

MAHARISHI INTERNATIONAL UNIVERSITY



Web Application Programming
Unity and Diversity

PROFESSOR

Sridevi Malasani

Jan – Feb Block, 2024

(Jan 15th – Feb 8th)

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CS472
Web Application Programming: Unity and Diversity
Jan - Feb 2024 Course Overview

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Week 1	HTML	CSS for Styling CSS for Page Layout	CSS for Page Layout Review	CSS Levels & Html5 Forms	JS Basics	JS Basics Review
PM	Html Assignment	Q1 - HTML	Basic CSS Quiz	CSS Assgn Presentation	Q2 - Advanced CSS & Levels	
Week 2	DOM/JQuery Event Handling	DOM/ JQuery Event Handling & Review	--	Javascript Functional Programming (Timers)	Scope, Closures And (Arrow/Rest- Spread)	Q5 – Scopes & Arrow, Rest, Spre
PM	Q3- JS Basics	DOM Assignment	Q4 -DOM	Timers Assignment	Timers Presentation	
Week 3	Nodejs & Express	Express Routes	Templates & MVC	Cookies & Sessions Ajax & JSON	--	
PM	Nodejs Assignment	Routes Assignment	Q6 –Express & Routes		Q7 – TemplatesCooki es/Ajax	
Week 4	Project	Project	Project	Project Presentation		

CS472

Web Application Programming

Unity and Diversity

A dominant feature of the World Wide Web that has made it the most successful computing platform on the planet is that there is a single unifying protocol that underlies and connects all applications running on the WWW throughout the entire world. The Hypertext Transfer Protocol (HTTP) is used by all servers and browsers on the WWW. HTTP is a simple set of rules that allows every one of the billions of hosts running on the WWW to have access to every other host. It is this simple underlying unification mechanism that has made web applications the predominant form of delivery for modern software applications.

Web applications are an example of a system of almost infinite diversity and complexity that has arisen based on an underlying unifying mechanism. This is a concrete computing example of a similar law of nature from the science of physics and Maharishi's Science of Consciousness. In physics all the diversity of the physical world arises from the underlying *unified field* of physics. In the 1970's and 1980's physicists traced all forces in the universe back to four fundamental forces or fields of nature (gravity, electromagnetic, weak and strong nuclear forces). Now these four fields are integrated into a single field known as the unified field. According to Maharishi's science of consciousness this unified field is the same as the field of pure consciousness or pure awareness that we experience in our daily practice of the Transcendental Meditation Program.

When our thoughts and actions are connected to this level of pure consciousness, they are naturally in accord with the laws of nature guiding the entire universe. They will tend to be successful like the WWW's success in becoming the predominant computing platform in the world.

Course Goals

This course provides a systematic introduction to programming interactive and dynamic web applications for individuals with little or no prior web application programming experience. At the completion of the course you will be proficient in designing and writing the following:

- HTML to specify webpage content.
- CSS to specify website styling and layout.
- Javascript as a functional language for making webpages responsive.
- The *jQuery* Library to access the Document Object Model.
- Node.js to create server-side programs
- Express to create server-side web applications

Client-Side Course Objectives

Design and write web pages including proper separation of content in HTML, styling in CSS, and processing in JavaScript.

Write CSS selection rules with understanding of CSS cascade, inheritance, and specificity rules
Servlets and Java Server Pages for creating dynamism in websites
Create sophisticated responsive layouts using box-model, floats, positioning, flexbox and grid. write JavaScript

using functional programming techniques, closures, the module pattern, and inheritance via prototypes and function constructors.

Understand JavaScript scope, execution context, scope chain, and event loop. Use jQuery to select, modify, create DOM elements, and handle events.

Server-Side Course Objectives

Write server-side JavaScript using applications using Node.js

Use Express to process HTTP requests and generate HTTP responses Use Templates to generate server-side HTML

Use the industry standard MVC architecture.

Understand and use cookies to create sessions and maintain state

Use Ajax calls to contact the server, especially as part of single page web applications. Clearly understand the different purposes of browser versus server-side code.

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 write small applications on exams.

Evaluation Criteria

Html.	5%
CSS	10%
Javascript	40%
Nodejs/ Express	20%
Project.	20%
Attn	5%

A (90–100)	Excellent, exceptional
B (80–90)	Good — comprehension of course concepts and proficiency in course competencies
C (70–80)	Fair — meets minimal expectations for passing
NC (below 70)	No credit — did not attain course objectives at a minimal level

The bottom 3 points of a grade range are considered minus, the top 3 are plus.

We will review each exam in class as it is possible that I've made a mistake while grading. Please do be aware that when regarding a question the points can either go up, or down.

Course Texts

Web Application Programming: Unity and Diversity

A Software Engineer Learns HTML5 JavaScript & jQuery: A Guide to standards-Based Web Applications by D. Cameron, Cisdal Publishing, 2014.

JavaScript.info (<https://javascript.info>) *The Modern JavaScript Tutorial*, 2019 by Kantor, I.

Class Attendance

Attendance at all classes (online meetings) 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. There is no such thing as a “personal day.” If you have personal business to take care of, please schedule it for after class or during the days between blocks. At the same time, it may occasionally be necessary for you to miss a class (or part of a class) for some reason other than illness or family emergency. Please speak with the instructor beforehand, who will be open to considering your needs.

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. Unexcused absences may result in the student receiving a grade of NC (No Credit) for the whole course.

Professional Etiquette

You are expected to dress and behave as you would in the context of a real IT job in the US. With Compro students, there are rarely any issues about professional etiquette, but you should be aware that you can lose up to 3 points (out of 100 total for the course) for failure to observe acceptable codes of dress and behavior. Be alert to the following:

1. Dress appropriately in classrooms / have your webcam on in online meetings
2. Attend class in the expected way
3. Don't be late to class
4. Don't leave class before it is time to leave
5. Don't skip class
6. Respectful attitude toward the professor. (Arguing about grades is a dangerous path to walk.)

Contact Information

Students may contact me through chat or a conversation or video call on MS Teams, or the following email. I may not see your message immediately, but will definitely respond within 24 hours.

Email: smalasani@miu.edu

Introduction to Web Programming: Layers of Abstraction

The basic technologies that make up the Internet are the World Wide Web and the Hyper Text Markup Language (HTML). Many technologies are built on top of other technologies. *Life is found in layers and the TM Technique gives us access to the full range of our awareness and thoughts.*

MAIN POINTS

1. The internet is a global computer network that uses the IP protocol to uniquely identify computers on the network. Through the TCP protocol each IP address can work with multiple services at the same time. One of these services is the HTTP protocol which is used by the World Wide Web to transport HTML pages. There are many layers of the Internet. *Familiarity with the deep layers is necessary for optimal understanding and use of the surface layers. TM settles our mind so that it is more connected to the deep layers that are the basis of the more expressed layers.*
2. The Hyper Text Markup Language uses tags to demarcate different sections of a text. An HTML page always starts with a <html> tag, inside of which it has a <head> tag to describe the page, and a <body> tag of the contents that will actually be displayed. These are the tags you will use for every HTML page. This is a foundational concept. *Well begun is half done. Start with a good foundation and build upon that.*
3. More common tags include inline elements, lists, tables. The most important concept is to use tags based on their semantics (meaning), not based on their visual effect (which can easily be changed). By using tags for their meaning, clients (including non visual) will better understand the meaning of your page and use it more effectively. *Clear and settled awareness allows us to better grasp the meaning of information and take the right actions for success.*

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

Intro to Web Programming: Layers of Abstraction

1. HTML is the basis of Web Programming, every web page is composed of HTML.
2. To be an effective web programmer you also must understand the deeper underlying realities of HTTP, TCP, and DNS.

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3. **Transcendental consciousness** is when our mind is in contact with the deepest underlying reality, the unified field.
 4. **Impulses within the Transcendental field:** the infinite dynamism of the unified field constantly expresses itself as all of the layers of the universe
 5. **Wholeness moving within itself:** In Unity Consciousness, one experiences that all these layers are ultimately composed of pure consciousness, our own pure awareness.



CSS for Styling: Diversity from Unity

The basics of CSS give different visual styles to HTML elements, changing their preset default appearance. Separating style rules from HTML enables the same underlying content to have multiple appearances. *The same underlying pure consciousness (or unified field) takes form as the infinite diversity of the manifest universe.*

MAIN POINTS

1. The CSS Properties for color, font, text, background, and lists are the basic properties used on almost every page. *There are a lot of details here, but few concepts. If you know the general concepts the details will follow with practice. Highest first—capture the fort to control the territory.*
2. The Cascading in CSS indicates that there are multiple levels of style sheets. More specific styles overwrite more general styles. We can be more specific by using class selectors (groups of elements) and even more so with id selectors (individual elements) and context selectors. *Life is found in layers.*
3. The <div> tag provides a generic block level element that can be used for any division or section of your page. The tag provides a generic inline element for specifying any range of text inside a box. By using these tags, combined with CSS selectors we can write powerful and reusable CSS rules to style and layout pages. *This is an example of efficiency through abstraction. We can have rules that apply to many different elements by abstracting over tags and classes. Do less and accomplish more by acting from abstract levels of awareness.*

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

CSS: Evolution through Specialization

1. How a page is displayed is affected by both the HTML and the CSS.
 2. Although every HTML tag has a default way of displaying, it can easily be changed with CSS and should never be the basis for using it. Instead use HTML tags based on meaning.
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3. **Transcendental consciousness** is the field that underlies all differences.
 4. **Impulses within the Transcendental field:** pure consciousness is a field of infinite possibilities that gives rise to the great diversity of the relative world, the same underlying content can appear as many expressions.
 5. **Wholeness moving within itself:** In Unity Consciousness, one experiences that this unbounded diversity is nothing but the Self.



Page Layout: Whole Is Greater than the Sum of the Parts

CSS provides different tools for creating a layout. There are a variety of ways to position an element; most of them are based on taking a block level element and placing it in relation to some other block. This illustrates the general principle that individual parts must often be understood in terms of a larger context. *The whole is greater than the sum of its parts.*

MAIN POINTS

1. The Box Model is a description of how every element has a basic width and height, outside of which it has padding, a border, and margin. For inline elements only the left and right margin and padding affect surrounding elements. *The box model is an abstraction that allows many similar elements to be treated by a common set of rules. More abstract levels of awareness are more powerful.*
2. A block-level element always starts on a new line and takes up the full width available (stretches out to the left and right as far as it can). An inline element does not start on a new line and only takes up as much width as necessary. These are the fundamental display types for almost all HTML elements. Understanding these fundamental types is critical to creating effective layouts. *Familiarity with fundamental levels of awareness is critical to successful action.*
3. Static position flows box elements from top to bottom, and inline elements from left to right. Relative position keeps the space in the original flow but displays the element at an offset. Absolute position takes the element out of the flow and places it relative to the 'containing element'. Fixed position takes the element out of the flow and places it relative to the viewport. *Layouts require understanding how parts fit into a larger whole. The whole is greater than the sum of its parts.*
4. The CSS float property makes its element move to right or left side of the containing box. The clear property moves its element downwards if there is a floating element on the specified side. Float is a convenient way to have text wrap around an element or make something appear on the right or left side. *Do less and accomplish more.*
5. Responsive design is the strategy of making a site that responds to the browser and device width. Responsive design utilizes media queries to determine the available display area and new CSS techniques such as flexbox and grid to make designs more flexible. *The unified field is the source of all possibilities and when we think from this level our actions are spontaneously responsive to whatever situation we encounter.*

Web Application Programming: Unity and Diversity

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

CSS Positioning: Whole Is Greater than the Sum of the Parts

1. You can use floats and positioning to change where elements are displayed.
 2. Modern web apps use responsive design principles including media queries, viewport, Flexbox, grid, and frameworks such as Bootstrap
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3. **Transcendental consciousness** is the experience of pure wholeness.
 4. **Impulses within the Transcendental field:** At quiet levels of awareness thoughts are fully supported by the wholeness of pure consciousness.
 5. **Wholeness moving within itself:** In Unity Consciousness, one appreciates all parts in terms of their ultimate reality in wholeness.



HTML Forms: Connecting with the Source

HTML forms generate and process user input. Users complete HTML forms using different data widgets, and the server will process the information submitted from the forms. *Forms are a communication mechanism, connecting a model with a remote view of the model and in this case providing input to the model. Forms collect and send information to the server like our sensory systems collect and send perceptions to our awareness.*

MAIN POINTS

1. An HTML form allows the user to send data (input parameters) to the server. Forms are created with the <form> tag, and can be submitted with either an HTTP GET or POST method. *HTTP is a protocol for contacting the server and thereby gaining access to all the resources on the server. Similarly, the TM technique is a protocol for contacting the Self and thereby gaining access to all the resources of pure consciousness.*
2. HTML provides many different types of input widgets, including text fields, text areas, check boxes, radio buttons, and dropdown lists, this is also an area HTML 5 is expanding to make form filling more efficient and effortless. *Nature supports the growth of things that are efficient. Do less and accomplish more.*

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

Connecting with the Source

1. Forms let us submit data to the web server, which can then generate a custom response based on server side information.
 2. GET requests are intended to only retrieve information and should be idempotent. POST requests are intended to submit data and not request a direct response.
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3. **Transcendental consciousness** is the experience of the source of thought.
 4. **Impulses within the Transcendental field:** inputs and perceptions are appreciated in their full value at the quiet levels of the mind.
 5. **Wholeness moving within itself:** In Unity Consciousness one appreciates the full value of all inputs and perceptions. Everything is appreciated as some expression of Totality.



JavaScript for Modern Web Apps: Spontaneous Right Action

JavaScript is a powerful lightweight loosely typed interpreted functional OO language that makes web pages highly dynamic and responsive. It runs in all browsers and is an increasingly important programming language. **Science of Consciousness:** If our awareness is grounded in pure consciousness then our actions will be dynamic and responsive.

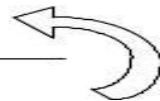
MAIN POINTS

1. JavaScript is a loosely typed language. It has types but does no compile time type checking. Programmers must be cautious of automatic type conversions, including conversions to Boolean types. It has a flexible and powerful array type as well as distinct types of null and undefined. **Science of Consciousness:** To be an effective JavaScript programmer one needs to understand the principles and details of the language. If our awareness is established in the source of all the laws of nature, then our actions will spontaneously be in accord with the laws of nature for a particular environment.
2. JavaScript programs have no main. They respond to user actions called events. **Science of Consciousness:** JavaScript was designed as a language that could effectively respond to browser and DOM events. We respond most effectively to events in our environment if our awareness is settled and alert.
3. The DOM is an API so the JavaScript programmer can conveniently access and manipulate the HTML elements in code. **Science of Consciousness:** The TM and TM-Sidhi programs are techniques that allow anyone to conveniently contact and act at the level of the Unified Field.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

JavaScript for Modern Web Apps: Spontaneous Right Action

1. JavaScript is embedded in an HTML page and is executed on the browser.
 2. JavaScript reacts to browser events and manipulates the web page using the HTML DOM API.
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3. **Transcendental consciousness** is the source of thought and the home of all the laws of nature.
 4. **Impulses within the transcendental field:** Actions arising from this level will spontaneously be in accord with all the laws of nature.
 5. **Wholeness moving within itself:** In unity consciousness, all actions are experienced as expressions of one's Self, pure awareness.



The JavaScript Programming Environment

Actions in Accord with the Laws of Nature

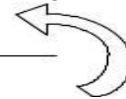
With web applications, JavaScript runs in the environment of a browser. Understanding this special programming environment is critical to success. **Science of Consciousness:** If our thoughts are connected to the home of all the laws of nature, then one will naturally behave according to the principles appropriate for any special environment.

MAIN POINTS

1. JavaScript has a set of global DOM objects accessible to every web page. Every JavaScript object runs inside the global window object. The window object has many global functions such as alert and timer methods. **Science of Consciousness:** To be successful we must have both fine discrimination and broad awareness. The experience of pure consciousness provides global awareness, but also enhances our ability to have fine focus and make careful discriminations.
2. “Unobtrusive” JavaScript promotes separation of web page content into 3 different concerns: content (HTML), presentation (CSS), and behavior(JS). **Science of Consciousness:** This is another example of knower (model), known (view), and process of knowing (controller) which is found throughout computer science and nature. When we experience transcendental consciousness, our Self is the knower, and it is also the known, and the experience is itself the process of the knower knowing herself.
3. JavaScript code runs when the page loads it. Event handlers cannot be assigned until the target elements are loaded. Event handlers often use anonymous functions because the code is specific to that event and element. **Science of Consciousness:** Creative intelligence proceeds in an orderly sequential manner. When our thoughts and actions arise from the source of all the laws of nature then we spontaneously act in accord with the natural order of events in nature.
4. Functional programming methods map, filter, reduce make code more understandable and error free by automating details of general-purpose looping mechanisms, indicating their intent by their name, and not changing the state of the original array. **Science of Consciousness:** Growth of consciousness makes behavior simpler and more error free because intentions that arise from deep levels are spontaneously in accord with and supported by all the laws of nature—i.e., the details are handled automatically like the convenience looping mechanisms.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

1. Client-side JavaScript is attached to HTML pages and is executed on the browser when the script loads.
2. JavaScript reacts to browser events and manipulates the web page using the HTML DOM API.



3. **Transcendental consciousness** is the source of thought and the home of all the laws of nature.
4. **Impulses within the transcendental field** spontaneously are in accord with all the laws of nature.
5. **Wholeness moving within itself:** In unity consciousness, one enjoys all perceptions and knowledge in terms of the source of all the laws of nature, pure bliss consciousness. This is similar to the good feeling and

Web Application Programming: Unity and Diversity

confidence that we experience when we have a deep appreciation and understanding of the environment in which JavaScript runs.

Scope, Closures, and Encapsulation Life Is Structured in Layers

All natural systems make use of layering of encapsulated subsystems to build up more complex super systems. JavaScript relies heavily on functions for most of its layering and encapsulation. **Science of Consciousness:** Life is structured in layers and when we practice the TM program we experience all the layers of thought from gross thinking to finest feeling.

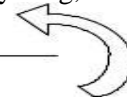
1. JavaScript has global scope and **MAIN POINTS** local scope within functions when variables are declared with var. **Science of Consciousness:** Local and global scopes are similar to fine and broad awareness. The experience of transcending opens our awareness to the expanded scope of unbounded awareness, at the same time that it promotes the ability to focus sharply within any local boundaries.
2. JavaScript has a 2-pass compiler that hoists all function declarations and any variables declared with var keyword. These declarations are visible anywhere in the current function scope regardless of where they are declared. Variables have value 'undefined' until the execution pass and an assignment is made. **Science of Consciousness:** The first pass sets up the proper conditions for the successful execution of the second pass. Similarly, when we set up the proper conditions for transcending then all we have to do is let go and nature will ensure that the experience is successful.
3. When we ask for any variable, JavaScript will look for that variable in the current scope. If it doesn't find it, it will consult its outer scope until we reach the global scope. **Science of Consciousness:** The scope chain proceeds from local awareness to more global awareness. During the process of transcending we naturally proceed from local awareness to more subtle levels of awareness to unbounded awareness.
4. 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.

Web Application Programming: Unity and Diversity

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

Life Is Found in Layers

1. JavaScript is a functional OO language that has a shared global namespace for each page and local scope within functions.
2. Closures provide a lexical scoping mechanism for JavaScript inner functions. Let and const provide this for blocks of ES6 code. These mechanisms promote encapsulation, layering, and abstraction in code.



3. Transcendental consciousness is the experience of the most fundamental layer of all existence, pure consciousness, the experience of one's own Self.

4. **Impulses within the transcendental field:** The many layers of abstraction required for sophisticated JavaScript implementations will be most successful if they arise from a solid basis of thought that is supported by all the laws of nature.

5. **Wholeness moving within itself:** In unity consciousness, one appreciates that all complex systems are ultimately compositions of pure consciousness, one's own Self.

Objects and Encapsulation

Life Is Structured in Layers

Natural systems make use of layering of encapsulated subsystems to build up more complex super systems. JavaScript relies heavily on functions for most of its layering and encapsulation. **Science of Consciousness:** Life is structured in layers and when we practice the TM program we experience all the layers of thought from gross thinking to finest feeling.

MAIN POINTS

1. Objects are a widely used encapsulation mechanism in JavaScript. They are easily created with object literals. They can dynamically add new properties; behave like associative arrays; must use 'this' to refer to properties; **Science of Consciousness:** Objects make code efficient and effective by encapsulating related pieces of functionality. With repeated experience of transcending, unbounded pure awareness develops to encapsulate individual awareness. Individual awareness becomes more efficient and effective if it is supported by unbounded pure awareness.
2. 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 is critical to living a successful life.
3. The revealing module pattern is widely used to provide a public API to an underlying implementation of private methods and properties. **Science of Consciousness:** The Transcendental Meditation program is sort of API to access the support of all the laws of nature through the experience of pure consciousness, the source of all the laws of nature.
4. JavaScript supports prototype inheritance so that objects can inherit common functionality from a single 'prototype' object. **Science of Consciousness:** Pure consciousness is a level of awareness that is a common experience shared by everyone.

Web Application Programming: Unity and Diversity

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE Life Is Found in Layers

1. JavaScript is a functional OO language with objects but no classes.
2. Closures and objects are fundamental to JavaScript best coding practices, particularly for promoting encapsulation, layering, and abstractions in code.



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3. **Transcendental consciousness** is the experience of the most fundamental layer of all existence, pure consciousness, the experience of one's own Self.
 4. **Impulses within the transcendental field:** The many layers of abstraction required for sophisticated JavaScript implementations will be most successful if they arise from a solid basis of thought that is supported by all the laws of nature.
 5. **Wholeness moving within itself:** In unity consciousness, one appreciates that all complex systems are ultimately compositions of pure consciousness, one's own Self.

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]]`. `[[Prototype]]` can also be set with the `__proto__` property, but that is now deprecated in favor of `Object.create`. 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 and the `Object.create` method.

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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.



Classes: Evolution through Layers of Abstraction

Wholeness: JavaScript classes are a new syntax that simplifies and enforces proper use of function constructors 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 function constructors 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.
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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.



jQuery and the DOM

The TM Technique and Pure Consciousness

jQuery is a powerful and convenient API for working with the DOM and handling events that ensures cross-browser compatibility and many additional functions. **Science of Consciousness:** The TM Technique is a powerful and convenient procedure that allows people of any background or culture to effortlessly transcend thought and experience pure consciousness.

MAIN POINTS

1. When the argument to `$()` is a CSS selector the function will return a “jQuery object” that contains a group of selected DOM elements. CSS selectors are a simple, natural, and powerful tool used by jQuery to identify groups of DOM elements. **Science of Consciousness:** A mantra is a simple, natural, and powerful tool that we use in the TM Technique.
2. In addition to selection by CSS-like selectors, jQuery has tree traversal relations that find children, sibling, parent, ancestor nodes. **Science of Consciousness:** jQuery traversal operations facilitate relationships with all elements of the DOM. The experience of self-referral awareness facilitates one’s relationships with family, friends, and the world.
3. The jQuery object returned by the selection mode of `$()` is a collection of DOM elements wrapped by jQuery functionality. This object can read and write node properties such as id, name, value, class, style, etc. **Science of Consciousness:** Node manipulation involves finding nodes and then reading and writing values. TM practice develops our ability to locate or experience quiet states of awareness. Advanced techniques and the TM-Sidhi Program develop abilities to experience and manipulate different characteristics of pure consciousness.
4. An efficient and clear style is to use object literals to create complex DOM elements in jQuery. Lists of elements should be created as a single list element before insertion for efficiency. **Science of Consciousness:** Actions arising from quiet levels of awareness are naturally efficient.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

1. jQuery is a powerful and widely used JavaScript API for working with the DOM that provides cross-browser compatibility.
2. The `$()` function is heavily overloaded. It will be a different function depending on the arguments it has, including running a callback function on page load, selecting DOM elements, wrapping DOM elements, and creating new DOM elements.



3. **Transcendental consciousness.** The TM Technique is a convenient and cross-platform API for experiencing transcendental consciousness.
4. **Impulses within the transcendental field:** Thoughts and actions at quiet levels of awareness are simple, natural, and effective because they are in accord with all the laws of nature that reside at these deep levels.
5. **Wholeness moving within itself:** Advanced TM Techniques and the TM-Sidhi Programs are powerful APIs for bringing the calm dynamism and bliss of pure consciousness into the experiences of daily activity.

Event Handling: Spontaneous Right Action

JavaScript in the browser is event driven programming. To respond to events we write a JavaScript function and attach it to a DOM element so that it will run when the target DOM event is triggered.

Science of Consciousness: Our actions will be appropriate and successful if they are in response to the current environment and events, and are not improperly influenced by stresses from old circumstances.

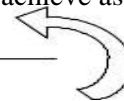
MAIN POINTS

1. Event handlers take callback functions that are executed later when the event occurs. **Science of Consciousness:** Callbacks are a form of memory for an action that is automatically executed when an event happens. When we act from deep levels of awareness, we are more likely to activate appropriate memories and reactions (event handlers).
2. JavaScript code runs inside of an object and the 'this' keyword refers to that object. Event handlers that are attached unobtrusively are bound to that element and inside the handler 'this' references the bound DOM element. Usage of 'this' in event handlers is a common JavaScript programming idiom that enables handlers to be reused across different kinds of elements. **Science of Consciousness:** We can think of the TM Technique as an event handler that gives the result of transcending and can be used by any person (element).
3. Events bubble from the bottom of the DOM tree to the top. The jQuery stopPropagation method prevents bubbling up the element tree. jQuery's stopImmediatePropagation method prevents any other handlers that might be attached to the current element from being executed. **Science of Consciousness:** In the DOM, events can affect almost every element. In the world almost everything is connected, and it is impossible to intellectually predict all the ramifications of an action. If our thoughts are connected to the home of all the laws of nature, then our actions will spontaneously be in accord with the entire environment.
4. JavaScript is single threaded. It handles asynchronous events by storing them and cycling through them in an 'event loop'. **Science of Consciousness:** The event loop gives the appearance of multitasking even though there is only ever a single task and thread of execution. The universe appears to be infinitely diverse even though there is only a single unified field.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

Spontaneous Right Action

1. Event handling is a fundamental aspect of JavaScript programming. jQuery makes it easy to attach event handlers to DOM elements.
2. Some subtle aspects of JavaScript event handlers include the use of event arguments passed to event handlers depending on the type of element, the use of the keyword 'this' to refer to different objects, the need to sometimes control event propagation, and the event loop to achieve asynchronous behavior.



3. **Transcendental consciousness.** The home of all the laws of nature
4. **Impulses within the transcendental field:** Thoughts arising from this level will be able to spontaneously respond with right actions to events because they are supported by all the laws of nature.
5. **Wholeness moving within itself:** In unity consciousness one appreciates that the same unified field can take on many different perspectives, like sap becoming the different perspectives of a flower. Similarly, a single event handler can be expressed differently depending on the element that activates it.

Introduction to Servlets and Web Containers

Actions in Accord with All the Laws of Nature

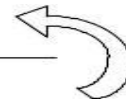
If servlets are developed in accord with the underlying principles of the web container, then the servlet will be much more likely to work smoothly and without mistakes. **Science of Consciousness:** If developers have broad awareness and fine focus then they will spontaneously design solutions in accord with the principles they have learned.

MAIN POINTS

1. Every platform for web applications has a mechanism to dynamically generate web pages containing information from the server. On the Java platform Servlets are the Java classes that provide this dynamism. **Science of Consciousness:** The power of Servlets is that they enable web apps to dynamically respond based on centralized knowledge and data at the web server. The power of TM is that it enables us to spontaneously respond based on the centralized knowledge and data of the home of all the laws of nature. .
2. Web containers provide essential support services for servlets. **Science of Consciousness:** Experience of the unified field of pure consciousness provides essential support services for successful action.
3. Web containers manage the life cycle of servlets and insure that everything happens as required with minimal involvement of web developers. **Science of Consciousness :** The unified field manages the entire universe, and by experiencing this field of awareness on a regular basis we spontaneously act in accord with all the laws of nature.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

1. Developers override the doGet or doPost methods of servlets to implement the request-response functionality of the web application.
2. The web container is responsible for calling the service methods as well as managing the lifecycle of the servlet and exchanging all information over the network.



3. **Transcendental consciousness** is the experience of the home of all the laws of nature. Having this experience structures one's awareness to be in accord with all the laws of nature.
4. **Impulses within the Transcendental Field:** Servlets represent specific impulses of intelligence that are supported by the general-purpose services of the web container. In a similar manner, thoughts connected with the transcendental field are supported by all the laws of nature.
5. **Wholeness moving within itself:** In unity consciousness, thoughts and actions arise from this level of thought, and daily life is lived in terms of this experience of wholeness and integration. This is like the effects of integration and correctness that are produced in web applications due to the underlying wholeness and integration of the web container.

Managing State Continuum of Awareness

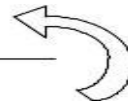
HTTP is a stateless protocol. Web applications must explicitly manage any required state information from one request to the next. **Science of Consciousness:** Intelligent behavior depends on memory and continuity of awareness. Development of consciousness naturally results in better memory, increased intelligence and expansion of awareness. In higher states of consciousness, one never loses the awareness of Self, even in deep sleep.

MAIN POINTS

1. HTTP request messages send input parameters as name/value pairs. Input parameters are text that must be accessed and converted by a servlet. This is the main mechanism web apps use to send information from the browser to the server. **Science of Consciousness:** Input parameters are an important communication mechanism for web apps. Clearer awareness results in better communication between ourselves and others.
2. Attributes are objects on the server. They promote communication between components. Only request attributes are thread-safe. **Science of Consciousness:** Our experience of transcending facilitates coherence and communication between different components of our brains and minds. Coherent communication is critical to successful thought and action.
3. Web containers use cookies to create sessions. **Science of Consciousness:** HTTP cookies enable relationships and communication between client-server entities distributed across space and time. At the level of pure consciousness and the unified field everything is connected with everything else.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

1. State information can be stored on the server in the session, and on the browser with cookies.
2. Sessions are managed by the container, which typically use cookies to store session identifiers on browsers.



3. **Transcendental consciousness** is the direct experience of the unified field. This experience brings orderliness and removes impurities and stresses from memory and thought, resulting in broader awareness and more powerful thoughts.
4. **Impulses within the Transcendental Field:** When one's awareness is connected to the transcendental field then even highly focused thoughts have the spontaneous support of the powerful unbounded awareness of pure consciousness.
5. **Wholeness moving within itself:** In unity consciousness, one not only experiences a continuum of unbounded awareness, pure consciousness, but one also appreciates all external entities as expressions of this continuum of awareness.

Java Server Pages and Model View Controller Architecture Knower, Known, and Process of Knowing

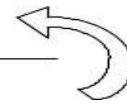
Using JSP pages for the view is the first step that a programmer takes in implementing the industry standard MVC (Model-View-Controller) pattern. **Science of Consciousness:** Acting in accord with established laws will increase your effectiveness, and the experience of pure awareness spontaneously makes one more in accord with all the laws of nature.

1. The web container generates a servlet **MAIN** from a **POINTS** JSP file the first time the JSP is requested from a web application. Since a JSP is essentially a servlet, one should understand servlets to effectively deal with JSPs. **Science of Consciousness:** Actions in accord with fundamental levels of knowledge promote success in dealing with more expressed values.
2. An EL expression is a compact expression of a systematic evaluation of the page, request, session and application scopes. **Science of Consciousness:** The laws of nature are compact expressions that control the infinite diversity of the manifest creation.
3. When you use JSP pages according to a Model 2 architecture, there is a servlet that acts as a controller (process of knowing) that sets attribute values based on computations and results from a business model (knower), then dispatches the request to the servlet generated by the JSP page (known). The JSP servlet then retrieves the attribute values and inserts them into the designated places in the HTML being sent to the browser. **Science of Consciousness:** Complete knowledge is the wholeness of knower, known, and process of knowing.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

JSP: Knower, Known, and Process of Knowing

1. Java Server Pages make it easy for HTML authors to interact with servlets.
2. The JSP Expression Language is designed to promote easy access to dynamic content contained in the MVC data model.



3. **Transcendental consciousness** is the knower knowing Himself or Herself.
4. **Impulses within the Transcendental Field** Model 2 architectures are successful with large systems because they maintain the integrity of the knower (model), known (view), and process of knowing (controller). Similarly, when developers maintain the integrity of their own Self then their actions will be successful even when developing large complex systems under demanding conditions.
5. **Wholeness moving within itself:** In unity consciousness, one appreciates that knower, known, and process of knowing are all expressions of the same underlying unified field of pure intelligence, one's own Self, pure bliss consciousness.

JSP Tag Libraries

Actions Supported by All the Laws of Nature

Instead of using code-like elements such as scriptlets and Java expressions in a JSP, current practice with JSP is to use actions and custom tags that encapsulate functionality into a simple declaration. There are many collections of such tags that have been created and are widely used, such as the JSP Standard Tag Library.

Science of Consciousness: Laws of nature are like JSP actions in the sense that they are descriptions of repeated patterns. Acting from the level of the unified field, our actions will spontaneously be in accord with all the laws of nature.

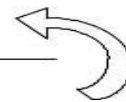
1. The JSP Standard Tag Library provides convenient **MAINPOINTS** action tags for many common operations on a JSP page. JSTL combined with the EL will satisfy most JSP needs. **Science of Consciousness:** The TM Technique is a simple repeatable procedure that increases our ability to act effectively and fulfill any need.

2. Developers can create custom tags for JSP that use a Java tag handler to provide any desired functionality in a simple tag definition for JSP authors. **Science of Consciousness:** Knowledge of custom tags gives developers a means to create any JSP tag functionality. Knowledge and experience of the unified field gives us access to the source of all possibilities.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

JSP Tag Libraries Actions Supported by All the Laws of nature

1. Custom tags are easy for JSP page authors to use.
2. Java developers can create custom tags for any functionality.



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3. **Transcendental consciousness** is the experience of the home of all the laws of nature.
 4. **Impulses within the transcendental field:** Thoughts that arise from this transcendental field will be naturally in accord with all the laws of nature because this transcendental field is the unified field from which the laws of nature arise.
 5. **Wholeness moving within itself:** A developer who understands the basic coding mechanisms underlying custom tags will feel a deep level of comfort and connection with JSP pages and web application technologies and frameworks that rely on them. In a similar manner, in unity consciousness we appreciate that the pure consciousness we experience as our deepest Self is also the same unified field of consciousness that is expressed as the rest of the manifest world and feel a deep level of comfort and connection with that.

Ajax: Frictionless Flow of Information

Ajax is a set of programming techniques collectively used to make web applications highly responsive even with rich content. The key aspects of Ajax are downloading data from a server asynchronously in the background, and refreshing part of a page with the returned data. **Science of Consciousness:** Ajax is about making web sites highly responsive. Growth of consciousness allows us to act from a state of restful alertness, which enables us to quickly and accurately respond even in fast moving and complex environments.

Main Points

1. The key component that a browser provides to enable Ajax is the XMLHttpRequest object, which is supported by all modern browsers. This object opens a connection with a server, sends a message, waits for the response, and then activates a given callback method. **Science of Consciousness:** The TM Technique is supported by any human nervous system. It allows us to connect with the source of thought, experience restful alertness, and then return to activity with that influence of calm alertness.
2. Ajax requests require a url for the target on the server, a designation of whether to send a Get or Post request, one or more callback functions to be called with the result, and optionally a set of request parameters. jQuery provides convenient wrapper methods: \$.ajax(), \$.get(), and \$.post. **Science of Consciousness:** Ajax requests are a highly efficient means to obtain information from the server that is the source of the application. The TM Technique is a highly efficient means to experience pure consciousness from the source of thought.
3. The browser console window is critical to debugging Ajax code since it allows the developer to easily see the request that was sent and the response that was returned. **Science of Consciousness:** Checking is critical to ensure that we are practicing our TM Technique easily and effortlessly.
4. The same origin policy is a security constraint on browsers that restricts scripts to only contact a site with the same domain name, application protocol, and port. This means that browsers only allow Ajax calls to the same web server from which the page originated. **Science of Consciousness:** If we are calm and alert then we are more secure from disruptions by external distractions or deceptions.
5. JSON has become more widely used for Ajax data representations than XML because JSON is easier to write and read and is almost identical to JavaScript object literal syntax. **Science of Consciousness:** We always prefer to do less and accomplish more. Actions arising from deep levels of consciousness are more efficient and effective.

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

1. Client-side programming with Javascript is useful for making web applications highly responsive.
 2. Ajax allows JavaScript to access the server in a very efficient manner using asynchronous messaging and partial page refreshing. Ajax is useful to retrieve information that necessarily resides on the server, otherwise favor client-side JavaScript operations.
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3. **Transcendental consciousness** is the experience of the home of all the laws of nature where all information is available at every point.
4. **Impulses within the transcendental field:** Communication at this level is instantaneous and effortless.

Wholeness moving within itself: In unity consciousness daily life is experienced in terms of this frictionless and effortless flow of information.

