

Experiment No: 1

Aim: To implement and Design a webpage containing Elements, Attributes, Head, Body, Hyperlink, Formatting, Images, Tables, list, Frames, Forms, Multimedia, links; in HTML.

Theory: HTML (Hypertext Markup language) is the standard markup language used for creating webpages. It consists of various elements, attributes and features that allows you to structure and present content on the web.

(1) Elements :- HTML elements are the building blocks of web pages. They are represented by tags, which are enclosed in angle brackets (<>). Some commonly used elements include:

1. <html> : Represents the root element of an HTML page.
2. <head> : Contains meta-information about the web-page, such as the title, character encoding & linked CSS stylesheets.
3. <body> : Represents the content of the webpage, including text, images, links, and other elements.
4. <a> : Creates a hyperlink, allowing users to navigate to another webpage or a specific section within the same page.
5. <h1> to <h6> : Defines headings of different levels, with <h1> being the highest (most important) &

<h6> the lowest .

- 6] <p>: Defines a paragraph .
7. <img>: Inserts an image into the webpage .
8. <table>: Create a table for displaying the tabular data .
9. <ul> and <ol>: Represent unordered & ordered lists , respectively .
10. <iframe>: Embeds another html page or external content with the current page .
11. <form>: Defines a form for collecting user input .
12. <video> and <audio>: Allows embedding multimedia content , such as videos & audio files .

- [2] Attributes :- HTML elements can have attributes that provide additional information or control their behaviour . Some commonly used attributes are -
1. href : Specifies the destination URL for hyperlinks .
  2. src : Specifies the source URL for images , videos or audio files .
  3. alt : Provides alternative text for images .
  4. width & height : Specify the dimension of an element .

- [3] Hyperlink :- The <a> element is used to create hyperlinks . It requires the href attribute , which specifies the URL of the destination . Users can click on the link to navigate to the specified URL .

[4] Formatting :- HTML provides various elements & attributes for text formatting, such as:

1. `<b>` : Renders text in bold.
2. `<i>` : Renders text in Italic.
3. `<u>` : Renders text with an underline.
4. `<strong>` : Indicates strong importance.
5. `<em>` : Indicates emphasis.

[5] lists :- HTML provides 2 types of lists —  
Unordered lists (`<ul>`) and Orderd lists(`<ol>`)  
list items are represented by `<li>` element.

[6] Foms :- The `<form>` element is used to embed another interactive forms on webpages.

Conclusion :- Thus, I have successfully implemented simple HTML Page using given attributes.

## Experiment No: 2

Aim :- To implement CSS3. Syntax, Inclusion, color, Background, Fonts, Tables, lists, CSS3 Selectors, Pseudo classes, Pseudo elements.

Theory :- [1] CSS3 Syntax - CSS3 Syntax is based on the following Rules:-

1. CSS declarations are made up of a property name and a value, separated by a colon(:).
2. Property names are always case-insensitive.
3. Property values can be any of the following:
4. Keywords, such as red, bold, and center.
5. Numbers, such as 10px and 3em.
6. Functions, such as ~~as~~ rgb(), hsl(), and calc().
7. Strings enclosed in single or double quotes.
8. Multiple declarations can be grouped together within curly braces ({}).
9. CSS declarations can be placed in either the <head> or <body> section of an HTML document.

[2] CSS3 Inclusion :- CSS3 can be included in a HTML document in two ways:

1. **Inline CSS:** Inline CSS is applied to a single element and is placed directly within the <style> attribute of that element.
2. **External CSS:** External CSS is applied to multiple elements and is placed in a separate CSS file.

which is then linked to in the `<head>` section of the HTML document.

[3] css3 Color: CSS3 colors can be specified in a variety of ways, including:

1. Hexadecimal: Hexadecimal colors are specified using a six-digit code, such as `#ffffff` for white and `#000000` for black.
2. RGB: RGB colors are specified using three numbers, representing the red, green, and blue components of the color. For example, `rgb(255,0,0)` is red and `rgb(0,0,255)` is blue.
3. HSL: HSL colors are specified using 3 numbers, representing the hue, saturation, and lightness of the color. For example, `hsl(0,100%,50%)` is red & `hsl(120,100%,50%)` is green.

[4] css3 Background: CSS3 backgrounds can be specified using a variety of properties, including:

~~background - color~~

~~background - image~~

~~background - repeat~~

~~background - position~~

~~background - attachment~~

[5] css3 Fonts: It can be specified using a variety of properties, including:

~~font - family~~, ~~font - style~~, ~~font - size~~, ~~font - weight~~, ~~font - variant~~.

[6] css3 Tables :- Can be styled using variety of properties, including:  
border-collapse, caption-side, empty-cells, table-layout.

[7] css3 lists :- CSS3 lists can be styled using a variety of properties, including:  
list-style-type, list-style-position, list-style-image.

[8] css3 selectors :- Are used to select the elements that should be styled.

1. Element selectors: Element selectors select all elements of a particular type. For example, the `h1` selector will select all heading elements.
2. Class selectors: Class selectors select all elements with a particular CSS class. For example, the `.my-class` selector will select all elements with the class `my-class`.
3. ID selectors: ID selectors select all elements with a particular CSS ID. For example, the `# my-id` selector will select the element with the ID `my-id`.

[9] css3 Pseudo classes: CSS3 pseudo classes are used to select elements based on their state. For example, the `:hover` pseudo class will select all elements when the user hovers over them.

[10] CSS3 Pseudo Elements :-

CSS3 Pseudo elements are used to select specific parts of an element. For example, the ::first-line pseudo element will select the first-line of a paragraph.

Conclusion :- Thus, we have successfully implemented CSS on last HTML File.

DOP: 02/09/24

## Experiment No: 4

Aim :- To create a webpage/form which includes:-  
Variables, operators, cond<sup>n</sup>, loops, Functions,  
Parents, Classes and Objects, Error handling,  
Validation, Array, String, Date.

### Theory :- Javascript Basics.

- (1) Variables  $\Rightarrow$  JS variables are used to store data. To declare a variable, you use the var keyword followed by the variable name.
- (2) Operators  $\Rightarrow$  JS operators are used to perform operations on data. There are many different types of operators in JS, including arithmetic operators, comparison operators, logical operators, and assignment operators.
- (3) Conditions  $\Rightarrow$  JS conditions are used to control the flow of your program. You can use conditions to check if a statement is true or false, and then execute different code based on the result.
- (4) Loops  $\Rightarrow$  JS loops are used to repeat a block of code until a certain condition is met. There are three types of loops in javascript: for loops, while loops, and do-while loops.
- (5) Functions  $\Rightarrow$  JS functions are blocks of code that can be reused. To define a function, you use the function keyword followed by the function name and a list of parameters.

- (6) Events  $\Rightarrow$  JS events are used to respond to user interactions, such as clicking on button or moving the mouse: To listen for an event, you use the addEventListener() method.
- (7) Classes and objects  $\Rightarrow$  JS classes & objects are used to create reusable code and organize your data.
- (8) Error handling  $\Rightarrow$  Used to catch and handle errors that occur in your program.
- (9) validations  $\Rightarrow$  JS validations are used to validate user input.
- (10) Arrays  $\Rightarrow$  To store collections of data.
- (11) Date  $\Rightarrow$  Represent dates and time.

Conclusion:- Here, we successfully implemented placement registration form & applying validation on date, no, email id & %.

DOP: 29/07/24

## Experiment No : 7

Aim :- To design and stimulate the environment for Dynamic routing using Cisco packet tracer / GNS3 .

### Theory :-

1. STAR TOPOLOGY: A star may be a topology for a local Area Network (LAN) during which all nodes are individually connected to a central connection point, sort of a hub or a switch.

#### Advantages of Star Topology:

— It is very reliable.

— Easier to put in.

— Robust in nature.

— Easy fault detection.

#### Disadvantages of Star Topology:

— Requires more cable than a linear bus.

— Performance is predicted on hub.

— Extra hardware is required which adds to the cost.

2. BUS TOPOLOGY: Bus topology carries transmitted data through the cable because data reaches each node, the node checks the destination address (MAC / IP address) to determine if it matches their address.

### Advantages of Bus Topology:

- It is the easiest network topology for linearly connecting peripherals or computers.
- It is easy to understand topology.
- Easy to expand by joining the 2 cables together.
- Very cost-effective as compared to mesh & star.

### Disadvantages of Bus Topology:

- Not good for large networks.
- Packet loss is high.
- Additional devices slow the network down.
- Troubleshooting individual device issues is very hard.

### RING TOPOLOGY:-

#### Advantages of Ring Topology:

- Equal access to resources.
- Easy to manage.
- Minimum collision.
- It is cheap to install and expand.
- Speed to transfer the data is very high.
- There is no need of server to control the connectivity among the nodes in the topology.

- Disadvantages of Ring Topology :-

- They were not scalable.
- Total dependence in one cable.
- Difficult to troubleshoot the ring.
- It is expensive.
- It is slower as compared to Bus topology.

4. MESH TOPOLOGY :- In mesh, all the computers are interconnected to every other during a network.

- Advantages :-

- Failure during a single device won't break the network.
- Fault identification is straightforward.
- A mesh doesn't have a centralized authority.
- Has Robust features to beat any situation.

- Disadvantages :-

- Complex process.
- The cost to implement mesh is above other sessions.
- There is high risk of redundant connections.
- Maintenance needs a challenging with a mesh.

## 5. TREE TOPOLOGY:-

- Advantages:-

- Tree Topology is reliable.
- It is used in WAN.
- Tree Topology is highly secure.
- Point-to-Point writing for individual segments.

- Disadvantages:-

- The establishment cost increases as well.
- Treatment is complex.
- This network is very difficult to configure as compared to the other network topologies.
- The length of a segment is limited & the limit of the segment depends on the type of cabling used.

## 6. HYBRID TOPOLOGY:-

- Advantages of Hybrid topology:-

- It is extremely flexible.
- It is very reliable.
- It is used to create large networks.
- Handles a large volume of traffic.

- Disadvantages of hybrid Topology:
  - It is a type of network expensive.
  - The design of a hybrid network is very complex.
  - Installation is a difficult process.
  - There is a change in the hardware to connect one topology with another topology.

DOP: 05/08/24

## Experiment No. 8

Aim: To design and stimulate VLANs on switch/router using Cisco Packet tracer.

Theory: To design and stimulate VLAN environment using Cisco packet tracer, configuring VLAN on switches & enabling VLAN routing on router to facilitate communication between devices in different VLANs.

Material required: Software, Cisco Packet Tracer.

Hardware: Switches, routers, PCs.

- 1] 1) Setup the network topology adding the devices.  
2) Connecting the devices.
- 2] Configure VLANs on switches.
  - 1) Accepting CLI of switch 1
  - 2) Configure VLAN 10 & VLAN 20
  - 3) Assigning switchports to VLANs.
  - 4) Repeat configuration on switch for remaining ports.
- 3] Configure In for VLAN Routing on Router.
  - 1) Access CLI of router.
  - 2) Create subinterfaces for VLANs
  - 3) Enabling main Interface.
  - 4) Assigning IP address to PCs.

PC 1: 192.168.10.10

PC 2: 192.168.10.11

PC 3: 192.168.20.10

PC 4: 192.168.20.11

3) Verifying      2- Testing & checking Raising  
tables

Conclusion: Thus, we have successfully demonstrated design & stimulation of VLAN environment using Cisco packet tracer.

DOP: 12/08/24

## Experiment No: 9

Aim:- To Design and stimulate NAT on the router using Cisco packet tracer / GNS3.

Theory:- NAT translates the addresses of hosts behind a firewall or router and is normally used for internal networks that have unregistered (non-routable) IP addresses. NAT will translate these unregistered addresses into routable addresses assigned to outside network. Outside networks are most usually referred to as public networks. & NAT allows non-routable or unregistered IP address spaces to connect to the web while providing added security. With cisco IOS, NAT translation is used by a device that sits between the private, or inside, network & the outside, or public, network. NAT has many forms and works in many ways:

- Static NAT: is where we map an unregistered IP address to a registered IP address on a one-to-one basis. This is most commonly employed when there is a device that needs to be accessible from outside the network.
- Dynamic NAT: is where an unregistered IP address is mapped to a registered IP address from a

group of available registered IP addresses.

- PAT (NAT overload): is a variation of dynamic NAT that maps multiple unregistered IP addresses to a single registered IP address by using different ports. Other names for this variation include port-level multiplexed NAT or single address NAT.

#### ► NAT Terminology:-

Before we even attempt to look at how to configure NAT on a router or a firewall, we need to become familiar with the terminology used in the NAT environment.

- Inside Local Address is an IP address that is assigned to a host on the inside network. This address is not advertised to the Public/Outside network. This is most frequently not a routable or legitimate IP address.
- Inside Global address is a routable IP address assigned by the International Number Authority or its regional delegates.
- Outside Local address is an IP address used by an outside host of the network. It is this address i.e. being translated as it appears to the private network.
- Outside global address is the IP address assigned to a host on the outside or public network that is being translated by that host's network.

► Configuring Static NAT :-

Here we will look at what is involved in configuring Static NAT on a Cisco router.

Static NAT is pretty straight forward.

Remember this is most commonly used for translating addresses on a one-to-one basis.

This is accomplished via - a 3-step process:

Step 1: Designate atleast one NAT inside interface.

Step 2: Designate atleast one NAT outside interface.

Step 3: NAT the source IP to the outside IP address.

Conclusion :- Thus, we have successfully implemented and learnt to design and stimulate NAT on the router using Cisco packet tracer / GNS3.

DOP: 02/09/24

## Experiment No: 10

Aim:- To Stimulate Software Defined Network using Mininet.

Theory:- Mininet is a tool for software-defined network. It is an emulator of a network and it is used to visualize the switches and application of software-defined network in a virtualized environment. It is also used to test the software-defined network devices and those using openFlow protocols. The switches used in mininet are openFlow switches.

Mininet is a majorly used as a learning tool to test, experiment, and learn about software-defined network. Mininet is preferable because it is very fast and helps us to create customizable topologies. It is also very easy to use.

### ► Mininet Works:-

- Hosts: Created using network namespace, each with its own network stack.
- switches: Virtual switches connect hosts and are controllable via SDN controller.

### ► Workflow:-

- 1) Topology Creation: Define the network python.
- 2) Network emulation: mininet creates the virtual network based on the defined topology.



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Interaction:- Use the mininet CLI to manage the network.

Controller:- Control switches & direct traffic.

Monitoring:- Tools like wireshark help monitor & debug.

Advantage:

Rapid prototyping:- Quickly build & test network.

Scalability:- Stimulate large network on single machine.

Flexibility:- Easily script & automate network setups.

Cost-effective:- No need for physical hardware.

Conclusion:- Thus, we have successfully implemented on Stimulation of Software Defined Network using mininet.