**FRC Robotics 2018**

**Software Engineering Team Log**

Team Members:

AM

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The purpose of this document is to facilitate collaboration and communication between team members on this project.

Initially, the contents are the daily robotics-related individual work log entries from the team members. Other, relevant content from any team member can also be added here.

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12-Jan-2018

Abby:

We found out what height and configuration the wheels have to be at for it to move and make it  up the ramp with the vertical flattened out part at the bottom.. The height of the frame has to be 3in. off the ground for clearing, and the bumpers have to be 7in. off the ground to make it. We also reconfigured where the wheels go ( bottom example ) To have the ability to move up this ramp because the last one ( top example ) couldn’t move upwards on it.



Austin:

In the robotics room we worked on the frame of the bot and tested out different ways the wheels can be arranged. We also found out that the ramp the bot must go up in going to be squared off making it impossible for our first idea to work. Our new design will be able to go up the ramp with no problems and will have at least 2 inches of space to clear the top of the ramp and the bottom of the bots frame. The frame will have to be 3-3.5 inches off the ground and the bumpers must sit on 7 inches. The wheels we’re using are completely omni and they will be arranged with 2 verticals in the front and back and 2 horizontal in the middle. This will allow the bot to clear the ramp and the wheels in the middle will no longer catch the ramp. Compared to our original design we added 2 more omni wheels and changes the arrangement of the wheels.



Matthew:

Today I communicated with Mr. Kooyers about what needs to be known about the robot for the programmers.

I had also sent out a group email telling the group

- the different parts that need programed

- parts of the bot that they need to know about

-how to get github onto their computers

-where to find the game manual

-where to find the release videos

And I downloaded eclipse.

Gavin:

I have been working on Robotics; I installed C++ for Eclipse and got the toolchain supplied by FRC. I have also installed NI Vision for future usage in the same robotics stuff I have previously mentioned. I have also researched things I did not know about mechanics such as the talons and other motor-related mechanical pieces.

Anthony:

Installed NI Vision Software and assisted others in installing and the like and went over the game details with other members.

Noah:

Went to robotics and talked about the code we will be using and GitHub.

Cody:

(Absent)

Robbie:

I followed the instructions Matthew left and downloaded GitHub and Eclipse for C++.

J. M. Hinckley:

This is a good start. The clock is running, however. We are one week down and have five to go. I have been mentoring the FIRST team 1254 for many years (more that I’ve been teaching Software Engineering here). The common experience is that each year we come down to the wire and have to rush the software and don’t have enough time to really test. My advice is this:

1. Master the software. Mechanical, electrical, CAD stuff is important, but this thing doesn’t go anywhere without software. In the end, all eyes will be on you to make it work. And the pressure will be high. So, while you stay in touch with the other build teams on different aspects of the robot, prepare yourselves and concentrate on mastering the software.
2. Write down, in a file here in the repository so that everyone has access, the specifications and design decisions for the software. Don’t rely on keeping this information on paper in a notebook. Those things get misplaced and are messy. Take the time to scan documents as needed and upload them. We have 21st century tools, let’s use them. If you need to, make drawings on paper, but then scan and upload them. Take the time to do neat work—other people have to understand your information.
3. Figure out how to write a basic robot program in the specified language. It looks like you are going to use C++ this year. So, figure out, as a team, how to write the equivalent of a “Hello World” program for the RoboRIO. This is generally a tank-drive kind of program. You need to be able to at least get a robot, perhaps last year’s robot, to move using the joysticks.
4. If last year’s robot is not available for code practice, at least get a RoboRIO (there are at least two of them around) and connect it on the test panel to a motor and a pneumatic valve. You must learn how to control a motor with a joystick and to switch a pneumatic valve with one of the buttons on the joystick. Figure this out sooner rather than later. You do not want to have to be learning this in the last week of the build. As the robot design evolves, add corresponding hardware components to your test setup and test your code for the new hardware. Start writing and testing simple code as soon as possible.
5. Make every day count. You don’t have enough of them to waste any. Work efficiently. There are eight of you on the software team. Divide the research and development work, delegating specific work to specific team members. In the same way that the entire robotics team is divided into subteams (e.g. drive team, climbing team, etc.), the software team should be organized with specific people responsible for specific things, such as tool configuration, test code, test panel system, hardware interfacing, code architecture, code test and debug, etc.. Don’t duplicate each other’s work. Be clear about who is doing what. This will require organization and communication. As each of you figures out how to do something, create a written, step by step document and upload it to this repository. The team should not have to figure out how to do something more than once.

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15-Jan-2018

Noah:

<https://wpilib.screenstepslive.com/s/currentCS/m/cpp>

- Reference for coding programs within First Robotics

I have talked with Mr. Hinckley and he says it would be beneficial for us to find the test panel which is located somewhere in the robotics area

* After that is found we have to work with coding the different parts to the panel (a reference guide is in the link above on how to do that)
* We should write/test code for each part located on the panel

He also stated that getting all of this figured out will prepare us for when the robot builders build something new on to the robot and we have to figure out how to code it

<https://s3.amazonaws.com/screensteps_live/exported/Wpilib/2078/54277/FRC_C_Programming.pdf?1515352886>

-Here is a manual to Programming (Same as link above but in PDF form)

Abby, Austin, Matthew, Gavin, Anthony, Cody, Robbie not at VBTC today.

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16-Jan-2018

Abby:

We both downloaded Github desktop then we got into working with c++ and understanding it more. For the robot, they’re using mecanum wheels. One side will be spinning inwards, the other side will be turning outwards. Also near the end tried installing eclipse with c++.

Austin:

Not much was done today but i'm trying to learn how to get my eclipse to work and also figuring out github as well. I learned the the robots wheels have to form a “X” like the front wheels have to make a diagonal line to the bottoms wheels. Kind of like this….

Matthew:

I did a large scale explanation of mech wheels and some other parts and plans.

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[FRC C++ Programming | 2018 FRC Control System - WPILib](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwicrKuk0NDYAhUL24MKHTAHA_0QFggmMAA&url=https%3A%2F%2Fwpilib.screenstepslive.com%2Fs%2FcurrentCS%2Fm%2Fcpp&usg=AOvVaw36pWbsYuVWefRtyqZn19yh)

please install eclipse for c++ on to your computers so that we may begin or programming. I will be distributing work among us soon.

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so there will be several areas that will need to be coded some being

-wheels (fix last years drive)

-climbing

-picking up boxes

-visual processing

there will possibly be more to come or some cut out depending on how the team makes the robot.

As well as that we have a list of robot parts that we need to formalize ourselves some being

- solenoids

-talons

-voltage regulators

-spike relay vs. speed controllers

-encoders

-limit switches

This is all for now. If you have any preference PM me and let me know.

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Everyone, please be sure to install git hub on your computer, Mr. Hinckley has shared a walkthrough on your drives that will assist you.

When a username and password are needed they are

username: FRCTeam1254

password: Dogbot1254

Git hub is a tool that we will be using to pull and push copies of the code without losing track of any functioning code pieces.

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any question that you have about the game or rules of the robot build can be answered with the pdf manual at this location

( <https://firstfrc.blob.core.windows.net/frc2018/Manual/2018FRCGameSeasonManual.pdf> )

and if you have not seen the release video for the game yet here it is

( <https://youtu.be/HZbdwYiCY74> )

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-for the AM chapter-

when you get here be sure to install the second software option on the "NI Software for FRC"  disc, that you can get from Mr. Hinckley.

you will need the serial number that will be found on the certificate of ownership.

Gavin:

I managed to contribute sorting out imaging the laptop(s) for Robotics and things of that nature. We, as a team, have also worked out what we’re doing to do for the wheels and what not. Going for more of an X shape instead of a Diamond shape. Allowing for easier strafing when necessary of a maneuver.

Anthony:

Installed most things and conversed with the other members

Noah:

We talked about the wheels and how we have to program them to move in a certain way. I have installed Eclipse for C++.

Cody:

First robotics

Robbie:

I went down to robotics and then returned. From there, we basically watched as the 2nd year students downloaded material to the programming laptop.

J. M. Hinckley:

The documentation for the FRC control system is at <https://wpilib.screenstepslive.com/s/4485> . This is the place to start your orientation to the software and the hardware that it controls.

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17-Jan-2018

Abby:

Starting installing the disc onto laptops.

Austin:

Spent today researching C++ and downloading the files to my laptop.

Matthew:

The instructions for downloading eclipse have been shared to the entire team.

Anthony:

Installed software onto new laptop and created instructions to do so.

Cody:

Today I worked on imaging the RoboRIO for our test bench and started the code for the drive.

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22-Jan-2018

Abby:

Learnt more about the code and how the mecanum wheels work also installed and created an account with the NI software onto the laptop.

https://wpilib.screenstepslive.com/s/currentCS/m/cpp/l/241862-driving-a-robot-using-mecanum-drive

Gavin:

Apparently we needed code done today, yet I could not supply said-code. I have been working on getting the exact code we needed but had complications with installing JDK and Eclipse CPP(C++).

Robbie:

I downloaded the required software onto the programming laptop. I wasn’t able to get much code done because of the time taken out to download stuff.

Austin, Cody, Anthony, Matthew, Noah:

Not here today.

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23-Jan-2018

Abby:

Trying to get the FRC Robotics Program to install

Austin:

We got everything working and that I have a better understanding of the programs we will be using to move the robot.

Matthew:

I downloaded the NI software onto the robotics computer. Then we attempted to make contact with the roborio.

Gavin:

our team has figured out that the RoboRio was being difficult to communicate with and will be working on it up-til we can fix the issue.

Anthony:

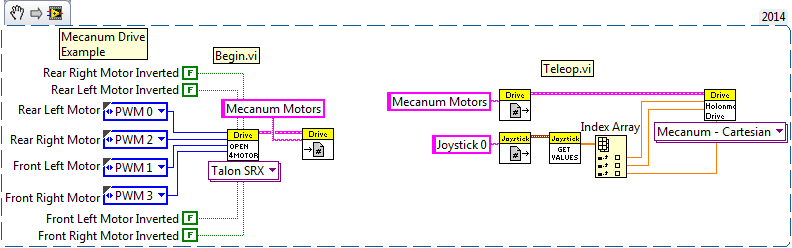
Helped write code for movement and began reconfiguring the radio

Noah:

Did some research with Robbie and Gavin on the robots radio configuration.

Cody:

I was down working with the First Robotics team writing the labview code



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24-Jan-2018

Matthew:

The new computer is downloading all of the need tools

And

The communication has been established with the roboRIO and we are now working on correcting the wheels.

Gavin:

have managed to get the wheels moving! Issue though, we had to use the old computer from last year in order to do it. Clearly there’s an issue with administrative power on the other computers we’re using. Only issue now is to figure out how to make the wheels turn the way we want them to since the left side turns forward, and the right side turns backward. My assumption is related to the joystick

Noah:

Robbie and I configured the router for the robot. The robot is running now we have to fix the code for which way the wheels turn.

Cody:

Today we fixed the communication problem and got the wheels to move.

Robbie:

Noah and I followed the tutorial for establishing the radio configuration. Then afterwards, I helped Cody with testing the wheels and fixing the one wheel that was not working. We then started testing the wheels before time ran out.

Abby, Austin and Anthony were absent.

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25-Jan-2018

Austin:

I got little done but know that we got the robot moving but have to fix how the wheels operate. Turning and strafing aren't working and they only have the robot moving forward/backwards.

Rest of team was either absent or completely occupied with Integrated Academics.

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26-Jan-2018

Matthew:

We fixed the axis problems and fixed wheel orientation

Then he reduced the speed of the bot to 25%

Anthony:

Fixed the wheels of the robot and got it functioning and moving properly

Noah:

We have gotten the robot running with all of the wheels going in the right direction. We tested it and had to lower the speed of the wheels. It was still a little fast but it will be a lot better when there is more weight on the robot. Next we are studying pneumatics and how to use them in Labview.

Cody:

Today we finished the Drive code in Labview and are now setting up the computer to use this year

Abby, Austin, Gavin and Robbie were absent.

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29-Jan-2018

Abby:

I got more into setting it up and working with labview and the math equation to see how big around the middle has to be to be 20% efficient while picking up a 200 lbs claw, and 49  in long.

Gavin:

I have been at Robotics today. Got thrown a fun equation to figure out the required diameter for our robot’s crane-system. I figured out a rather… Interesting formula and it did not seem to be the required thing.

Anthony:

Finished the assignment and researched the linear actuator and hall sensors

Noah:

Gavin and I worked on calculations for the diameter of the gear in the mechanisms they want to build. We found that it should be about 18 inches big with about 300 teeth. The number is pretty big. There is probably a miscalculation somewhere.

Cody:

Uploading Code To The Rio

**NOTE**: You have to use one of the laptops from class to put the code on the rio and then use the robotics laptop to run the  driver station application  to control the robot.

Step 1

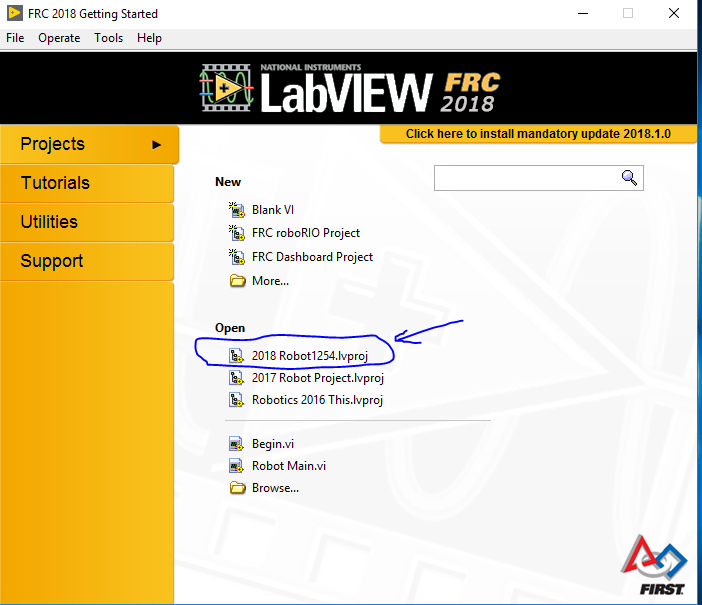
Plug one end of the ethernet cable into the computer then plug the other end into the ethernet port on the roborio located to the right of the two usb ports.

And then open the driver station application.



Step 2

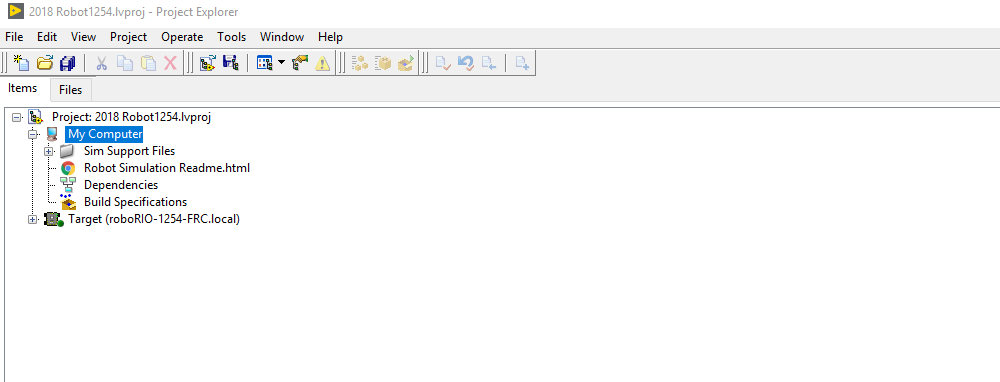
Open labview



Then open the code *The robot code for this year can be located in the robotics github repository*

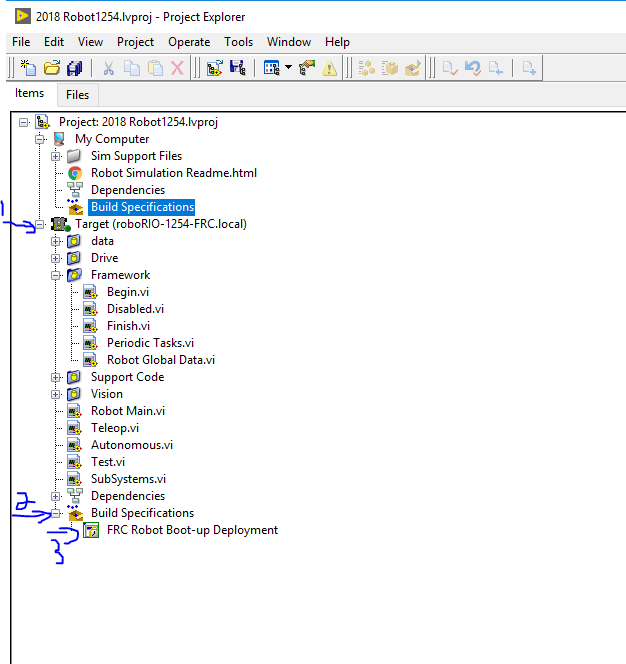
Step 3

It should look like this when you open the code .



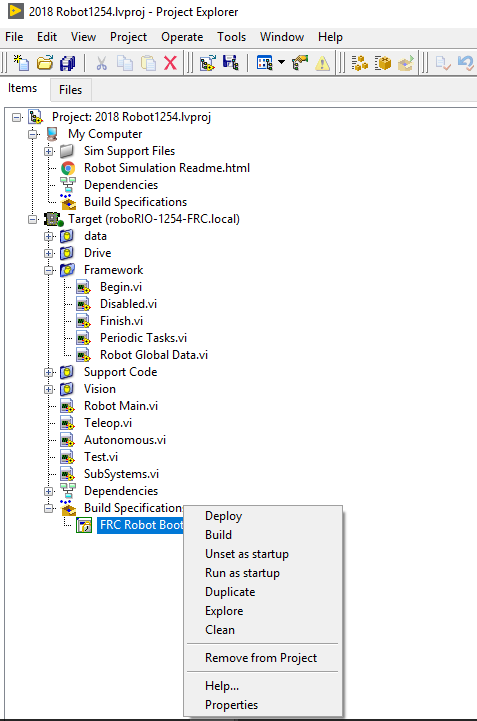
Step 4

Follow the arrows.



Step 5

Right click on the FRC Robot Build Specifications.



**Deploy** - Put the code on the rio if you click deploy you will be able to run the code on the robot but if you were to shut the power off the code would be gone.

**Build**- builds the code this does not put the code on the rio it only builds it to see if the code is evan runnable.

**Run as startup** - This will put the code on the rio and it will stay there even if the robot powers off

**The end**

Don't forget to unplug the the ethernet cable from the laptop and plug it into the Robotics laptop so  you can use the driver station:)

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30-Jan-2018

Austin:

I have a better-ish idea of connecting to the roborio. Took me a few tries but I eventually got it working. While I was in the other room I took a look at the robot and did research on some of the things talked about in the teambinder. I also looked up so information I thought I should know to start helping code the robots movements. From the information talked about in the team log I think we're doing something with  pneumatics  to make the arm or the robot move. (NOT SURE) I didn’t work on the problem yet and also don't know where to start. Soooooo Mr. Hinckley and I got the math thing done and it doesn't seem realistic at all. Like to get the amount of power needed we need a huge sized gear that is about 17 feet.

Matthew:

We did some research on hull sensors.

Gavin:

We began to plot on how to make the Hall sensors work for how the mechanics wanted them to. We figured that we would work around the magnetic mechanism and how the script/machine registers its actions.

Anthony:

Researched and talked to the students about the actuators and sensors and how they need to place the sensors on the actuators where the want the pre-programmed positions to be.

Cody:

Research and Dev

Abby and Noah were absent.

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