hanging mechanism to the robot, a mechanism that is very important to have as it allows us to score a lot of points. We deemed the Drive Train to be good as it allowed us a greater speed in the arena and we thought that Mecanum Wheels would be overkill in terms of mobility.

Mihai soon came with another idea, to have a collecting system that can go up and down with a slider and can also incline itself in order to collect minerals easier. We liked the idea of this design because it had a rudimentary, but efficient, hanging mechanism and that meant we could score more points than with the previous one. This design lacked, however, in a rapid way of collecting the minerals because we had to actually go inside the crater if we intended to collect anything which meant we would lose a lot of time. Also the robot was in danger of tipping this way because most of its weight was on the back of the robot.

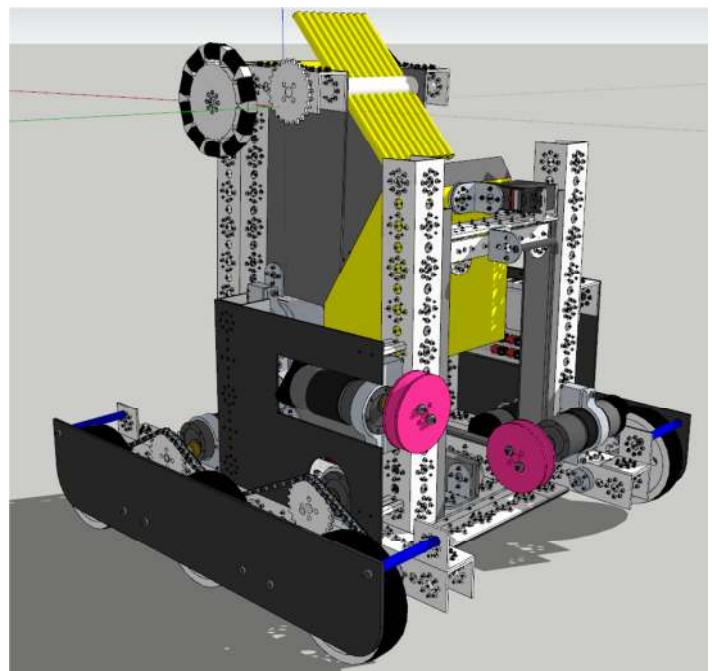


Mihai's first design of R.E.L.U.



Mihai's second design of R.E.L.U.

After these two ideas Albert came up with a design that incorporated the advantages of both previous ones and also reduced the disadvantages as much as possible. This was the design we decided our robot would have. It had a hanging mechanism. We had two sliders that would allow us to reach inside the Crater without ever going inside it. The collecting system has been improved and would be able to get minerals in, easier. This design seemed like it would be perfect for us during this year's game.



Albert's first design of R.E.L.U

## R.E.L.U. in October

Having our Design finished for now, it was time for the Assembly Department to get to work. The Drive Train took a surprising amount of time to assemble due to several reasons. First of all, we were renovating our Robotics Laboratory so we couldn't work there, so we used the Physics Laboratory instead, which limited the time we could spend there. Also, our Chain Breaker broke when we were breaking the last three chains so we had to improvise until we got a new one.

Because our Drive Train from the design was not finished yet we built a more simpler Drive Train to show to the participants in Erasmus. This also set us back a week because the simpler Drive Train was made of the same parts as the one we had in the Design.

Besides working on the Drive Train, somebody had to make a connector to the REV Expansion Hub with one end having Anderson Poles. This was because in the past two years we used a Modern Robotics based system which needed batteries to have Anderson Poles, so instead of modifying batteries once again we decided that we would just make a connector that had one end with Anderson Poles.

We managed to get a new Chain Breaker with the help of a local blacksmith which we have gotten to know through our University. This allowed us to start working on the Drive Train once again.



The improvised R.E.L.U. we have presented at an Erasmus.



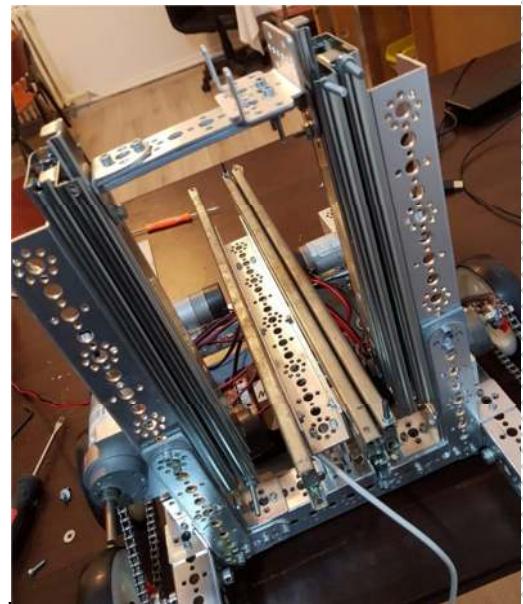
The battery connector we made for Anderson Poles.

However, not long after we started working our new Chain Breaker broke again and we had to take it for reparation.

Because we had another Erasmus visit soon we decided that this time we would improvise the current Drive Train because it would set us back way to much.

## R.E.L.U. in November

After we finished our Drive Train and prepared to assemble the rest of the robot we came to the realization that the sliders in Albert's design were smaller than the ones we could find or buy. This lead to some minor and major changes in the design of the robot. First of all we lifted the horizontal sliders up so that they don't hit the other C Channels. Second of all we had to create a different connection between the vertical sliders because they were bigger and shorter than the ones in Albert design. These two changes, while not major, snowballed and lead to many more adjustments. We could not connect the motor on the horizontal Linear Slides responsible for flipping the collecting system like in the design. Because of this the gearing became non-existent and meant that we had to make a lighter collecting system. Thinking these changes through took us a longer time than expected and pretty much lasted the whole month.



The Drive Train with the Linear Slides we needed for the modules added.

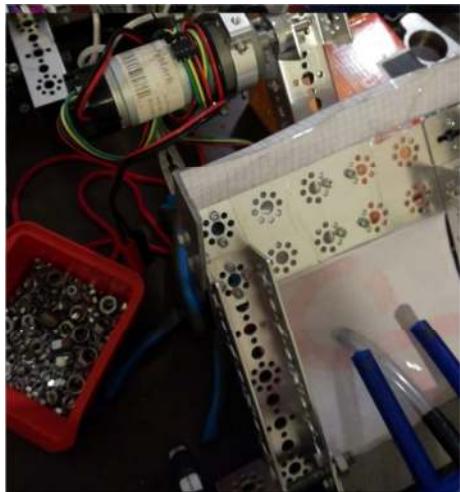
## R.E.L.U. in December

With the demo at lasi closing in we started working harder than ever to finish R.E.L.U for his first competition. We rushed some of our decisions because of the lack of time. We added one more servo for the scoring system because it was very heavy, made extendable cables for the servos that would go up, made the scoring system out of a flat and a few L brackets. We then attached a smaller and a bigger pulley instead of two of the same size on the motor that was responsible for controlling the horizontal slide because of the way we attached the ropes.

Our collecting system has been changed as well we used shorter Channels and we replaced anything that would normally have been made out of plastic with paper.



R.E.L.U. completed, before adding spacers and side-walls



The collecting system we have used.

Because we were in a rush we also used extrusion bars as spacers. This decision was also made because we knew our robot couldn't possibly weigh more than 15 kg.

## R.E.L.U. in January and February

After the demo at lași, we met to talk about the future of the team and what needs to be done. The meeting was structured on 3 main topics

1. The lași Demo
2. Setting deadlines for the following week
3. Future strategy

1. lași Demo From the everyone's presentation, we deducted the following: We had a bad presentation of the team, we have to change the design of the robot (because it reached a weight of 14 kg) ,we made poor use of the team members (this relates to bad team organization)

2. For this section of the meeting we had a special guest, an alumni of the college, who is now a student at Oxford University. With his help we started to rethink the autonomy part especially. Here we split the members into departments/ people whose work was related/ had ideas. Dragos came up with a new design for the robot which was taken into consideration, but because it wasn't completed, he was given another 2 days to finish the design, with the help of Albert.

3. We decided we should change the design of the robot starting with the drivetrain, because driving the robot with the old Drive Train felt clumsy and difficult for the driver, lowering the efficiency of the robot

Dragos's design was very similar to Albert's, however this one is way lighter. While as concepts all the systems are the same, the executions differ a lot. This time we made the collecting system lighter, we added a gearing to the motor that helps the robot climb up the Lander, we separated the two pulleys that were for pulling and pushing respectively. Another difference between the two designs is that Dragos's used what we earlier deemed to be overkill, a Mecanum Drive Train. We have concluded that it would actually be very useful for both climbing up the Lander and also for collecting minerals.

Unlike the previous design the assembly of this one has gone with little to no problems. We now are ready and can't wait to see how our robot will fair against the others.

# **5.GAME STRATEGY**

## Introduction

This season's game has a steep curve in terms of earning point. While the Autonomus and End game are not way to challenging technically wise and offer a lot of points(80 in Autonomus,50 in the End Game), earning points in TeleOP is harder, due to the low value of a single mineral (5points) and the fact that we can't carry more than 2 at once. Because of this, we decided that we should do a robot that, while having the Autonomus and End Game extremely reliable, would also be capable of scoring at least 6 to 8 minerals.

While not extremely important in End Game and Autonomus, the Drive Train plays a vital role in scoring minerals due to the distance the robot must cover. We decided that a Mecanum Drive Train would be best suited for this as we did not intend to get in the crater from the beginning. Second thing that was most important in our design was to have our robot as light as possible because that would allow us to be as fast as possible.

After designing our robot with that in mind we have gathered up and devised a couple strategies depending of the situations we find ourselves in.

## Ideal Case:

Both our robot and our ally's robot are capable of doing every task and also of scoring 8 minerals in the Lander each, meaning they are in optimal condition:

### Autonomus:

Both robots Landing ( $30 * 2 = 60$  points)

Both robots Claiming ( $15 * 2 = 30$  points)

Both robots Parking ( $10 * 2 = 20$  points)

Both robots Sampling ( $25 * 2 = 50$  points)

Autonomus Total: 160 points

### TeleOP

16 minerals scored in the Lander ( $5 * 16 = 80$  points)

TeleOP Total: 80 points

### End game

Both robots Latching ( $50 * 2 = 100$  points)

End Game Total: 100 points

**Total : 360 points**

This is the ideal development of a game match, of course not everything goes as planned, we might be able to score even more minerals in the Lander, or by accident the opposing alliance might score some points in the Lander for us. As we have seen however, sometimes things can also go bad, either for us or our ally, keeping that in mind we have thought through some other strategies in case our ideal cannot be reached.

## Less than ideal Case:

In this case our ally's robot does not work because of a certain bug we have failed to identify or to solve before the match began, we will assume that our robot will be however in optimal shape. Even though this is a very bad scenario we will not give up and still try to do our best. In Autonomus we will sample the mineral for them which would allow us to score the 25 points they would have scored if their robot wouldn't have had that certain bug. We will instruct them to start on the side of the lander that faces away from the crater so that we will get a slight edge in terms of scoring minerals in TeleOP.

### **Autonomus:**

One robot Landing ( $30 * 1 = 30$  points)

One robot Claiming ( $15 * 1 = 15$  points)

One robot Parking ( $10 * 1 = 10$  points)

Both Sampling tasks being completed successfully ( $25 * 2 = 50$  points)

Autonomus Total: 105 points

### **TeleOP**

10 minerals scored in the Lander ( $5 * 10 = 50$  points)

TeleOP Total: 50 points

### **End game**

One robot Parked in the Crater ( $50 * 1 = 50$  points)

End Game Total: 50 points

**Total : 205 points**

This case is far from ideal, however because our robot would be in optimal condition we would still fair quite good. Even if we assume that the enemy alliance will have perfect Autonomus ,if somehow they will not manage to Latch the win would be ours. If they will manage to Latch we will still earn quite a lot of TieBreaker Points.

## **Worse Case:**

We can affirm that this is one of the worst , if not the worst case we will possibly encounter. In this scenario our ally's robot would be bugged, as before, however our robot would be in a very bad shape as well, not managing to score the second sampling ,not being to Latch back to the Lander, and not able to score minerals into the Lander.

### **Autonomus:**

One robot Landing( $30 * 1 = 30$  points)

One robot Claiming( $15 * 1 = 15$  points)

One Sampling task being completed successfully ( $25 * 1= 25$  points)

Autonomus Total: 80 points

### **TeleOP**

8 minerals scored in the Claimed Zone ( $2 * 8 = 16$  points)

TeleOP Total: 16 points

### **End game**

One robot Parked in the Crater ( $15 * 1 = 15$  points)

End Game Total: 15 points

**Total : 101 points**

This scenario would be extremely unlucky for us. We would only be able to win if the other alliance encounters the same problems we do or even worse. Even if we would win the amount of TieBreaker Points we would gain from this win would be very small.

## Tips and Tactics

After devising the three scenarios above we decided that every other match would be something between these three. We have also thought through a couple tips and tactics in the worst happens and also ways of avoiding this from happening.

### One of the wheels coming off:

This is something that during all our competitions throughout the past years. This can potentially lead to a lot of other problems like not being to move without tipping or not having a good Autonomus.

#### How to manage it during the match:

While there is nothing we can do during Autonomus we can move quite good during TeleOp using the wheels from our collecting system for balancing. Also if this happens we will try to score all the minerals that are outside the crater in the Depot because even if they are not worth a lot of points(12 points) they can break a tie and are also fast to score.

#### How to prevent it:

Every match each wheel will be checked so that it is fixated to the axle hub, if there is a little amount of play to it we will unscrew it and change it with a new one or we will just unscrew it, make sure it is positioned right and screw it back.

### Battery not being fully charged:

This is something that will not affect our capability of scoring directly, but can make us move slower and thus not be capable of scoring as many points.

#### How to manage it during the match:

Again, this problem is possible to fix during the match, however, in case this happens we will have a button for the TeleOp that will place all motors under maximum load when needed, while this will burn even faster through the battery if pressed at the right moment it will give us the edge we need to keep up with the enemy alliance and still climb the lander.

#### How to prevent it:

To prevent this we make sure that all our batteries are charged to the maximum before we go to the competition, also during the competition we will have 2 chargers in order to charge the batteries faster. This will also be true for our phone that we will use as a Robot Controller and Driver Station. To also be completely sure that the phones are charged at any moment we will have an external battery in which we will plug them as soon as the match ends.

## **Autonomus not working for whatever reason**

This is not something we can address during the match, however we have a way of preventing against it.

### **How to prevent it:**

To prevent this we will run tests and double-check everything the day before leaving to the competition. Also as soon as we will reach the training pits we will take our robot there for one more set of tests in every position and one again a double-check. If there will be any problems with the Autonomus all the members from Assembly and Programming will focus on solving it above all else, while the PR and Design will provide any explanations needed by visitors.

## **Our robot is overthrown**

This is a very serious issue because it would mean we would become completely useless.

### **How to manage it during the match:**

We will try to get ourselves back on our "feet" by extending our collecting system as much as possible and trying to drive forward towards the Crater. We will also ask for the help of our teammate, however, if we notice it takes more then 5 seconds we will ask them to leave us and try scoring as many points as possible, if we are close enough we could at least partially park in the crater with our collecting system.

### **How to prevent it:**

First of all we will avoid contact with any robot during the time we score minerals because that's when our robot is most instable, also we will try not to get to close to the crater because that could also be a possible cause for us to tip.

## **Parts of the robot failing, or getting broken**

Depending on the part that gets broken we will try to use the tactics mentioned above for other issues.

**How to prevent it:**

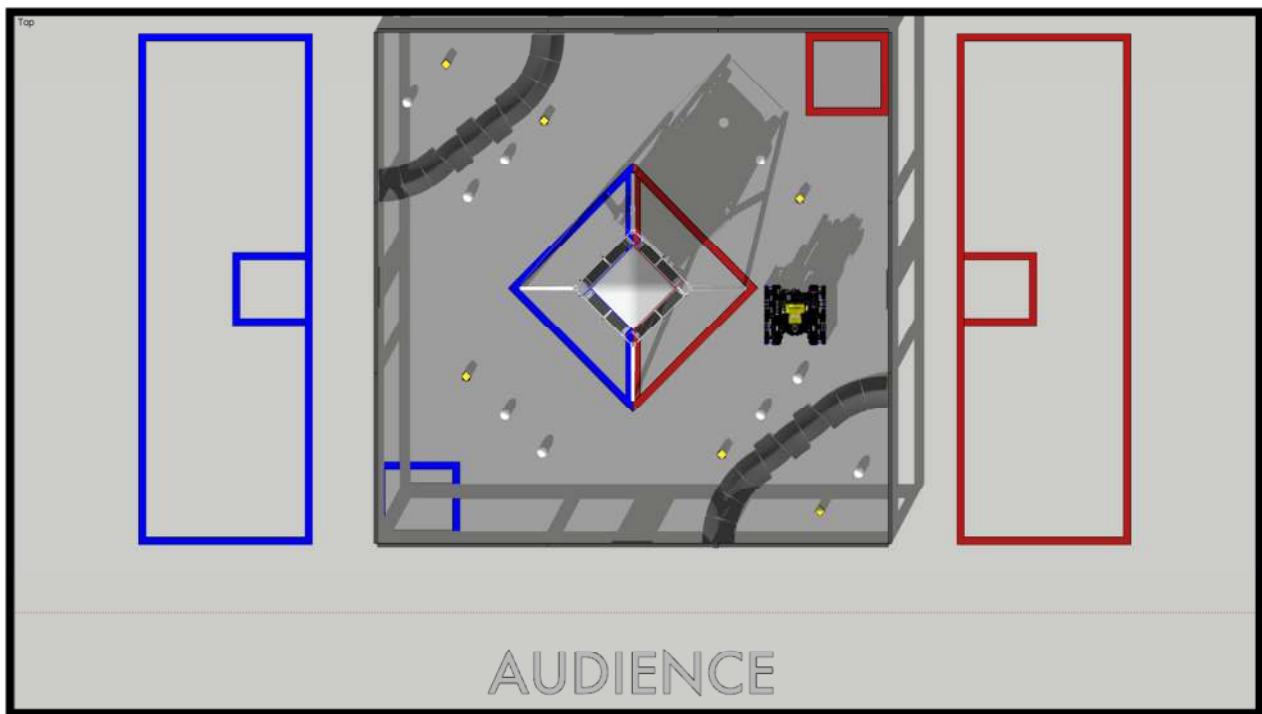
Same as before, we will double-check everything before leaving to the competition and after every match, in case something breaks we will have at least one back up for everything (including cables and even a REV Expansion Hub) except our mecanum wheels , because they are hard to break.

# 6. ROBOT DESIGN

## The Department of 3D Design

The 3D modeling department is the section of the team where the preparation for the matches in the competition begin. This year, we had a consistent flow of ideas, both from past members but also from new recruits. Sharing knowledge and finding solutions for this year's game was a true challenge, but with coordination and hard work, soon enough the models constructed on the computer were ready to be given for assembly.

The workshop prepared during the Summer School was a paramount opportunity for the team to attract new forces in any department. If there is one aspect that impressed all past members, the ingenuity and creativity of the freshmen is for certain. Being thought how the 3D model, the ninth graders learned quickly the basics and already started to create their own robots. Sketchup was the go to application, as it's interface and mechanics were easy to understand. Later on, we changed to Solid Works and Creo, mainly because we could have downloaded any Tetrix and AndyMark piece directly into our model.



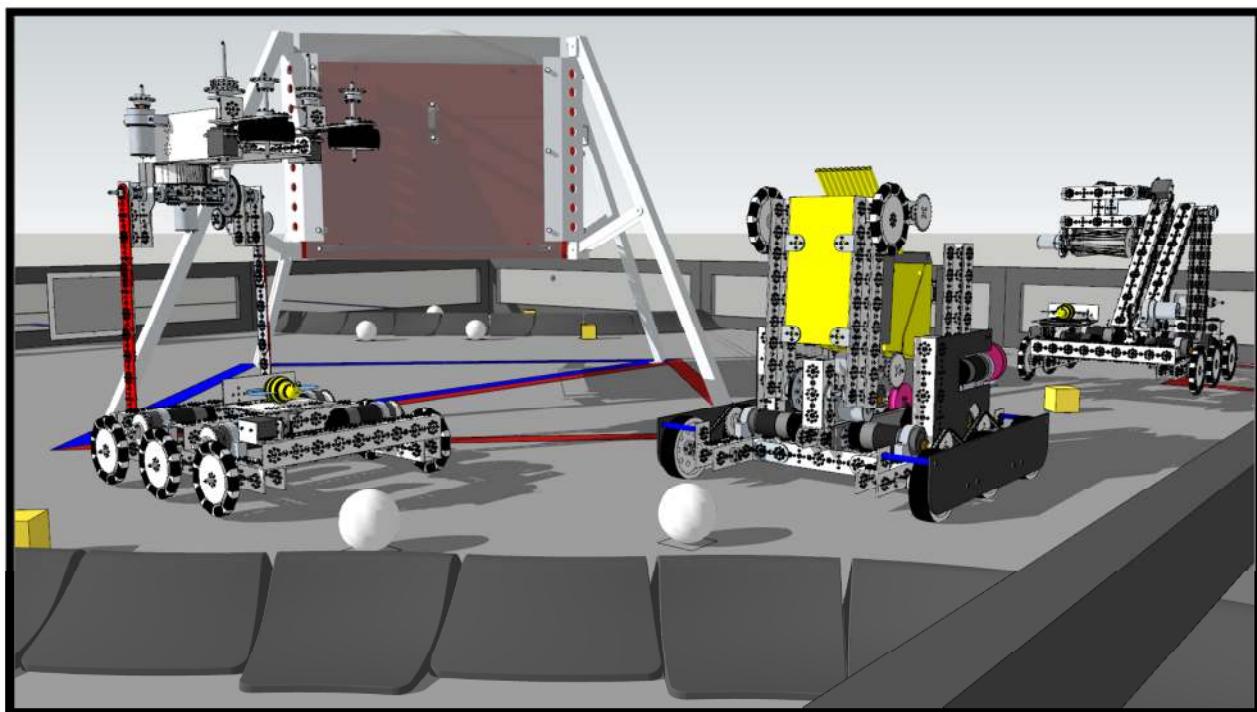
### - THE ARENA -

The selection of the components of the robot was carefully done. As the long time for delivery was a substantial problem, the team had to make the most out of the pieces from the previous years.

Consequently, we have adapted the functions of robot in accordance with both available items and what we could have ordered online. The strategy earlier established was paramount when choosing the most efficient parts and deciding how to build them.

The design was inspired by the last year's game "Relic Recovery", and the one prior to it, "Velocity Vortex". The team decided that gaining as many points as possible was all about descending and climbing the lander while the time for transporting the cubes and spheres into the correct box was minimum. Therefore, we imagined the robot as having two separate parts, one for collecting the minerals and one for dropping them. However, the ideas for the designs proposed by the new recruits were impressive, much simpler, but not as efficient in the arena.

The Regional Demonstrative Competitions we attended at Cluj and Bucharest were a great opportunity for the team to understand better the mistakes in the model, what should be done in order to improve them, and what to do in order to make sure that the inspection of the robot would occur without embracing any problems.



#### - ROBOT MODELS -

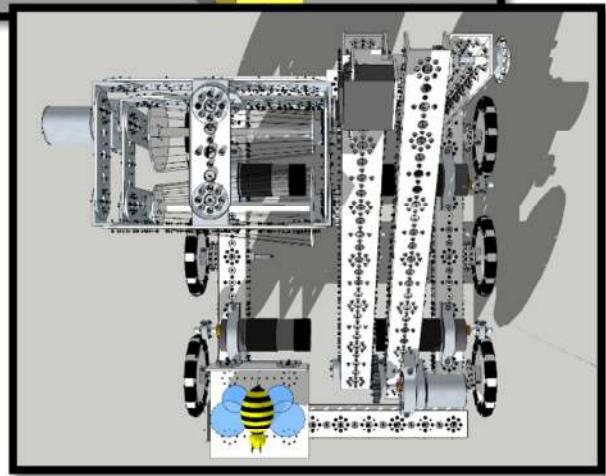
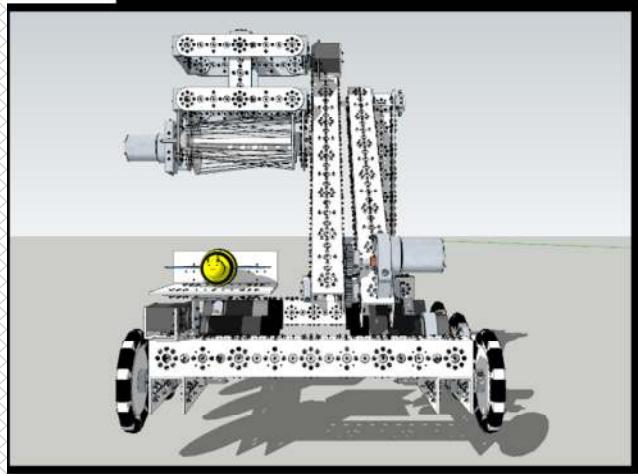
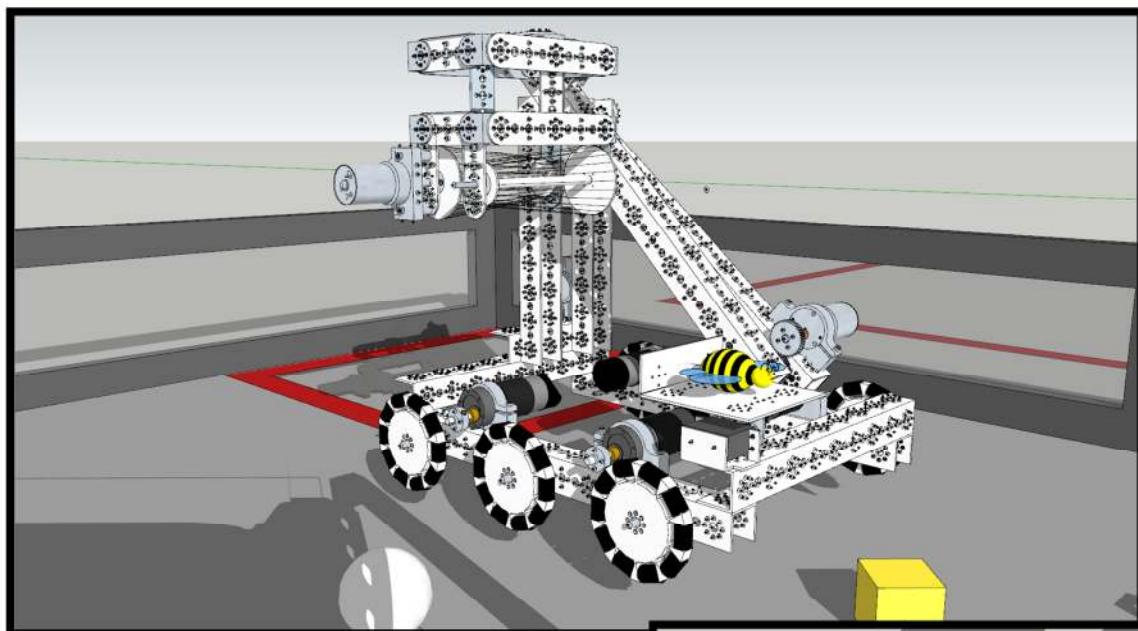
Apart from constructing the robot, the 3D modelling applications were used for printing some of the components we needed like different sized sprockets, spacers, wheels for wire support and other different components. Creo and Solid Works were used mainly for these parts and with the help of the 3D printer and the CNC station we had access to at the „Stefan Cel Mare” University of Suceava,

## Robot Concepts

As previously mentioned, ideas came from all the members, regardless of the department they were in. The old recruits of the team were delighted with the ideas proposed by the freshmen. Their ingenuity was astonishing for someone who had only several hours of experience in the world of Robotics. It was much to our surprise when the freshmen were deliberately making models without us telling them. Some of their ideas turned out to be complete robots, ready for assembly. The next robots are exclusively built by the new members of the team.

### I. STRUȚO-CĂMILA (The Ostrich-Camel )

The name might come as a surprise, but the combination of words is carefully chosen. The Ostrich is represented by the long arm used for collecting and dropping the minerals, similar to the way this animal has its posture or blocks its head in the earth. The Camel is a simple reference to the crate, since the bumps on the surface look like the back of this animal, where this model can reach easily with the help of the 6-wheel drive train.



## DRIVE TRAIN:

A Tank-Type drive train, specially built for climbing safely in the crater. The wheels are rotated with the help of the chains which are directly fixed with sprockets on the wheel axle and the motor.

### COMPONENTS:

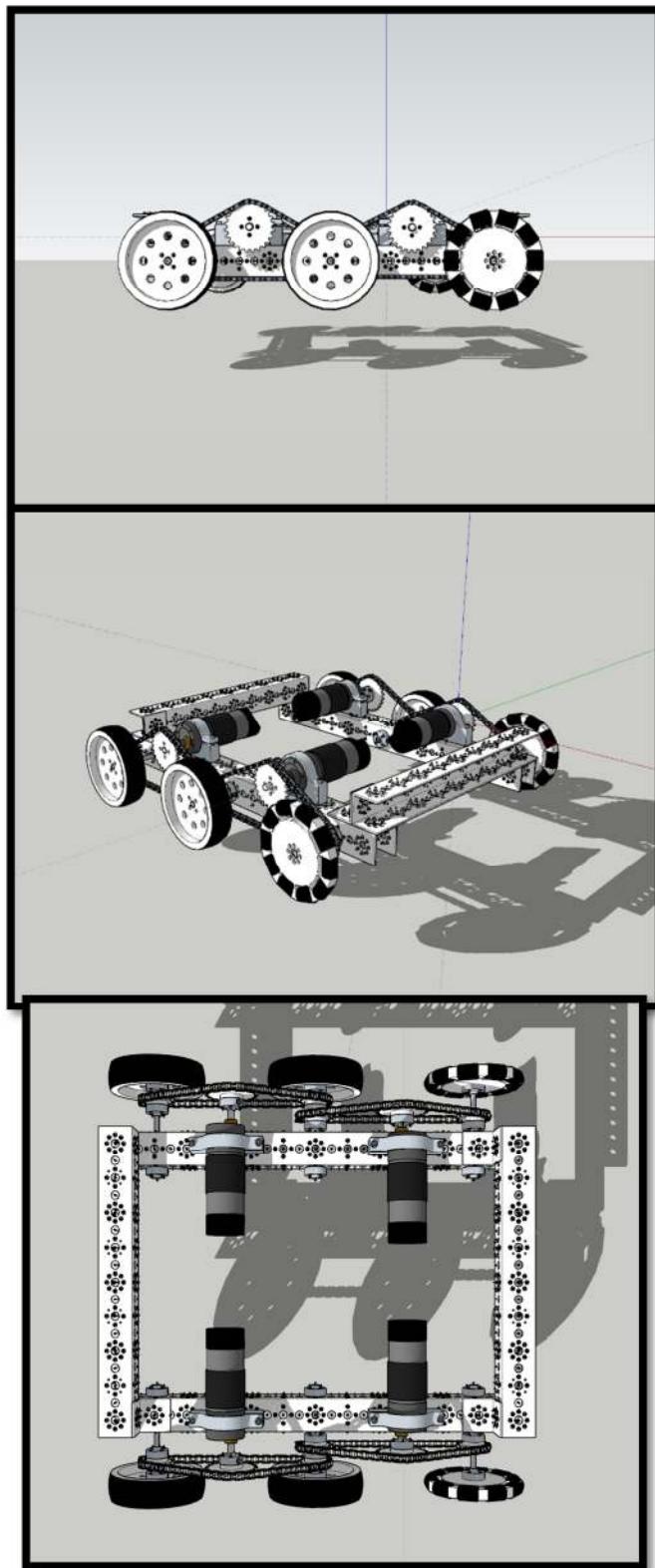
- 2x Tetrix 416 mm C-Channels used for the sides;
- 2x Tetrix 288 mm C-Channels used as a foundation for the upcoming functions
- and internal resistance;
- 4x L Brackets;
- 4x Andy Mark Motors;
- 4x Tetrix Motor Mount;
- 4x Chains;
- 4x Tetrix 24-tooth Gear;
- 6x Tetrix 16-tooth Gear;
- 4x Tetrix 4" Wheels without Tires;
- 2x Tetrix 4" Omni Wheels;
- 6x Axles;
- 24x Axle Hubs;
- 12x Tetrix Bronze Bushing;

### PROS:

- The 6-wheel drive train can easily climb over the bumps in the crater, thanks to the wheel in the middle which is also actioned by the motors.
- Assures stability, avoiding the robot to fall while climbing;

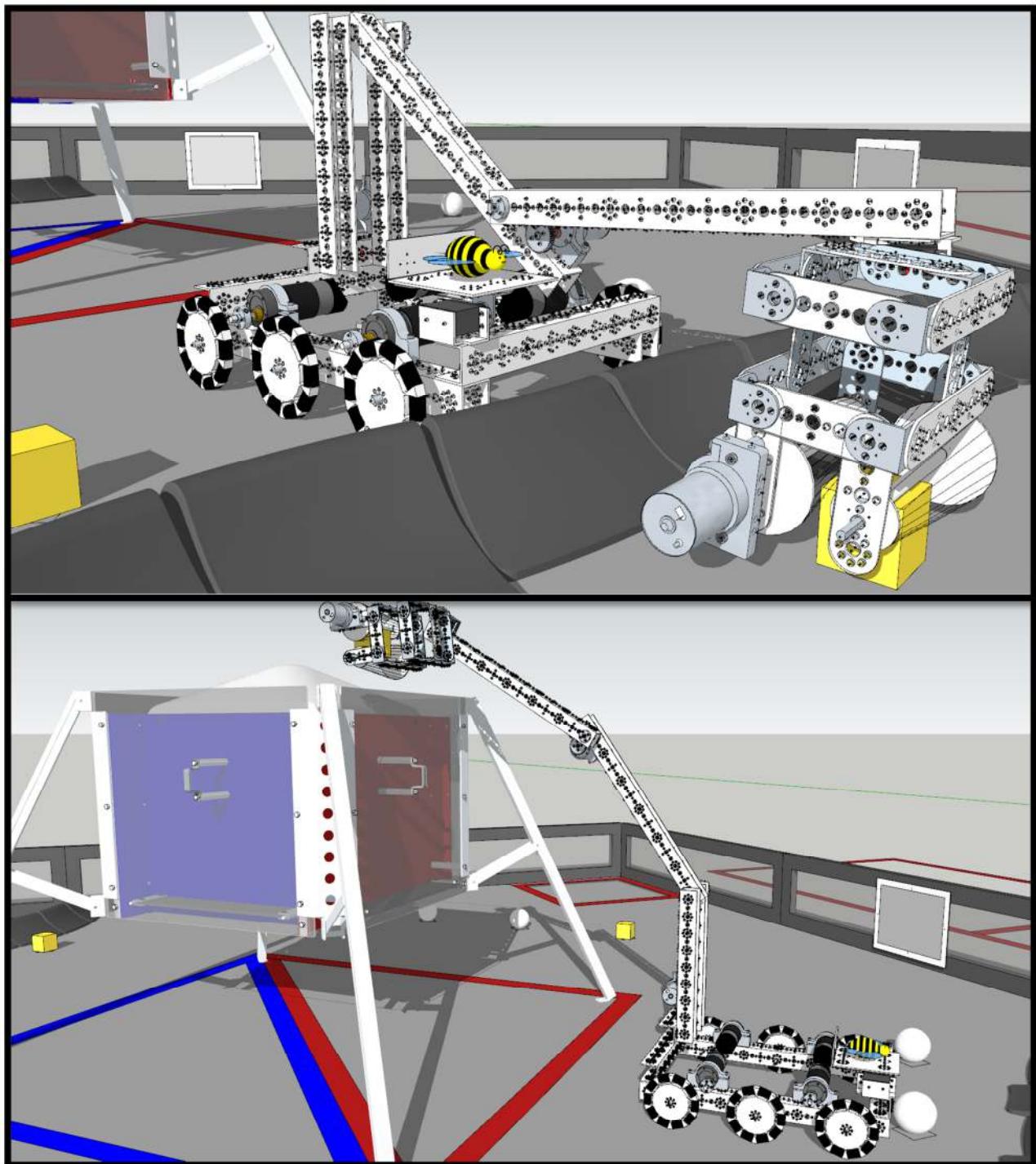
### CONS:

- Slow movement while turning which means scoring less points from minerals as we waste more time.



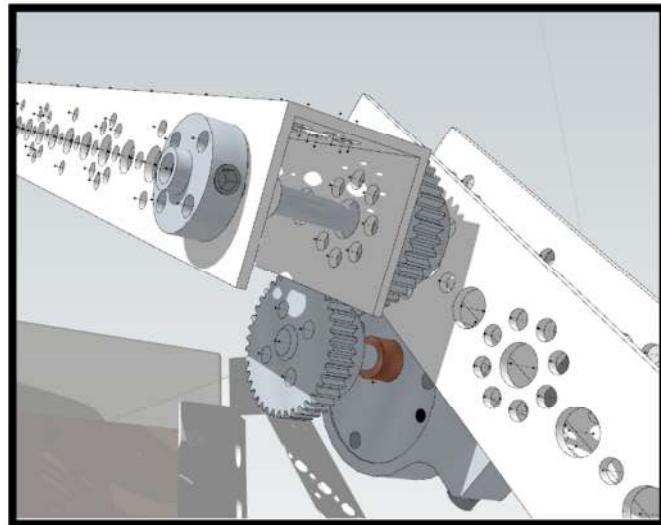
## COLLECTING MECHANISM

Based on the idea of a crane, it has a long arm with 3 rotating points, it reduces the traveling distance when the robot is placed nearby the crater. The collecting of the minerals is assured by two sets of strings, revolving towards the exterior (the left set revolving counter clock-wise whereas the right set revolves clockwise). When dropping the minerals, the two set simply revolve oppositely to the first motion.

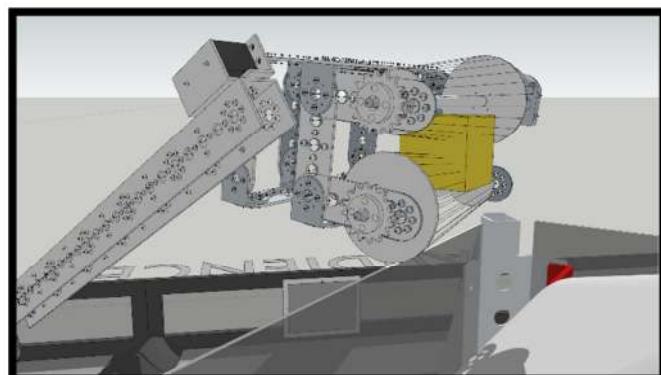


**COMPONENTS:**

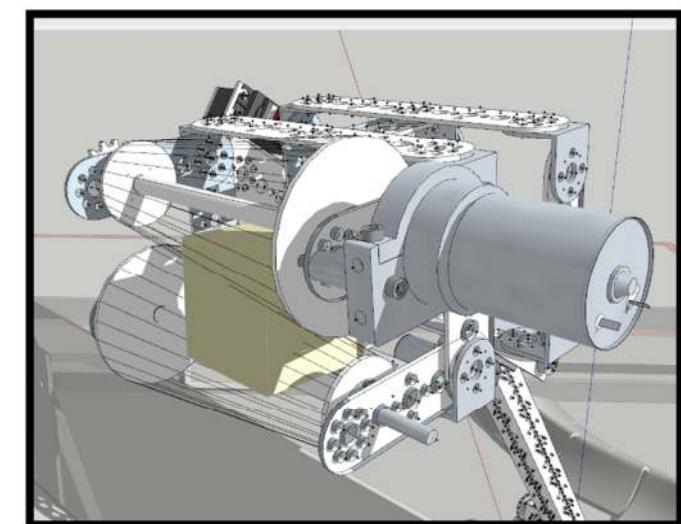
- 4x Tetrix 416 channel;
- 1x Servo motor;
- 1x Servo mount;
- 3x AndyMark Motors;
- 3x Motor mounts;
- 6x Tetrix 16-tooth Gear;
- 6x Tetrix 24-tooth Gear;
- 12x Tetrix Axle Hubs;
- 2x Tetrix 40-tooth Gear;
- 6x Bronze bushing;
- 11x Tetrix Flat Profile 96mm;
- 4x Tetrix Flat Profile 160mm;
- 10x Tetrix L brackets;
- 2x Chains;
- 2x String Collector;
- 2x Tetrix Axles;

**PROS:**

- Efficient for gaining points from dropping the minerals as can revolve 145 degrees;
- The robot doesn't have to turn in order to drop minerals into the box;
- Fast collecting thanks to the revolving strings;

**CONS:**

- The Momentum is far too great for the robot not to fall.
- Unstable arms while revolving because of the inertia.
- Motors cannot sustain the crane for too long.



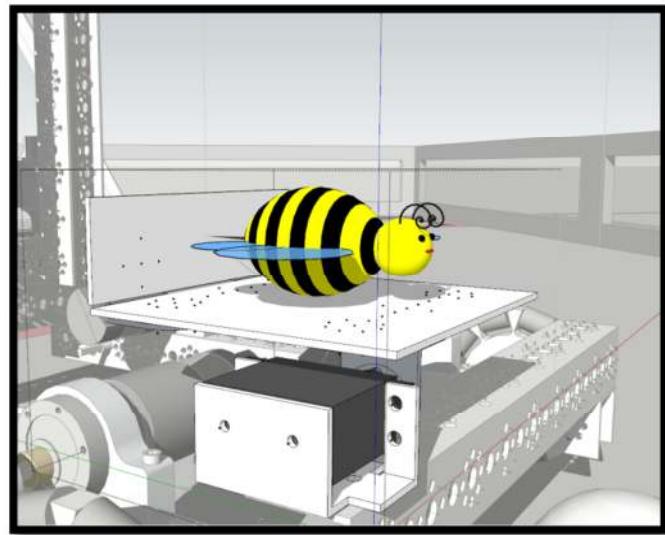
## Play Marker Device:

### Components:

- 1x Servo Motor;
- 1x Servo Motor Mount;
- 3 L Brackets;
- 1x Tetrix Servo Horn;
- 2x Custom made plates;

### Pros:

- Easy to build, and fast while tuning and dropping the Play Marker;
- Extra walls for stability can be added;

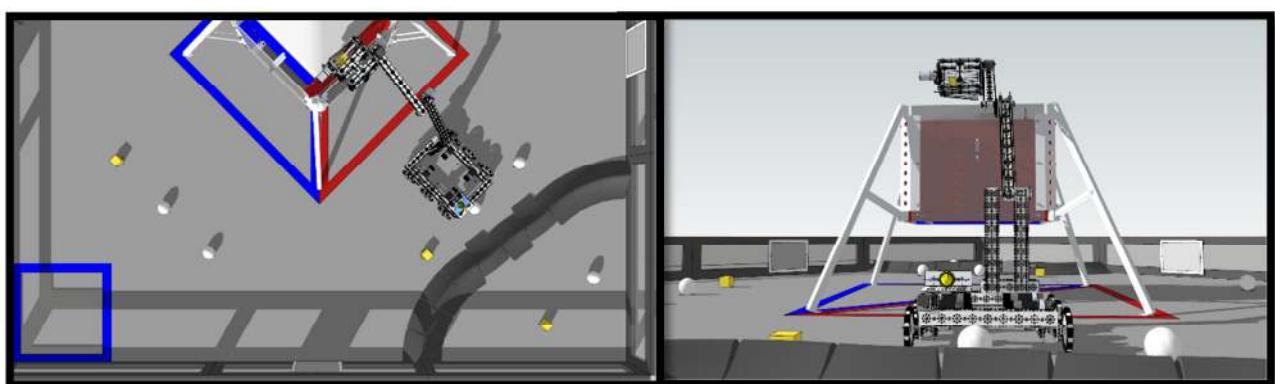


### Cons:

- The Play Marker can fall because of inertia;

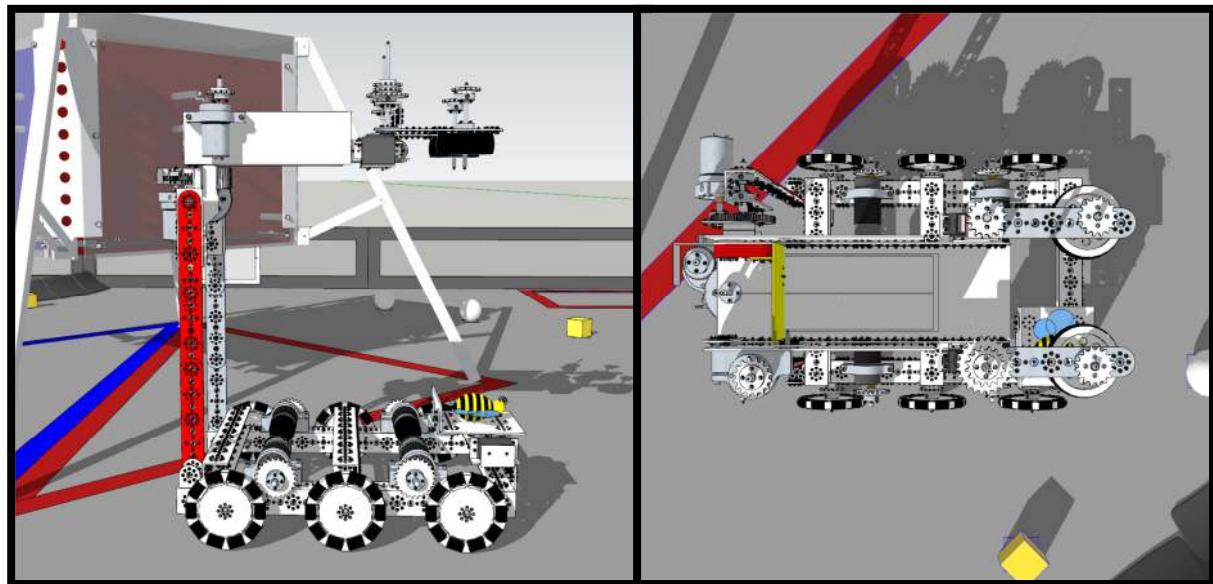
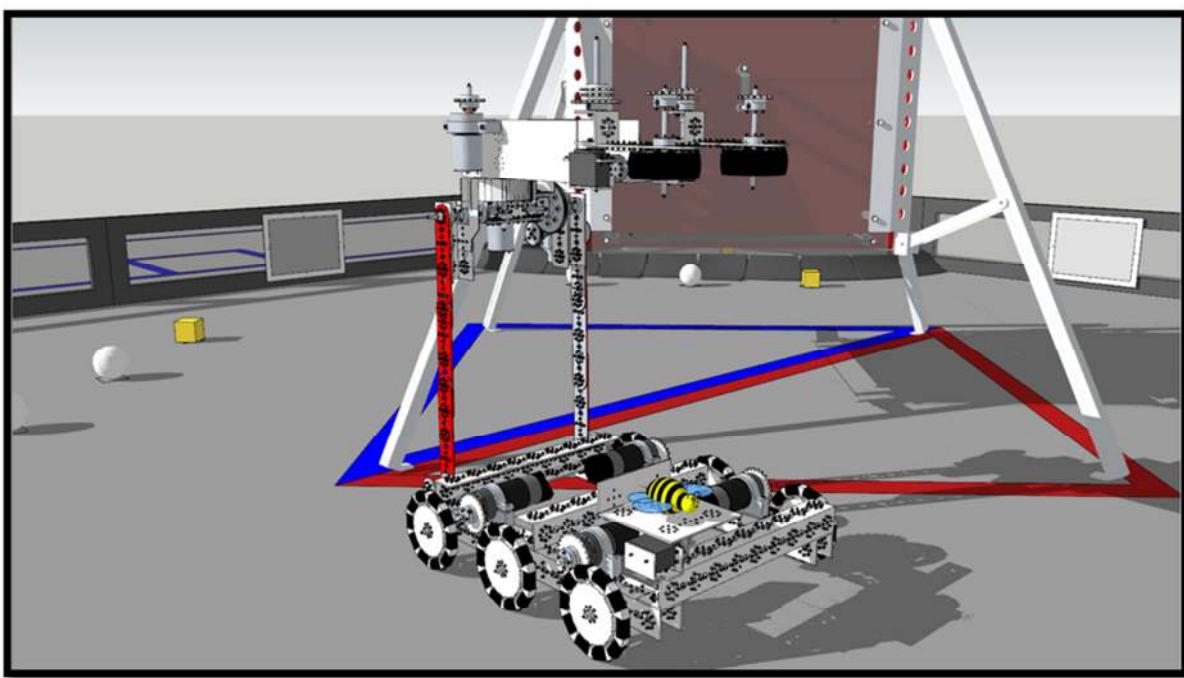
## Overall impressions of the Robot:

This robot was made completely by one of the new members just after the 2 weeks in which the team held the ROBOFUN workshop during the Summer School event organised by the National College "Petru Rareș". Simple and straight-forward ideas, this was a pleasant surprise to the old members of the team. Unfortunately, the model was never brought to life, but instead, it was a clear reflection of the fact that the recruits were going to have a substantial role in the team. The disadvantages were outweighing the strong points, and fixing these problems couldn't have been with the available components.



## II. STRUȚO-CĂMILA V2.0 (The Ostrich-Camel V2.0)

Because the first model was not already enough or just because the newest member of the design department was too inspired and passionate about robots, he came up with a second model. This one astonished us by the unique solutions found for the robot's function, unlike anything we have seen before. Reducing the need for turning the whole robot in order to drop the minerals in the lander, the second concept for the robot is worth mentioning.



## DRIVE TRAIN:

A Tank-Type drive train, specially built for climbing safely in the crater. The wheels are rotated with the help of the chains which are directly fixed with sprockets on the wheel axle and the motor.

### COMPONENTS:

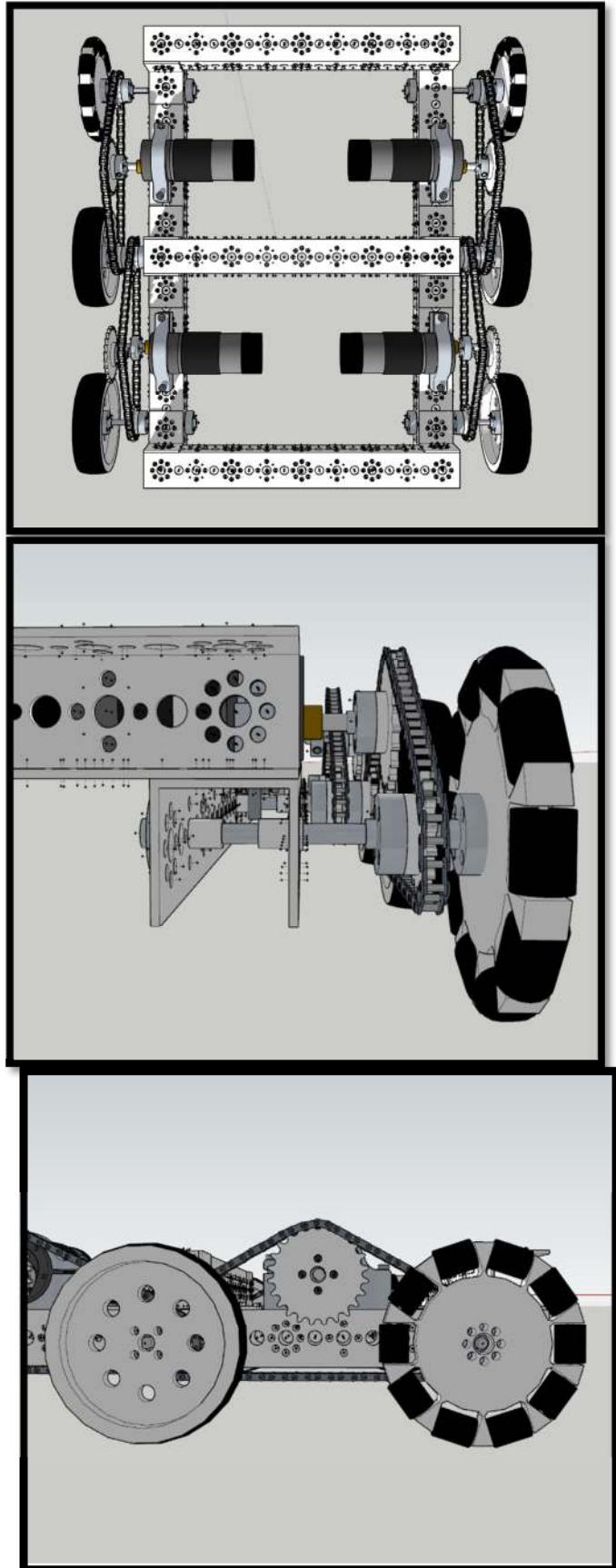
- 2x Tetrix 416 mm C-Channels used for the sides;
- 3x Tetrix 288 mm C-Channels used as a foundation for the upcoming functions and internal resistance;
- 4x L Brackets;
- 4x Andy Mark Motors;
- 4x Tetrix Motor Mount;
- 4x Chains;
- 4x Tetrix 24-tooth Gear;
- 6x Tetrix 16-tooth Gear;
- 4x Tetrix 4" Wheels without Tires;
- 2x Tetrix 4" Omni Wheels;
- 6x Axles;
- 24x Axle Hubs;
- 12x Tetrad Bronze Bushing;

### PROS:

- The 6-wheel drive train can easily climb over the bumps in the crater, thanks to the wheel in the middle which is also actioned by the motors.
- Assures stability, avoiding the robot to fall while climbing;

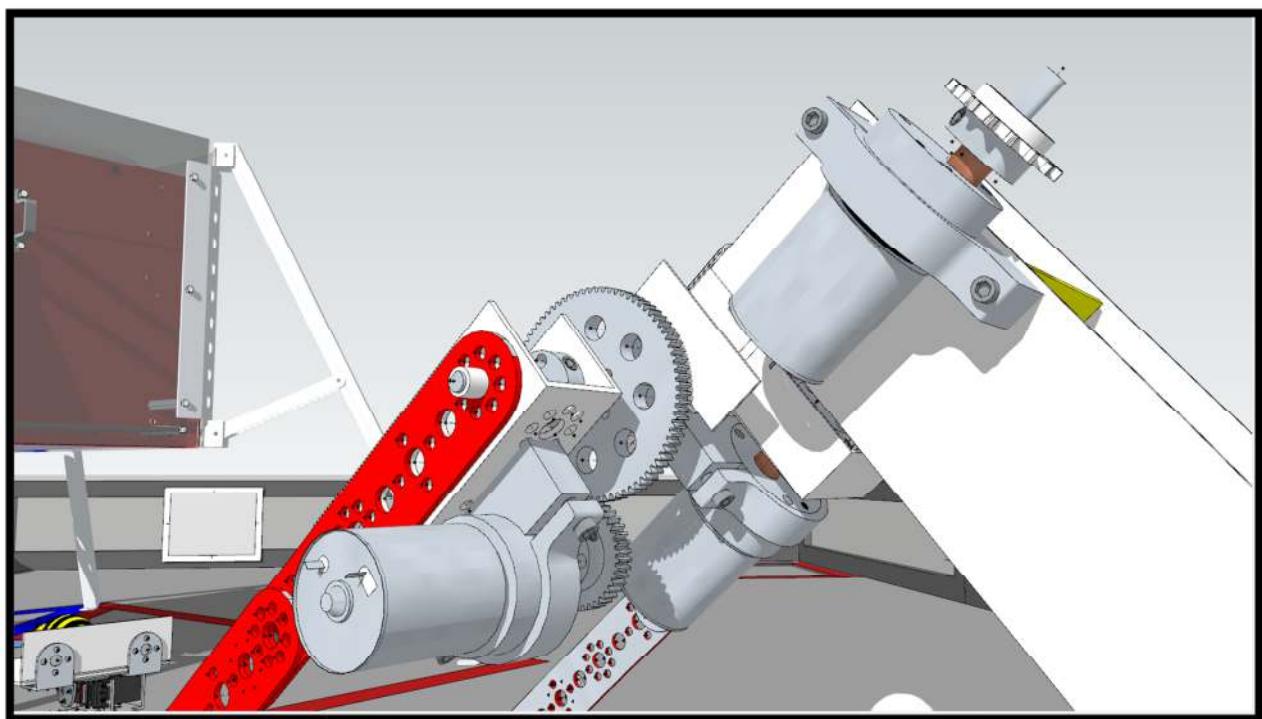
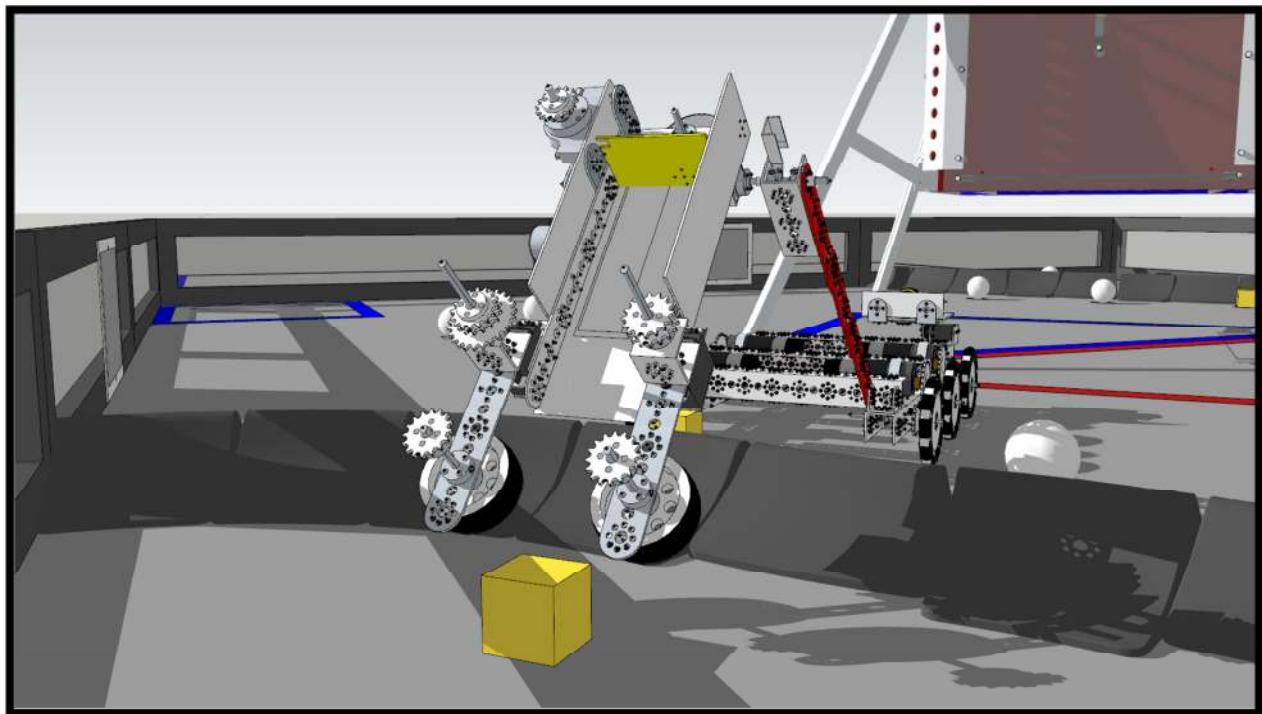
### CONS:

- Slow movement while turning which means scoring less points from minerals as we waste more time.



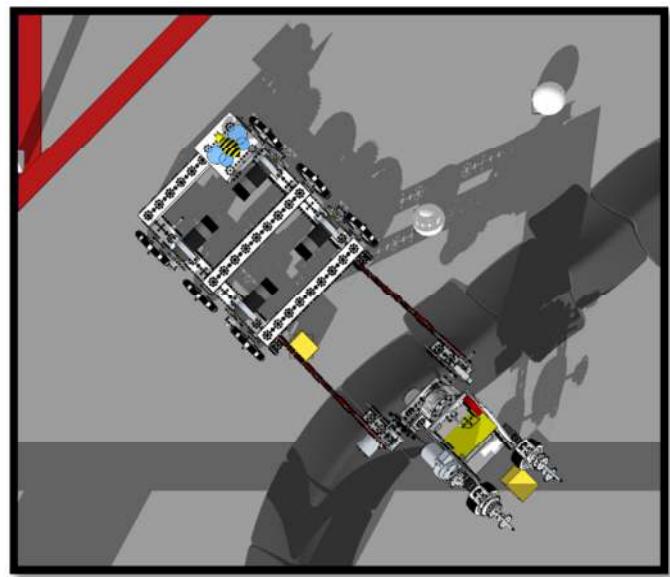
## COLLECTING MECHANISM:

The innovation of this model is the revolving system of the collecting function. Being able to rotate in any direction, it assures a fast collecting and dropping function. Powered by multiple motors, the "bucket" prevents the minerals from falling anywhere else but the right box;



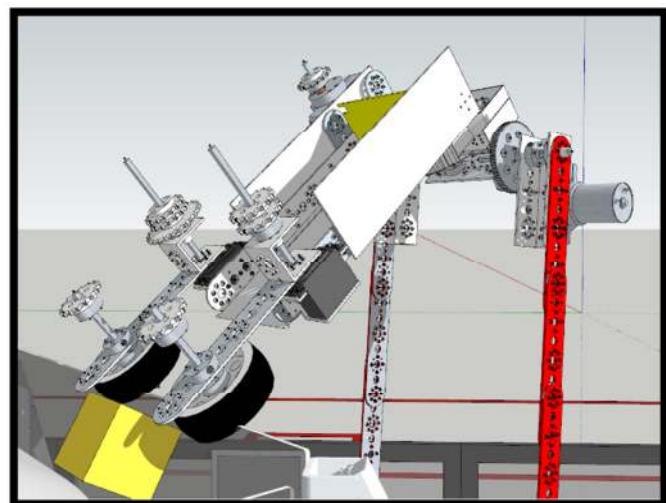
## COMPONENTS:

- 2 Lifts;
- 2x Tetrix 96mm Channel;
- 3x Tetrix flat profile 160mm;
- 2x Tetrix flat profile 288mm;
- 2x Tetrix flat profile 96mm;
- 3x Tetrix Motors;
- 3x Tetrix Motor Mount;
- 2x Tetrix 4" Wheel;
- 2x Servo;
- 2x Servo Mount;
- 2x Axles;
- 7x Sprockets;
- 7x Axle Hub;
- 22x bronze bushings;
- 7x Tetrix 40-tooth Gear;
- 2x Tetrix 80-tooth Gear;
- 2x Cable Guards;
- 200 x 66 x 2 Plate;
- 285 x 91 x 2 Plate;
- 191 x 57 x 2 Plate;
- 1x L bracket;
- 5x 32mm C-Channel;
- 2x Chains;



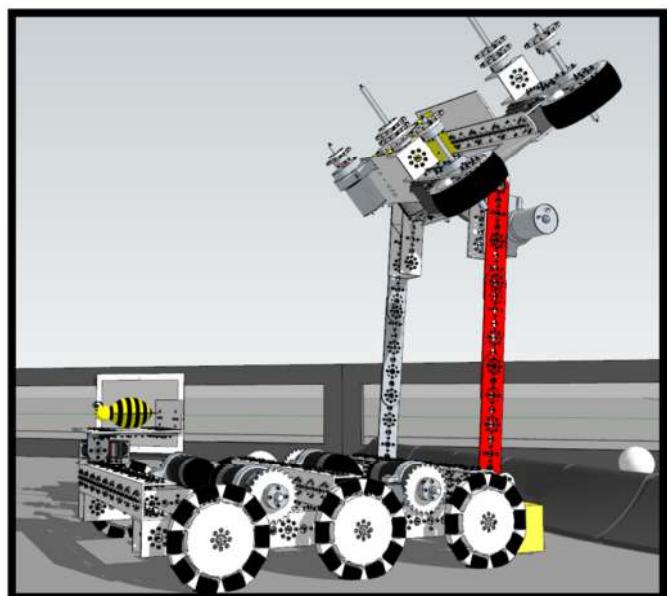
## PROS:

- Efficient for gaining points from dropping the minerals as it can revolve in any direction possible;
- The robot doesn't have to turn in order to drop minerals into the box;



## CONS:

- The Momentum is far too great for the robot not to fall.
- Unstable arms while revolving because of the inertia.



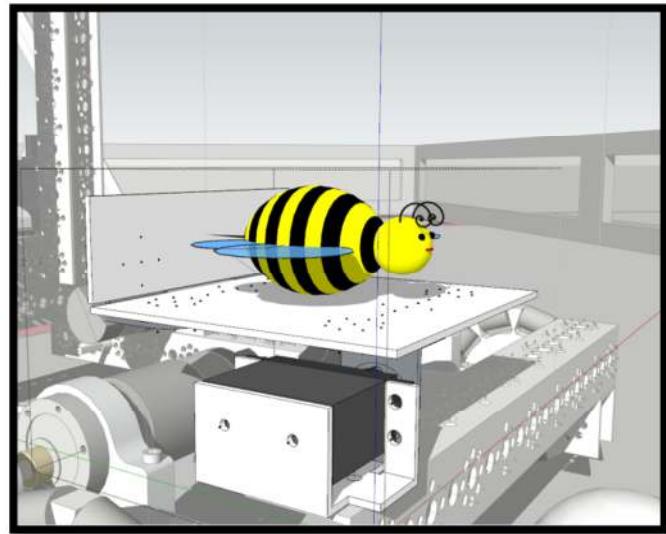
## Play Marker Device:

### Components:

- 1x Servo Motor;
- 1x Servo Motor Mount;
- 3 L Brackets;
- 1x Tetrix Servo Horn;
- 2x Custom made plates;

### Pros:

- Easy to build, and fast while tuning and dropping the Play Marker;
- Extra walls for stability can be added;

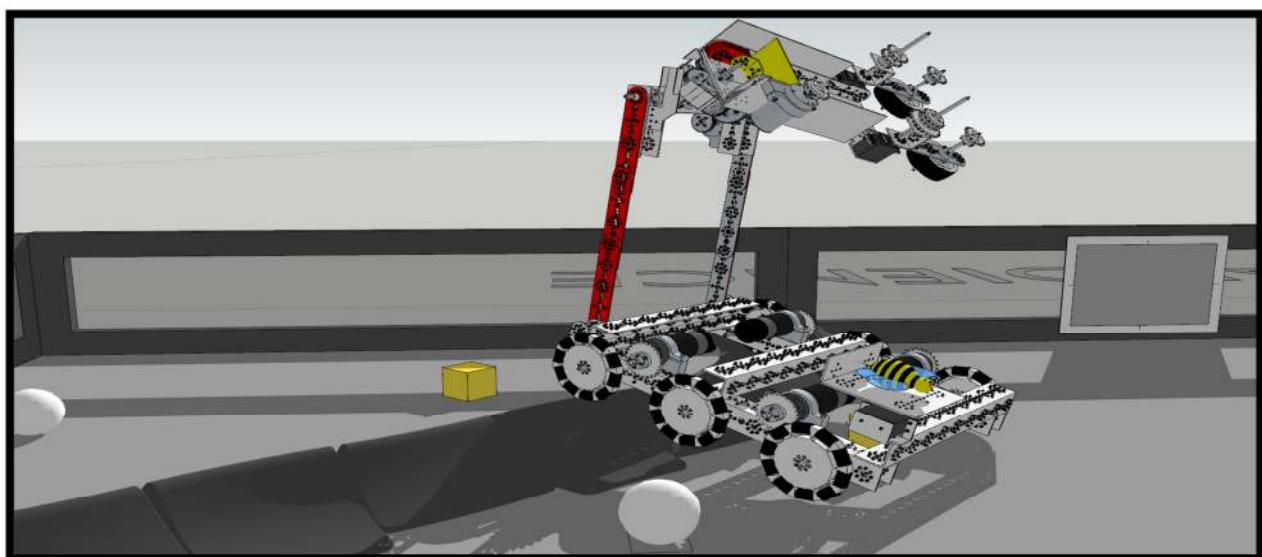


### Cons:

- The Play Marker can fall because of inertia;

## Overall impressions of the Robot:

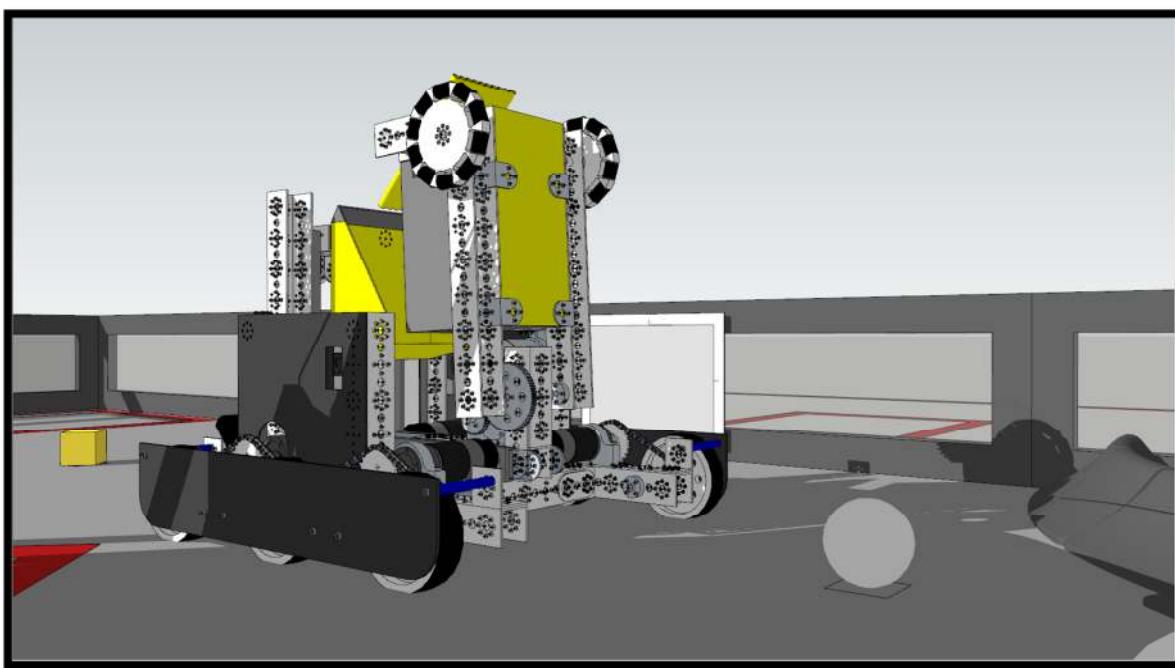
Sharing the same problems of the previous model, this concept couldn't have been built. The weight of the collecting system is just too great for the robot to extend properly. However, once again, the team has witnessed sparking creativity coming from our new recruits, demonstrating that original ideas can come even from the untrained eye.

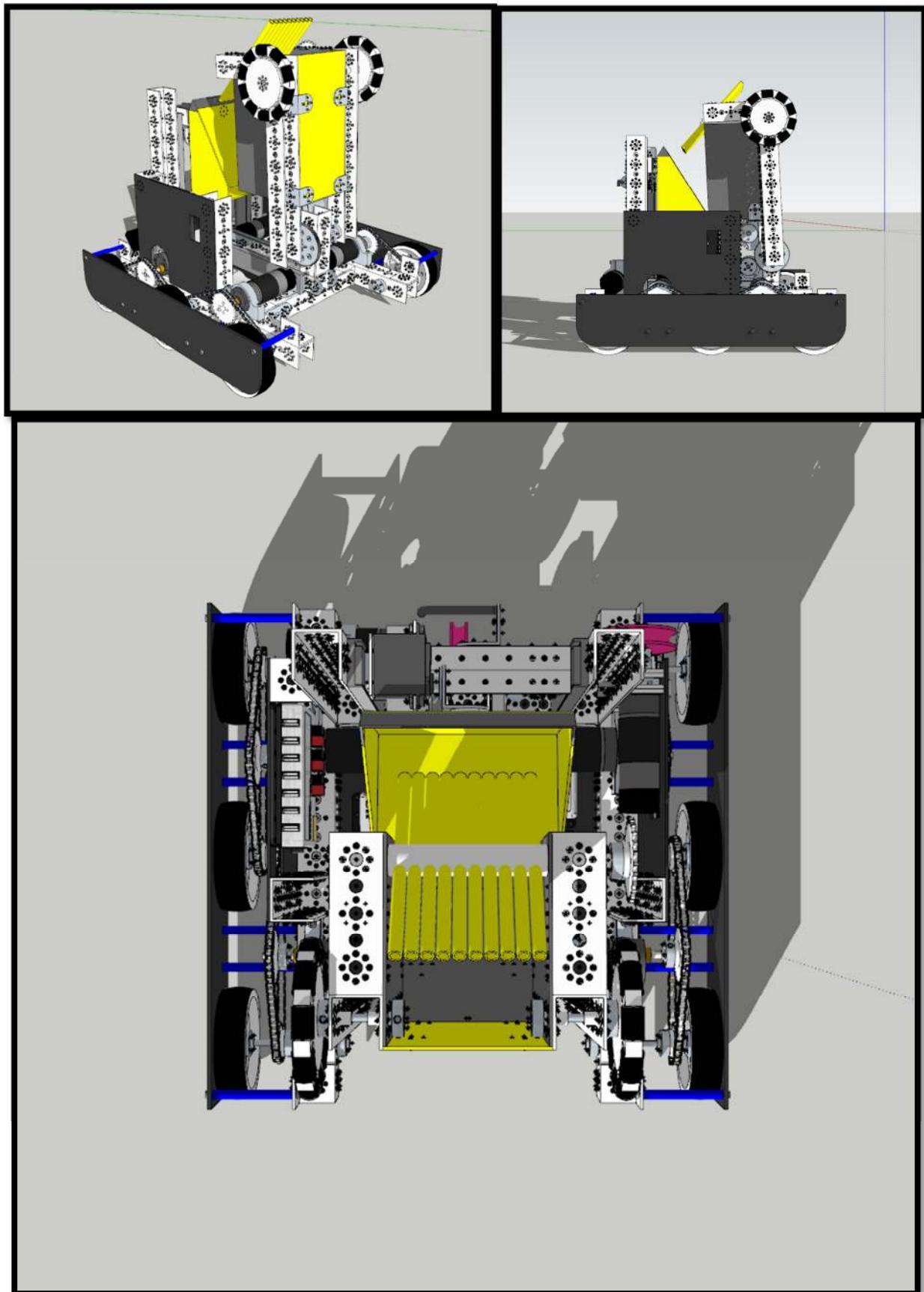


## CONSTRUCTED ROBOTS:

### I. R.E.L.U. VI.0

The first ever constructed robot during this season, the first version of R.E.L.U. is a true challenger. Unlike the previous models, this one has two separate functions, one for collecting (called the shovel), and one for dropping the minerals (called the basket). This model was much more stable, as the centre of mass remained at all times above the Tank-Type drive train. The shovel was represented by a moving platform, that could have extended itself into the crater, without the robot climbing the bumps. The basket is inspired by the robot model we prepared for last year's game "Relic Recovery", as it used two slides for climbing up the basket above the lander. Our team used it in the Demonstrative matches at laşı. After seeing how it performed in real matches, the team decided that we had to make the robot lighter in order to make as efficient as possible. Weighting over 14 kilograms, it was the heaviest out of all the robots. The next and final model shares the same solutions found for this season match requirements, but optimized. However, the team was proud with our first built model, a lot of hard work has been put into making it. Even though it was rebuilt entirely, it was a great concept from which we have gathered knowledge and acquired a better understanding of "Rover Ruckus". The model was complete from any point of view, space for electronics, protection and a clear representation of its functions. This helped the hardware and software department to work in parallel, finishing almost simultaneously. Consequently, R.E.L.U. turned out to be a great first project, the first one that was able to latch on the lander.





## DRIVE TRAIN:

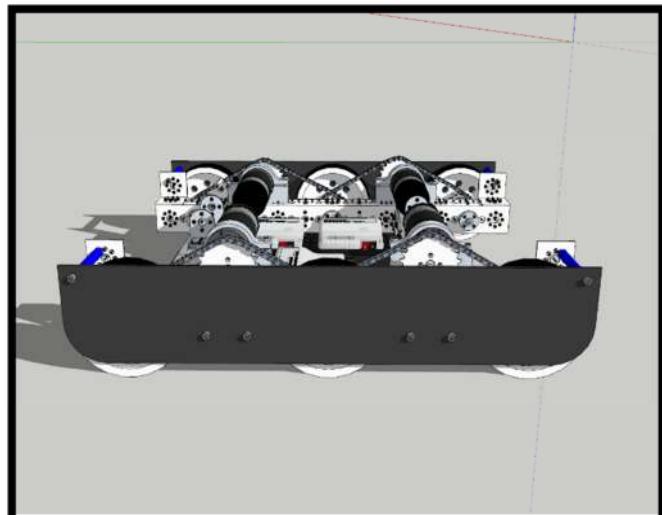
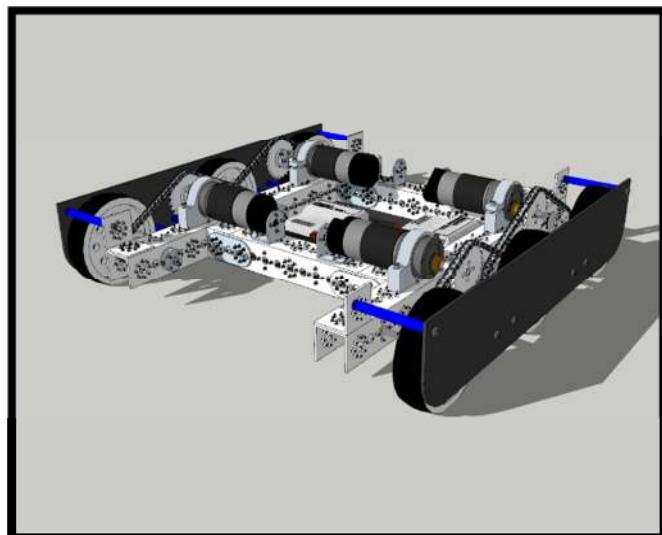
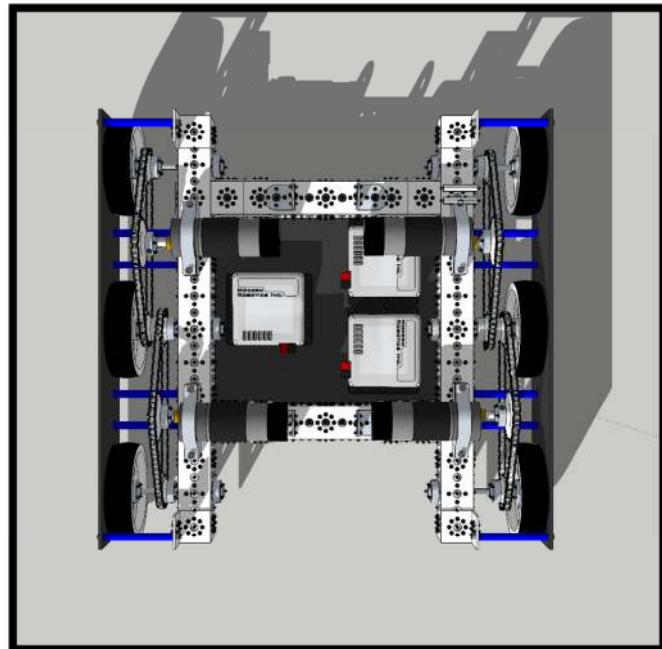
A Tank-Type drive train, specially built for climbing safely in the crater. The wheels are rotated with the help of the chains which are directly fixed with sprockets on the wheel axle and the motor.

### COMPONENTS:

- 2x Tetrix 416 mm C-Channels used for the sides;
- 2x Tetrix 216 mm C-Channels used as a foundation for the upcoming functions and internal resistance;
- 8x L Brackets;
- 4x Andy Mark Motors;
- 4x Tetrix Motor Mount;
- 4x Chains;
- 4x Tetrix 24-tooth Gear;
- 6x Tetrix 16-tooth Gear;
- 4x Tetrix 4" Wheels without Tires;
- 2x Tetrix 4" Omni Wheels;
- 6x Axles;
- 24x Axle Hubs;
- 12x Tetrix Bronze Bushing;
- 1x Plate for arranging Hubs and battery.
- 2x External Plates for covering the wheels;
- 8x 3D Printed Spacers;

### PROS:

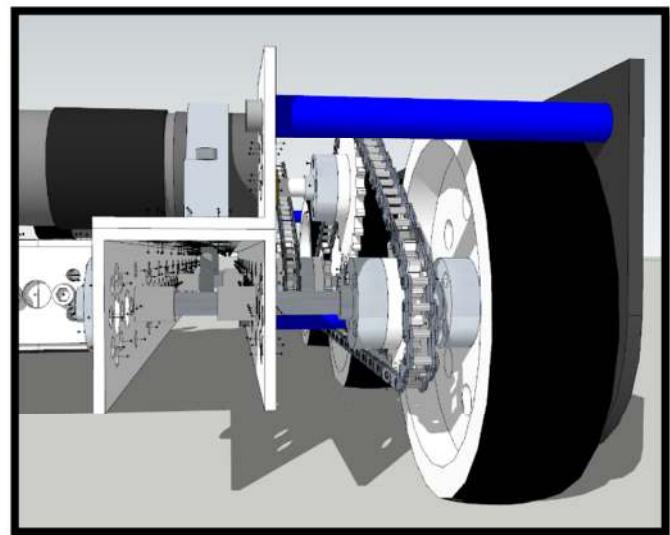
- The 6-wheel drive train can easily climb over the bumps in the crater, thanks to the wheel in the middle which is also actioned by the motors.



- Assures stability, avoiding the robot to fall while climbing;
- Protection covered by external walls;

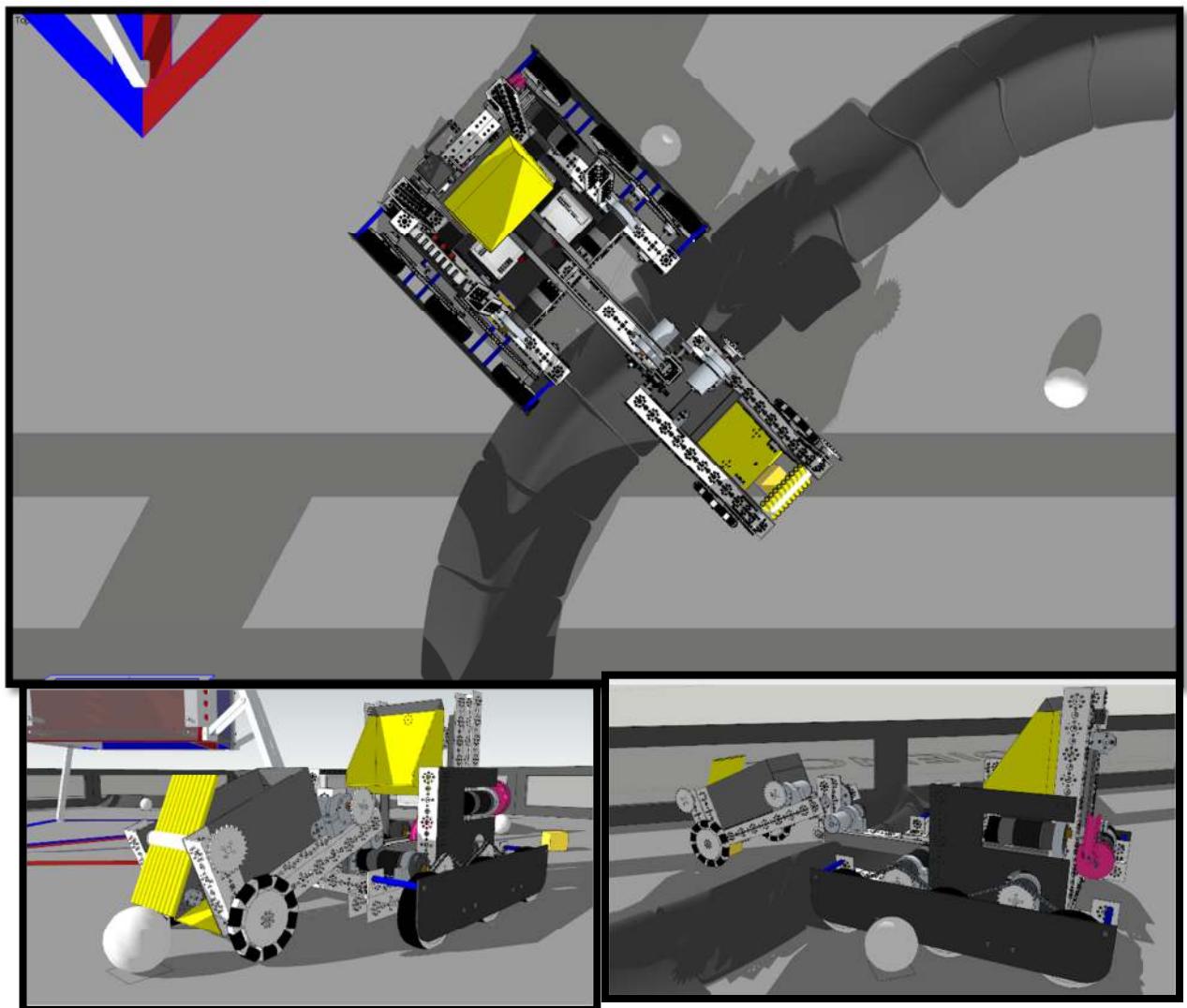
**CONS:**

- Slow movement while turning which means scoring less points from minerals as we waste more time.
- Difficulty when changing parts on the exterior due to the side walls used for protection;



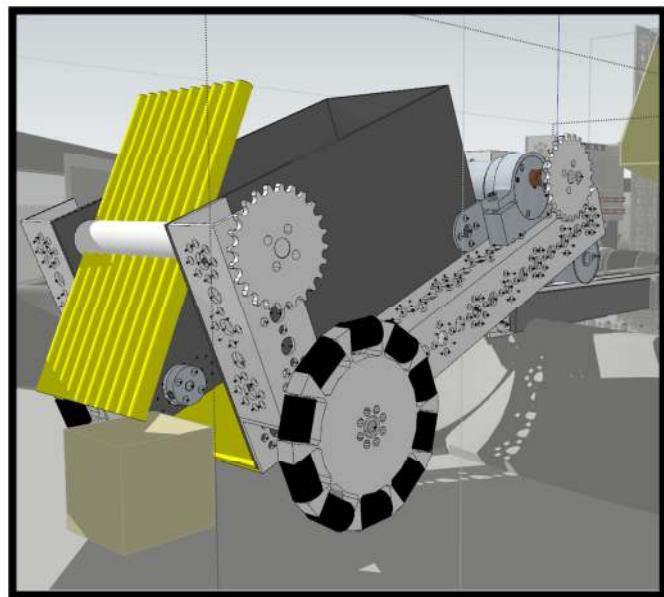
## COLLECTING MECHANISM:

The novelty in this model is the two separate function which assure both gaining points from latching to the crater and from correctly placing the minerals in the two compartments. The extendable platform reduced substantially the time needed for gathering the cubes and spheres, whereas the two slides in the back of the robot were adapted for grabbing the lander. Fast and efficient are the words through which this model can be described.

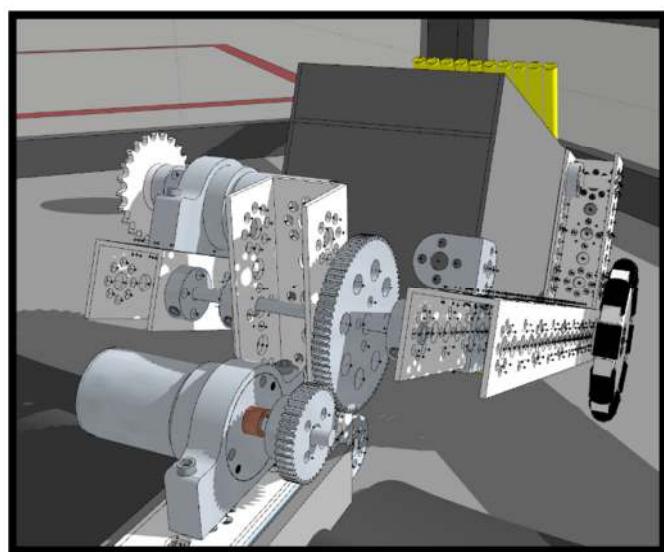


**COMPONENTS:**

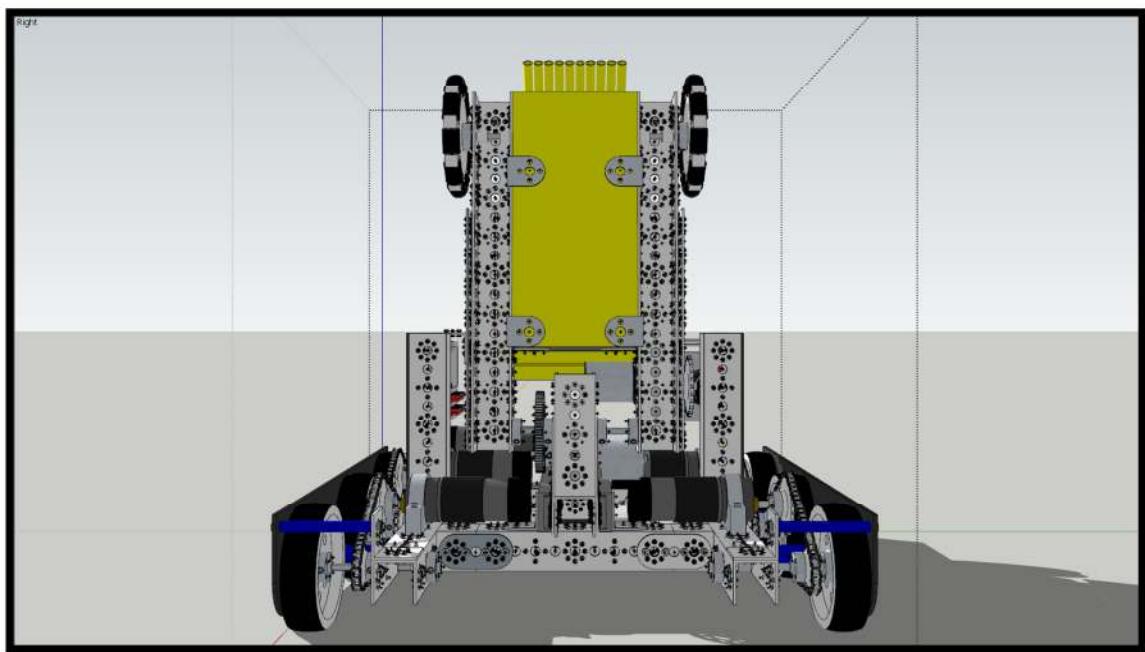
- 2x Tetrix Omni Wheels;
- 1x Tube collector;
- 3x Tetrix 96mm C-Channel;
- 2x Tetrix 160mm C-Channel;
- 1x AndyMark Motors;
- 1x Motor mounts;
- 1x Tetrix 16-tooth Gear;
- 1x Tetrix 24-tooth Gear;
- 6x Tetrix Axle Hubs;
- 2x Tetrix 40-tooth Gear;
- 4x Bronze bushing;
- 14x Tetrix L brackets;
- 1x Chains;
- 2s Tetrix Axles;
- 3x Custom made walls;

**PROS:**

- Fast collecting of minerals;
- Easy to move in the crater;
- Walls that prevent the minerals from falling off;

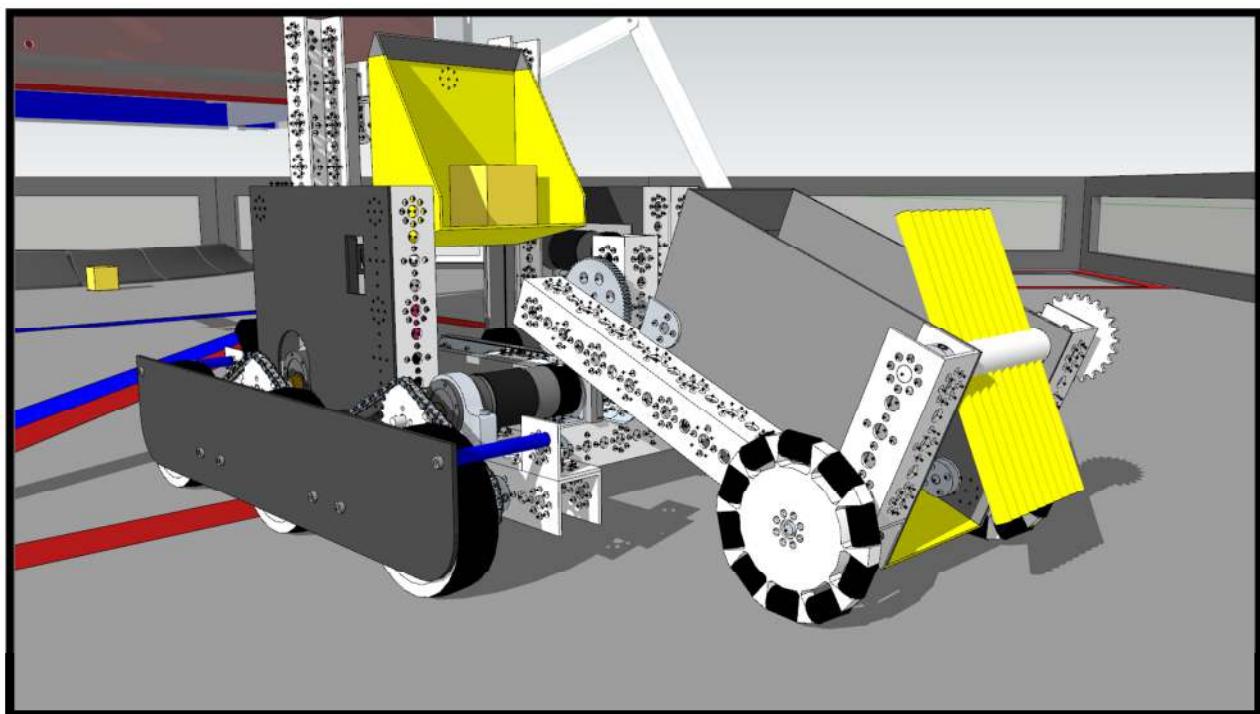
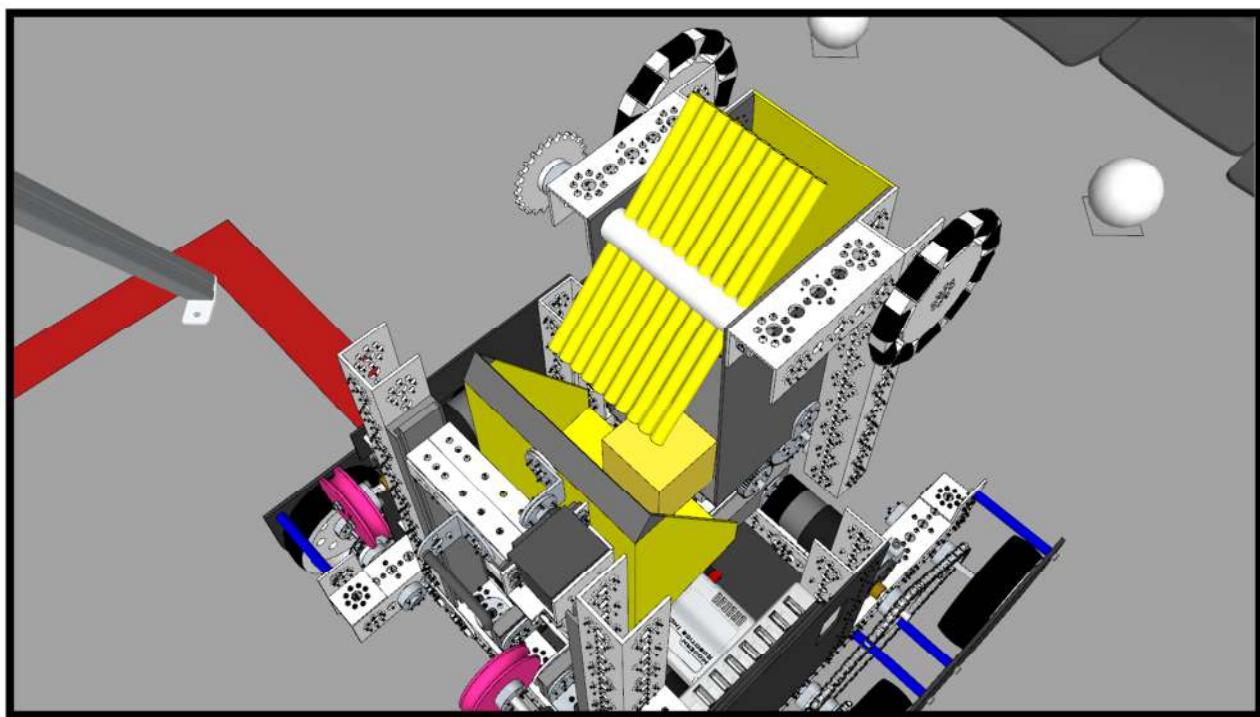
**CONS:**

- Heavy Mechanism;
- Shakes because of the inertial;



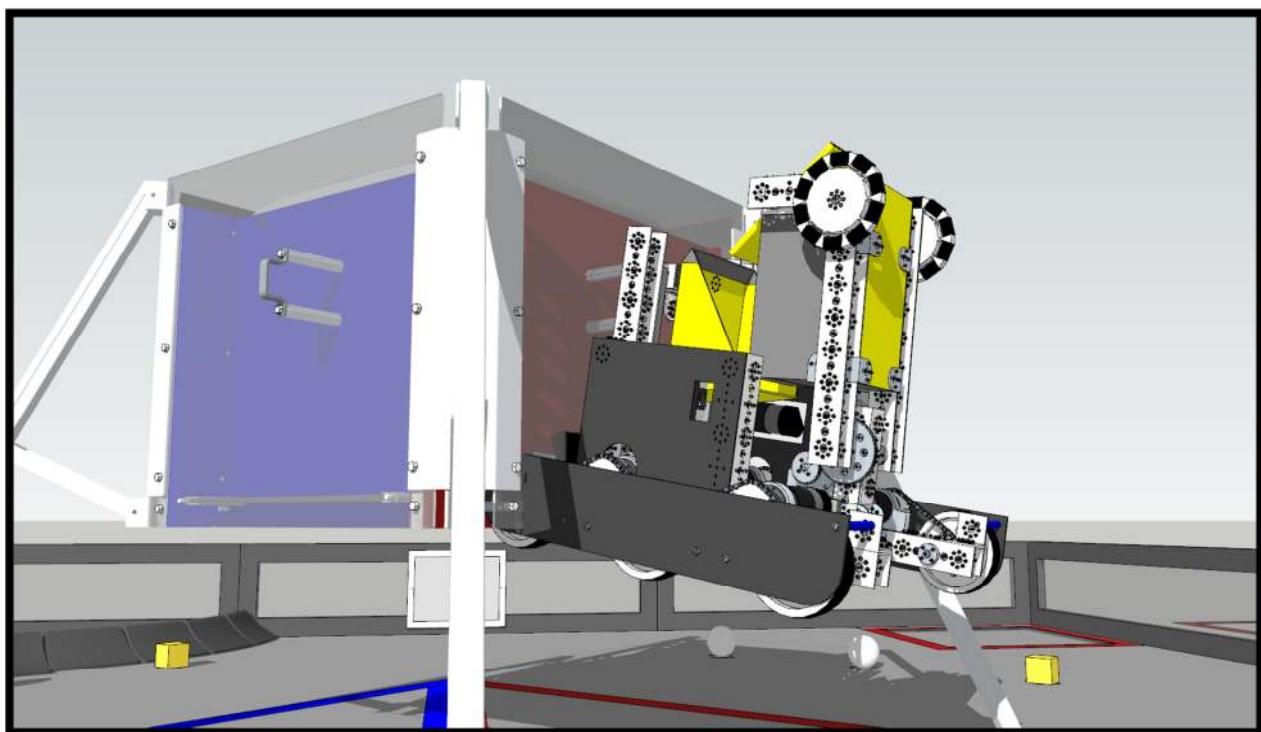
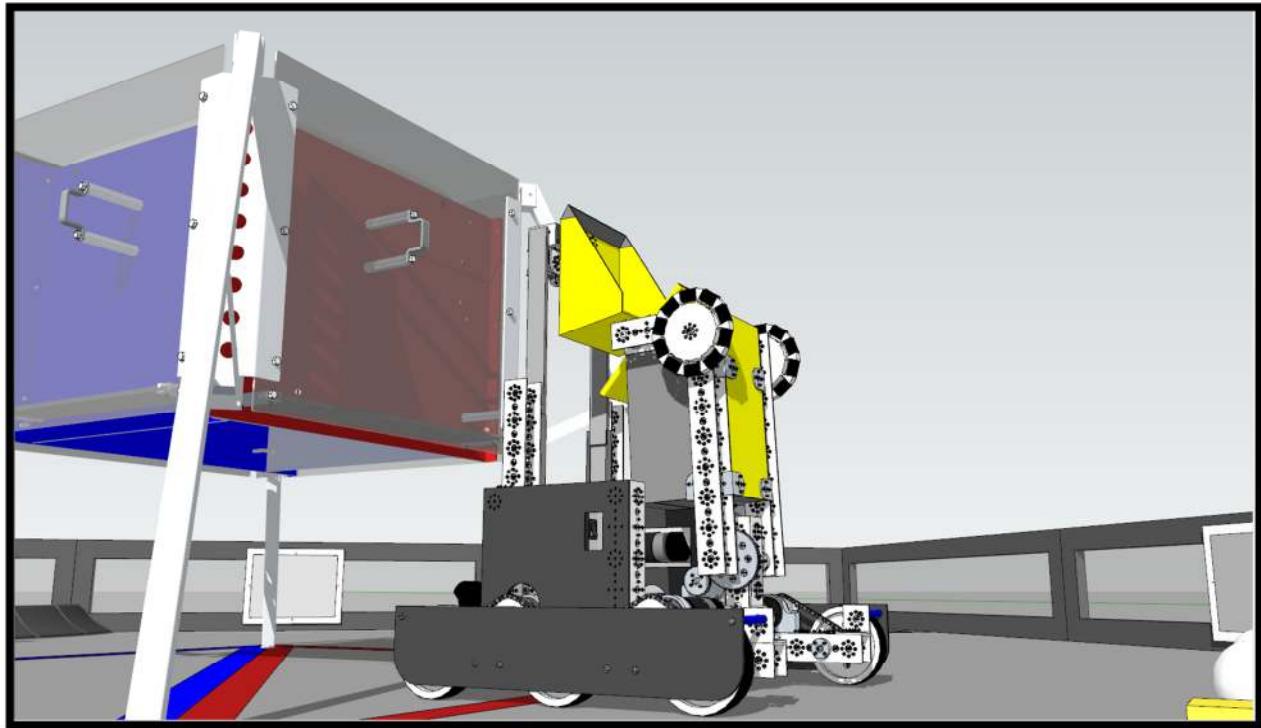
## DROPPING MECHANISM:

The idea behind this function came from last season "Relic Recovery", where we used a similar system for arranging the boxes in the shelves. The "shovel" drop the two minerals, continued by ascension off the two side slides raising the bucket above the lander. Consequently, with the help of a servo motor, the bucket revolves releasing the minerals; This function was also used for latching and getting the Team Marker to the Safe Zone.



## LATCHING:

The autonomous period would start with the robot extending in order to latch to the lander, followed by descending it. R.E.L.U. would carefully move after extension in order to get the hook in the right place. An Andy Mark Motor would extend with the help of ropes to the sliders



**COMPONENTS:**

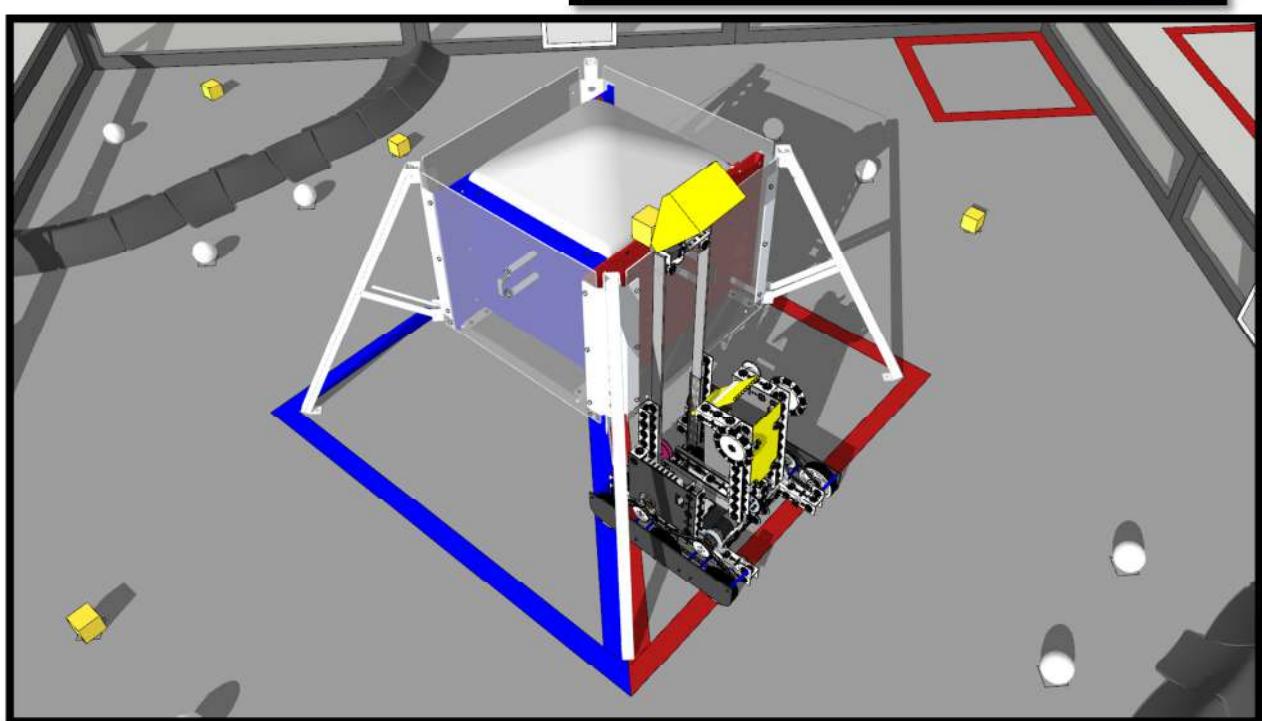
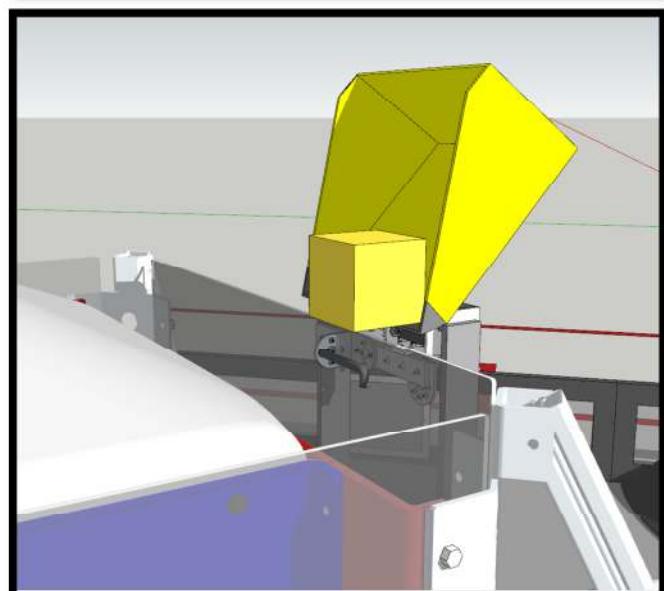
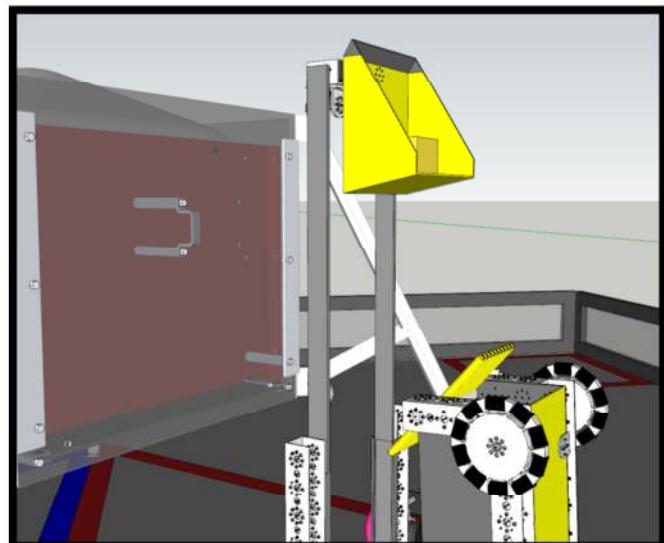
- 1x Servo Motor;
- 1x Servo Motor Mount;
- 3 L Brackets;
- 1x Tetrix Servo Horn;
- 3x Custom made plates;
- 2x Tetrix 288mm C-Channels;
- 2x Sliders;
- 2x 100mm Tetrix Profiles;

**Pros:**

- Easy to build, and fast while turning and dropping the Play Marker and Minerals;
- Extra walls for preventing the minerals from falling;
- Covers 3 functions of the robot just in a single one;

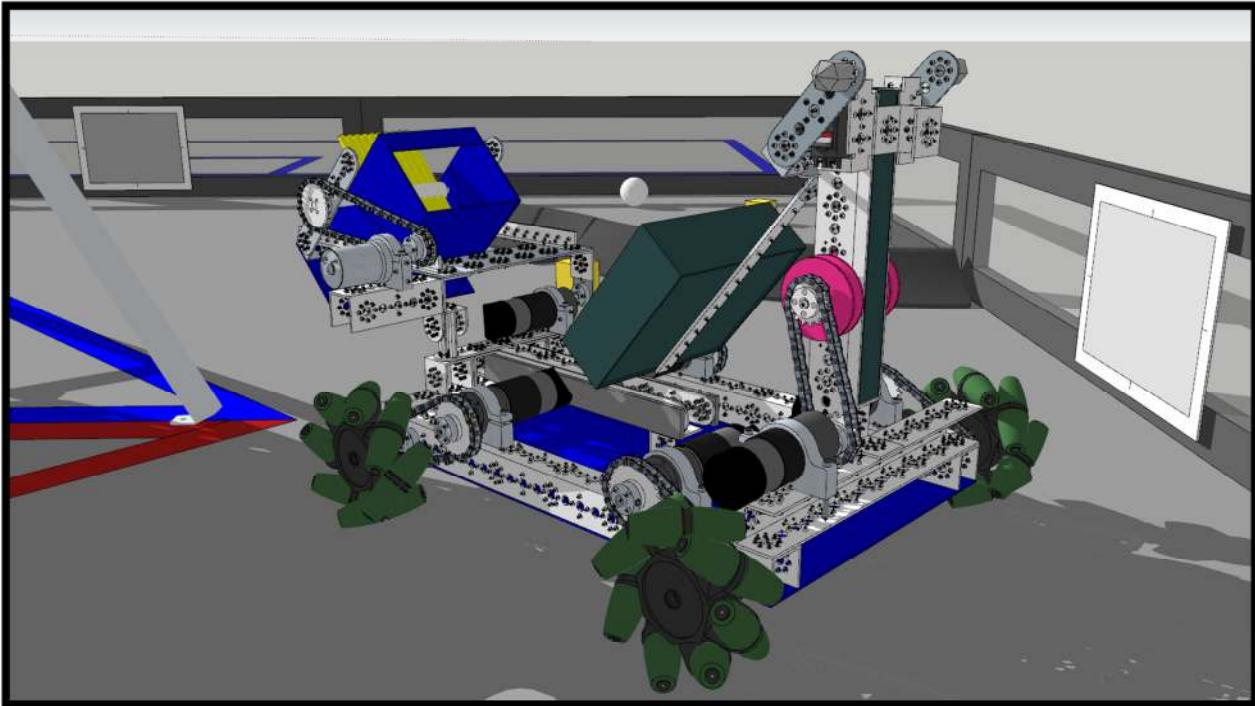
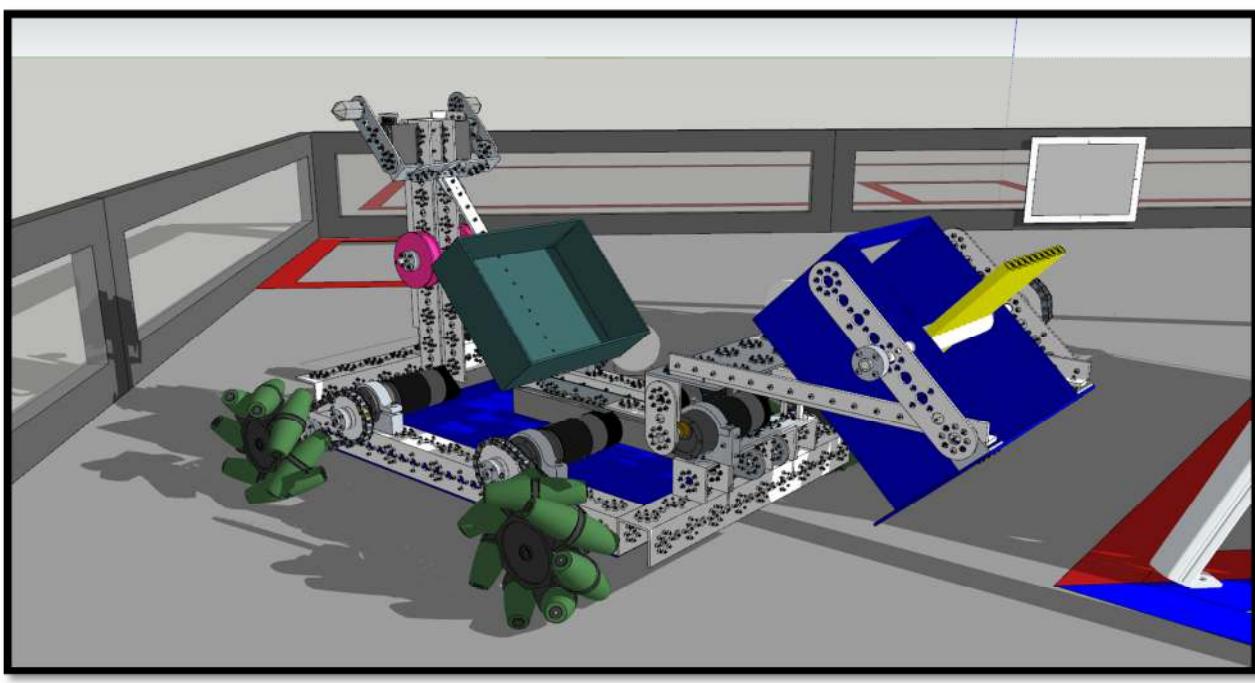
**Cons:**

- Unstable while latching;



## R.E.L.U v2.0

After the Regional Demonstrative Competitions in which the team participated in at lași, the members of all the departments came to the conclusion that the robot needed some improvements. For these, we had taken several measures. One aspect was using fewer sliders and lighter components. The drive train was also changed by replacing the 6 wheel-tank drive train with 4 Vex Mecanum wheels, in order to make it easier to latch to the Lander. Consequently, "the shovel" and "the bucket" were improved in order to make collecting and dropping the minerals more efficient.

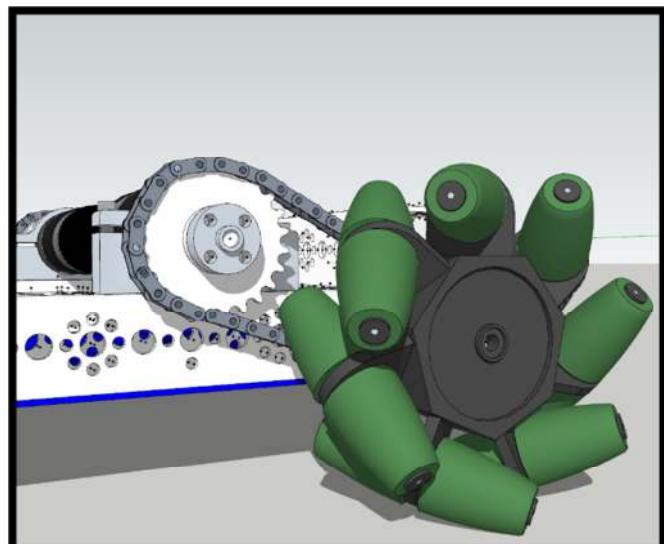
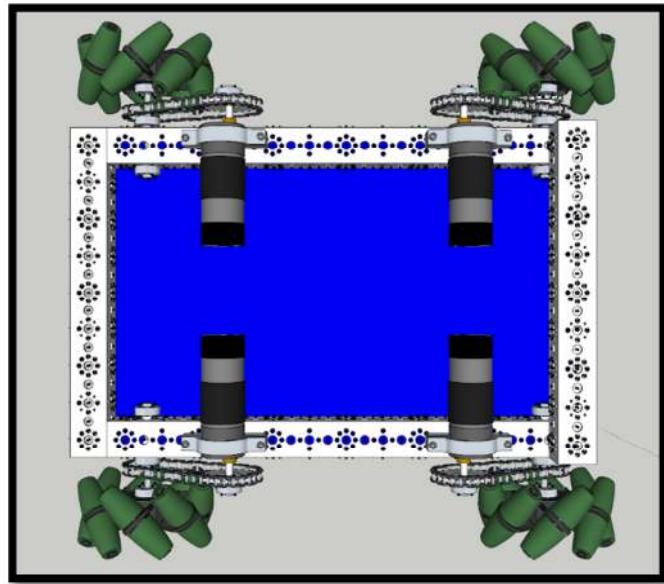


## DRIVE TRAIN:

A Mecanum-wheel drive train specially built for making it easier to latch to the lander while moving faster in the arena.

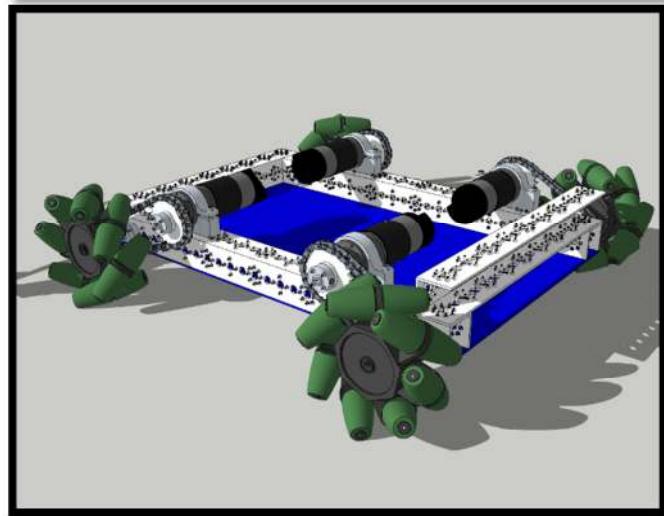
### COMPONENTS:

- 2x Tetrix 416 mm C-Channels used for the sides;
- 2x Tetrix 288 mm C-Channels used as a foundation for the upcoming functions and internal resistance;
- 4x L Brackets;
- 4x Andy Mark Motors;
- 4x Tetrix Motor Mount;
- 4x Chains;
- 4x Tetrix 24-tooth Gear;
- 6x Tetrix 16-tooth Gear;
- 4x Vex Mecanum Wheels;
- 4x Axles;
- 18x Axle Hubs;
- 8x Tetrad Bronze Bushing;



### PROS:

- Easy to latch to the lander;
- Fast movement in the arena;
- Easier driver control;

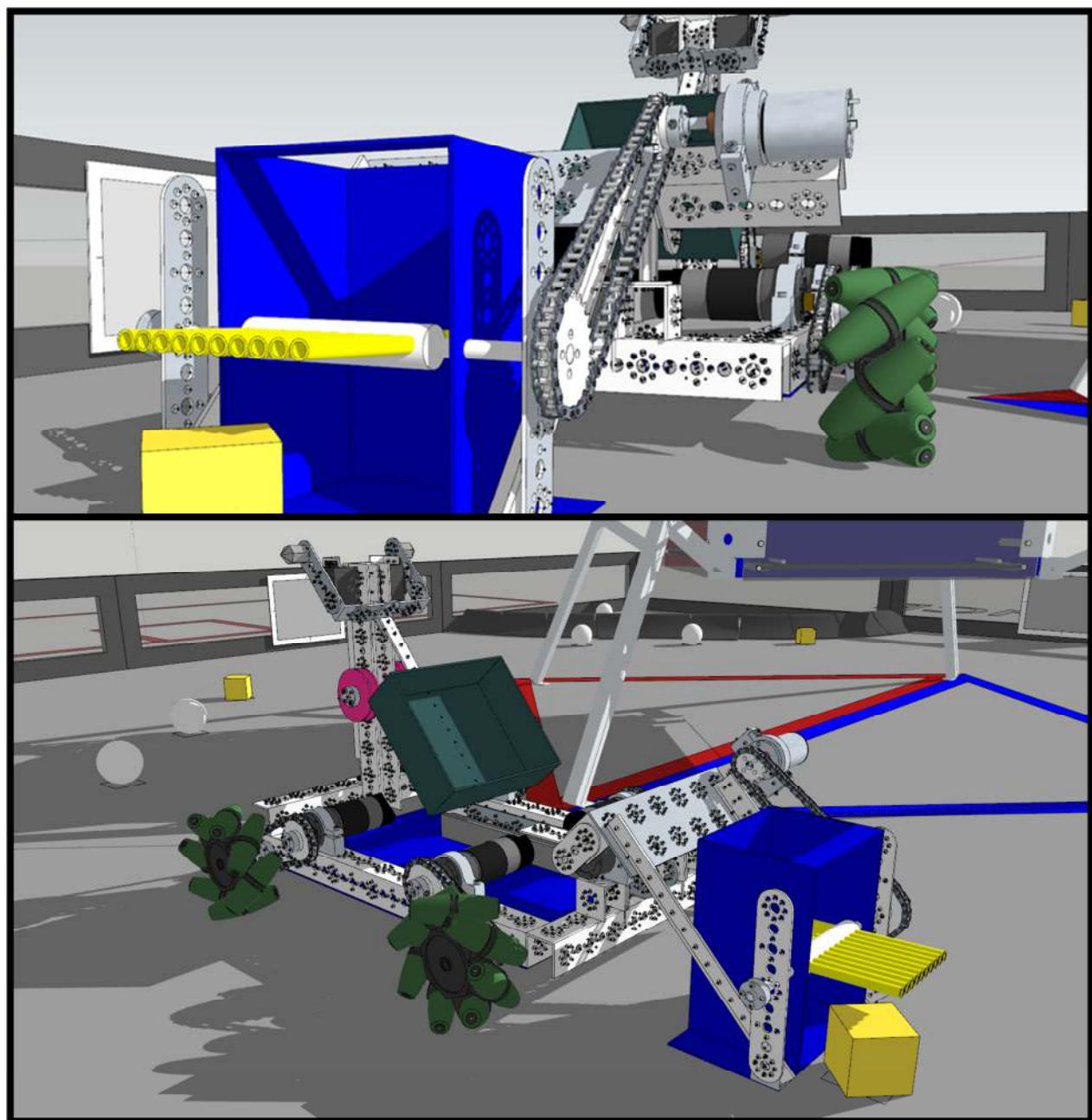


### CONS:

- Hard to climb in the crater;

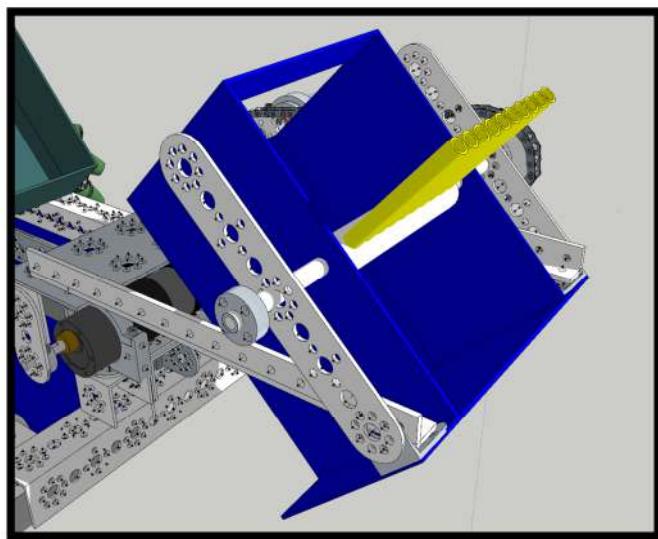
## Collecting Mechanism

Having the same idea as the previous model for collecting the minerals, the new mechanism is lighter, having a smaller momentum which led to a better functionality of the motor that assures an easier rotation, without risking to overheat the motor. The improved "shovel" also helps the minerals to stay in place while moving, without falling off.

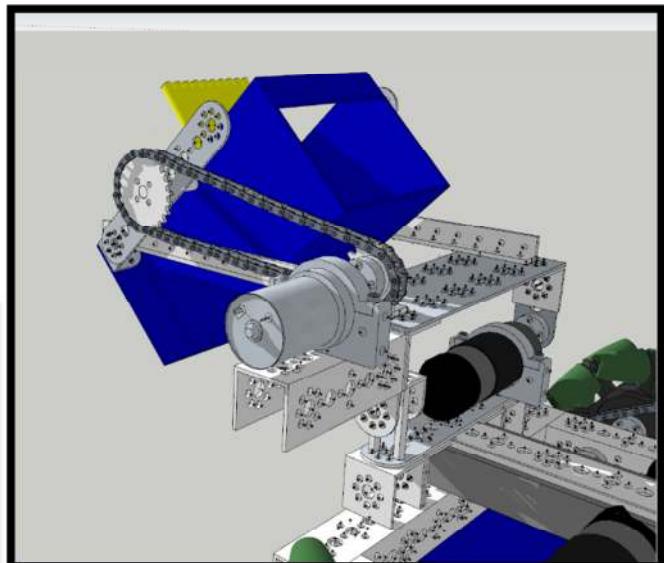
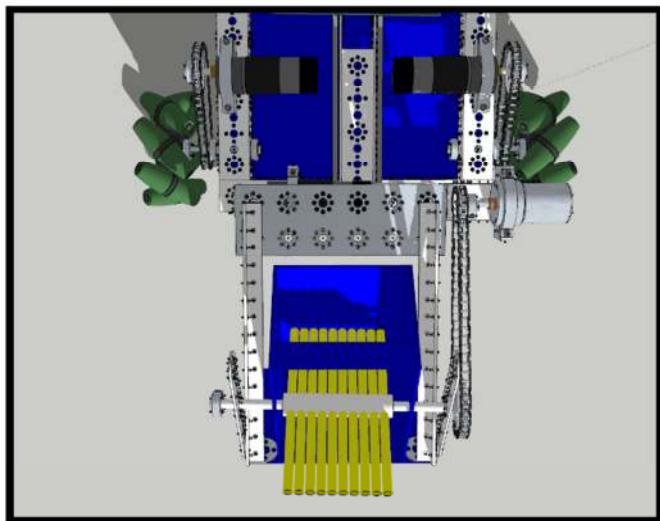


**Components:**

- 1x Tetrix Motors;
- 2x Motor mounts;
- 1x AdyMark Motor;
- 1x Tetrix 16-tooth Gear;
- 1x Tetrix 24-tooth Gear;
- 12x Tetrix Axle Hubs;
- 8x Tetrix Flat Profile 96mm;
- 4x Tetrix Flat Profile 160mm;
- 10x Tetrix L brackets;
- 1x Chain;
- 1x Custom made bucket;
- Tubes;
- 2x Tetrix Axles;
- 1x 9,6cm Tetrix C-Channel;

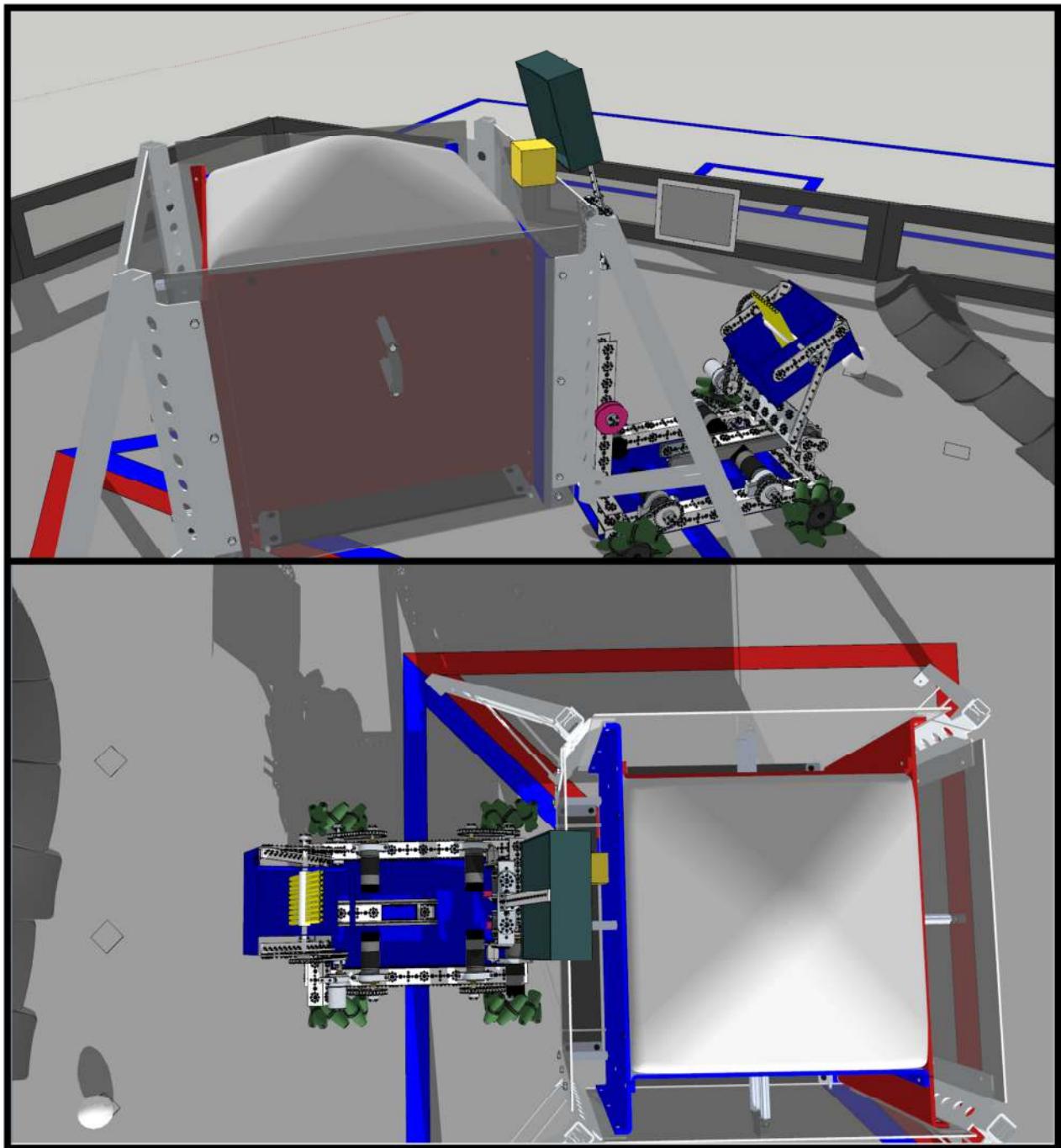
**Pros:**

- Easy to build, and fast while turning and dropping the Minerals into "the bucket";
- Extra walls for preventing the minerals from falling;
- Light weight;
- Can easily reach into the crater without having to enter in it with the help of the two sliders;



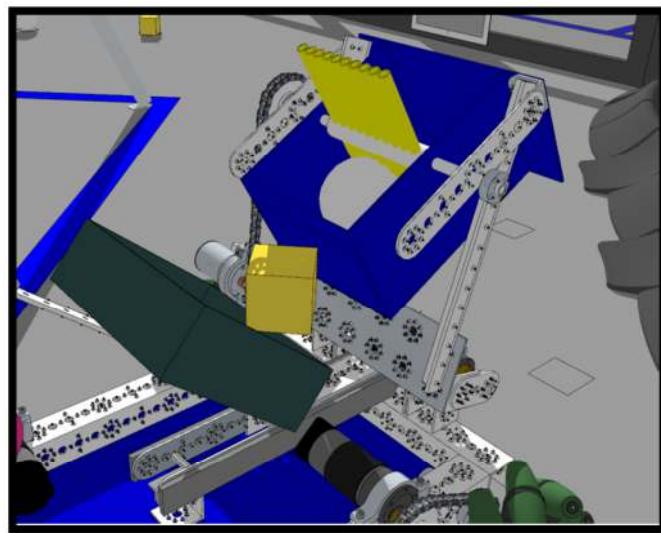
## DROPPING MECHANISM AND LATCHING MECHANISM:

The idea behind this function came from last season "Relic Recovery", where we used a similar system for arranging the boxes in the shelves. The "shovel" drop the two minerals, continued by ascension off the two side slides raising the bucket above the lander. Consequently, with the help of a servo motor, the bucket revolves releasing the minerals; This function was also used for latching and getting the Team Marker to the Safe Zone. The autonomous period would start with the robot extending in order to latch to the lander, followed by descending it. R.E.L.U. would carefully move after extension in order to get the hook in the right place. An Andy Mark Motor would extend with the help of ropes to the sliders;

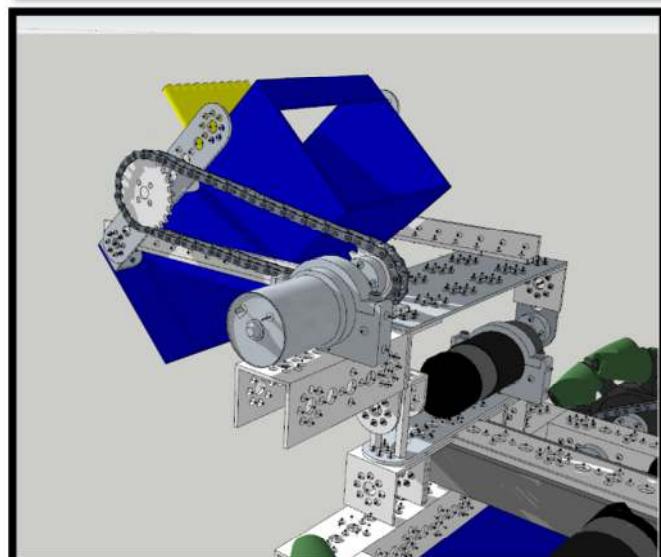


**COMPONENTS:**

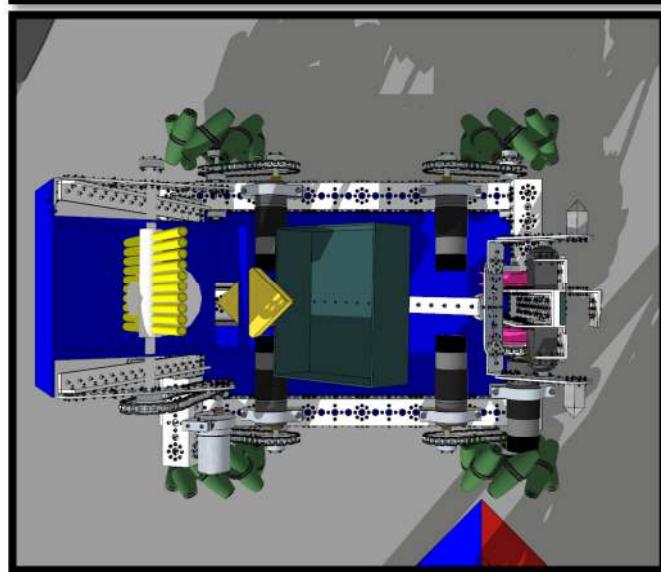
- 2x Servo Motor;
- 2x Servo Motor Mount;
- 6x L Brackets;
- 2x Tetrix Servo Horn;
- 5x Custom made plates;
- 1x Tetrix 288mm C-Channels;
- 1x Sliders;
- 1x 100mm Tetrix Profiles;
- 2x Counter Wheights;

**Pros:**

- Easy to build, and fast while turning and dropping the Play Marker and Minerals;
- Extra walls for preventing the minerals from falling;
- Covers 3 functions of the robot just in a single one;
- Counter Weights for reducing the momentum creating a faster and steadier rotation

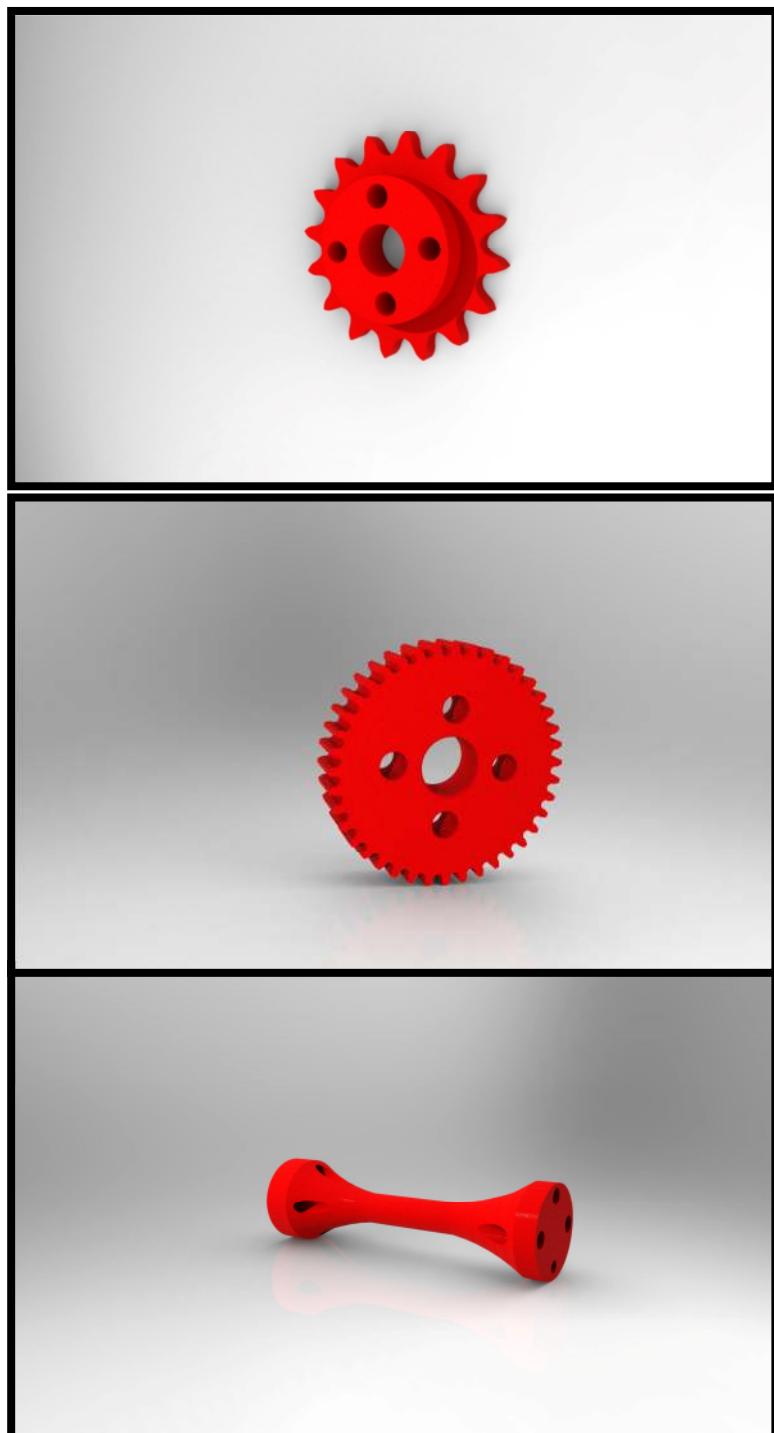
**Cons:**

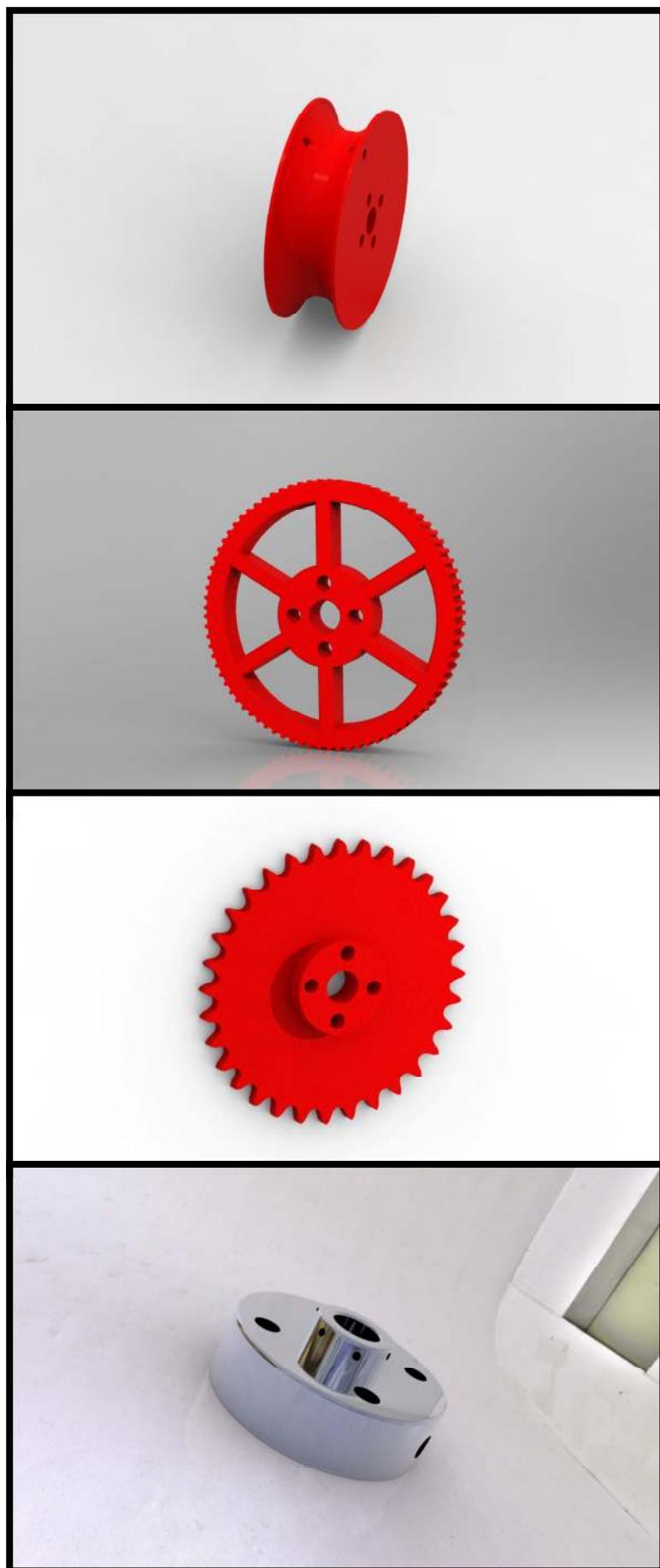
- Unstable while latching;

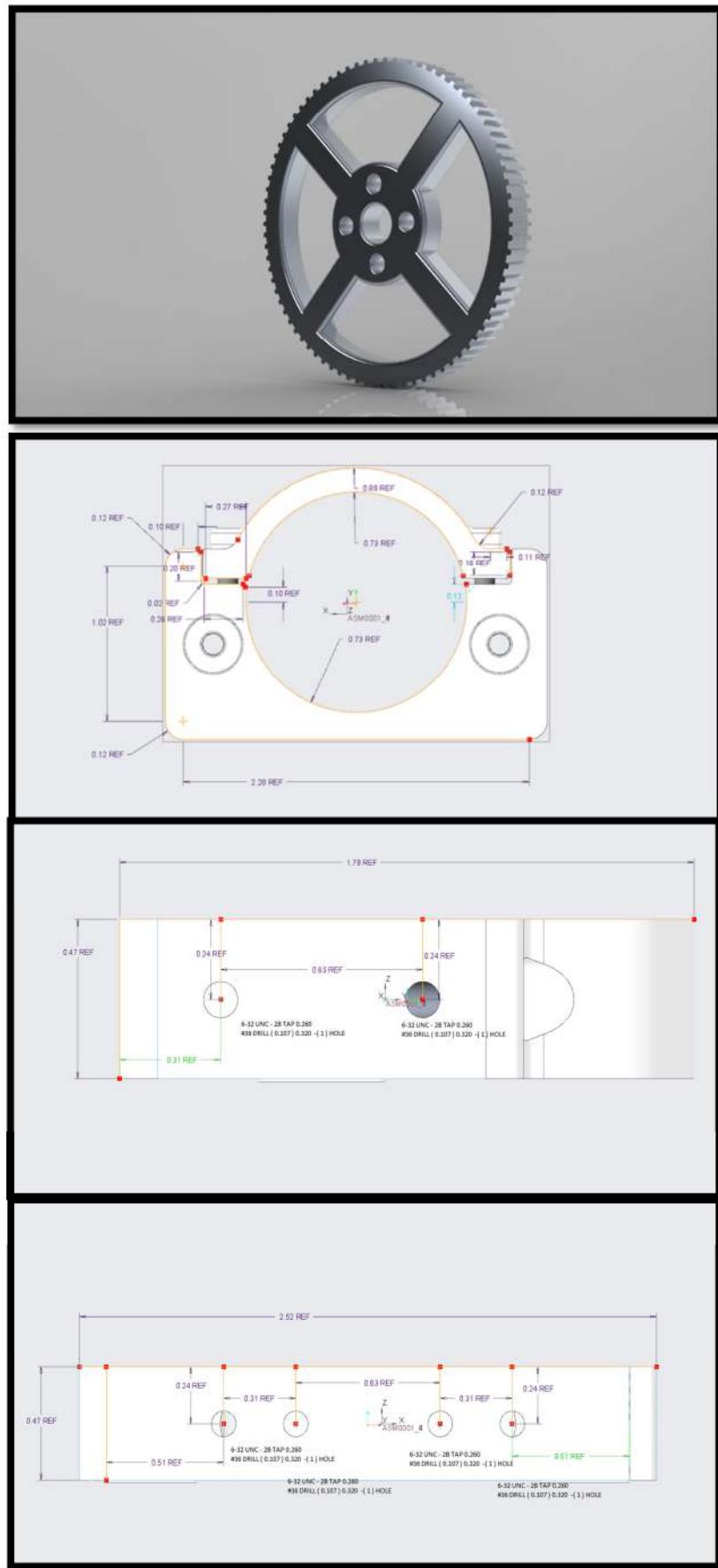


## 3D Printed Parts and Concepts

Since our team did not have all the parts needed for assembly, the 3D department had no other choice but to come up with their own 3D printable ideas. All the parts were done in Crea, which proved to be real efficient and easy to use for building new items.







## 7. ROBOT INTELLIGENCE

## Overview

The program behind a robot is what gives it life and makes it work. It is like the heart which pumps blood into the blood vessels, but instead it pumps electricity through the circuits. It is what makes the difference between a robot and an iron box.

This chapter has the purpose to explain how our robot works and brings him to life.

This code is different from the previous years ones because we made it using some OOP(object oriented programming) notions like inheritance, abstraction, polymorphism.

So, our code has more classes. One class which includes all the methods necessary for the autonomous period, the class needed for the tele-op period and the classes for the autonomous periods for every possible scenario( i.e red team, blue team, near depo, near crater etc).

## 7.1 Autonomous Period

### Autonomous Class

First of all, I want to start with the autonomous period. To make things clear, the autonomous period is that period of the game in which the robot has to move himself without being controlled by a gamepad or a driver.

This class includes all the necessary methods for running the autonomy.

## I. Initialization

```

public void initialize(HardwareMap ahwMap){
    hardwareMap = ahwMap;

    LeftFront      = hardwareMap.dcMotor.get("LeftFront");
    LeftBack       = hardwareMap.dcMotor.get("LeftBack");
    RightFront     = hardwareMap.dcMotor.get("RightFront");
    RightBack      = hardwareMap.dcMotor.get("RightBack");

    VerticalSlider = hardwareMap.dcMotor.get("VerticalSlider");
    HorizontalSlider = hardwareMap.dcMotor.get("HorizontalSlider");

    CollectingMotor = hardwareMap.dcMotor.get("CollectingMotor");
    OverthrowMotor = hardwareMap.dcMotor.get("OverthrowMotor");

    colorSensor    = hardwareMap.colorSensor.get("sensor_distance_color");
    distanceSensor = hardwareMap.get(DistanceSensor.class, "deviceName: sensor_distance_color");

    LeftScoringServo = hardwareMap.servo.get("ServoStanga");
    RightScoringServo = hardwareMap.servo.get("ServoDreapta");

    LeftRangeSensor = hardwareMap.get(DistanceSensor.class, "deviceName: LeftRangeSensor");
    RightRangeSensor = hardwareMap.get(DistanceSensor.class, "deviceName: RightRangeSensor");
    FrontRangeSensor = hardwareMap.get(DistanceSensor.class, "deviceName: FrontRangeSensor");

    RightFront.setDirection(DcMotorSimple.Direction.REVERSE);
    RightBack.setDirection(DcMotorSimple.Direction.REVERSE);

    LeftScoringServo.setDirection(Servo.Direction.REVERSE);

    LeftScoringServo.setPosition(Servo.InitialPosition);
    RightScoringServo.setPosition(Servo.InitialPosition);

}

```

The necessary function to initialize all the motors, servos, sensors(color sensor, distance sensor and Modern Robotics Sensor). Also, the direction of the motors from the right side of the robot is set to REVERSE. That means that the motor will spin backwards. As the motors' direction is set to REVERSE the left servo's direction. Moreover, both servos are initialized setting an initial position.

## 2.Imu's Initialization

Imu is an accessory of the rev expansion hub. It is an accelerometer or a gyro.

We use it as a gyro (a device that returns the angle that the initial Z axis of the robot makes with the during-the-match Z axis). This function is responsible for initializing it.

```

public void initializeIMU(HardwareMap ahwMap){
    hardwareMap = ahwMap;

    BN0055IMU.Parameters parameters = new BN0055IMU.Parameters();
    parameters.angleUnit          = BN0055IMU.AngleUnit.DEGREES;
    parameters.calibrationDataFile = "BN0055IMUCalibration.json";
    parameters.loggingEnabled     = true;
    parameters.loggingTag        = "IMU";

    imu = hardwareMap.get(BN0055IMU.class, "deviceName: imu");
    imu.initialize(parameters);
}

```

### 3. DriveUsingEncoder

```

public void DriveUsingEncoder(int LeftFrontSteps,
                               int LeftBackSteps,
                               int RightFrontSteps,
                               int RightBackSteps,
                               double LeftFrontPower,
                               double LeftBackPower,
                               double RightFrontPower,
                               double RightBackPower){

    LeftFront.setMode(DcMotor.RunMode.STOP_AND_RESET_ENCODER);
    LeftBack.setMode(DcMotor.RunMode.STOP_AND_RESET_ENCODER);
    RightFront.setMode(DcMotor.RunMode.STOP_AND_RESET_ENCODER);
    RightBack.setMode(DcMotor.RunMode.STOP_AND_RESET_ENCODER);

    LeftFront.setMode(DcMotor.RunMode.RUN_USING_ENCODER);
    LeftBack.setMode(DcMotor.RunMode.RUN_USING_ENCODER);
    RightFront.setMode(DcMotor.RunMode.RUN_USING_ENCODER);
    RightBack.setMode(DcMotor.RunMode.RUN_USING_ENCODER);

    LeftFront.setTargetPosition(LeftFront.getCurrentPosition() + LeftFrontSteps);
    LeftBack.setTargetPosition(LeftBack.getCurrentPosition() + LeftBackSteps);
    RightFront.setTargetPosition(RightFront.getCurrentPosition() + RightFrontSteps);
    RightBack.setTargetPosition(RightBack.getCurrentPosition() + RightBackSteps);

    LeftFront.setPower(LeftFrontPower);
    LeftBack.setPower(LeftBackPower);
    RightFront.setPower(RightFrontPower);
    RightBack.setPower(RightBackPower);

    while(opModeIsActive() &&
          (LeftBack.isBusy() && LeftFront.isBusy() && RightFront.isBusy() && RightBack.isBusy())){
    }

    LeftFront.setPower(0.0);
    LeftBack.setPower(0.0);
    RightFront.setPower(0.0);
    RightBack.setPower(0.0);

    LeftFront.setMode(DcMotor.RunMode.RUN_USING_ENCODER);
    LeftBack.setMode(DcMotor.RunMode.RUN_USING_ENCODER);
    RightFront.setMode(DcMotor.RunMode.RUN_USING_ENCODER);
    RightBack.setMode(DcMotor.RunMode.RUN_USING_ENCODER);
}
}

```

This is one of the most important functions. It is responsible for making the robot move for a certain distance using the number of steps necessary for a motor to make a complete rotation. First of all, all motors' encoders are stopped and reset, then encoders are activated using the command: "RUN\_USING\_ENCODER". Afterwards, we set the motors target position (at which step we want the motors to arrive) summing to the current position of each motor the number of steps needed. After that, each motor gets a power.

The while loop makes impossible to give any command to the robot until the motors have not reached the target position. When they finished their job, they are stopped and the encoders are reset using the command: "RUN\_USING\_ENCODER".

The formula for the necessary steps for moving a certain distance is:

Distance\*No/(Pi\*Wheel\_Diameter), where:

Distance = the certain distance that we want our robot to move

No = the numbers of steps necessary for a motor to make a complete rotation

Pi = 3,1415...

Wheel\_Diameter = the diameter of the wheel.

## 4. DriveUsingRangeSensor

```
public void DriveUsingRangeSensor(double distance,
                                   double LeftFrontPower,
                                   double LeftBackPower,
                                   double RightFrontPower,
                                   double RightBackPower,
                                   DistanceSensor distanceSensor){

    //while(distanceSensor.getDistance(DistanceUnit.INCH) > distance + INCH_DISTANCE_ERROR )
    if(distanceSensor.getDistance(DistanceUnit.INCH) > distance + INCH_DISTANCE_ERROR){
        LeftFront.setPower(LeftFrontPower);
        LeftBack.setPower(LeftBackPower);
        RightFront.setPower(RightFrontPower);
        RightBack.setPower(RightBackPower);
    }
    else if(distanceSensor.getDistance(DistanceUnit.INCH) < distance - INCH_DISTANCE_ERROR){
        LeftFront.setPower(-LeftFrontPower);
        LeftBack.setPower(-LeftBackPower);
        RightFront.setPower(-RightFrontPower);
        RightBack.setPower(-RightBackPower);
    }
    else {
        LeftFront.setPower(0.0);
        LeftBack.setPower(0.0);
        RightFront.setPower(0.0);
        RightBack.setPower(0.0);
    }
}
```

Another function responsible for movement. It is more accurate than the DriveUsingEncoder function in some cases and also less accurate in other cases. This happens because sometimes the motors jump over some steps or because of the inertia the robot move more than wanted. But using this function the robot can move until it encounter an obstacle or arrives near a wall. As I said, sometimes inertia and the small friction between the wheels and the arena the robot move more than wanted. The solution is taking into account an distance error. More precisely, if the distance between the robot and the obstacle is bigger than the actual distance between them, then the robot will move with the power that was transmitted the formal parameter of the function. Otherwise, it will move in the opposite sense. The power transmitted as a formal parameter can be either positive (the robot will move forward if the distance is smaller than the actual distance) or negative (the robot will move backward if the distance is smaller than the actual distance), depending on where is positioned the range sensor on the robot.

## 5. DriveUsingTimeAndPower

```
public void DriveUsingTimeAndPower(int time,
                                    double LeftFrontPower,
                                    double LeftBackPower,
                                    double RightFrontPower,
                                    double RightBackPower,
                                    Orientation angle){

    LeftFront.setPower(LeftFrontPower);
    LeftBack.setPower(LeftBackPower);
    RightFront.setPower(RightFrontPower);
    RightBack.setPower(RightBackPower);

    Orientation error;

    runTime.reset();

    while(runTime.milliseconds() < time){
        error = imu.getAngularOrientation(AxesReference.INTRINSIC, AxesOrder.ZYX, AngleUnit.DEGREES);
        if(error.firstAngle > 5+angle.firstAngle || error.firstAngle < angle.firstAngle-5) {
            if (error.firstAngle > 5+angle.firstAngle) {
                LeftBack.setPower(LeftBack.getPower() - 0.01);
                LeftFront.setPower(LeftFront.getPower() - 0.01);
                RightBack.setPower(RightBack.getPower() + 0.01);
                RightFront.setPower(RightFront.getPower() + 0.01);
            }
            else if (error.firstAngle < angle.firstAngle-5) {
                LeftBack.setPower(LeftBack.getPower() + 0.01);
                LeftFront.setPower(LeftFront.getPower() + 0.01);
                RightBack.setPower(RightBack.getPower() - 0.01);
                RightFront.setPower(RightFront.getPower() - 0.01);
            }
            else{
                LeftFront.setPower(LeftFrontPower);
                LeftBack.setPower(LeftBackPower);
                RightFront.setPower(RightFrontPower);
                RightBack.setPower(RightBackPower);
            }
        }
        telemetry.addData( caption: "Time: ", runTime.milliseconds());
        //telemetry.update();
    }

    LeftFront.setPower(0.0);
    LeftBack.setPower(0.0);
    RightFront.setPower(0.0);
    RightBack.setPower(0.0);
}
```

One of the most inaccurate functions used for movement. The robot moves setting the motor a certain power and waiting a certain amount of time. While the robot is moving, if the robot starts to deviate from its normal course, changing the speed of the motors the errors are corrected. It is used in extreme situation and on short distances. This way we make sure that the errors are minimal.

## 6. TurnUsingIMU

```
public void TurnUsingIMU(double angle,
                         double LeftFrontPower,
                         double LeftBackPower,
                         double RightFrontPower,
                         double RightBackPower){

    while(StillTurning == true) {

        RobotAngle = imu.getAngularOrientation(AxesReference.INTRINSIC, AxesOrder.ZYX, AngleUnit.DEGREES);

        if (RobotAngle.firstAngle < angle - ANGLE_ERROR) {
            LeftFront.setPower(LeftFrontPower);
            LeftBack.setPower(LeftBackPower);
            RightFront.setPower(RightFrontPower);
            RightBack.setPower(RightBackPower);
            StillTurning = true;
        } else if (RobotAngle.firstAngle > angle + ANGLE_ERROR) {
            LeftFront.setPower(-LeftFrontPower);
            LeftBack.setPower(-LeftBackPower);
            RightFront.setPower(-RightFrontPower);
            RightBack.setPower(-RightBackPower);
            StillTurning = true;
        } else {
            LeftFront.setPower(0.0);
            LeftBack.setPower(0.0);
            RightFront.setPower(0.0);
            RightBack.setPower(0.0);
            StillTurning = false;
        }

        //telemetry.addData("Angle:", RobotAngle.firstAngle);
        //telemetry.update();
    }

    StillTurning = true;
}
```

One of the most accurate method of rotation for a certain angle is using the imu's gyro. This functions has a formal parameter called "angle" which represents the wanted angle that we want to turn. The gyro works like this: it has to be initialized and the robot's position in the moment of initialization is the reference position. After that, the gyro will give the angle that the robot makes with that reference position. To make things clear, if we want to turn our robot parallel to the wall and we know that in the initial position the robot made 35 degrees with the wall then we have to turn the robot at  $180 - 35 = 135$  degrees as against the intial position. So, we give the power to motor using the "while loop" until we reach the target angle. To rotate the robot, the left motors have to spin reverse to the right motors.

## 7. TurnParallelToTheWallUsingRangeSensor

```
public void TurnParallelToTheWallUsingRangeSensor(double LeftFrontPower,
                                                 double LeftBackPower,
                                                 double RightFrontPower,
                                                 double RightBackPower){

    double LeftDistance, RightDistance;
    LeftDistance = LeftRangeSensor.getDistance(DistanceUnit.INCH);
    RightDistance = RightRangeSensor.getDistance(DistanceUnit.INCH);

    if(LeftDistance > RightDistance){
        while(LeftDistance > RightDistance){
            LeftDistance = LeftRangeSensor.getDistance(DistanceUnit.INCH);
            RightDistance = RightRangeSensor.getDistance(DistanceUnit.INCH);

            LeftFront.setPower(LeftFrontPower);
            LeftBack.setPower(LeftBackPower);
            RightFront.setPower(RightFrontPower);
            RightBack.setPower(RightBackPower);
        }
    }
    else{
        while(LeftDistance <= RightDistance){
            LeftDistance = LeftRangeSensor.getDistance(DistanceUnit.INCH);
            RightDistance = RightRangeSensor.getDistance(DistanceUnit.INCH);

            LeftFront.setPower(-LeftFrontPower);
            LeftBack.setPower(-LeftBackPower);
            RightFront.setPower(-RightFrontPower);
            RightBack.setPower(-RightBackPower);
        }
    }
}
```

Function responsible for turning parallel to the wall. It uses two range sensor. The robot is turning until the output given by the two sensor is approximately equal.

## 8. DriveUntilRedOrBlueLine

Function responsible for moving the robot until it reaches the red or blue (depending on the alliance color) line which delimits the depot.

```
public void DriveUntilBlueOrRedLine(String color,
                                     double LeftFrontPower,
                                     double LeftBackPower,
                                     double RightFrontPower,
                                     double RightBackPower){
    if(color == "red"){
        //sleep(3000);
        while(colorSensor.red() < 300){
            if(colorSensor.red() < 300){
                LeftBack.setPower(LeftBackPower);
                LeftFront.setPower(LeftFrontPower);
                RightBack.setPower(RightBackPower);
                RightFront.setPower(RightFrontPower);
            }
            else {
                StopMovement();
            }
        }
        StopMovement();
    }
    else if(color == "blue"){
        while(colorSensor.blue() < 300){
            if(colorSensor.blue() < 300){
                LeftBack.setPower(LeftBackPower);
                LeftFront.setPower(LeftFrontPower);
                RightBack.setPower(RightBackPower);
                RightFront.setPower(RightFrontPower);
            }
            else {
                StopMovement();
            }
        }
        StopMovement();
    }
}
```

## 9. StopMovement

Function responsible for stopping the movement of the robot.  
Used in emergency cases like force stop.

```
public void StopMovement(){
    LeftBack.setPower(0);
    LeftFront.setPower(0);
    RightFront.setPower(0);
    RightBack.setPower(0);
}
```

## RecognizeMinerals Class

Class responsible for recognition of the gold mineral. It includes the function the initialize vuforia and to find the position of the gold mineral (Left, Right or Center).

### 1. initVuforia()

```
public void initVuforia() {
    /*
     * Configure Vuforia by creating a Parameter object, and passing it to the Vuforia engine.
     */
    VuforiaLocalizer.Parameters parameters = new VuforiaLocalizer.Parameters();

    parameters.vuforiaLicenseKey = VUFORIA_KEY;
    parameters.cameraDirection = VuforiaLocalizer.CameraDirection.BACK;

    // Instantiate the Vuforia engine
    vuforia = ClassFactory.getInstance().createVuforia(parameters);

    // Loading trackables is not necessary for the Tensor Flow Object Detection engine.
}
```

Initialize Vuforia.

### 2. initTFOD()

```
public void initTfod(HardwareMap ahwMap) {
    this.hardwareMap = ahwMap;
    if (ClassFactory.getInstance().canCreateTFObjectDetector()) {

        int tfodMonitorViewId = hardwareMap.appContext.getResources().getIdentifier(
            name: "tfodMonitorViewId", defType: "id", hardwareMap.appContext.getPackageName());
        TFObjectDetector.Parameters tfodParameters = new TFObjectDetector.Parameters(tfodMonitorViewId);
        tfod = ClassFactory.getInstance().createTFObjectDetector(tfodParameters, vuforia);
        tfod.loadModelFromAsset(TFOD_MODEL_ASSET, LABEL_GOLD_MINERAL, LABEL_SILVER_MINERAL);
    }
}
```

Initialize TensorFlow Object Detection

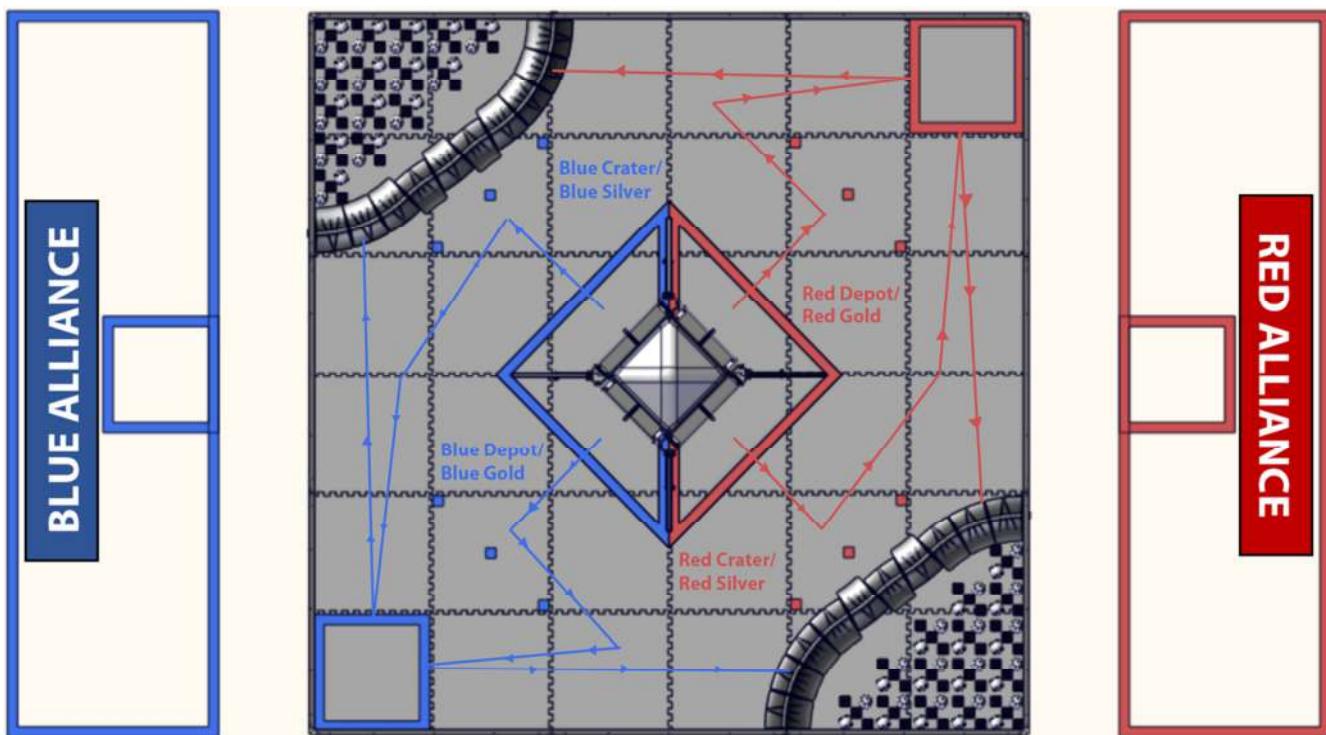
### 3. getPosition()

```
public String getPosition() {  
    /* Activate Tensor Flow Object Detection. */  
    if (tfod != null) {  
        tfod.activate();  
    }  
  
    int x = 0;  
  
    while(x == 0) {  
        if (tfod != null) {  
            // getUpdatedRecognitions() will return null if no new information is available since  
            // the last time that call was made.  
            List<Recognition> updatedRecognitions = tfod.getUpdatedRecognitions();  
            if (updatedRecognitions != null) {  
                if (updatedRecognitions.size() == 3) {  
                    int goldMineralX = -1;  
                    int silverMineral1X = -1;  
                    int silverMineral2X = -1;  
                    for (Recognition recognition : updatedRecognitions) {  
                        if (recognition.getLabel().equals(LABEL_GOLD_MINERAL)) {  
                            goldMineralX = (int) recognition.getLeft();  
                        } else if (silverMineral1X == -1) {  
                            silverMineral1X = (int) recognition.getLeft();  
                        } else {  
                            silverMineral2X = (int) recognition.getLeft();  
                        }  
                    }  
                    if (goldMineralX != -1 && silverMineral1X != -1 && silverMineral2X != -1) {  
                        if (goldMineralX < silverMineral1X && goldMineralX < silverMineral2X) {  
                            return "Left";  
                        } else if (goldMineralX > silverMineral1X && goldMineralX > silverMineral2X) {  
                            return "Right";  
                        } else {  
                            return "Center";  
                        }  
                    }  
                }  
            }  
        }  
        return "Not found";  
    }  
}
```

After the phone's camera is taking picture, the program starts to recognize the minerals from the images. Afte that, comparing to a database it recognize the gold mineral and it's localization (Left, Right or Center).

## Red Near Depot Class

This is the class which uses the autonomous functions to earn all the autonomous points. In accordance to the game strategy, this class is available when the robot starts from the position near the depot (and the alliance color is red).



This picture shows the safest roads for every start point. In our case (starting from the red depot) the safest road should be taking out the gold mineral, then going to the wall, turning parallel to the wall, scoring the team marker in the depot then parking in the crater.

The initialization of the imu, motors, servos, sensors, vuforia, TensorFlow Object Detection.

Position = position of the gold mineral

```

@Override
public void runOpMode() throws InterruptedException{
    autonomie.initializare(hardwareMap);
    autonomie.initializareIMU(hardwareMap);

    recongize.initVuforia();
    recongize.initTfod(hardwareMap);
    waitForStart();

    Position = recongize.getPosition();
}

```

```

switch (Position) {
    case "Left":
        autonomie.TurnUsingIMU(angle: 25, TURNING_SPEED, TURNING_SPEED, -TURNING_SPEED, -TURNING_SPEED);
        steps = (int) (COUNTS_PER_REVOLUTION*FIRST_LEFT_DISTANCE/(PI*DIAMETER));
        autonomie.DriveUsingEncoder(steps, steps, steps, DRIVING_SPEED, DRIVING_SPEED, DRIVING_SPEED);
        autonomie.TurnUsingIMU(angle: 127, TURNING_SPEED, TURNING_SPEED, -TURNING_SPEED, -TURNING_SPEED);
        autonomie.DriveUntilBlueOrRedLine(color: "red", LeftFrontPower: -0.3, LeftBackPower: -0.3, RightFrontPower: -0.3, RightBackPower: -0.3);
        steps = (int) (COUNTS_PER_REVOLUTION*SECOND_LEFT_DISTANCE/(PI*DIAMETER));
        autonomie.DriveUsingEncoder(steps, steps, steps, -DRIVING_SPEED, -DRIVING_SPEED, -DRIVING_SPEED, -DRIVING_SPEED);
        break;
    case "Center":
        steps = (int) (COUNTS_PER_REVOLUTION*FIRST_CENTER_DISTANCE/(PI*DIAMETER));
        autonomie.DriveUsingEncoder(steps, steps, steps, DRIVING_SPEED, DRIVING_SPEED, DRIVING_SPEED);
        steps = (int) (COUNTS_PER_REVOLUTION*SECOND_CENTER_DISTANCE/(PI*DIAMETER));
        autonomie.DriveUsingEncoder(steps, steps, steps, -DRIVING_SPEED, -DRIVING_SPEED, -DRIVING_SPEED, -DRIVING_SPEED);
        autonomie.TurnUsingIMU(angle: 75, LeftFrontPower: 0.3, LeftBackPower: 0.3, RightFrontPower: -0.3, RightBackPower: -0.3);
        steps = (int) (COUNTS_PER_REVOLUTION*THIRD_LEFT_DISTANCE/(PI*DIAMETER));
        autonomie.DriveUsingEncoder(steps, steps, steps, -DRIVING_SPEED, -DRIVING_SPEED, -DRIVING_SPEED, -DRIVING_SPEED);
        autonomie.TurnUsingIMU(angle: 127, LeftFrontPower: 0.3, LeftBackPower: 0.3, RightFrontPower: -0.3, RightBackPower: -0.3);
        autonomie.DriveUntilBlueOrRedLine(color: "red", LeftFrontPower: -0.35, LeftBackPower: -0.35, RightFrontPower: -0.35, RightBackPower: -0.35);
        steps = (int) (COUNTS_PER_REVOLUTION*FOURTH_LEFT_DISTANCE/(PI*DIAMETER));
        autonomie.DriveUsingEncoder(steps, steps, steps, -DRIVING_SPEED, -DRIVING_SPEED, -DRIVING_SPEED, -DRIVING_SPEED);
        break;
    case "Right":
        autonomie.TurnUsingIMU(angle: -25, TURNING_SPEED, TURNING_SPEED, -TURNING_SPEED, -TURNING_SPEED);
        steps = (int) (COUNTS_PER_REVOLUTION*FIRST_RIGHT_DISTANCE/(PI*DIAMETER));
        autonomie.DriveUsingEncoder(steps, steps, steps, DRIVING_SPEED, DRIVING_SPEED, DRIVING_SPEED);
        steps = (int) (COUNTS_PER_REVOLUTION*SECOND_RIGHT_DISTANCE/(PI*DIAMETER));
        autonomie.DriveUsingEncoder(steps, steps, steps, -DRIVING_SPEED, -DRIVING_SPEED, -DRIVING_SPEED, -DRIVING_SPEED);
        autonomie.TurnUsingIMU(angle: 127, TURNING_SPEED, TURNING_SPEED, -TURNING_SPEED, -TURNING_SPEED);
        steps = (int) (COUNTS_PER_REVOLUTION*THIRD_RIGHT_DISTANCE/(PI*DIAMETER));
        autonomie.DriveUsingEncoder(steps, steps, steps, DRIVING_SPEED, DRIVING_SPEED, DRIVING_SPEED);
        autonomie.DriveUntilBlueOrRedLine(color: "red", LeftFrontPower: -0.3, LeftBackPower: -0.3, RightFrontPower: -0.3, RightBackPower: -0.3);
        steps = (int) (COUNTS_PER_REVOLUTION*FOURTH_RIGHT_DISTANCE/(PI*DIAMETER));
        autonomie.DriveUsingEncoder(steps, steps, steps, -DRIVING_SPEED, -DRIVING_SPEED, -DRIVING_SPEED, -DRIVING_SPEED);
}

```

If Position is equal to "Left" that means that the gold mineral is in the left side of the robot. So, in accordance to the game strategy, the robot will turn a certain angle to be in front of the left mineral, go forward to move the gold mineral, move a little bit backwards, turn a certain angle, go to the wall, turn parallel to the wall, move backwards until the red line, score the team marker, then go to the crater to park.

If Position is equal to "Center" that means that the gold mineral is in front of the robot. So, in accordance to the game strategy, the robot will go forward to move the gold mineral, move a little bit backwards, turn a certain angle, go to the wall, turn parallel to the wall, drive until the red line of the depot, score the team marker, then go to the crater to park.

If Position is equal to "Right" that means that the gold mineral is in the right side of the robot. So, in accordance to the game strategy, the robot will turn a certain angle to be in front of the right mineral, go forward to move the gold mineral, move a little bit backwards, turn a certain angle, go to the wall, turn parallel to the wall, drive until the red line of the depot, score the team marker, then go to the crater to park.

## **7.2.Tel-Ops Period**

The Tele-Op period is that period in which the robot is controlled by a driver with a gamepad. In this period, the driver has to collect and score into the lander as many minerals as he can and in the End Game, he has to get up to the Lander. This year we will use only one driver and one gamepad. The buttons are programmed as seen below :



Button A: Compresses the vertical slider

Button Y: Lifts the vertical slider

Button X: Compresses the horizontal slider

Button B: Expands the horizontal slider

Left Stick : Controls the left motors of the robot

Right Stick : Controls the right motors of the robot

Left Bumper ( LB ): Gear shift down

Right Bumper ( RB ): Gear shift up ( to 4 gears )

Gamepad button left: Throws the minerals from the collecting system to the scoring system

Gamepad button up: Throws the minerals from the scoring system into the Lander

Left and Right back trigger ( RT & LT ): Controlling the collecting system

## I. Variables

### A) Motors and Servos

```
// the double variables which represent the needed power for different action
private static final double DRIVING_POWER = 1;
static private double Lifting_Power = 0.7; // for lifting the scoring system
static private double Descending_Power = -0.3; // for descending the scoring system
static private double Elongation_Power = 0.5; // for elongating the collecting system
static private double Compression_Power = -0.5; // for compressing the collecting system to the original form
static private double Servo_InitialPosition = 0.7; // the initial position (necessary at the beginning of the match) for the scoring system's servo
static private double Servo_SecondPosition = 0.7; // the position necessary during the match
static private double Servo_FinalPosition = 0.0; // the final position for the scoring system's servo
static private double OverThrowMineralsInScoringSystem_Power = 0.6; // for throwing the minerals into the scoring system overthrowing the collecting system
static private double GetCollectingSystemOnTheFloor_Power = -0.4; // for getting the collecting system back in the original position (ready for collecting)

double GearRatio = 0.8; // the percentage equivalent the gear shift

double inputY1, inputY2; // the Y input from the two sticks of the gamepad
double inputX1; // The X input from the left stick of the gamepad
// necessary for movement
double inputX2;
```

The variables are need to know which motor or servo is which in order to give them the correct commands , know their location or function.

### B) Buttons

```
public class Insciere_Bile extends LinearOpMode {

    //First comes the needed variables

    Servo LeftServo, RightServo; // the servos for scoring the minerals in the lander
        // the scoring sistem is made out of two servos which are both connected to an arm which throw the minerals in the lander

    DcMotor LeftFront, LeftBack, RightFront, RightBack; // the motors for movement

    DcMotor Vertical_Slider, Orizontal_Slider; // the motors used for sliders
        // The vertical slider lift the scoring system until it reach the necessary altitude to put the minerals in the lander
        // The horizontal slider elongates the collecting system to reach the minerals which are very far from the robot

    DcMotor Collecting_Motor; // the motor which puts in action the collecting system

    DcMotor OverThrow_Motor; // the motor which makes the transition from collecting system to the scoring one
        // it "throw" the minerals into the scoring system
```

This variables are necessary for the gamepad to know if the buttons are pressed or unpressed.

### C) Powers

```
// the true or false variables necessary to remember if the gamepad's button are or are not pressed  
// true = pressed  
// false = unpressed  
boolean Gamepad1B_isPressed      = false;  
boolean Gamepad1Y_isPressed       = false;  
boolean Gamepad1A_isPressed       = false;  
boolean Gamepad1X_isPressed       = false;  
boolean Gamepad1DpadLeft_isPressed = false;  
boolean Gamepad1DpadRight_isPressed = false;  
boolean Gamepad1DpadUp_isPressed  = false;  
boolean Gamepad1DpadDown_isPressed = false;  
boolean Gamepad1LeftBumper_isPressed = false;  
boolean Gamepad1RightBumper_isPressed = false;
```

Using variables for the power are very helpful because if the power is too high or too low it is easier to correct the errors only at the beginning of the program.

## 2. Initialization

```

public void initialize(){
    RightServo      = hardwareMap.servo.get("ServoDreapta");
    LeftServo       = hardwareMap.servo.get("ServoStanga");
    Vertical_Slider = hardwareMap.dcMotor.get("VerticalSlider");
    Orizontal_Slider = hardwareMap.dcMotor.get("HorizontalSlider");
    LeftFront       = hardwareMap.dcMotor.get("LeftFront");
    LeftBack        = hardwareMap.dcMotor.get("LeftBack");
    RightFront      = hardwareMap.dcMotor.get("RightFront");
    RightBack       = hardwareMap.dcMotor.get("RightBack");
    OverThrow_Motor = hardwareMap.dcMotor.get("OverthrowMotor");
    Collecting_Motor = hardwareMap.dcMotor.get("CollectingMotor");

    // some motors and servos need to be on the reverse mode
    Collecting_Motor.setDirection(DcMotorSimple.Direction.REVERSE);
    Orizontal_Slider.setDirection(DcMotorSimple.Direction.REVERSE);
    LeftBack.setDirection(DcMotorSimple.Direction.REVERSE);
    LeftFront.setDirection(DcMotorSimple.Direction.REVERSE);

    LeftServo.setDirection(Servo.Direction.REVERSE);

    // initializing the servos setting their position
    RightServo.setPosition(Servo_InitialPosition);
    LeftServo.setPosition(Servo_InitialPosition);

    OverThrow_Motor.setMode(DcMotor.RunMode.RUN_USING_ENCODER);
}

```

The necessary function to initialize all the motors and servos. Also, the direction of the motors from the left side of the robot are set to REVERSE. That means that the motor will spin backwards.

And for the buttons:

```

// the function responsible for collecting the input from the gamepad
public void getInput(){
    Gamepad1B_isPressed      = gamepad1.b;
    Gamepad1Y_isPressed      = gamepad1.y;
    Gamepad1A_isPressed      = gamepad1.a;
    Gamepad1X_isPressed      = gamepad1.x;
    Gamepad1DpadLeft_isPressed = gamepad1.dpad_left;
    Gamepad1DpadRight_isPressed = gamepad1.dpad_right;
    Gamepad1DpadUp_isPressed = gamepad1.dpad_up;
    Gamepad1DpadDown_isPressed = gamepad1.dpad_down;
    Gamepad1RightBumper_isPressed = gamepad1.right_bumper;
    Gamepad1LeftBumper_isPressed = gamepad1.left_bumper;
    // the gamepad's Y axis is in negative when it should be positive and vice versa, so we change the sign
    inputYl = -gamepad1.left_stick_y;
    inputXl = gamepad1.right_stick_x;
}

```

### 3.Movement

```
public void Movement(double LeftFrontPower,
                     double LeftBackPower,
                     double RightFrontPower,
                     double RightBackPower) {

    LeftFront.setPower(LeftFrontPower);
    LeftBack.setPower(LeftBackPower);
    RightFront.setPower(RightFrontPower);
    RightBack.setPower(RightBackPower);

}
```

This function sets the power ( using the power variables ) for the motors that are dealing with moving the robot.

```
public void StopMovement(){
    LeftFront.setPower(0);
    LeftBack.setPower(0);
    RightFront.setPower(0);
    RightBack.setPower(0);
}
```

This function stops the motors dealing with the movement.

### 4.Scoring System

```
public void lifting(){
    if(Gamepad1Y_isPressed == true){
        Vertical_Slider.setPower(Lifting_Power);
    }
    else if(Gamepad1A_isPressed == true) {
        Vertical_Slider.setPower(Descending_Power);
    }
    else{
        Vertical_Slider.setPower(0.0);
    }
}
```

This function is for activating the motors that will lift the Scoring System. If the button Y is pressed, the system will lift, if the button A is pressed, the system goes down and if no button is pressed it will remain still.

```
public void scoring(){

    if(Gamepad1DpadUp_isPressed == true){
        LeftServo.setPosition(Servo_FinalPosition);
        RightServo.setPosition(Servo_FinalPosition);
    }
}
```

the "shovel" from the top will throw the minerals using 2 servos.

This function makes the Scoring System to throw the minerals into the Lander if the gamepad up is pressed. While the system is lifted,

## 5. Collecting System

This function is used for moving the Collecting System. If the button X is pressed the system is compressing. If the button B is press the system will expend. If no button is pressed the system will remain in place.

```
public void elongation(){
    if(Gamepad1X_isPressed == true){
        Orizontal_Slider.setPower(Compresion_Power);
    }
    else if(Gamepad1B_isPressed == true){
        Orizontal_Slider.setPower(Elongation_Power);
    }
    else{
        Orizontal_Slider.setPower(0.0);
    }
}
```

```
public void collecting(){
    Collecting_Motor.setPower(gamepad1.right_trigger - gamepad1.left_trigger);
}
```

This function controls the collecting system from the triggers. If the right trigger is pressed the system will collect and if the left one is pressed it will shot minerals out.

```
if(Gamepad1DpadLeft_isPressed == true){

    OverThrow_Motor.setMode(DcMotor.RunMode.STOP_AND_RESET_ENCODER);
    OverThrow_Motor.setTargetPosition(600);

    OverThrow_Motor.setMode(DcMotor.RunMode.RUN_TO_POSITION);
    OverThrow_Motor.setPower(1);

    while (OverThrow_Motor.isBusy() && opModeIsActive()) {
        getInput();
        if(Gamepad1DpadRight_isPressed == true){
            break;
        }
        telemetry.addData("Steps: ", OverThrow_Motor.getCurrentPosition());
        telemetry.addData("OPower: ", OverThrow_Motor.getPower());
        telemetry.update();
    }

    OverThrow_Motor.setPower(0.0);

    OverThrow_Motor.setMode(DcMotor.RunMode.RUN_USING_ENCODER);

} // DpadRight se intorce in pozitie initiala
else if(Gamepad1DpadRight_isPressed == true){

    OverThrow_Motor.setPower(-0.4);
    sleep(300);
    OverThrow_Motor.setPower(0.0);
```

This function makes the Collecting System to throw the minerals collected into the Scoring System. If the gamepad left is pressed the Scoring System will overthrow the mineral into the Scoring System until it reaches a limit. When the limit is reached

and the button is pressed, the Collecting System will come back on the ground. If nothing is pressed, the System will remain still.

## 6. Gearaing System

```
public void SpeedGear(){

    if(Gamepad1RightBumper_isPressed == true && GearRatio <= 0.8){
        GearRatio += 0.2;
        sleep(100);
    }
    else if(Gamepad1LeftBumper_isPressed == true && GearRatio >= 0.4){
        GearRatio -= 0.2;
        sleep(100);
    }
}
```

This function makes the power of the motors change if the right bumper is pressed. The system has 4 gears.

## 7. Directions and Movement

```
if(inputY1 > 0){
    Movement( LeftFrontPower: -DRIVING_POWER*GearRatio, LeftBackPower: -DRIVING_POWER*GearRatio, RightFrontPower: -DRIVING_POWER*GearRatio, RightBackPower: -DRIVING_POWER*GearRatio);
}
else if(inputY1 < 0){
    Movement( LeftFrontPower: DRIVING_POWER*GearRatio, LeftBackPower: DRIVING_POWER*GearRatio, RightFrontPower: DRIVING_POWER*GearRatio, RightBackPower: DRIVING_POWER*GearRatio);
}
else {
    StopMovement();
}

if(inputX1 > 0){
    Movement( LeftFrontPower: DRIVING_POWER*GearRatio, LeftBackPower: DRIVING_POWER*GearRatio, RightFrontPower: -DRIVING_POWER*GearRatio, RightBackPower: -DRIVING_POWER*GearRatio);
}
else if(inputX1 < 0){
    Movement( LeftFrontPower: -DRIVING_POWER*GearRatio, LeftBackPower: -DRIVING_POWER*GearRatio, RightFrontPower: DRIVING_POWER*GearRatio, RightBackPower: DRIVING_POWER*GearRatio);
}
else {
    StopMovement();
}
```

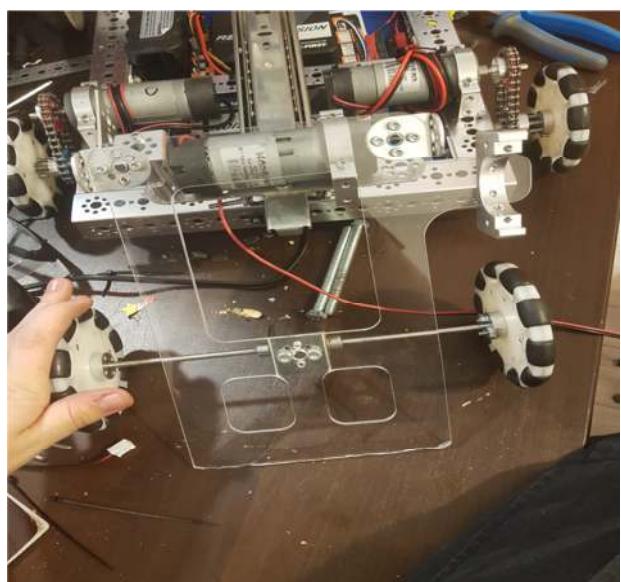
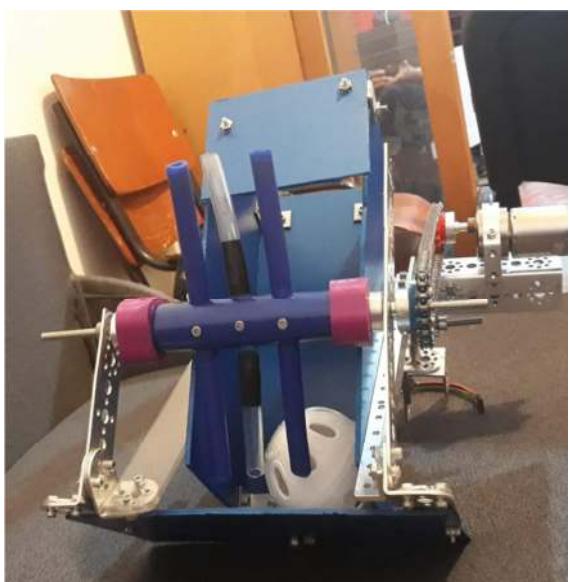
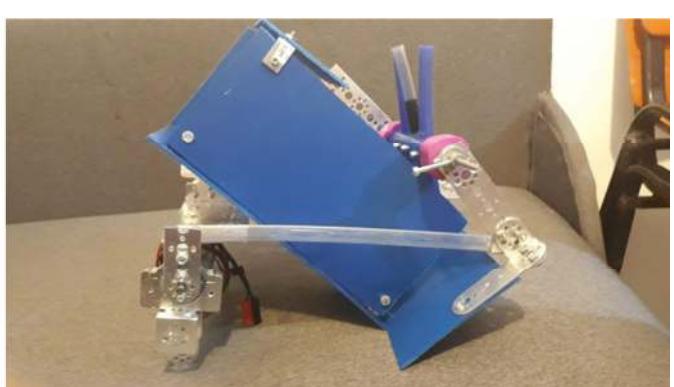
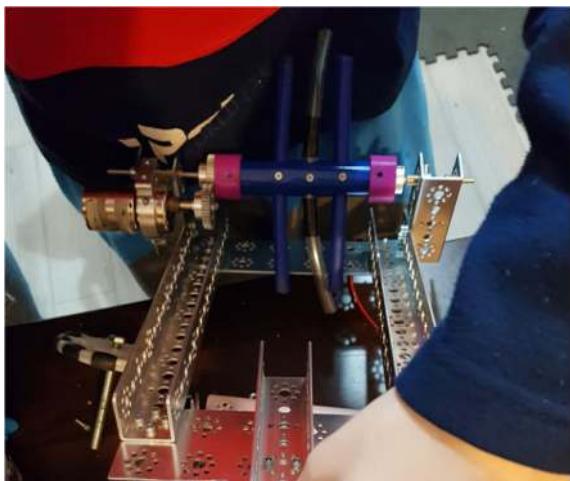
This function makes the robot move. If the left stick is moved, the robot will go forward or backwards. The right stick will make it rotate to left or right.

## **8. ROBOT INNOVATION**

## Robot Innovation

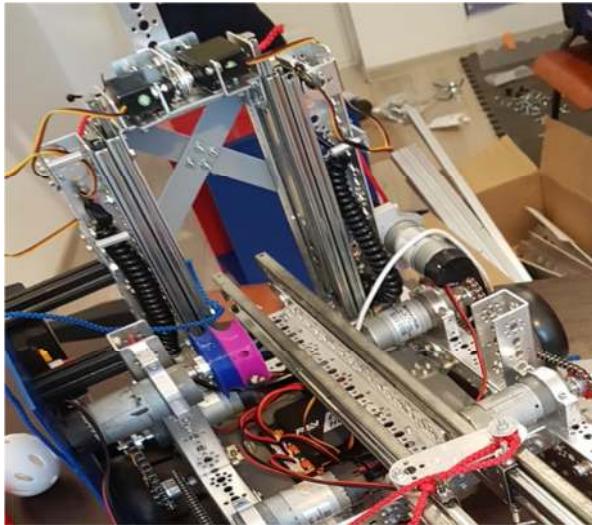
The collecting system rake represents the most important piece in our robot as it's function allows us to make R.E.L.U. able to pick up the minerals from outside the crater and therefore it helps us save time in order to either score more points or prepare for parking.

The decision of using such a system was to make our lives easier in the arena, but it came with a cost, the process of creating it , as at this moment it's still one challenge that we did not manage to complete because it either broke or was too heavy, proven by the fact that one slider was not enough to sustain it, but it's end is near as our future project is to create it out of Polyoxymethylene , a light and resistant material.



The X will be remembered as the best idea that came out of nowhere but which died once with "Dezmembirla". Its role was to make the vertical sliders move at once, and unexpectedly it made the vertical system a whole lot more resistant.

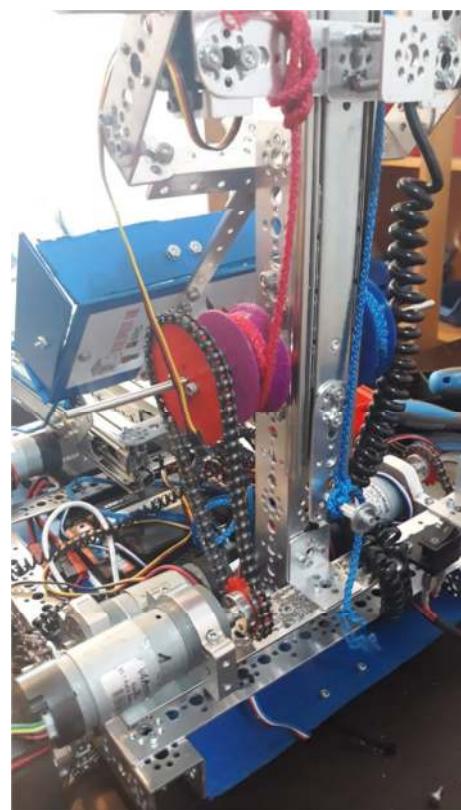
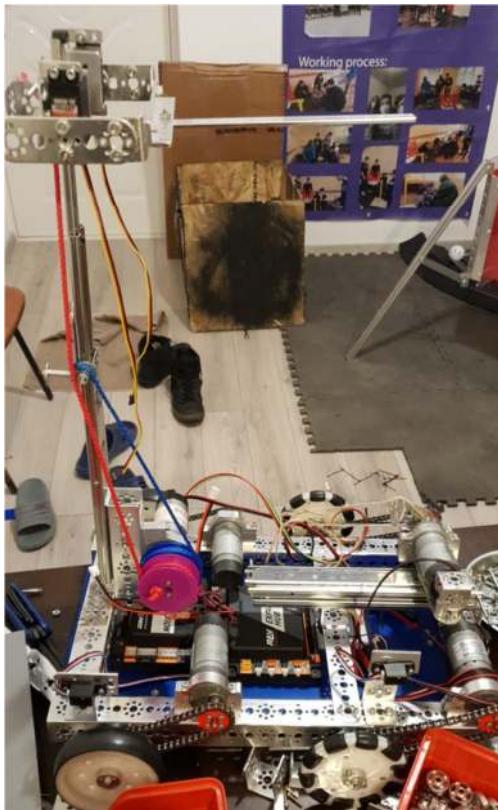
The reason behind its disposal was the weight of the robot, so when the time came for us to cut the extra kilograms, we decided to remove one of the vertical sliders and so the X perished



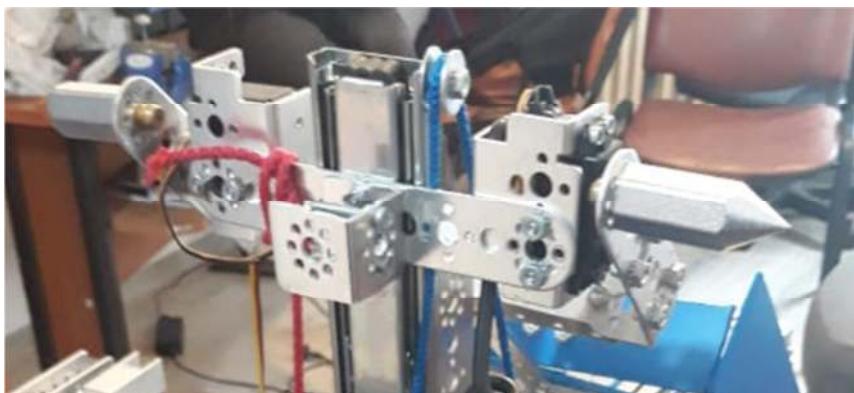
The ropes system are the option we used as they imply little to no weight, they are efficient and can execute both movement to enlarge the sliders but also shorten them .

The difficulty in having these is at the beginning of usage as we realised that our pulley wheels didn't have the same size so one rope would automatically get loose and tangle to something.

To be added is that at one point we realised that we can no longer hang the robot to the lander and added a chain system that doubled the force.



At one point our flipping system could not support the weight and would stop but one simple yet amazing other idea was too add some weight to our flipping system that ,indeed would make the first part of the movement harder ,but at a certain angle it would start helping our Servos finish their movement.



On our future plan list there are stuff like making the vertical slider push the lander and so, when the robot hangs, the chassis would be parallel with the ground as for now the weight that the vertical slider has to support is high due to the inclination, or some strings for our cables that have to enlarge so they wouldn't hang loosen and risk tangling with something

Team #R0 044

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