Robotics

**Unit 5 User’s Guide**

Advanced Programming

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**CONTENT OF UNIT 5 SLIDES**

# Unit 5: Advanced Programming

**Section 1: Variables Types**

* In Depth Variables
  + Types
  + Uses

**Section 2: Statements**

* Case Statement
  + Switch Explanation
  + Project

**Section 3: Loops**

* + While Loop
  + For Loop

**Section 4: Functions**

* Function
  + Why Use Them
  + Names
  + Project

# OVERVIEW

# Students will further explore the Arduino IDE . This unit is an extension of introduction to programming. Students will learn an advance approach to programing an Arduino board. Student will learn about variable types and how they are declared in the Arduino IDE. Student will also how to build functions and create loops. At the end of this unit students should be able to declare variables, create a working loop and build and test their functions. Students will learn more on how to work with the Arduino IDE. This unit contain several activities that illustrated the above descriptions.

# FOCUS STANDARDS

# From our experience implementing this unit, we have selected the following focus standards.

* Describe what Microcontrollers are and why they needed in this project.
* Describe what an Arduino Uno is (as an example of a microcontroller).
* Describe what an Arduino IDE is.
* Explain the different types of variables that exist.
* Explain what a “For” Loop is.
* Explain the difference between a While Loop and a Do While Loop.
* Describe to the students what a “Switch statement” in contrast of an “If statement”.

# OBJECTIVES

These set objectives are to be checked at the end of this unit. Students should know the minimum of the following objectives to move forward. Students should learn and understand the following:

* Variables
* Variables of different types
  + How to declare variables and what types of variables exist.
* Switch statements
  + How to construct a switch statements and why they are used
* Controlled loops
  + What are loops and what they do in a program.
* Functions
  + What are functions
  + Why we need them
  + How to test a function

# SAMPLE ACTIVITIES

The activities listed below are to completely by the end of this unit. All of them are build using materials leaned in this unit.

* Declare variables using the Arduino IDE
  + Variables of type integer
  + Variables of type Boolean
  + Variables of type Double
  + Variables of type Character
  + Variables of type String
  + Variables of type Void
* Construct a Switch Statement
  + A statement that print student’s name
* Create the following Loops
  + While loop
  + Do While Loop
  + For Loop
* Build and create basic functions in Arduino IDE

# BILL OF MATERIALS

* **List of Materials needed for this unit (per student)**
  + Laptop
  + Arduino Board
  + Arduino IDE