Session 3: Functions and Problem Solving with Programming

Understanding Loops

- Introduction to loops in programming. Explain while and for loops, and why we use them in our code.

- Discuss why loops can be particulalry useful for solving repetive tasks, and examples of how they are used in robotics programming.

Discussion

- Why are loops essential in programming, and what are their benefits?

- Give an example of a problem that would benefit from using loops.

Demo

- Practical example of using loops in the context of PROS. In the PROS initialize() function, we can use a loop to initialize properties of multiple sensors.

Probem Solving with Programming

- We will introduce problem solving strategies in programming such as breaking down the problem into simpler steps, designing an algorithm, and coding the solution, and how functions can be effective for this.

Discussion

- What are the key steps in problem solving through programming?

Demo

- We will walk through the modelling, breaking down, and solving of simple problems at first, such as reading in numbers and adding them.

Understanding Functions

- Functions are reusable blocks of code. You can define functions via a function name, parameters, return type, and body. All functions follow this format.

- The advantages of functions: modularity and better code organization.

Discussion

- Why are functions important in programming?

- Give an example of a function

- DRY: Don't Repeat Yourself principle

Demo

- Create and demonstrate a simple function in C that performs a specific task in PROS for robotics, such as a function to control motor speed.

Uploading Code to VEX V5

- Introduction to the process of uploading code to the VEX V5 using PROS

- Overview of the tools and software required, i.e. PROS plugin and VS Code. Using these tools we provide step-by-step instrucitons for how to upload sample code that will control robot's motors.

Discussion

- In your own words, what are the required steps for uploading a program to the VEX V5?

Demo

- Will demo uploading code that will control robot's motors using PROS VS Code plugin.