



MAHARISHI UNIVERSITY OF MANAGEMENT

*Higher Consciousness
and Professional Excellence*

Object Oriented and Functional Programming in JavaScript

CS305
March 2022

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2022

Maharishi's Fifteenth Year of Invincibility
– Global Raam Raj

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CS305

Object Oriented and Functional Programming in JavaScript

March 2022

Course Overview

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Theme I: Functions and Data Types						
Week 1	Data Types, Selection, Iteration	Functions	Code Quality	Arrays	Function Expressions and Review	Integration Opportunity 1
			Theme II: Advanced Functions			
Week 2	Object Properties and References	Object Methods and Constructor Functions	Data Types: Strings and Arrays	Data Types: Map Filter Reduce	Practice and exam preparation	Integration Opportunity 2
Week 3	Destructuring, JSON, Rest/Spread	Closures and Lexical Environment	Scheduled Callbacks	Call Context: bind/call/apply	Project	Prototype Inheritance
Theme III: Classes and Inheritance						
Week 4	Classes	Project	Practice and exam preparation	Final Integration Opportunity		

CS305

Object Oriented and Functional Programming in JavaScript

Course Goals

In this course, you will gain proficiency in using JavaScript as a functional programming language. You will learn object-oriented programming principles and the nature of JavaScript's loosely typed programs and dynamic object model.

Course Objectives

Understand and write JavaScript programs for the following:

- programs composed of functions and data types appropriate for a different application types;
- advanced function concepts such as closures, higher order functions, scheduled callbacks, and call context;
- JavaScripts lexical environment and scoping;
- revealing module pattern and encapsulation of implementation details;
- prototypal inheritance model and constructor functions;
- JavaScript's new class syntax;
- professional coding principles and practices for high quality code including coding conventions, linting processors, JS doc, and unit testing.
- medium sized JavaScript programs (200 – 1000 lines) involving collections of objects using inheritance, classes and the other programming techniques included above.

How You Will Accomplish the Objectives

Preview the slides and reading, attend lectures, complete readings and answer quiz questions.

How You Will Demonstrate You Have Accomplished the Objectives

Complete homework labs and project and write small applications on exams.

Course Text

Kantor, I. JavaScript.info (<https://javascript.info>) The Modern JavaScript Tutorial, 2022. (main text)

Evaluation Criteria

First exam	20%
Second exam	25%
Final exam	45%
Homeworks and quizzes	5%
Attendance	5%

a+	97 - 100
a	92 - 96
a-	87 - 91
b+	80 - 86
b	76 - 79
b-	73 - 75
c+	70 - 72
c	67 - 69
c-	62 - 65

Class Attendance

Attendance at all classes is required, because all elements of class — lectures, questions and answers, discussions, laboratory work — contribute to the learning process. Absences are usually excused only if you are sick in bed or have a family emergency.

If you must miss a class, please let your instructor know ahead of time. Call, send an email, or send a note with a friend.

The first lesson of each course is the most important. Students are expected to be present from the first lesson onward. Any student not present on the first morning (except for such compelling reasons as illness or family emergency) may be asked to withdraw from the course. Courses move very quickly in the block system. Any absent days are difficult to make up.

Object Oriented and Functional Programming in JavaScript

Reading assignments from <https://javascript.info>

Always pre-read the assignments the day before the lesson. This will help you follow the lecture. After the lecture you should be able to briefly review any parts of the reading that were unclear and quickly proceed with the lab assignment for the day.

Week 1

Monday

Chapter 1: An Introduction
sections 1 - 4

Chapter 2: JavaScript Fundamentals
sections 1-11, 13

Tuesday

Functions

Chapter 2 JavaScript Fundamentals
sections 12, 14, 15

Wednesday

Code Quality

Chapter 3: Code quality
sections 1 - 5

Thursday

Arrays

Chapter 5 Data types
section 4 Arrays

Friday

Function Expressions and Review

Chapter 2 JavaScript Fundamentals
sections 16, 17, 18

WEEK 2

Monday and Tuesday

Objects: the basics chapter

- Sections: all except can skip Symbol type and Object to primitive conversion

Wednesday

Data types, Sections:

- Methods of primitives [can skip this section]

Object Oriented and Functional Programming in JavaScript

- Numbers
 - can skip: Hex, binary and octal numbers; toString(base)
- Strings,
 - Can skip: The bitwise NOT trick; Internals, Unicode
- Arrays

Thursday and Friday

Data types, Sections

- Array methods
 - Can skip: Most methods support “thisArg”

WEEK 3

Monday

Destructuring, Date, JSON

Sections

- Skip Iterables
- Skip WeakMap and WeakSet
- Extra credit (not required for 305 but good to know)
 - Map and Set
 - Object.keys, values, entries
- Destructuring assignment
 - Skip Nested destructuring, Smart function parameters
- Skip Date and time
- JSON methods, toJSON
 - skip Excluding and transforming: replacer
 - skip Custom “toJSON”
 - skip Using reviver

Advanced working with functions chapter

Sections

- Rest parameters and the spread operator

Tuesday

Closure lesson

Chapter: Advanced working with functions

Sections:

- Closure,
 - Skip Garbage Collection, Real-life optimizations
- The old “var”,
- Global object,
- Function object (skip Named Function Expressions)

Wednesday

Object Oriented and Functional Programming in JavaScript

Scheduled Callbacks

Chapter: Advanced working with functions

Sections:

- Scheduling: setTimeout and setInterval (omit Nested setTimeout section)

Thursday

Function Call Context

Chapter: Advanced working with functions

Sections:

- (EC) Decorators and forwarding, call/apply
- Function binding
- Arrow functions revisited

Friday

Saturday

Inheritance lesson

Chapter: Prototypes, Inheritance

Sections

- Prototypal inheritance
- F.prototype
- Native prototypes

WEEK 4

Monday

Classes lesson

Chapter: Classes

Sections:

- Class basic syntax
- Class inheritance
 - Skip
 - Overriding class fields: a tricky note
 - Super: internals, [[HomeObject]]
 - [[HomeObject]]
 - Methods are not “free”
 - Methods, not function properties
- Static properties and methods
- Private and protected properties and methods

Lesson 1

Data Types, Selection and Iteration

Consciousness Is All There Is

Wholeness

Programs are made of simple components of variables and data types. When these are combined and repeated with looping constructs using simple relational and logical operators they can become incredibly complex creations. *Science of Consciousness. According to modern physics the entire universe can be described as interactions among a few simple particles and forces arising from a single unified field. The science of consciousness identifies this unified field as the unified field of pure consciousness, from which particles and forces arise as a result of its Self aware nature of consciousness.*

MAIN POINTS

1. JavaScript variables are declared with const or let and are loosely typed
2. JavaScript has 8 data types including Number, String, Boolean, Object, null, and undefined. Data types determine the operations that can be carried out on data. The same operator can do different operations depending on the data type. *Science of consciousness: We can compare a human nervous system to a data type and TM to an operation on the nervous system. TM operates in same way for every human nervous system.*
3. In programming, we encounter situations where we must make decisions based on conditions that determines the flow of code execution. We use relational and logical operators to make such decisions. Our programs produce expected results only when our decision logic is correct. *Science of Consciousness, as in programing, taking the right decision at the right point of time is also crucial to success in life. Our actions and decisions are spontaneously in the right direction when we have a good connection to the field of pure intelligence.*
4. Looping/ repetition is the control structure that powers computation. The same operations are repeated over and over with slight changes to state information produces all the interesting effects of computation. *Science of consciousness: Self referral awareness, pure consciousness or the unified field aware of itself by its own nature is the source of all energy and matter. "Curving back on myself I create again and again."*

Object Oriented and Functional Programming in JavaScript

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

Consciousness Is All There Is

1. Selection and iteration are the foundations of all programs.
2. All computation is based on the basic control structures of sequence, selection, and repetition.

-
3. **Transcendental consciousness** is the experience of the pure consciousness.
 4. **Impulses within the transcendental field:** Originate from the lively nature of Self-referral consciousness.
 5. **Wholeness moving within itself:** In unity consciousness we recognize all objects, actions, and events as the interplay of that pure consciousness which is our own Self.



Lesson 2

Functions

Fine Focus with Broad Awareness

MAIN POINTS

1. Expert developers break complex problems into smaller, meaningful, reusable functions. Functions make programs modular, reusable and easier to understand. *Science of consciousness, with regular experience of pure consciousness, one develops the ability to have fine focus on details without losing the big picture.*
2. When we refer a variable in a program, JavaScript will look for that variable in the current scope. If it doesn't find it, it will consult its outer scopes until it reaches the global scope. *Science of consciousness, During the process of transcending we naturally proceed from local awareness to more subtle levels of awareness to unbounded awareness.*

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

1. All well-designed complex programs are compositions of smaller well-defined functions.
2. JavaScript function calls can have more or fewer arguments than parameters and always return a value or the special value, "undefined".

-
3. **Transcendental consciousness** is the experience of pure consciousness, which is the ultimate component of everything.
 4. **Impulses within the transcendental field** are the fine impulses that give rise to expressed thoughts and result in actions and behavior.
 5. **Wholeness moving within itself:** In unity consciousness one appreciates that everything is composed of the same pure consciousness that is our own Self.

Lesson 3

Code quality: Source of Orderliness and Coherence

The best quality code is easy to understand and maintain. Science of Consciousness: Pure consciousness is a state of perfect orderliness and simplicity. Having this experience promotes the ability to find the simplest and most orderly solutions to problems.

MAIN POINTS

1. One should carefully develop code to avoid bugs, but in the real world some mistakes are inevitable even for the best developers. Proper use of debugging tools greatly reduces the time required to remove errors. Science of Consciousness: Ideally one can avoid stress and strain in daily life, but in the real world some daily stress is inevitable. The TM Technique is an effective and efficient manner to remove stress.
2. Coding conventions are standardized best practices that ensure that code is easy to read and maintain. Science of Consciousness: The TM Technique is taught in a standard manner to ensure that the knowledge is understood and maintained over time and across individuals.
3. In Behavior Driven Development we write tests that define what a function is supposed to do before we implement the function. Science of Consciousness: This provides a goal to guide development and a means to test success. This is like the SCI principle of Capture the Fort or Seek the Highest First. Once you have defined the required outcome the rest of the implementation flows from that.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

Intro to Web Programming: Layers of Abstraction

1. Coding conventions provide guidelines to write code without bugs. Debuggers are critical for efficiently finding bugs that do occur.
2. Automated testing and Behavior Driven Development help guide development to prevent bugs during development and provide a means to ensure everything continues to work when there are extensions and modifications.

-
3. **Transcendental consciousness.** State of perfect order and coherence
 4. **Impulses within the transcendental field:** Thoughts arising from this level will naturally be orderly and coherent.
 5. **Wholeness moving within itself:** In unity consciousness everything is appreciated in terms of this experience of order and coherence.



Lesson 4

JavaScript Arrays

Self-referral Awareness as the Basis of Everything

MAIN POINTS

1. Using an array, we can hold many elements under a single identifier, which eliminates the need for unique identifiers for every value. *Science of consciousness, during transcendence our bounded individual identity identifies with the unbounded cosmic identity.*
2. If you do not need the array index when looping through array elements, the for..of loop is simpler and more error-free. Push/pop, shift/unshift, toString are convenience methods on Array to simplify common operations on arrays. *Science of consciousness, nature always takes the path of least action.*
3. In JavaScript multidimensional arrays are arrays of arrays. *Science of consciousness, building a more complex data structure by repeated use of a simpler structure is an example of a common phenomena in nature that complex things are generally combinations of simpler things. Ultimately, everything starts with self referral awareness, awareness being aware of itself.*

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

Self-referral Awareness as the Basis of Everything

1. Key components of JavaScript programs are functions and arrays.
 2. JavaScript arrays can dynamically add or remove elements.
-
3. **Transcendental consciousness** is the experience of the self referral awareness.
 4. **Impulses within the transcendental field:** Thoughts from this level are naturally connected to the basis of everything.
 5. **Wholeness moving within itself:** In unity consciousness we experience everything as expressions of our own Self-referral awareness.



Lesson 5

Function Expressions

Spontaneous Support of all the Laws of Nature

WHOLENESS

This short lesson introduces several features of JavaScript functions that will be important as we start to use more advanced functional programming techniques in the remainder of the course.

Science of Consciousness: This knowledge will put us in a good position for diving deeply into functional programming. Take the correct angle and let go.

MAIN POINTS

1. Functions are first class objects in JavaScript, which means they can be treated as values, parameters, and return values. Whenever functions are followed by parentheses it means they should be executed.
2. Functions can call other functions. Synchronous calls are managed in the runtime execution stack. *Science of consciousness: Programmers do not directly manage the runtime stack but understanding how it works will allow us to spontaneously write correct programs that work with the full support of the underlying laws and rules of the runtime engine.*

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

Spontaneous Support of all the Laws of Nature

1. Function expressions and arrow functions are often used when functions are used as first class objects.
 2. The interplay of functions calling other functions is managed automatically by the runtime engine using the runtime execution stack.
-
3. **Transcendental consciousness** is the experience of the home of all the laws of nature.
 4. **Impulses within the transcendental field:** Thoughts from this level are spontaneously in accord with all the laws of nature.
 5. **Wholeness moving within itself:** In unity consciousness we perceive everything as actions according to the laws of nature.



Lessons 6 & 7

Objects: Knowledge is the Wholeness of Knower, Known, and Process of Knowing

(Almost) everything in JavaScript is an object. Objects encapsulate state information in properties and associated behavior in methods. Science of Consciousness: Objects are an example of the common model-view-controller pattern of computer science, which closely corresponds to knower-known-process of knowing in our own consciousness. The state information contained in the properties is a model. The methods define the controller. The property names are the interface or view.

MAIN POINTS

1. Objects and properties can be created very simply using the object literal syntax. Properties can be added after the object is created simply by assigning a value to a property. Science of Consciousness: This is an example of accomplishing something in a very simple manner. Natural law takes the path of least action.
2. Variables bound to primitive types contain actual values. Variables bound to objects contain references to memory locations that store the objects. Science of Consciousness: Variables are identifiers. They are not the actual values. When we transcend thought during the practice of our TM Technique we experience deeper values of our Self beyond our surface identity.
3. The behavior associated with an object is defined in methods, which are properties that have functions as their value. Methods refer to other object properties using the keyword 'this'. Since functions are first-class they can be passed between objects, in which case 'this' can refer to different objects at different times.
4. Constructor functions are helpful when we need to create many similar objects

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

Knowledge Is the Wholeness of Knower, Known, and Process of Knowing

1. Objects contain properties and their values.
2. Large JavaScript programs use objects and their properties to break the program into smaller manageable components. It is the interaction of all the component objects that make the program work.

3. Transcendental consciousness. State of wholeness.

4. Impulses within the transcendental field: Pure consciousness, by its own nature, is aware of itself by itself. It thereby becomes the knower of itself through the self-referral process of knowing.



5. Wholeness moving within itself: In unity consciousness the value of wholeness is appreciated even in the components of knower, known, and process of knowing.

Lessons 8 & 9

Data Types: Knowledge Has Organizing Power

All programs are organized in terms of data (information) and the operations that can be performed on it. Science of Consciousness: Programs are organized around different types of data and operations common to those types. Knowledge Has Organizing Power.

MAIN POINTS

1. Numbers, strings, and booleans each have special operations such as parseInt, parseFloat, round, includes, and slice.
2. Arrays are used in almost every program. There are special methods for common operations on them including to modify, search, and transform arrays.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

Knowledge Has Organizing Power

1. Numbers, strings, and arrays are important data types that have many common operations unique to their purpose and many methods in the language to support those operations.
 2. JavaScript arrays are highly flexible data structures with many built in methods.
-
3. **Transcendental consciousness.** Is the experience of total knowledge and perfect orderliness.
 4. **Impulses within the transcendental field:** Thoughts connected to the field of all the laws of nature will be supported by that level of total knowledge and coherence.
 5. **Wholeness moving within itself:** In unity consciousness one appreciates daily perceptions and experiences as being infused with order and purpose.



Lesson 10

Destructuring, Dates, JSON: The Nature of Life Is to Grow

JavaScript is a rapidly evolving language. This lesson covers several new data type features that make the language more efficient and powerful. *Science of Consciousness*: The nature of life is to grow and evolve to greater accomplishment and fulfillment.

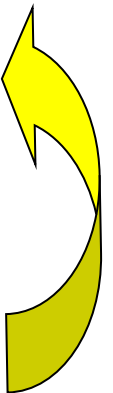
MAIN POINTS

1. *Destructuring assignment* is a new (ES6) and now widely used convenience syntax that allows us to “unpack” arrays or objects into a bunch of variables. *Science of Consciousness*: This feature allows developers to more quickly accomplish common coding tasks. Do less and accomplish more.
2. JavaScript has added a new Date object has many convenient methods for working with subtle aspects of dates and time. *Science of Consciousness*: Dates are important in many common programming tasks and involve complex logic. This is an important development for the language. The nature of life is to grow and evolve.
3. JSON is a widely used data exchange format used in every modern programming language. It is based on JavaScript object representations. The main uses are to convert JavaScripts to strings for transmission over a network and to parse JSON strings sent from servers into JavaScript objects. *Science of Consciousness*: JSON is a mechanism for improving communication between remote entities—clients and servers. Coherent and orderly consciousness is a mechanism for improving communication between people.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

The Nature of Life Is to Grow

1. Destructuring assignments, the Date object, and JSON are new features and data representations in JavaScript.
 2. Destructuring provides syntactic convenience and programming efficiency, Date provides capabilities, and JSON enables remote transfer of data.
-
3. **Transcendental consciousness.** Is the simplest state of awareness and home of all the laws of nature.
 4. **Impulses within the transcendental field:** Thoughts at this level will be maximally life supporting.
 5. **Wholeness moving within itself:** In unity consciousness one experiences the goal of all growth and evolution in daily life.



Lessons 11 & 12

Recursion: Self Referral Awareness

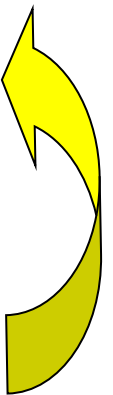
MAIN POINTS

1. Recursion is when a function calls itself. Recursion is useful when a task can be simplified into an easy action plus a simpler variant of the same task. Science of Consciousness: Repetition, looping, is the basis of computing. All repetition in computing can be implemented through recursion. Recursion is an example of self referral. Self referral awareness is the basis of manifest existence.
2. Rest parameters and the spread operator are convenience syntax for, respectively, collecting function parameters into an array or assigning collection elements across a set of variables.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

The Nature of Life Is to Grow

1. Recursive functions call themselves on successively smaller parts of a program.
 2. In theory all of computing can be represented by recursion. In practice, recursive functions work best for problems involving recursive data structures such as trees and linked lists.
-
3. **Transcendental consciousness.** Is the experience of the Self awake to itself.
 4. **Impulses within the transcendental field:** Awareness of Awareness is the most basic process of knowledge and produces a three in one structure of knower, known, and process of knowing.
 5. **Wholeness moving within itself:** In unity one perceives the basic reality of Self referral awareness as the source of all elements, matter, and existence.



Lesson 13

Closures: Established in Being, Perform Action

Wholeness: A fundamental aspect of function-oriented programming in JavaScript is the use of closures to store state information associated with a function when the function is passed to other objects. Science of Consciousness: Closures provide a protective wrapper for state information associated with a function. An analogy in consciousness is the supportive wrapper that transcendental consciousness provides to our own consciousness.

MAIN POINTS

1. Closures are created whenever an inner function with free variables is returned or assigned as a callback. Closures provide encapsulation of methods and data. Encapsulation promotes self-sufficiency, stability, and re-usability. **Science of Consciousness:** Closures provide a supportive wrapper for actions that will occur in another context. Transcendental consciousness provides a supportive wrapper for our actions that will occur outside of meditation.
2. Functions are objects and can have their own properties. Function properties can store state information associated with a function like a closure, however, function properties are accessible to external objects unlike closure variables.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

Established in Being, Perform Action

1. Closures are a feature of functional programming languages that allow state information to be encapsulated with functions when they are passed among objects.
 2. The scope of variables in modern JavaScript is defined by the lexical environment.
-
3. **Transcendental consciousness** is the home of all the laws of nature.
 4. **Impulses within the transcendental field:** Thoughts encapsulated by this deep level of consciousness will result in actions in accord with all the laws of nature.
 5. **Wholeness moving within itself:** In unity consciousness all thoughts and perceptions are encapsulated by blissful wrapper of pure consciousness.



Lesson 14

Scheduled Callbacks: Spontaneous Right Action

MAIN POINT

The asynchronous global methods `setTimeout` and `setInterval` take a function reference as an argument and then callback the function at a specified time. Science of Consciousness: Performing actions in proper sequence and correct time is critical to intelligent behavior. Actions performed from the level of pure consciousness will be spontaneously in accord with all the laws of nature.

Lesson 15

Call Context: Knowledge Is Different in Different States of Consciousness

Wholeness: JavaScript allows functions to be called back at scheduled times and with different contexts. All functions can access a private data structure containing context information referred to by the keyword 'this'. Calling a function with different contexts enables code reuse and different behavior from the same code. **Science of Consciousness:** This is an example of knowledge being different in different contexts. Knowledge is different in different states of consciousness.

MAIN POINTS

1. In JavaScript, like Java, the keyword 'this' refers to the containing object. However, in JavaScript the same 'this' can refer to many different types of objects depending on the context. **Science of Consciousness:** The keyword 'this' is an important form of self-referral and understanding this self-referral is critical to writing successful JavaScript. Experiencing and understanding self-referral consciousness promotes a successful and fulfilling life..
2. Functions have built-in methods call, apply and bind that set the 'this' context of a given function. Call and apply execute the function immediately. Bind returns a new function object to be executed later with context and/or arguments set to specified values. **Science of Consciousness:** The same function can have different semantics depending on the 'this' context. Our own understanding can change depending on our level of awareness. Knowledge is different in different states of consciousness.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

Knowledge Is Different in Different States of Consciousness

1. Functions can be passed and called back from different objects.
2. Built-in function methods call/apply/bind can all set the 'this' context for function calls.

3. **Transcendental consciousness.** Is the experience of nonchanging pure consciousness.
4. **Impulses within the transcendental field:** Thoughts at the deepest levels of consciousness are most powerful and successful.
5. **Wholeness moving within itself:** In unity consciousness all knowledge is experienced in terms of its nonchanging basis in pure consciousness.



Lesson 16

Prototype Inheritance: Archetypal Patterns of Intelligence

Wholeness: Inheritance is a fundamental feature of object-oriented programming. Common code is kept in a base component. Specialized components ‘inherit’ the common code from the more general base component. **Science of Consciousness:** An archetype is a fundamental pattern or law of nature that gives rise to many variations and realizations at more expressed levels of nature. Deeper levels of awareness make us more connected with these fundamental patterns.

MAIN POINTS

1. Prototypal inheritance allows object to inherit properties from a ‘prototype’ parent object. The main purpose of inheritance is to promote code reuse and avoid duplication. **Science of Consciousness:** Reuse of code for common tasks is efficient and avoids errors that can arise from inconsistent updates of duplicated code. Natural law takes the path of least action. Do less and accomplish more.
2. Programmers cannot directly access the special `[[Prototype]]` property. All functions have a regular ‘prototype’ property. When they are called as constructors with ‘new’ that property will be set as the value of `[[Prototype]]`. **Science of Consciousness:** JavaScript’s prototype is like “archetype”, which is an original object that is a basis for other objects. Deeper levels of thought are connected to archetypal patterns of intelligence or ‘laws of nature’.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

Archetypal Patterns of Intelligence

1. JavaScript objects often share common methods through prototype chains.
 2. Modern JavaScript sets up prototype chains using the prototype property of constructor functions (or class syntax).
-
3. **Transcendental consciousness** Is the experience of pure consciousness, the level of awareness that is the basis of all existence and all patterns of intelligence.
 4. **Impulses within the transcendental field:** Thoughts arising from this level have direct access to the deepest patterns of intelligence of nature.
 5. **Wholeness moving within itself:** In unity consciousness all levels of existence are perceived as expressions of these archetypal patterns of intelligence.



Lesson 17

Classes: Evolution through Layers of Abstraction

Wholeness: JavaScript classes are a new syntax that simplifies and enforces proper use of constructor functions and prototypal inheritance for creating objects and using good object-oriented design principles such as encapsulation. Science of Consciousness: Classes are an evolution of JavaScript as a language to support the requirement for good object-oriented design principles needed to develop large applications found in modern web applications. The nature of life is to grow and evolve through layers of abstraction.

MAIN POINTS

1. JavaScript classes are mainly a helpful syntax over JavaScript constructor functions. Science of Consciousness: JavaScript classes are an instance of abstracting away implementation details and issues of constructor functions with this improved syntax. Life is found in layers and more abstract layers of consciousness are simpler and more effective.
2. JavaScript classes add keywords `extend` and `super` that are abstractions over the details of inheritance with function constructors and prototype chains.
3. Encapsulation is a cornerstone principle of good object-oriented design. Encapsulation hides internal component implementation details and provides a well delimited external interface for external components. Science of Consciousness: Experience of the simplest state of awareness eliminates stress and allows us to only have thoughts that are relevant to a given situation. This is like providing a well delimited external interface appropriate to the external environment.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

Evolution through Layers of Abstraction

1. JavaScript classes are a helpful syntax that abstracts out details of constructor functions and prototypal inheritance for creating objects.
2. The `extends` and `super` keywords cause objects and properties to be set in the function prototype and `[[Prototype]]` properties.
-
3. **Transcendental consciousness** Is the simplest state of awareness. It abstracts away everything and is also the basis of everything.
4. **Impulses within the transcendental field:** Impulses at this level are the finest layer of existence and represent the first abstraction of knower, known, and process of knowing when consciousness is aware of itself.
5. **Wholeness moving within itself:** In unity consciousness one appreciates all layers of existence as expressions and abstractions over pure consciousness, the unified field of existence.

