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COURSE NAME	ADVANCED WEB DESIGN

SET - I

Q1) Define the HTML Tags and describe the HTML Terminology in detail.

Answer . :- HTML Tags and Terminology
HTML Tags
HTML (Hypertext Markup Language) is the standard markup language for creating web pages. It uses tags to define the structure and content of a webpage. These tags are enclosed within angle brackets (< >) and are typically used in pairs, with an opening tag and a closing tag.
Common HTML Tags:

- <html> and </html>: Define the root of an HTML document.
- <head> and </head>: Contain metadata about the webpage, such as the title, stylesheets, and scripts.
- <title> and </title>: Define the title of the webpage, which appears in the browser's title bar.
- <body> and </body>: Contain the visible content of the webpage, including text, images, links, and other elements.
- <h1> to <h6>: Define headings of different levels.
- <p> and </p>: Define paragraphs of text.
- <a> and </a>: Define hyperlinks to other web pages or resources.
- <img>: Define an image.
- <ul> and </ul>: Define an unordered list.
- <ol> and </ol>: Define an ordered list.
- <li> and </li>: Define list items.
- <table> and </table>: Define a table.
- <tr> and </tr>: Define a table row.
- <td> and </td>: Define a table data cell.
- <form> and </form>: Define an HTML form for collecting user input.
- <input>: Define an input field, such as a text field, checkbox, or radio button.
- <button>: Define a button.
- <label>: Define a label for an <input> element.

HTML Terminology

- Element: A unit of content within an HTML document, defined by a pair of tags.
- Attribute: A property of an HTML element, specified within the opening tag. For example, the href attribute of the <a> tag specifies the link's destination.
- Value: The assigned value of an attribute.
- Nested Elements: Elements that are contained within other elements. For example, a <p> element can be nested within a <div> element.
- Parent Element: The element that contains another element.
- Child Element: An element that is contained within another element.
- Self-Closing Tags: Tags that do not require a closing tag, such as <br> (line break) and <img>.
- Void Elements: Elements that do not have content and are self-closing.

Example:
HTML

```html
<!DOCTYPE html>
<html>
<head>
  <title>My Webpage</title>
</head>
<body>
  <h1>Welcome to My Website</h1>
```

```
    <p>This is a paragraph of text.</p>
    <ul>
      <li>Item 1</li>
      <li>Item 2</li>
    </ul>
    <a href="https://surbajao.com">Visit Example</a>
</body>
</html>
```

This example demonstrates the use of various HTML tags to create a simple webpage with a title, heading, paragraph, unordered list, and a hyperlink.

Q2) What is XML? Explain the XML Versions History and XML Parsing Techniques.

Answer . : - XML: Extensible Markup Language

XML (Extensible Markup Language) is a markup language that defines a standard for representing structured data. It's designed to be both human-readable and machine-readable, making it widely used for data exchange and storage. Unlike HTML, which is primarily used for structuring web content, XML is more flexible and can be customized to represent any type of data.

XML Versions History

1. XML 1.0 (1998): The original version of XML, it established the core syntax and features of the language.
2. XML 1.1 (2004): Introduced support for additional character sets, including those used in Asian languages.
3. XML Schema (2001): A language for defining the structure and content of XML documents.
4. XSLT (XSL Transformations): A language for transforming XML documents into other formats, such as HTML or text.
5. XPath (XML Path Language): A language for navigating and selecting nodes within an XML document.
6. XQuery (XML Query Language): A language for querying and manipulating XML documents.

XML Parsing Techniques

Parsing XML involves breaking down an XML document into its constituent elements and attributes. There are several techniques for parsing XML:

1. DOM (Document Object Model):
   - Creates a tree-like representation of the XML document in memory.
   - Allows for random access and modification of elements and attributes.
   - Can be memory-intensive for large documents.
2. SAX (Simple API for XML):
   - An event-based parser that processes the XML document sequentially.
   - More efficient for large documents as it doesn't require loading the entire document into memory.
   - Less flexible than DOM for random access.
3. StAX (Streaming API for XML):
   - A pull parser that allows you to control the parsing process.
   - Offers a more flexible approach to XML processing compared to SAX.
   - Can be more complex to use than SAX or DOM.
4. XPath and XQuery:
   - Can be used to parse and query XML documents.

- Provide powerful tools for navigating and manipulating XML data.

Choosing the Right Parsing Technique

The choice of parsing technique depends on several factors, including:

- Document size: For large documents, SAX or StAX are often more efficient due to their streaming nature.
- Access patterns: If you need to access elements randomly or modify the document, DOM might be suitable.
- Complexity of the XML structure: For complex XML structures, XPath and XQuery can be helpful.

Example:

Consider the following XML document:

XML
```
<book>
  <title>The Hitchhiker's Guide to the Galaxy</title>
  <author>Douglas Adams</author>
  <genre>Science Fiction</genre>
</book>
```
To parse this document using DOM, you would create a DOM tree and access elements like:

Java
```
DocumentBuilderFactory factory = DocumentBuilderFactory.newInstance();
DocumentBuilder builder = factory.newDocumentBuilder();
Document document = builder.parse(new    File("book.xml"));

Element bookElement = document.getDocumentElement();
NodeList titleElements = bookElement.getElementsByTagName("title");
Element titleElement = (Element) titleElements.item(0);
String title = titleElement.getTextContent();
```
By understanding the different XML parsing techniques and their strengths and weaknesses, you can choose the most appropriate method for your specific use case.

Q.3.a) Explain the working of AJAX-XMLHttp Request Object.

Answer .: - AJAX (Asynchronous JavaScript and XML) is a technique that allows web pages to make asynchronous requests to a server and receive data without reloading the entire page. The core of AJAX is the XMLHttpRequest object.

How the XMLHttpRequest Object Works:

1. Create an instance: A new XMLHttpRequest object is created using JavaScript.
2. Open a request: The open() method is used to specify the HTTP method (e.g., GET, POST) and the URL of the resource to be requested.
3. Set headers: Optional headers can be set using the setRequestHeader() method.
4. Send the request: The send() method is used to send the request to the server.
5. Handle the response: The onreadystatechange event handler is used to monitor the status of the request and handle the response when it's ready. The readyState property indicates the current state of the request (e.g., UNSENT, OPENED, HEADERS_RECEIVED, LOADING, DONE).
6. Process the response: Once the request completes successfully, the responseText or responseXML property can be used to access the response data.

Example:

JavaScript

```
var xhr = new XMLHttpRequest();
xhr.open("GET", "data.xml", true);
xhr.onreadystatechange = function() {
  if (xhr.readyState == 4 && xhr.status == 200) {
    var xmlDoc    = xhr.responseXML;
    // Process the XML data
  }
};
xhr.send();
```

In this example, an XMLHttpRequest object is created to make a GET request to the "data.xml" file. The onreadystatechange event handler is used to check if the request has completed successfully and to process the XML response data using the responseXML property.

Q.3.b) Describe the Object-Oriented features in JavaScript.

Answer .: -

JavaScript, though primarily a scripting language, incorporates object-oriented features. While it doesn't follow a strict class-based approach like languages like Java or C++, it offers a prototype-based system.

Key Object-Oriented Features in JavaScript:

1. Objects: JavaScript treats everything as an object, including primitive values like numbers and strings. Objects are collections of key-value pairs, where the keys are properties and the values can be data or functions.
2. Prototype-Based Inheritance: JavaScript uses prototypes to inherit properties and methods from other objects. A prototype is an object that serves as a template for other objects. When you create a new object, it inherits properties and methods from its prototype.
3. Constructors: Constructors are functions used to create objects. They define the initial properties and methods of the object. When a constructor is called with the new keyword, a new object is created and linked to the constructor's prototype.
4. Methods: Methods are functions that are properties of an object. They can access and modify the object's properties.
5. Classes (ES6): While JavaScript didn't originally have classes, ES6 introduced them as a syntactic sugar for prototype-based inheritance. Classes provide a more familiar syntax for creating objects and defining their properties and methods.

Example:

JavaScript

```
function Person(name, age) {
  this.name = name;
  this.age = age;
}

Person.prototype.greet = function() {
  console.log("Hello,    my name is " + this.name);
};

var person1 = new Person("Alice",    30);
person1.greet();
```

In this example, Person is a constructor function that creates objects with name and age properties. The greet() method is defined on the Person prototype, so all objects created using the Person constructor will inherit this method.

SET - II

Q4) Describe the CANVAS elements and drawing in HTML5.

Answer . : - The Canvas Element and Drawing in HTML5
The <canvas> element is a powerful tool in HTML5 for creating dynamic, interactive graphics. It provides a space where you can draw shapes, images, text, and more using JavaScript.
Basic Structure:
HTML

```
<canvas id="myCanvas" width="300" height="150"></canvas>
```

- **id: A unique identifier for the canvas element.**
- **width and height: Specify the dimensions of the canvas in pixels.**

Accessing the Canvas Context:
To draw on the canvas, you need to access its 2D drawing context. This is done using the getContext() method:
JavaScript

```
var canvas = document.getElementById("myCanvas");
var ctx = canvas.getContext("2d");
```

Drawing Shapes:

- **Rectangles:**

JavaScript

```
ctx.fillRect(x, y, width, height); // Fill a rectangle
ctx.strokeRect(x, y, width, height); // Stroke a rectangle
```

- **Lines:**

JavaScript

```
ctx.beginPath();
ctx.moveTo(x1, y1);
ctx.lineTo(x2, y2);
ctx.stroke();
```

- **Arcs:**

JavaScript

```
ctx.beginPath();
ctx.arc(x, y, radius, startAngle, endAngle, anticlockwise);
ctx.stroke();
```

- **Paths:**

JavaScript

```
ctx.beginPath();
ctx.moveTo(x1, y1);
ctx.lineTo(x2, y2);
// ... more path commands
ctx.closePath();
ctx.stroke();
```

Drawing Images:
JavaScript

```
var img = new Image();
img.src = "image.png";
img.onload = function() {
  ctx.drawImage(img, x, y, width, height);
};
```

Drawing Text:
JavaScript

```
ctx.font = "20px Arial";
ctx.textAlign = "center";
ctx.textBaseline = "middle";
ctx.fillText("Hello, World!", x, y);
```

Transformations:

- **Translation:**

JavaScript

```
ctx.translate(x, y);
```

- **Rotation:**

JavaScript

```
ctx.rotate(angle);
```

- **Scaling:**

JavaScript

```
ctx.scale(x, y);
```

Color and Style:

- **Color:**

JavaScript

```
ctx.fillStyle = "red";
ctx.strokeStyle = "blue";
```

- **Line Width:**

JavaScript

```
ctx.lineWidth = 5;
```

- **Line Cap:**

JavaScript

```
ctx.lineCap = "round";
```

- **Line Join:**

JavaScript

```
ctx.lineJoin = "bevel";
```

Animation:

Use the requestAnimationFrame() function to create smooth animations.

Example:

JavaScript

```
function draw() {
  ctx.clearRect(0, 0, canvas.width, canvas.height);
  ctx.fillStyle = "blue";
  ctx.fillRect(x, y, 50, 50);
  x += 1;
  requestAnimationFrame(draw);
}
draw();
```

The canvas element provides a versatile platform for creating a wide range of graphics and animations. By understanding its basic concepts and methods, you can create visually appealing and interactive web applications.

Q.5) What is Version Control System? Define the Git's role in Web Development.

Answer . : - Version Control System (VCS)

A Version Control System (VCS) is a software development tool that helps track changes to files over time. It allows developers to collaborate effectively, manage different versions of their projects, and revert to previous states if necessary.

Key Features of a VCS:

- Centralized or Distributed: VCS can be centralized, where all changes are stored in a central repository, or distributed, where each developer has a local copy of the repository.
- Version Tracking: VCS records changes to files and creates a history of versions, allowing developers to review and compare different states of their projects.
- Branching and Merging: VCS supports branching, which allows developers to create parallel lines of development. Merging enables combining changes from different branches into a single branch.
- Collaboration: VCS facilitates collaboration among multiple developers by providing a shared workspace and tools for managing conflicts.
- Reverting Changes: VCS allows developers to revert to previous versions of files if needed, helping to recover from mistakes or experiment with different approaches.

Git's Role in Web Development
Git is a popular distributed version control system that has become the de facto standard for web development projects. Its decentralized nature offers several advantages:

- Offline Development: Developers can work on their projects locally without requiring a constant internet connection.
- Faster Operations: Git's distributed model allows for faster operations, especially for large projects.
- Branching and Merging: Git's branching and merging features make it easy to experiment with different features or bug fixes without affecting the main development branch.
- Collaboration: Git's distributed nature enables seamless collaboration among teams, regardless of their geographic location.
- Open Source: Git is an open-source project, which means it's freely available and has a large and active community.

Common Git Commands:

- git init: Initializes a new Git repository.
- git add <filename>: Adds a file to the staging area.
- git commit -m "Commit message": Commits changes from the staging area to the local repository.
- git push origin <branch>: Pushes changes to a remote repository.
- git pull origin <branch>: Fetches changes from a remote repository and merges them into the local branch.
- git branch <branch-name>: Creates a new branch.
- git checkout <branch-name>: Switches to a different branch.
- git merge <branch-name>: Merges changes from one branch into another.

By using Git, web developers can effectively manage their projects, collaborate with others, and maintain a history of their changes. This ultimately leads to better code quality, faster development cycles, and more efficient workflows.

Q.6) Explain the terms Transitions and Transforms in CSS3.

Answer . : - CSS3 Transitions and Transforms
CSS3 Transitions
CSS3 transitions provide a smooth way to animate the transition between different CSS property values. This creates dynamic and visually appealing effects on your web pages.
Key Properties:

- transition-property: Specifies the CSS properties that should transition.

- transition-duration: Sets the duration of the transition in seconds or milliseconds.
- transition-timing-function: Defines the speed curve of the transition. Common values include linear, ease, ease-in, ease-out, ease-in-out, and cubic bezier functions.
- transition-delay: Specifies the delay before the transition starts.

Example:

CSS

```
.button {
  background-color: blue;
  color: white;
  padding: 10px 20px;
  border: none;
  cursor: pointer;
  transition: background-color 0.3s ease;
}

.button:hover {
  background-color:    green;
}
```

In this example, the .button element will smoothly transition its background color from blue to green when hovered over.

CSS3 Transforms

CSS3 transforms allow you to manipulate the position, size, rotation, skewing, and perspective of elements on a web page.

Key Properties:

- transform: Applies multiple transformations to an element.
- transform-origin: Sets the origin point for transformations.
- transform-style: Specifies how nested elements should be transformed.

Common Transformation Functions:

- translate(x, y): Moves an element horizontally and vertically.
- rotate(angle): Rotates an element around its origin.
- scale(x, y): Scales an element horizontally and vertically.
- skew(x, y): Skews an element along the x and y axes.
- perspective(distance): Sets the perspective for 3D transformations.

Example:

CSS

```
.card {
  width: 200px;
  height: 200px;
  background-color: #f0f0f0;
  transition: transform 0.5s ease;
}

.card:hover {
  transform: scale(1.2);
}
```

In this example, the .card element will smoothly scale up when hovered over, creating a hover effect.

Combining Transitions and Transforms:

You can combine transitions and transforms to create more complex animations. For example, you could create a fading and rotating element using both properties.