

Software Syllabus

Intro

Welcome to the software team for the 2014-2015 school year. Our group is responsible for programming the robot to complete whatever task we are assigned. It is very likely that we will be coding in the Java programming language, but previous experience in any language will be valuable. There are many things that we will learn over the course of the year, and we will hopefully have some fun along the way.

Learning to program

This year, I will be trying something new when it comes to teaching software. Since we only have a limited amount of time until build season begins, I will be leaving it to the students to learn Java on their own time. In the past, this has taken up a vast majority of our time, leaving us unable to conduct more hands-on activities. You still have all the time to learn, but we will not be spending much time during meetings. There are many online tutorials which are much more thorough anyway. In addition to Java, you will need to learn Git, a source-control method, but this is much simpler and not really worth spending class time on anyway.

Homework and Quizzes

There will be homework assigned each week which will be checked for completion. However, we will have frequent quizzes. This should be nothing hard, but if too many people seem to be failing, I will begin checking homework thoroughly. The homework and quizzes will cover the same general topics, so if they are getting tough, you probably need to learn at a faster pace. If I feel that many people do not understand a specific concept, we may skip a quiz and instead work on that idea. Students who do better on the quizzes are much more likely to be assigned work on the actual robot during build season. Try your best because I do consider effort even if you cannot solve the problem.

Java

Java has been our team's language of choice for FRC for many years because of its portability, even at the cost of efficiency. More than likely, this will remain the language we use this year. Java is an object-oriented language, and has many syntactic similarities with C++ and other languages. Online tutorials will help you greatly with learning the language, so take advantage of them.

Git

In past years, I have not stressed source-control very much because we had fewer people working on the robot, but since I aim to have everyone contribute in some way this year, proper version control will become necessary. A common tool for this is Git, which is considered a distributed system. You will be required to learn this on your own as well, but not very extensively. GitHub is a popular service for managing Git servers, and we will be using it for our purposes this year. This includes uploading your homework and quizzes and managing the final code on the robot. GitHub requires a free account which we will be creating in class.

Project Euler

Most of the homework will be from Project Euler, a site with many programming and mathematical challenges. Most of the solutions are online, so you should have no problem checking your answers or getting hints, but please do not simply copy someone else's code. The quizzes will be modified versions of the problems, and are much more important overall. Do not restrict yourself to doing only the problems that I assign because more practice will help.

Topics We Will Cover

This is not an exhaustive list, and is largely dependent on the amount of time we have, but at the very least I hope to cover the following ideas before the end of the year:

- Drive Systems
- Actuators
- PID Control
- Pneumatics
- Control System (Pre-2015 and 2015)
- Electrical
- Computer Vision
- Networking
- RobotBuilder

Some Links

- GitHub: <https://github.com>
- Project Euler: <https://projecteuler.net/problems>
- FRC Screen Steps: <https://wpilib.screenstepslive.com/s/3120>
- Git Tutorial: <http://www.vogella.com/tutorials/Git/article.html>
- Java Tutorial: <http://docs.oracle.com/javase/tutorial/>