Javascript 101

Nimish Narang

ZENVA

What will we Learn?

- Coding basics with Javascript syntax
- Game development with Javascript
- Three separate parts:
  - Javascript language basics
  - Game development basics
  - Building the final game

ZENVA

What do you Need Going in?

- Some experience with HTML and CSS
- No experience with game development or Javascript necessary
- Text editor
- Browser

How will the Tutorials Work?

- Start with an intro in the slides
- Look at some code examples - follow along with an online compiler or a text editor
- Code challenge at the end of the tutorials
- Provide a solution at the beginning of the next tutorial

Why Learn Javascript?

- Javascript is one of the most popular languages
- Javascript is used everywhere to power web and mobile apps, websites, games, and even machine learning and data science software
- Javascript is easy to learn with plenty of support
- All you need to run it is a text editor and a browser

Language Basics

What will we Cover?

- Variables and Strings
- Operators
- Arrays and dictionaries
- Functions, parameters, and return values
- If statements
- While and for loops
- Break, continue, and return statements
- Classes and objects

ZENVA

Variables

What are Variables?

- A way to keep track of values and data in our code
- Assign a value to a name
- Can change the value unless using constants
- We will cover 2 types here:
  - Numbers (whole or decimal)
  - Booleans (true/false)

Strings

What are Strings?

- Another kind of variable
- Represent text, messages, names, etc.
- Anything between “ “ or ‘ ‘

Operators

What are Operators?

- Allow us to perform tests or modify variable values
- We will cover 5 types:
  - Assignment
  - Arithmetic
  - Comparison
  - Logical
  - Ternary

Arrays

What are Arrays?

- Allow us to store multiple values in a single variable
- Access values by index
- Come with various operations to retrieve properties or modify the values in some way
- Can have multidimensional arrays (matrices)

Dictionaries

What are Dictionaries?

- Similar to arrays as we store multiple values
- Each element is a key-value pair
- Access and store items based on key instead of index

Functions

What are Functions?

- Allow us to store code and choose when and where to execute it
- Implement a function to specify what code to run
- Call a function to execute the code within
- Can take values as input via parameters
- Can output values via return value

If Statements

What are If Statements?

- Perform a test and run code if test returns true
- Way to add logic to code
- Variants include:
  - Else-if to add additional test
  - Else to add a default value
- Can nest if statements or use logical operators for additional tests

While Loops

What are While Loops?

- Way to run code multiple times
- Similar to an if statement but continue to execute the code as long as the condition is true
- Stop running the code once condition is false

Control Statements

What are Control Statements?

- Allow you to exit loops or functions prematurely or skip loop iterations
- We will cover:
  - break
  - continue
  - return

For Loops

What are For Loops?

- Similar to while loops but with predefined start and end points and iterator
- Pair well with arrays
- Variant is the forEach loop which implicitly visits every member of an array from start to finish

Classes and Objects

What are Classes and Objects?

- Objects are constructs within code that have state and behaviour
- State is the properties/attributes and is defined with variables/fields
- Behaviour is what an object can do and is defined with functions/methods
- Classes act as blueprints to objects and are the code implementations

Inheritance

What is Inheritance

- A class gets all of the fields and methods of another class
- Subclass inherits from superclass
- Use the keyword super to get access to superclass implementation of something

Game Development

ZENVA

What will we Cover?

- Canvas
- Drawing on a canvas
- Adding movement to objects
- Updating multiple items
- Adding player controls
- Collision detection and objectives
- Sprites

ZENVA

Canvas

What is a Canvas?

- Platform we draw on
- Packaged in HTML <canvas> tag
- Add a width and height
- Access the canvas and canvas context inside <script> tag

Drawing on Canvas

ZENVA

How do we Draw on a Canvas?

- Supply a drawing context and draw function
- Add a rectangle with specified dimensions
- Draw rectangle on canvas context
- Call draw function from a step function

Adding Movement

ZENVA

How do we add Movement

- Create update function
- Update positions of items in the game
- Call update function in step function
- Can update multiple items with an array and for loops

Player Controls

How do we add Controls?

- Add event listeners
- Listen for events such as mouse clicks or key presses
- Call functions to update positions accordingly
- Call update functions

Collision Detection

How do we Detect Collisions?

- Check x and y positions
- Determine if there is overlap by comparison
- Do this for all objects
- End game or perform other collision logic

Sprites

What is a Sprite?

- Entity in game with an image and properties such as x and y position and width and height
- Can represent player, enemies, or even background and other objects
- Load in images
- Draw sprite images instead of rectangles

Javascript 101

Nimish Narang

ZENVA

What did we Learn?

- Coding basics with Javascript syntax
- Game development with Javascript
- Two separate parts:
  - Javascript language basics
  - Game development basics with the final game

ZENVA

Language Basics

- Variables and Strings
- Operators
- Arrays and dictionaries
- Functions, parameters, and return values
- If statements
- While and for loops
- Break, continue, and return statements
- Classes and objects

ZENVA

Game Development

- Canvas
- Drawing on a canvas
- Adding movement to objects
- Updating multiple items
- Adding player controls
- Collision detection and objectives
- Sprites

ZENVA