



# Course Information

Java

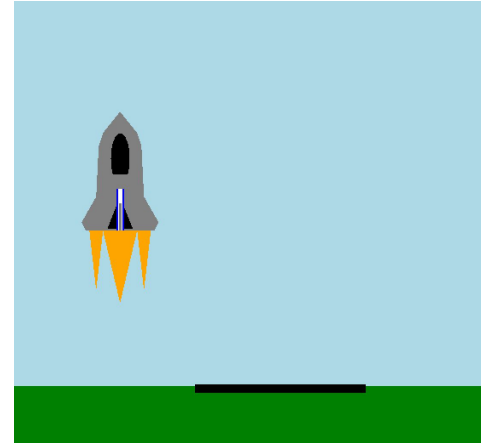
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# What is our teaching philosophy?

## Students will...

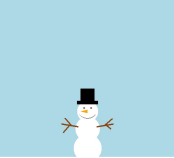

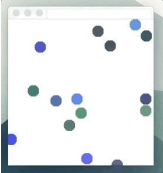
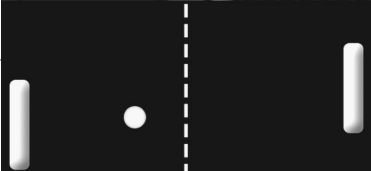
- ❖ Learn core fundamental concepts
- ❖ Experience visual and interactive learning
- ❖ Watch their *own* code come alive
- ❖ Develop *lifelong* problem solving skills



# Introduction to Java

- Recommended: Grades: 8+, For beginners with no prior Java experience
- Course Description
  - With one of the largest developer community, Java is undoubtedly going to retain its position as one of the top programming languages for years to come. Industries usually always pay extra attention to Java developers. This course will introduce kids to the fundamentals of programming in Java. They will put concepts into action with hands on problem solving and a end to end project - game of pong.
- Learning Objectives
  - Basics of algorithmic thinking and implementation via Java
  - Computer Logic and Looping
  - Methods
  - Classes & Objects
- Prerequisites: None

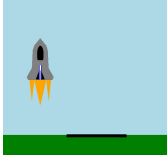
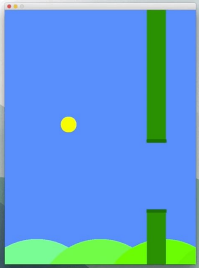
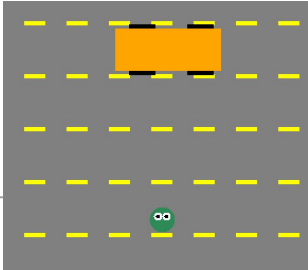
# Course Outline

Modules	Learning Goals	Sample Projects
<p>Module1: Introduction to Computing</p> <ul style="list-style-type: none"><li>● Basics of computing</li><li>● Algorithmic Thinking</li><li>● Java</li></ul>	<p>How programming languages work, implementing simple instructions in Java</p>	
<p>Module2: Logic</p> <ul style="list-style-type: none"><li>● Variables, Math Operations</li><li>● Boolean Logic</li><li>● Loops</li></ul>	<p>How to use variables, logic and loops to solve math problems such as square of sums. Create simple animations</p>	
<p>Module3: Methods</p> <ul style="list-style-type: none"><li>● Method signatures</li><li>● Arguments and parameters</li></ul>	<p>Understand why methods are used and how to call them</p>	
<p>Module4: Object Oriented Design</p> <ul style="list-style-type: none"><li>● Classes</li><li>● Member variables &amp; methods</li></ul>	<p>Conceptualize classes as blue prints for objects and how to use these.</p>	
<p>Module5: Put it all together</p>	<p>Constructing a full scale program using classes and logic</p>	

# Intermediate Java

- Recommended: Grades: 8+
- Course Description
  - With one of the largest developer community, Java is undoubtedly going to retain its position as one of the top programming languages for years to come. Industries usually always pay extra attention to Java developers. This course will go deeper into Object oriented programming and the theory around it. Students will also learn about arrays and arraylists as the basis for data structures and algorithms. They will put concepts into action with hands on problem solving and an end project of flappy bird.
- Learning Objectives
  - Theory and Practice of Object Oriented Programming
  - Arrays and ArrayLists as foundation for data structures and algorithms
- Prerequisites: Introduction to Java; Knowledge of logic, loops and basics of OOP

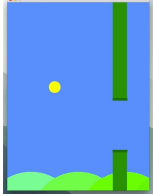
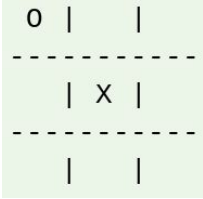
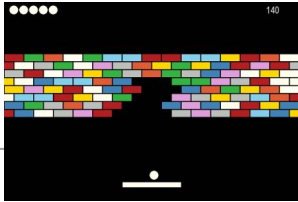
# Course Outline

Modules	Learning Goals	Sample Projects
Module 1: Recap <ul style="list-style-type: none"><li>• Structure of a Java program</li><li>• Variables, Logic, Loops, methods</li><li>• Classes and Objects</li></ul>	Drill into basics	
Module 2: Arrays, ArrayLists <ul style="list-style-type: none"><li>• 1D Arrays</li><li>• ArrayLists</li></ul>	Understanding of arrays and arraylists as basis for data structures and algorithms	
Module3: Object oriented Programming <ul style="list-style-type: none"><li>• Classes &amp; Objects</li><li>• Member variables, Methods &amp; scope</li><li>• Encapsulation</li></ul>	Deep Dive into theory behind OOP and implementation in Java	
Module4: Basics of Inheritance <ul style="list-style-type: none"><li>• Abstraction &amp; Polymorphism</li><li>• Standard Objects</li></ul>	Inheritance and polymorphism principles	
Module5: Put it all together	Develop one (or all) of GameofLife, Connect 4, frogger	

# Advanced Java (APCS prep)

- Recommended Grades: 8+
- Course Description
  - With one of the largest developer community, Java is undoubtedly going to retain its position as one of the top programming languages for years to come. Industries usually always pay extra attention to Java developers. This course will have students go deep into the principles behind inheritance and polymorphism. It will drill into 2D arrays and algorithms for searching, sorting and recursion. Students will put concepts into action with hands on problem solving and an end project of brick breaker. They will be ready for APCS by the end of this class.
- Learning Objectives
  - Inheritance and Polymorphism
  - 2D Arrays
  - Search, Sort, Recursion and complexity of algorithms
- Prerequisites: Intermediate Java, Knowledge of Arrays, OOP

# Course Outline

Modules	Learning Goals	Sample Projects
<p>Module 1: Recap</p> <ul style="list-style-type: none"><li>● Basics of OOP</li><li>● Standard Objects</li><li>● Arrays &amp; ArrayLists</li></ul>	<p>Drill into basics</p>	
<p>Module 2: Arrays &amp; Algorithms</p> <ul style="list-style-type: none"><li>● 2D Arrays</li><li>● Search, Sort</li><li>● Recursion</li><li>● Complexity of algorithms</li></ul>	<p>Understanding of 2D arrays, basics of search and sorting algorithms</p>	
<p>Module3: Advanced OOP</p> <ul style="list-style-type: none"><li>● Abstraction &amp; Polymorphism</li><li>● Inheritance</li><li>● Interfaces</li></ul>	<p>Deep Dive into theory behind OOP and implementation in Java</p>	
<p>Module4: Put it all together</p>	<p>Develop brick breaker or equivalent game deploying all of the above concepts</p>	