# MBEYA UNIVERSITY OF SCIENCE AND TECHNOLOGY


## INFORMATION SYSTEMS AND TECHNOLOGY DEPARTMENT

# INTERNET TECHNOLOGIES

**lecture 2**
**Internet Application**

2020

# Content

- *WWW*
- *Hyper Text Mark-up Language (HTML)*
- *Hyper Text Transfer Protocol (HTTP)*
- *Uniform Resource Identifiers (URIs)*
- *Uniform Resource Locators (URLs)*
- *File Transfer Protocol (FTP)*
- *Internet Connectivity*
- *Video Conferencing*
- *Communication Services*
- *Domain Name System (DNS)*
- *Electronic-mail*

# World Wide Web (WWW):

- WWW it refers to the collection of information accessible on the internet. The web consists of pages of text, pictures, sounds and animation on various topics.
- The web pages have links between them i.e when we click a certain word or picture in a page, it will take us to another page. These words or pictures that help to move from one page to another are called hyperlinks.
- A collection of related web pages is known as a web site. A web site can be accessed by means of a unique name assigned to it.
- The World Wide Web Consortium (W3C) is the main international standard organization for the World Wide Web (abbreviated WWW or W3).

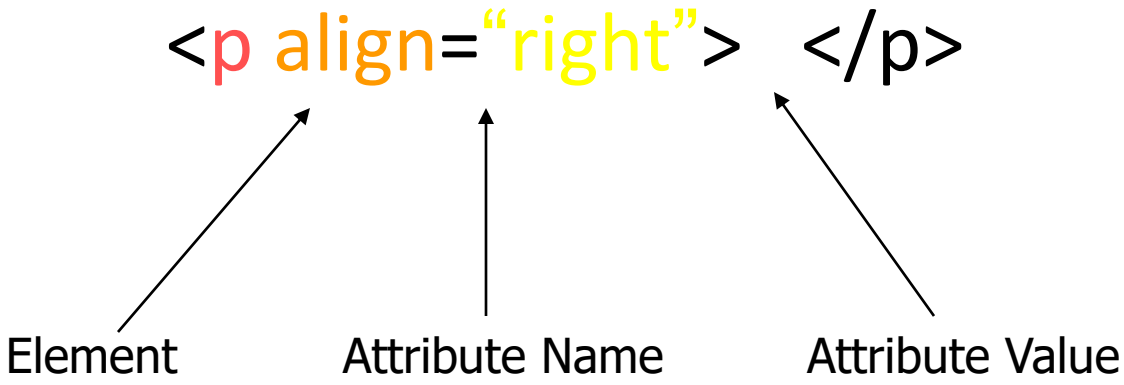
# WWW Terminology

- Home page
  - The cover page for a Web site that has graphics, titles, coloured text, etc.
- Hypermedia
  - Tools that connect the data on Web pages, allowing users to access topics in whatever order they wish
- Hypertext markup language (HTML)
  - The standard page description language for Web pages
- Web browser
  - Software that creates a unique hypermedia-based menu on your computer screen and provides a graphical interface to the Web
- Web page
  - A screen of information sent to a requesting user and presented through a browser
- Applet
  - A small program embedded in Web pages

# Hyper Text Mark up Language (HTML)

- Internet was initially designed for the transmission of text basing on the protocols mentioned.
- In order to transmit a graphically designed web page complete with pictures, embedded sound and animation a special language was designed which is referred to as HTML.
- HTML uses special text codes to define the various elements of a web page.

# HTML Element / Tag

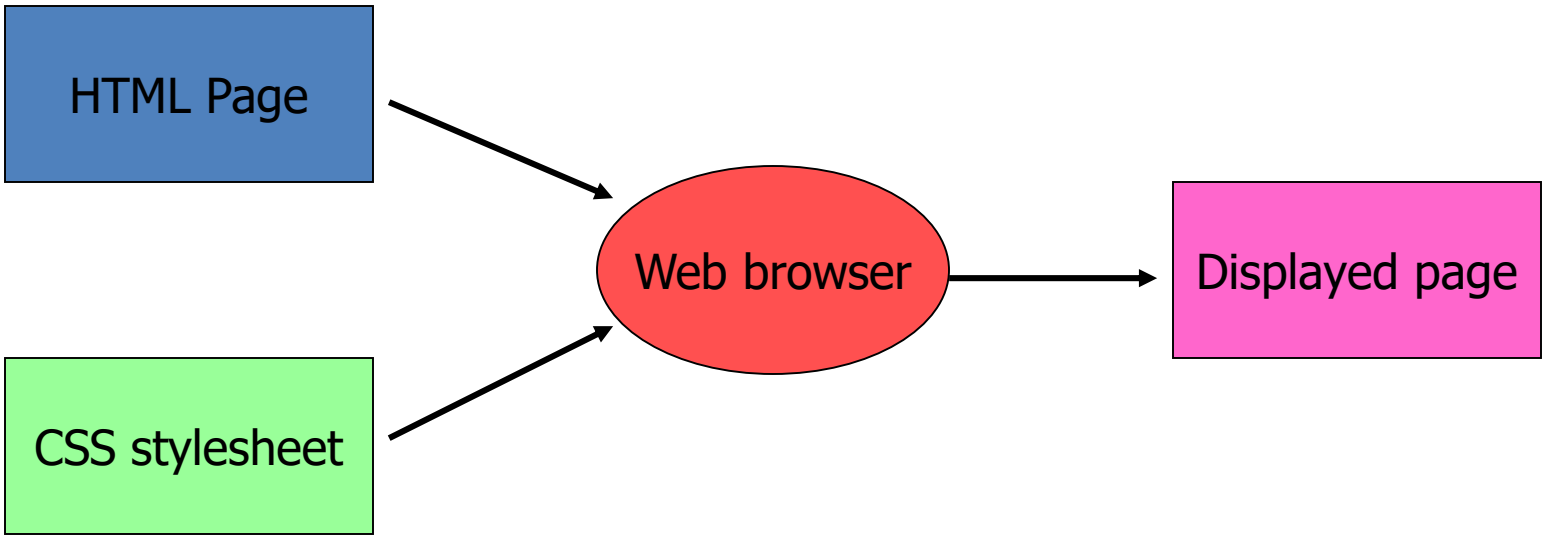
- 


- **You have to understand the important terms related to HTML.**
- **Not case-sensitive.**

# Cascading Style Sheets (CSS)

- Provides a powerful and flexible way to control the details of web documents.
- HTML is more concerned about the content, CSS is used to impose a particular style on the document.
- Named cascading style sheets because they can be defined at three different levels to specify the style of a document.
  - Inline, document level, external.

# Using Stylesheets to add presentation



# *Hyper Text Transfer Protocol (HTTP)*

- **HTTP** is a set of standards that allow users of the World Wide Web to exchange information found on web pages. When accessing any web page entering http:// in front of the address tells the browser to communicate over HTTP.
- **HTTP** defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands. For example, when you enter a URL in your browser, this actually sends an HTTP command to the Web server directing it to fetch and transmit the requested Web page.

# *Uniform Resource Identifier (URI)*

- a *Uniform Resource Identifier (URI)* is a unique identifier for identifying a resource on the Internet
- A resource can be anything: 
  - Index.html 
  - mysong.mp3 
  - picture.jpg
- The most commonly used URIs are *Uniform Resource Locators* (URLs)

# *Uniform Resource Locators* (URLs)

- Each web site has a unique address commonly referred to as a URL. A URL specifies the exact location of the web page on the internet.
- A typical web address or URL looks as *http://www.mustnet.ac.tz/schools_colleges.php*.
  - **http** is the protocol.
  - *mustnet.ac.tz* is the server name.
  - *schools_colleges.php* is the file name
- There are two forms of URL as listed below:
  - Absolute URL
  - Relative URL

# URL schemes

- http
  - user name and password usually not applicable
  - default port number is 80
- https
  - HTTP encrypted by *Transport Layer Security (TLS)* (or previously *Secure Sockets Layer (SSL)*)
  - default port number is 443
- ftp
  - user name and password can be given
  - if not, anonymous ftp used
  - default port number is 21
- telnet
  - host is mandatory
  - default port number is 23
- mailto
  - no need for url-path to be specified
  - program should prompt user for message, then send using SMTP

# *File Transfer Protocol (FTP)*

- ***File Transfer Protocol,*** the protocol for exchanging files over the Internet. FTP works in the same way as HTTP for transferring Web pages from a server to a user's browser and SMTP for transferring electronic mail across the Internet in that, like these technologies, FTP uses the Internet's TCP/IP protocols to enable data transfer.
- FTP is most commonly used to download a file from a server using the Internet or to upload a file to a server (e.g., uploading a Web page file to a server).

# *Internet Connectivity*

- **Internet Service Provider (ISP)** is a company offering access to internet.
- They offer various services:
  - ❑Internet Access
  - ❑Domain name registration
  - ❑Dial-up access
  - ❑Leased line access

# ISP Types

- **ACCESS PROVIDERS**

  They provide access to internet through telephone lines, cable wi-fi or fiber optics.

- **MAILBOX PROVIDER**

  Such providers offer mailbox hosting services.

- **HOSTING ISPS**

  Hosting ISPs offers e-mail, and other web hosting services such as virtual machines, clouds etc.

- **VIRTUAL ISPS**

  Such ISPs offer internet access via other ISP services.

- **FREE ISPS**

  Free ISPs do not charge for internet services.

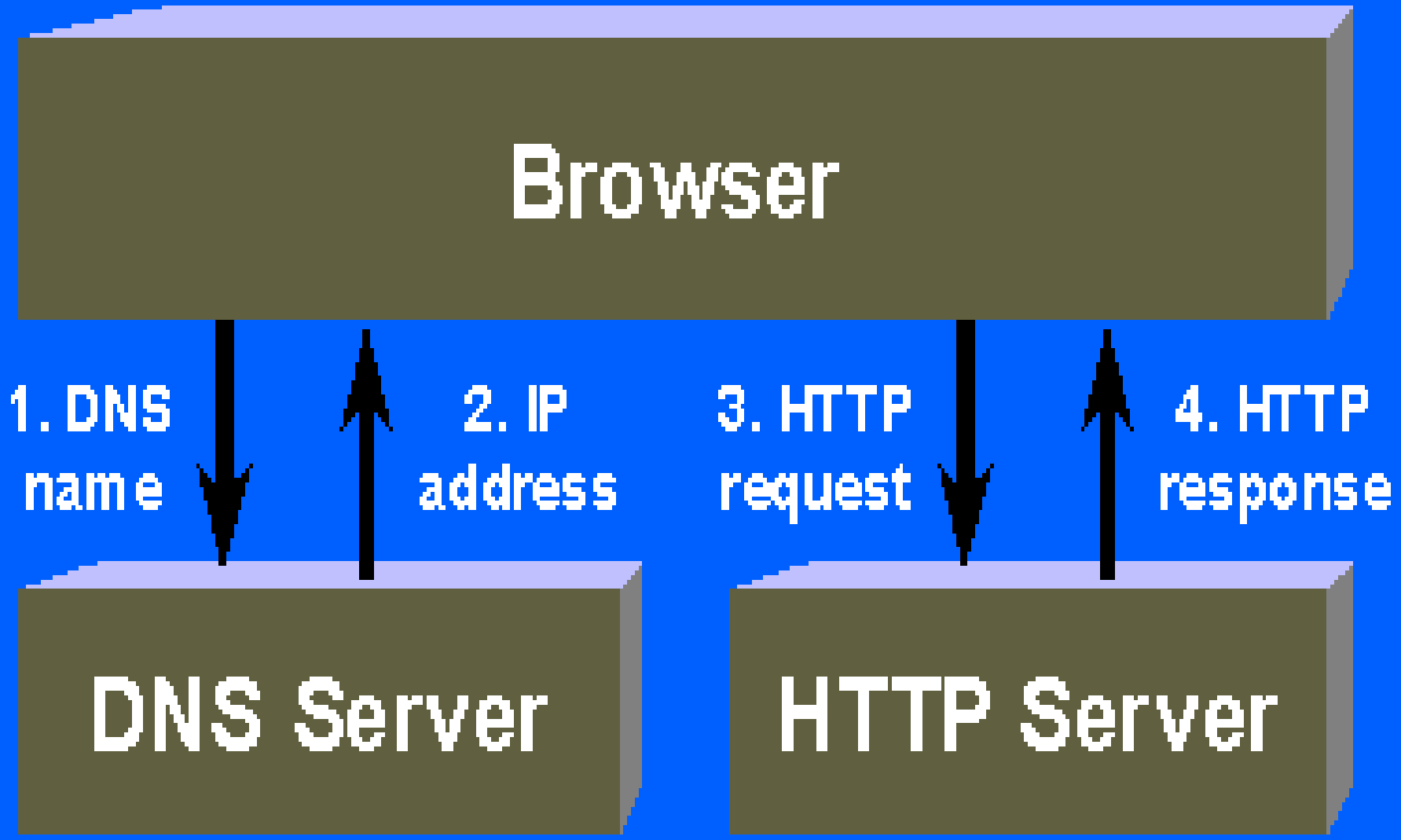
# *Domain Name System (DNS)*

- **Domain Name System** helps to resolve the host name to an address. It uses a hierarchical naming scheme and distributed database of IP addresses and associated names.
- The Domain Name System comprises of **Domain Names, Domain Name Space** and **Name Server**.
- Domain Name is a symbolic string associated with an IP address.
- The domain name space refers a hierarchy in the internet naming structure
- Name server contains the DNS database. This database comprises of various names and their corresponding IP addresses.
- *www.mustnet.ac.tz ……. 41.93.49.3*

- .co.tz - Only for registered company or business entity as defined under national laws.
- .or.tz - Only for none profit making organizations.
- .go.tz - Only for formal Tanzania Governmental entities as recognized through parliament or on production of a letter from relevant Permanent Secretary of the relevant government Ministry where the registrant belongs.
- .ac.tz - Only for formal tertiary academic or technical institutions with relevant accreditation.
- .ne.tz - Only for addressing the network of people and hardware.
- .mil.tz - Exclusively for Tanzania Military entities recognized by the Ministry responsible for Defense;
- .sc.tz - Only for schools that are elementary, primary and secondary level institutions

# Name Resolution

- A translation of a domain name into an address is called *name resolution*
- Software to perform the translation is known as a *name resolver* (or simply *resolver*) this software is usually built in to the application
- A resolver uses the DNS protocol to contact a DNS server on port 53
- e.g., browser uses a DNS server to map DNS name to IP address as fo


Browser
1. DNS name
2. IP address
3. HTTP request
4. HTTP response
DNS Server
HTTP Server

# e-mail

- Email is a service which allows us to send the message in electronic mode over the internet. It offers an efficient, inexpensive and real time mean of distributing information among people.
- E-Mail Address, Each user of email is assigned a unique name for his email account. This name is known as E-mail address. Different users can send and receive messages according to the e-mail address.

# E-mail Header

- The first five lines of an E-mail message is called E-mail header. The header part comprises of following fields:
- From
- Date
- To
- Subject
- CC
- BCC - Black Carbon Copy

# E-mail Protocols

- E-mail Protocols are set of rules that help the client to properly transmit the information to or from the mail server. Here in this tutorial, we will discuss various protocols such as the following:-
- **SMTP - Simple Mail Transfer Protocol**
- **IMAP - Internet Mail Access Protocol**
- **POP - Post Office Protocol**

# SMTP

- It handles exchange of messages between e-mail servers over TCP/IP network.
- Apart from transferring e-mail, SMPT also provides notification regarding incoming mail.
- When you send e-mail, your e-mail client sends it to your e-mail server which further contacts the recipient mail server using SMTP client.
- These SMTP commands specify the sender's and receiver's e-mail address, along with the message to be send.
- The exchange of commands between servers is carried out without intervention of any user.
- In case, message cannot be delivered, an error report is sent to the sender which makes SMTP a reliable protocol.

# IMAP

- IMAP allows the client program to manipulate the e-mail message on the server without downloading them on the local computer.
- The e-mail is hold and maintained by the remote server.
- It enables us to take any action such as downloading, delete the mail without reading the mail.It enables us to create, manipulate and delete remote message folders called mail boxes.
- IMAP enables the users to search the e-mails.
- It allows concurrent access to multiple mailboxes on multiple mail servers.

# POP

- POP is an application layer internet standard protocol.
- Since POP supports offline access to the messages, thus requires less internet usage time.
- POP does not allow search facility.
- In order to access the messaged, it is necessary to download them.
- It allows only one mailbox to be created on server.
- It is not suitable for accessing non mail data.

# Client vs Server e-mail

- **e-mail client** responsible for
  - retrieving mail from server (POP3, IMAP4)
  - sending mail to server (SMTP)
- **e-mail server** responsible for
  - collecting mail from client (SMTP)
  - distributing mail to client (POP3, IMAP4)
  - relaying mail between e-mail servers (SMTP)

# Multi-purpose Internet Mail Extensions (MIME)

- MIME is an Internet standard that helps extend the limited capabilities of email by allowing insertion of images, sounds and text in a message
- The features offered by MIME to email services are as follows:
  - Support for multiple attachments in a single message
  - Support for non-(American Standard Code for Information Interchange –ASCII) characters
  - Support for layouts, fonts and colors which are categorized as rich text.
  - Support for attachments which may contain executables, audio, images and video files, etc.
  - Support for unlimited message length

# MIMO Header

- MIME Version: The presence of MIME Version generally indicates whether the message is MIME formatted
- Content-Type: This describes the data's Internet media type and the subtype
- Content-Transfer-Encoding: It specifies the encoding used in the message body.
- Content-Description: Provides additional information about the content of the message.
- Content-Disposition: Defines the name of the file and the attachment settings and uses the attribute 'filename

# Reference

- Data Communications and Computer Networks **for Computer Scientists and Engineers BY** Michael Duck and Richard Read SECOND EDITION
- Computer Networks and Internets by Douglas E. Comer. Fifth edtion
- Computer networking : a top down approach Kurose Ross 6th
- **Data and Computer Communications BY William Stallings**