“Engaging students in the learning process through innovation”

(ESTI)

2017-1-ES01-KA219-037963

Workplan of our Robot

1. The team and its formation

2. How did it all begin?

3. Now we have the kit, what do we do with it?

4. How did we promote the project?

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6. The programming stage

7. Short interview of the team before the first contest

8. Our first robotics contest

9. Team impressions

10. How did we find funds for funding?

The team

First, the team was formed of approximate 20 members, but a big part of this team participated to a small number of meetings, so the robot was mostly built by those 4 persons:

- Popescu Stefan – Builder, clasa IX
- Visan Cezar – Programmer, clasa IX
- Baston Denis – Programmer, clasa IX
- Patru Stefan – Builder, clasa IX

The notebook was realized by Banu Andrei and Ariana Mertoiu.

The members who signed up in this project are:

Programming resources:

- **Visan Cezar**
- **Baston Jenica**

Notebook engineers:

- **Banu Andrei**
- **Mertoiu Ariana**

Building:

- **Patru Stefan**
- **Popescu Stefan**

Now we have the kit, what do we do with it?

The answer: The hard part of the project begins, we have to learn how to build a robot and how to promme it. We have to follow the guide that the project presented to us and we have to try to make an unique robot, “our robot”.

Fortunately, we had along our side as a mentor/coordinator mister Nicoara Paul, which helped and guided us for the entire period of the project.

We select the most courageous of the traco-geti robots.

We share the kits and our table for our specializations and preferences: building, notebook and programming.

The business team begins the search for sponsors.

The mentor is getting more and more nervous because things go in the opposite direction.

And that is how we will get with “unirelul” moving forward, backwards, to the right or to the left. (without going up and down)

How did it all begin?

The Erasmus+ project “Engaging students in the learning process through innovation” initiated us in the mysteries of robotics. On November 15th 2018, the team “ROBOTEII CNU” formed of Ariana Mertoiu, Soare Beniamin, Dimancescu Liviu, Lotrea Alexandru, Cristea Razvan, together with Nicoara Paul, the mentor of the project,

they applied for the BRD FIRST TECH Challenge Romania 2018, National Championship (March 23-25th). This is organized with the support from BRD Romania.

The ONG “Natie prin Educatie” has the mission to become “an active force in STEM education (Science, Technology, Inginery, Mathematichs), which has the goal to create a strong connection between STEM highschools and universities and the business environment from Romania.

The vision of this ascociation is to support a new way to learn the theoretical sciences: lerning with the discovery method, through practice activities and team work. This new way to learn generates a bigger interest from the students for school and theoretical curriculum. We invest in formation of the students, because they will be the specialists of tomorrow, we help the preparation of the students for the fourth industrial revolution- DIGITAL ERA.

On November 2nd 2018 we presented our team Roboteii CNU in our festivities hall.

The CONCEPT AND VALUES OF FIRST Tech Challenge needed more than tem work, the work on the project, antreprenorial spirit and abilities, initiative and solving problems, volunteering. Activities were proposed for the evolving of the tehnical and non-tehnical components. The FIRST values stood at the base of all the activities of the project. Through these values, students learn the importance of the communication and of cooperation between teams, those abilities are also useful in the adult life, indifferent in which field they will work.

Friday, November 2nd 2018, the association representative, mister Cristian Vlasceanu, Supervisor mentor, came to our highschool to bring us the robotics KIT that we won. The meeting was in the festivities hall where 130 students were present.

The association representative, mister "Cristache" showed us a presentation of the National Contest of Robotics, he spoke to us about the vision, mission and values of the FIRST program of the association. He also spoke to us about his experience as a judge from the national contests and the international championships in USA. Next, he told us a lot of tips and tricks about all the stages that we have to go through: the formation of the team, establishing our necessary tasks: the robot contruction, programming, taking part at the regional and national contest (March 29th). He answered to questions about the 3D projection, the programming language of the robot and the necessary components that we have to obtain ourselves.

He presented us the kit component: 3D printer, two boxes with elements for the robot construction, a toolbox, half of a robot test track, a tool organizer.

The presentation in the festivities hall was two hour long, after that we brought the kit in the Informatichs Laborator no.2 and together with the students from 9th grade. Here mister “Cristache” continued to describe us the kit composition and he gave us the links where we can read the documentation: of robot construction, of his programmation, of the contest preparation. Near 5:30pm, exhausted and very happy we finished the activity.

How did we promote the project?

After we got the kit and installed it in LI2, the first thing that we did, we announced out “feat” through posting at the student’s entrances the poster of the BRD FIRST TECH CHALLENGE where the school team, ROBOTEII CNU have to participate. We tried to “advertise” for information and attraction of new followers and fans. He posted on the project facebook account Erasmus KA2 „Engaging students in the learning process through innovation”, www.facebook.com/Erasmus-Colegiul-National-Unirea; www.facebook.com/ASCNU

“Ecouri dunarene”- The publication of Local Council Turnu Magurele

November 9th, “ROBOTEII CNU” had a meeting for the first time after the presentation from Friday, November 2nd.

From the contruction team were present: Scarlat Dan, Venisaris Dumitru, Patru Stefan, Andrei Mihai. The missing ones are: Popescu Stefan, Lamba Cristian, Cojocaru. From the programming team were present: Saliani Matteo, Visan Cezar, Nania Cristi. From the NOTEBOOK team were present: Gheorghita Gina, Badan Laura, Dana Raluca, Rezeanu Maria, Budulan Ana Andreea.

We have discussed the following:

1. We presented the results obtained in using the 3D printer. Dan Scarlat, Dumitru Velisalis tested the Tinkercad program, for programming the printer, to continue studying the CURA/Slice3r program for the command of the printer.

   With the NOTE BOOK team, we set the contents of the journal and the station of the day.

   From the PROGRAMMING team, Visan Cezar went through the robot programming documentation, the other colleagues still doing the same thing. Finally, we set the next meeting for Tuesday in the long break in L12 with the full team.

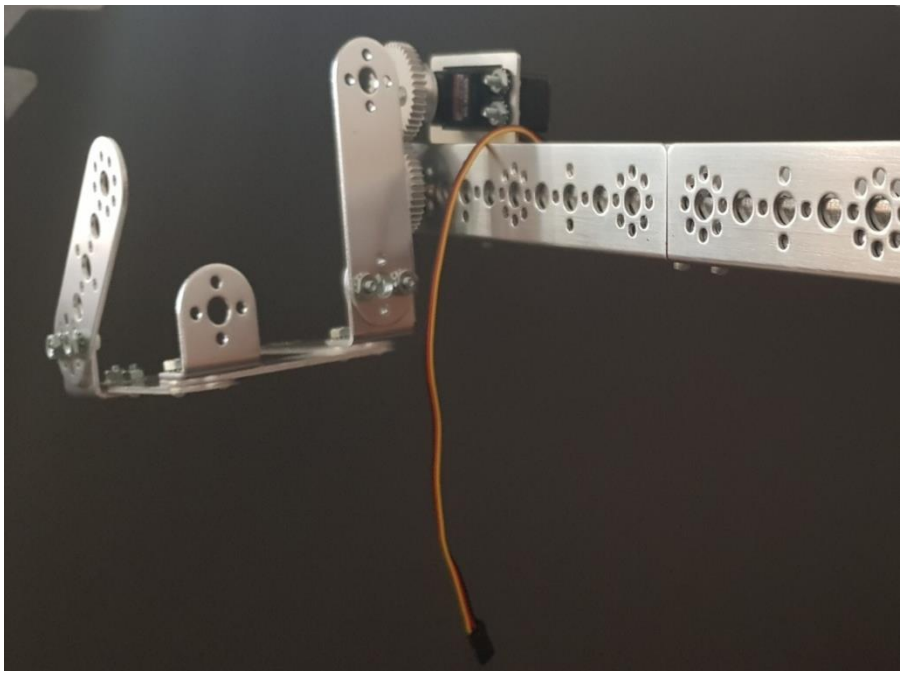
Construction Stage

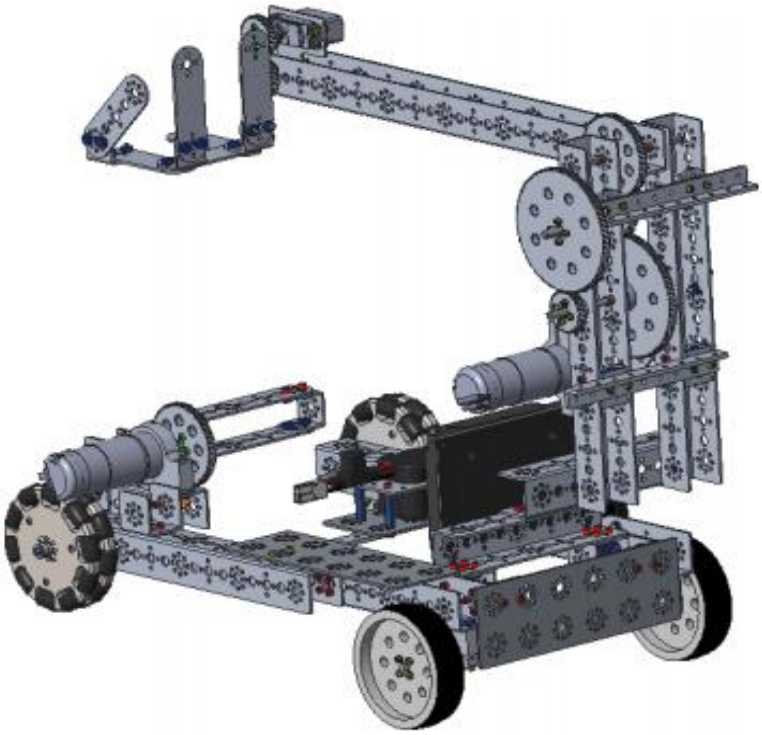
Description: Robot with four wheels, 4 motors and one arm custom made to attach the projected subsystem.

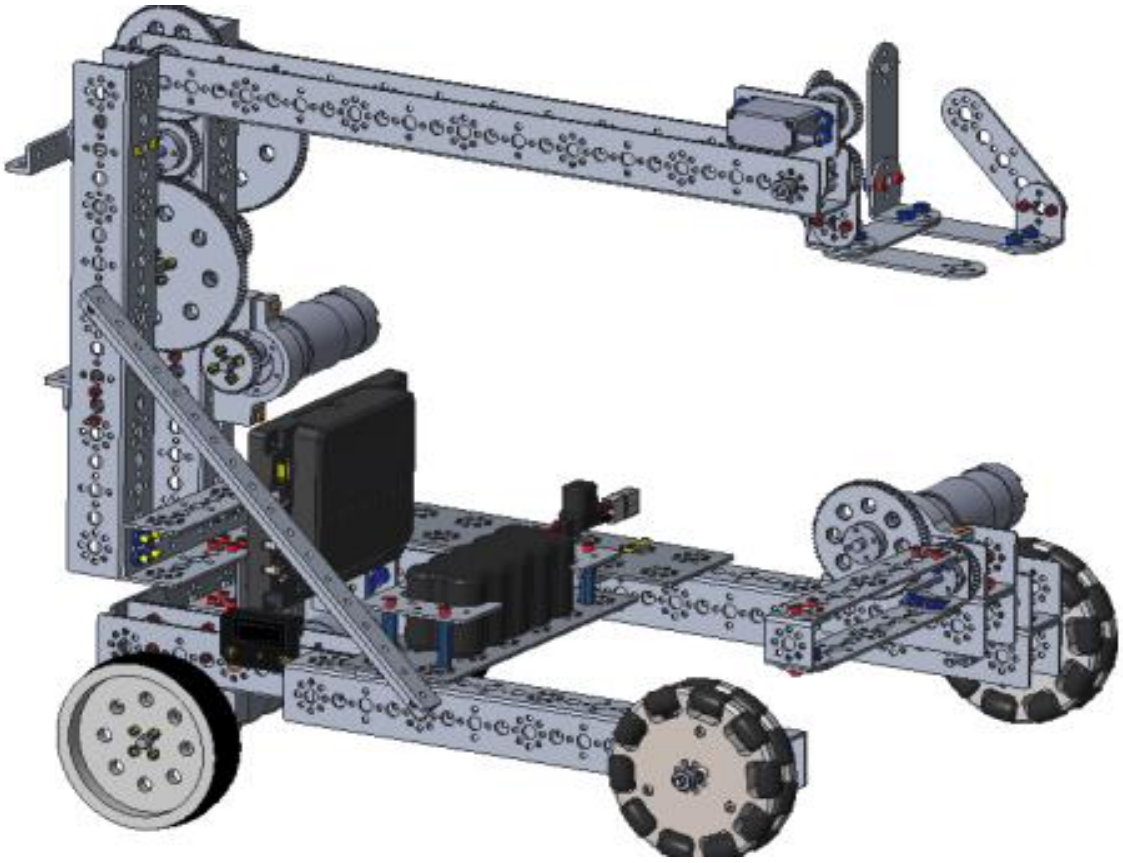
Number of versions: 2

Customed parts:

- Metal arm projected with a special catch system designed to fit on the robot skeleton.
- Serrated wheel designed to be integrated into the lifting mechanism.







Programming Stage

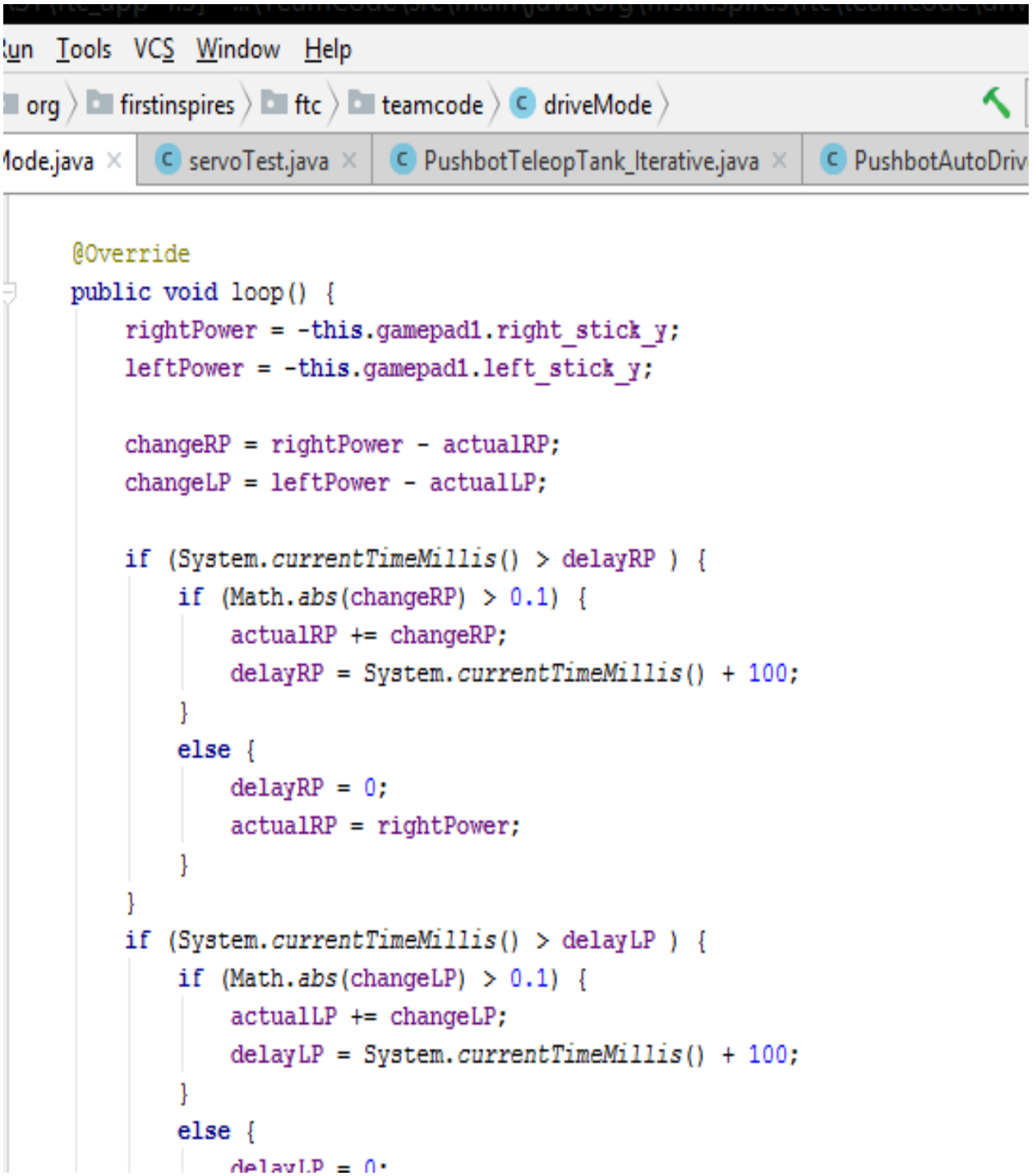
ssCalibration.java | ConceptNullOp.java | ConceptVuforiaNavRoverRuckus.java | ConceptVuforiaNavigation.java

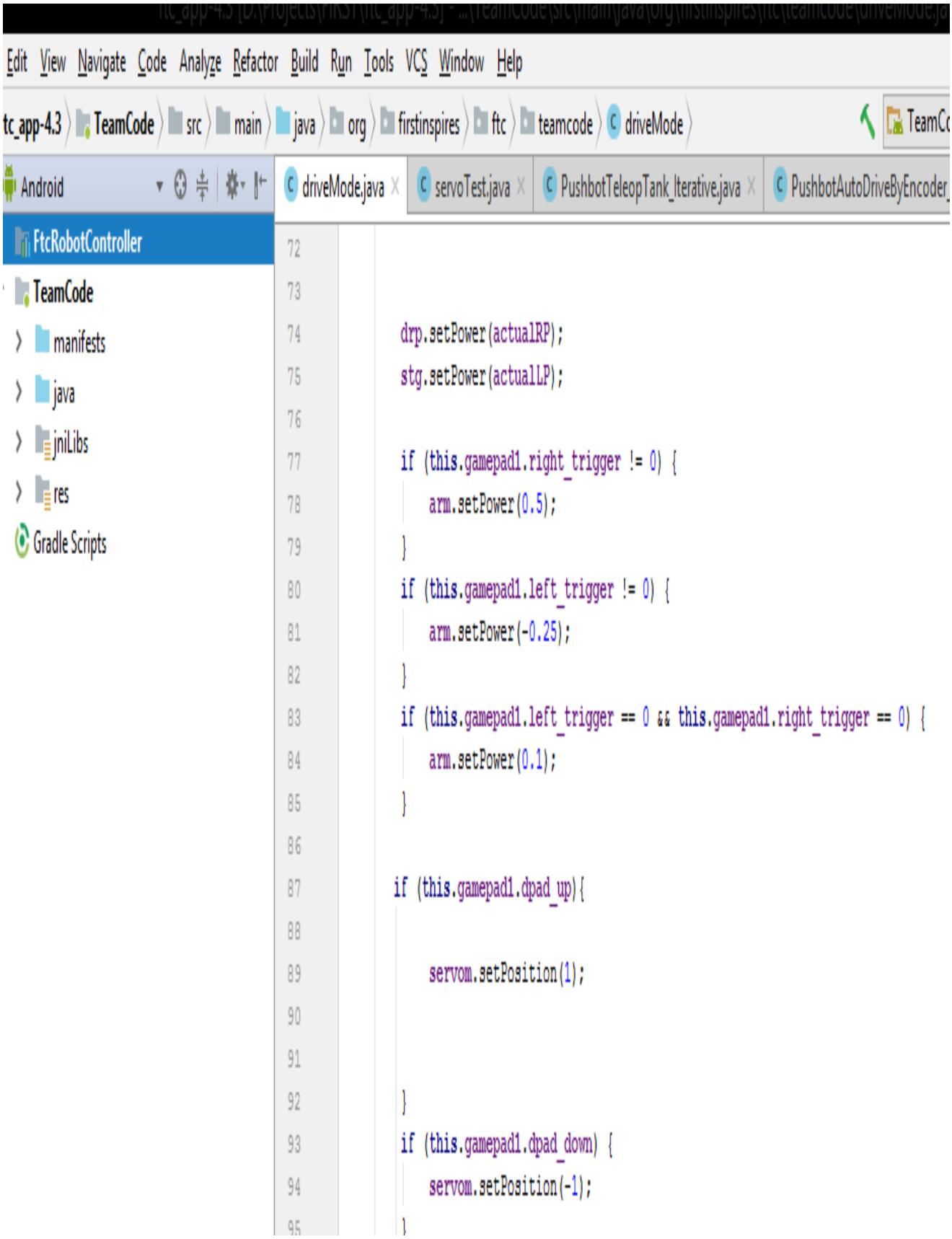
```
16      private DcMotor motor;
17      private DigitalChannel touch;
18      private DistanceSensor distSensor;
19      private Servo servo;
20          @Override
21          public void runOpMode() {
22              gyr = hardwareMap.get(Gyroscope.class, deviceName: "gyr");
23              motor = hardwareMap.get(DcMotor.class, deviceName: "motor");
24              touch = hardwareMap.get(DigitalChannel.class, deviceName: "touch");
25              distSensor = hardwareMap.get(DistanceSensor.class, deviceName: "distSensor");
26              servo = hardwareMap.get(Servo.class, deviceName: "servo");
27              double power = 0;
28
29                  while (opModeIsActive()) {
30                      power = -this.gamepad1.left_stick_y;
31                      motor.setPower(power);
32                      telemetry.addData( caption: "Targeted Power", power);
33                      telemetry.addData( caption: "Power", motor.getPower());
34
35                  telemetry.addData( caption: "Status", value: "Initialised");
36                  telemetry.update();
37                      waitForStart();
38                  }
```

java > org > firstinspires > ftc > teamcode > driveMode

driveMode.java | servoTest.java | PushbotTeleopTank_Iterative.java

```java
package org.firstinspires.ftc.teamcode;

import com.qualcomm.robotcore.eventloop.opmode.OpMode;
import com.qualcomm.robotcore.eventloop.opmode.TeleOp;
import com.qualcomm.robotcore.hardware.DcMotor;
import com.qualcomm.robotcore.hardware.DcMotorSimple;
import com.qualcomm.robotcore.hardware.Servo;

@TeleOp
public class driveMode extends OpMode {
    private DcMotor stg;
    private DcMotor drp;
    private DcMotor arm;

    private Servo servom;


    double rightPower;
    double leftPower;
    double a = 0.0;
    double actualRP = 0.0;
    double actualLP = 0.0;
    long delayRP = 0;
    long delayLP = 0;
    double changeRP;
    double changeLP;
```


Run Tools VCS Window Help
org firstinspires ftc teamcode driveMode
Mode.java servoTest.java PushbotTeleopTank_Iterative.java PushbotAutoDriv
@Override
public void loop() {
rightPower = -this.gamepad1.right_stick_y;
leftPower = -this.gamepad1.left_stick_y;
changeRP = rightPower - actualRP;
changeLP = leftPower - actualLP;
if (System.currentTimeMillis() > delayRP) {
if (Math.abs(changeRP) > 0.1) {
actualRP += changeRP;
delayRP = System.currentTimeMillis() + 100;
}
else {
delayRP = 0;
actualRP = rightPower;
}
}
if (System.currentTimeMillis() > delayLP) {
if (Math.abs(changeLP) > 0.1) {
actualLP += changeLP;
delayLP = System.currentTimeMillis() + 100;
}
else {


Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
tc_app-4.3 TeamCode src main java org firstinspires ftc teamcode driveMode
Android
FtcRobotController
TeamCode
manifests
java
jniLibs
res
Gradle Scripts
driveMode.java
servoTest.java
PushbotTeleopTank_Iterative.java
PushbotAutoDriveByEncoder
72
73
74 drp.setPower(actualRP);
75 stg.setPower(actualLP);
76
77 if (this.gamepad1.right_trigger != 0) {
78 arm.setPower(0.5);
79 }
80 if (this.gamepad1.left_trigger != 0) {
81 arm.setPower(-0.25);
82 }
83 if (this.gamepad1.left_trigger == 0 && this.gamepad1.right_trigger == 0) {
84 arm.setPower(0.1);
85 }
86
87 if (this.gamepad1.dpad_up){
88
89 servom.setPosition(1);
90
91
92 }
93 if (this.gamepad1.dpad_down) {
94 servom.setPosition(-1);
95 }

Summary

November 2nd 2018

The robotics kit is brought at the highschool. The meeting took place in the festivities hall, where were present 130 students. The KIT is formed of a 3D printer, two boxes with elements for the robot construction, a toolbox, half of a robot test track, a tool organizer.

November 9th 2018

Now the hard part begins: the team members are distributed on roles (Programmers, Notebook, Engineers, Builders) and the team needs to learn the construction steps of a robot.

The programming team: Visan Cezar and Baston Jenica

The construction team: Patru Stefan and Popescu Stefan

Notebook Engineering: Mertoiu Ariana and Banu Andrei

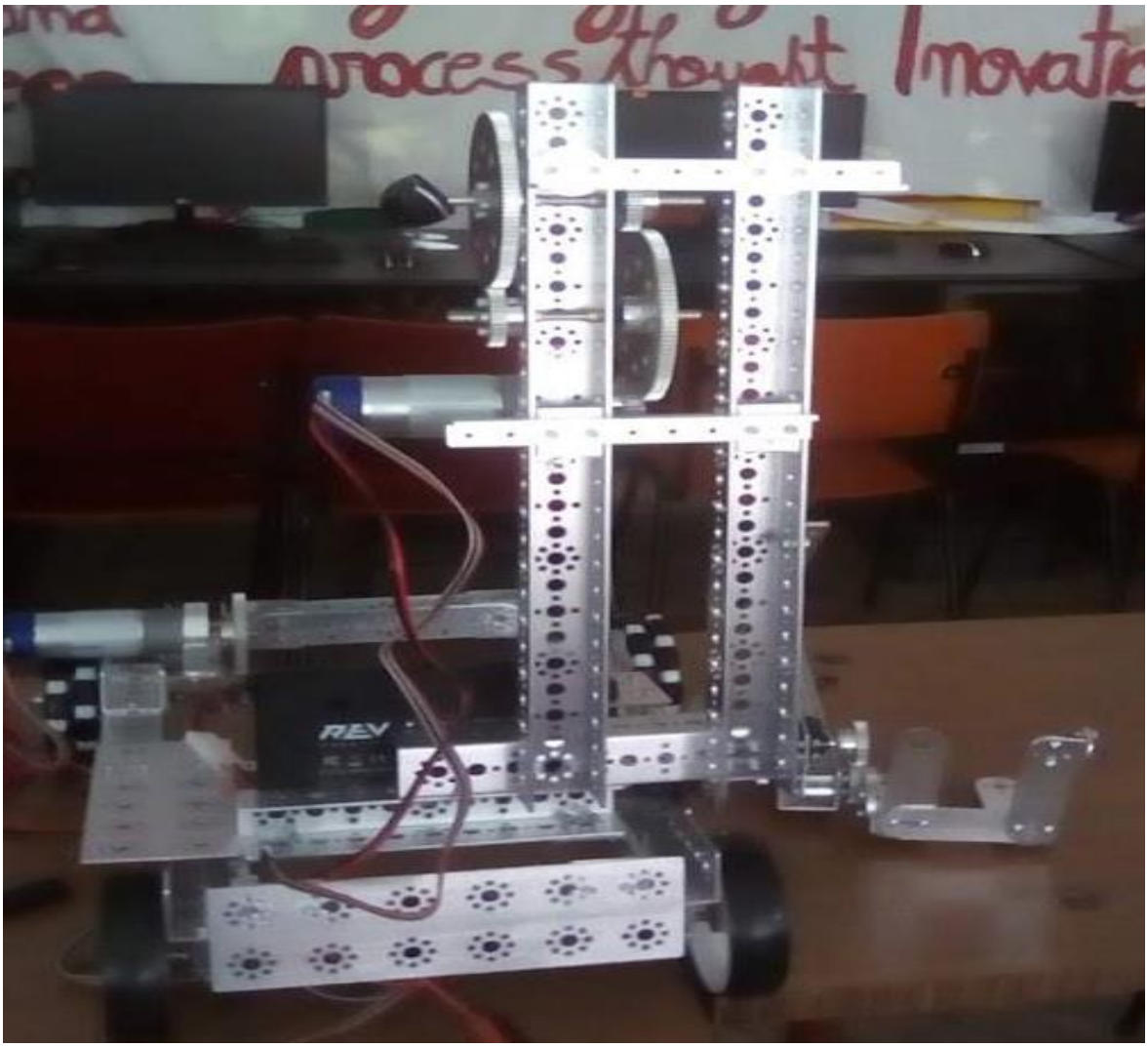
November 23th 2018

Motivated because of this new opportunity, the team finishes the lander construction and the robot assembling begins! This was a small step for the robot construction, but a huge step for our highschool!

Congratulations, Stefan Patru, Dan Scarlat, Albert Ciurea, Claudiu Nita, Stefan Popescu!

December 21st 2018

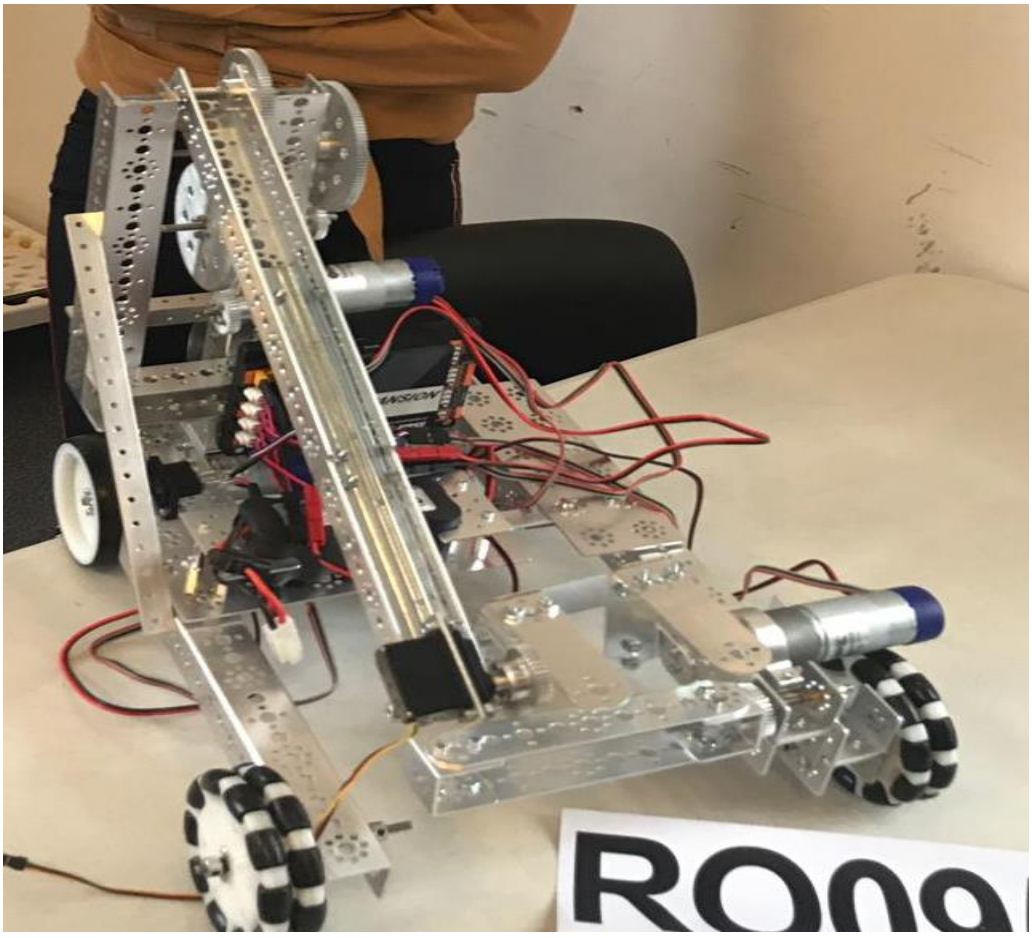
Our robot begins to have shape, but unfortunately a big part of the people who signed up for this project don't participate at meetings.



We start looking for new members in our team!

January 21st 2018

The construction is finished, all we have left is the programming which could not be started because we did not have the necessary tools. (wires, phones for pairing, controller)



We start the work with the help from the 3D printer.

Short team interview before the participation in the first DEMO contest

- Q1) What difficulties did your team encounter during the project?
- A1) The biggest obstacle that we encounter was the lack of coordination, thing that is inevitable in a big group of people. Fortunately, we successfully passed the hard period and finish our robot in time.

- Q2) Through what changes have your robot passed during the project?

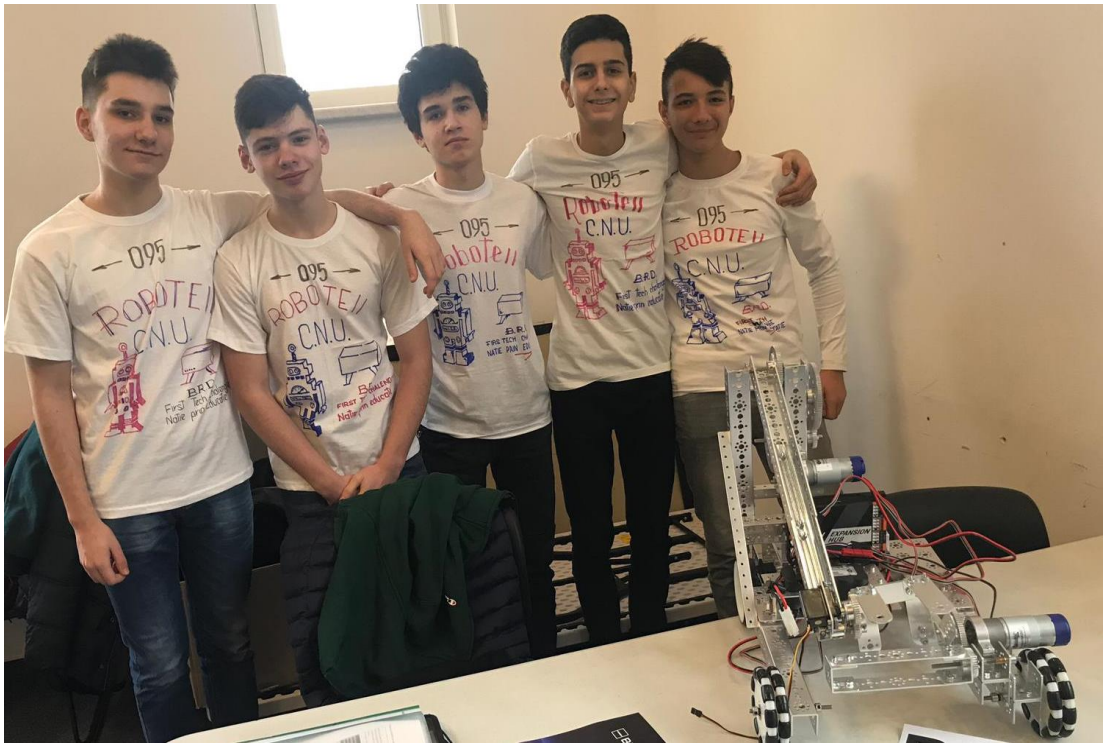
- A2) A drastic change has taken place near the finish line, when we realized that our robot does not fit in the size limits of FTC.

In this moment, before the official demo we realized the following: collaboration between a team is a very difficult thing and does not realize by itself. We tried to appreciate and to use any idea and also we tried to create an environment where members can integrate easily. In addition, the jokes and the self-ironies started to be a part from our robot.

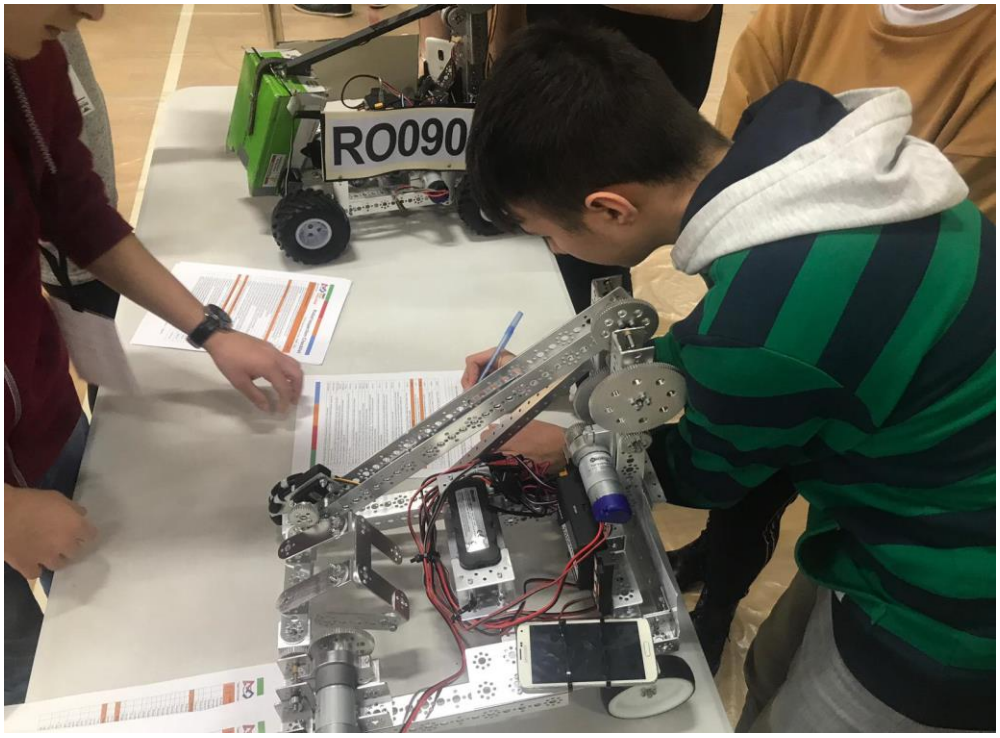
The first robotics contest

Sunday, February 3rd 2019, we participated in our first contest that took place at American International School of Bucharest, in Voluntari city, Ilfov.

The team was formed of our programmer: Cezar Visan and Jenica Baston, builders Stefan Patru and Stefan Popescu and the officials with the Notebook Andrei Banu and Ariana Mertoiu, together with the mentor Paul Nicoara.



After the check from the outside we arrived at our stand. We were under the inspection that brought us some heachaches, but we can say that we passed it in the final.



We waited with enthusiasm the lists to see the competitions where we will participate, after that we interacted with the teams that were in an alliance with us and we created some strategies.

Our drivers, Andrei and Cezar started a bit scared the first match were we were forming an alliance with Axiopolis Robotics.

We did it pretty well for a team that participates for the first time at this kind of competition. We managed to win one match.

We had a surprise from the Homosapiens team. Even if we did not form an alliance with this team, they were willing to help

We realized that the participating at this kind of competition helps a lot, even if we were not very prepared, we interacted with teams that have that experience and we learnt something from them.

Team impressions

Jenica:

The contest was a new experience, fascinating for me. I was driver in our last match and my colleagues told me that I did very well. I will continue to participate to robotics contests.

Stefan Patru:

I was pleasantly impressed of what robots can do and I will dedicate a lot of time so our robot wil get to that performance.

Andrei:

I was not really satisified of what our robot could do, so I will take this more seriously this work and I hope that at the next contest the results will be visible!

Stefan:

It seemed to me like an unique experience from where I have learnt a lot.

Ariana:

I was pleasantly impressed of this competition. It was a new experience for me and I can say that I have learnt a lot.

Cezar:

I was in shock when I first saw the potential of a well constructed robot.

Mentor:

This was a demonstrative contest extremely useful which showed us how much we have to work to have a robot as good as the ones that we saw there!

How did(n’t) we found funds for founding?

We tried to fund our project looking for funders and promotion. We had promotion from the local magazine “Ecouri Dunarene”, on the facebook account.

We tried to obtain the support of some businesses from our city, but those failed because they did not want to support us financial.

We went with strong emotions and hopes to our first three private in our city. As we went that is how we came back. I did not think that people with big incomes can be so insensitive that they will not support our robotics team.

The hard part stayed on the shoulders of the ASCNU association (Asociatia de Sprijin a Colegiului National “UNIREA”). We found tehnical support from our craftsmen. The one who supported us the most is the administrator of our highschool. We have to remember the substantial help from CSS, mister Poncea Gabriel to whom we remain deeply indebted.

We have as big hopes as in the beginning after submitting the 2% forms for ASCNU when we hope that our friend, ANAF will redirect us a part of our money.

How did we prepare for the Regional in Bucharest on March 8-9-10th 2019?

After the DE on February 2nd from AISB we came back with big hopes and we started the work: the builders started to dismount the robot, the mentor to search for another phone, the programmer to modify, and we kept it like this till the last day; mount-dismount and putting the mentor to hard mental problems. The day before the departure which found us with the arm of the robot in modifying stage. Besides those problems we continued to insist that maybe our robot will make a big deed and the team RO 95 Roboteii CNU will come back with laurel robotics from the Basket Gym of the CSA club.