Intro to FIRST Programming

Prepared by Grace Wise - Lead Programmer and Captain of Software

Overview & Purpose

This week long course will introduce you to the basics of the Java Programming Language, introduce you to the tools used for FRC Robots, help you understand the interactions between software and hardware, and how to program.

Objectives

1. Foundation in Java
2. Knowledge of Software Used for Robotics Programming
3. Robot getting Inputs from Computer and Controller
4. Robot gives Text-based Output to Computer
5. Introduction to Driver Station Software

Materials Needed

1. Laptop/Tablet Computer running macOS, Windows, or Linux
2. Java Development Kit Installed
3. Eclipse IDE Installed
4. A GitHub Account
5. GitHub Desktop client installed - optional

If you are not able to bring a laptop computer, Team 5933 may provide you with one to use at lessons. In this instance we ask that you bring a flash drive so that you may transport your work between school and home.

Additional Resources

Basic Java Syntax
Codecademy on Java
Codecademy on Git
GitHub Created Tutorial on Git
YouTube Playlist Detailing RobotBuilder
Software to Hardware Communication
Sensor Selection Guide and Overview

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Day 1: Java Syntax

June 20, 2016

Agenda:

- Introduce Java in a Text Editor (Eclipse)
- Introduce Objects, Classes, Methods, and Variables
- Create Basic “Hello, World” Programs

Homework:

- Create More Complex Program which prints strings of different types

Day 2: Robot Builder and Source Control

June 21, 2016

Agenda:

- Introduce Robot Builder and Robot Builder Schematic Files
- Introduce Source Control, Git, and GitHub

Homework:

- Commit the code you wrote on the first day to your GitHub account.

Day 3: Software-Hardware Interaction

June 22, 2016

Agenda:

- Software needs feedback mechanism (ie sensors)
- What is a PID subsystem?
- Introduce the different hardware on Rosie.

Homework:

- Write up a plan on how you would combat the programming of a specific mechanism.

Day 4: Input

June 23, 2016

Agenda:

- Introduce Smart Dashboard
- Introduce Controllers
- Introduce FRC Driver Station and OSS Alternatives

Homework:

- Plan a basic robotics program of your own. Begin programming your program if you’re ready.

Day 5: Output from Robot Deploy and run code

June 24, 2016

Agenda:

- Take 20 minutes to write lines of code to deploy to the robot
- Deploy Student’s Code to Guest Robot
- Show and Tell