**Enon STEM Initiative**

**Java Programming Workshop for Students**

**Instructor:**

TBD

**Assistant:**

TBD

**Description**

Introduction to computer programming and object-oriented development using the Java programming language. Topics covered include managing data in a computer program, data types, classes, and object, controlling program flow and writing applications incorporating a Graphical User Interface.

**Objectives**

Introduce students to the concepts behind developing computer programs. Show how programs interact with the underlying computer hardware to solve real world problems. Show how a program progresses to solve problems and how to manipulate that progression.

**Topics**

* Programming semantics
* The relationship between hardware, software, compilers and programming languages
* Introduction to Object Oriented Programming
* Control flow
* Translating problem descriptions to computer programs
* Writing imperative computer programs
* GUI and event driven development

**Schedule**

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| **Session** | **Contents** |
| 1 | - **Hello world – Introduction to the basics of OOP and Java**  - **Data, variables and basic statements**  Project(s):   * **Calculating the area of geometric shapes** |
| 2 | - **Basic classes, objects and methods**  - **Creating and calling methods**  - Method argument and return values  - Void methods  Project(s):   * **Shape Area 2.0 (Calculate the areas for additional shapes)** |
| 3 | - **Revisiting Boolean values and expressions**  - **Control flow**  - Conditional statements  Discussion:   * Non-linear control flow   Project(s)   * **Retirement gift** |
| 4 | **Revisiting Boolean values and expressions**  - **Control flow cont.**  - Loops  - Types of loops  - For, While, Do-While  - Purpose of various loop types  Discussion:   * Why looping is important * Identifying appropriate places for loops * Loop errors   + Infinite loops   + Off-by-one error   Project(s)   * **Blast Off** * **Slot machine** |
| 5 | - **Graphical User Interface**  - Calculating the area of shapes using GUI input tools  - Creating GUI applications  Discussion:   * Why is GUI important? * What do various components communicate to the user?   Project(s)   * **Calculating the area of shapes using GUI input tools** |
| 6 | - **Graphical User Interface**  - Using widgets for input and output (display)  - Events, sources, and listeners  Discussion:   * How does event driven development differ from standard development?   Project(s)   * **Slot machine 2 (Event driven version)** |

**Prerequisites and Expectations**

* None