The logo of Lira University is a circular emblem. It features a yellow five-pointed star at the top center. Below the star is a blue vertical line with a small circle at its base. The emblem is surrounded by a blue and yellow border. The words "LIRA UNIVERSITY" are written in a semi-circle at the top, and "THE BEACON" is written in a banner at the bottom.

Introduction to websites (Unit 1)

Ogwal-Awio Kenneth

MCF (BU), MSc.CS (Mak), PGDE (GU), BSc.CS (Mak), CCNA (Mak), CertLaw (LDC)

akogwal@lirauni.ac.ug

+256-774-171813

Lecture objectives

- By the end of this lecture, students should be able to:
 - ✓ Explain the basic terms related to website development: web page, home page, website, URL, responsive website, hyperlink, transfer protocol, etc.
 - ✓ Discuss the evolution and generations of websites
 - ✓ Synthesize the World wide Web
 - ✓ Appreciate the difference between static and dynamic websites
 - ✓ Appreciate the different classes of websites
 - ✓ Justify why an organization needs a website
 - ✓ Differentiate a URL from a website address
 - ✓ Discuss the approaches to website development
 - ✓ Discuss the current trends of websites

What is a website

- A **website** is a collection of linked related web pages on a common theme that is singly identified through a single web address.
- A website can be:
 - A personal website
 - A corporate website for a company, or
 - A government website.
- Early websites had only text
 - and later images, videos, and today applications can also be included.

Websites...

- Notable examples of websites are:

- ✓ www.focusuganda.org
- ✓ www.suuganda.org
- ✓ www.itbeginswithyou.net
- ✓ www.ura.go.ug
- ✓ www.ucu.ac.ug
- ✓ www.lirauni.ac.ug

Websites...

A website can serve as:

- ✓ A presentation tool
- ✓ A communication tool
- ✓ A teaching and learning tool
- ✓ A marketing important tool
- ✓ etc.



Websites...

- Some websites require a user to first register or subscribe in order to access its contents.
 - Examples of websites which require subscription include:
 - ✓ Business websites (e.g. www.amazon.com)
 - ✓ Academic journal websites (e.g. www.researchgate.com)
 - ✓ Web-based email (e.g. www.gmail.com)
 - ✓ Social networking websites (e.g. www.facebook.com).

Early history of world wide web



- On March 12th, 1989, British computer scientist Tim Berners-Lee in a proposal entitled “Information Management: A Proposal” suggested a computer network-based tool for sharing information at CERN (European Organization for Nuclear Research).
 - It was based on **Client/Server** data transfer architecture.
 - A communication system that would run on top of the global standard networking infrastructure already earlier invented in the late 1960s.
 - And was to be developed using a **markup language**.
- Berners-Lee’s proposal was supported, and the implementation was successful.

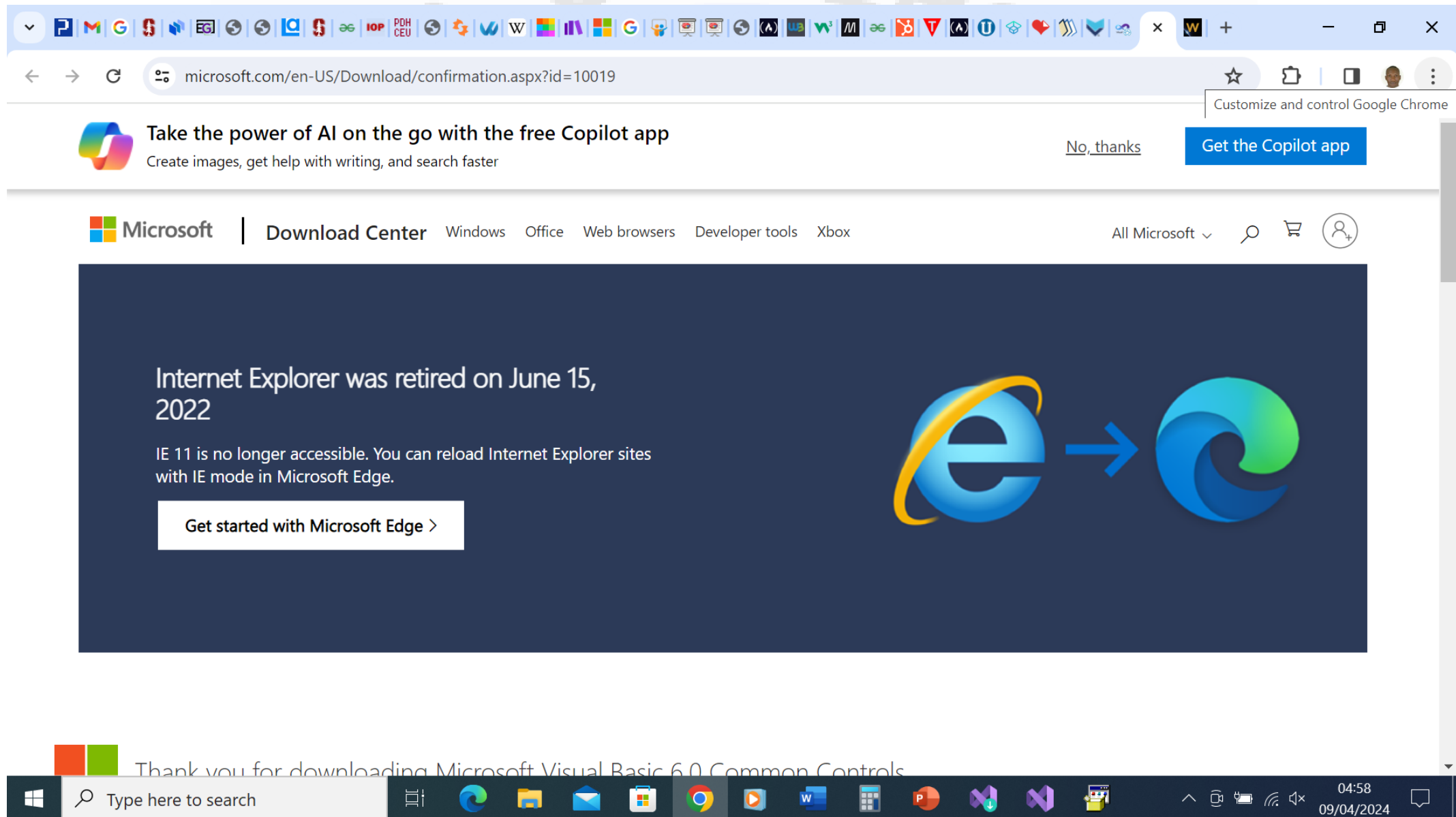
Early history of world wide web...

- On November 12, 1990, Berners-Lee and a colleague, Robert Cailliau, returned to the idea from the 1989 document with a deeper proposal.
 - They coined the name “World Wide Web.”
 - By December 25 1990, they had the World Wide Web software up and running at CERN in its most basic form.
- The first website was introduced on 6 August 1991.
 - People outside CERN got access to the web as a public Internet service for the first time.

Early history of world wide web...

- 1993-1994 – Mark Andreessen invented MOSAIC at National Center for Super Computing Applications (NCSA)
 - The campaign for its need actually **begun in late 1992** but NCSA released it in 1993
 - This became the first graphical browser
 - Was freely distributed
 - Mosaic was later renamed Netscape navigator.
 - Microsoft licensed Mosaic to create Internet Explorer in 1995

From the source: IE was retired on 15th June 2022



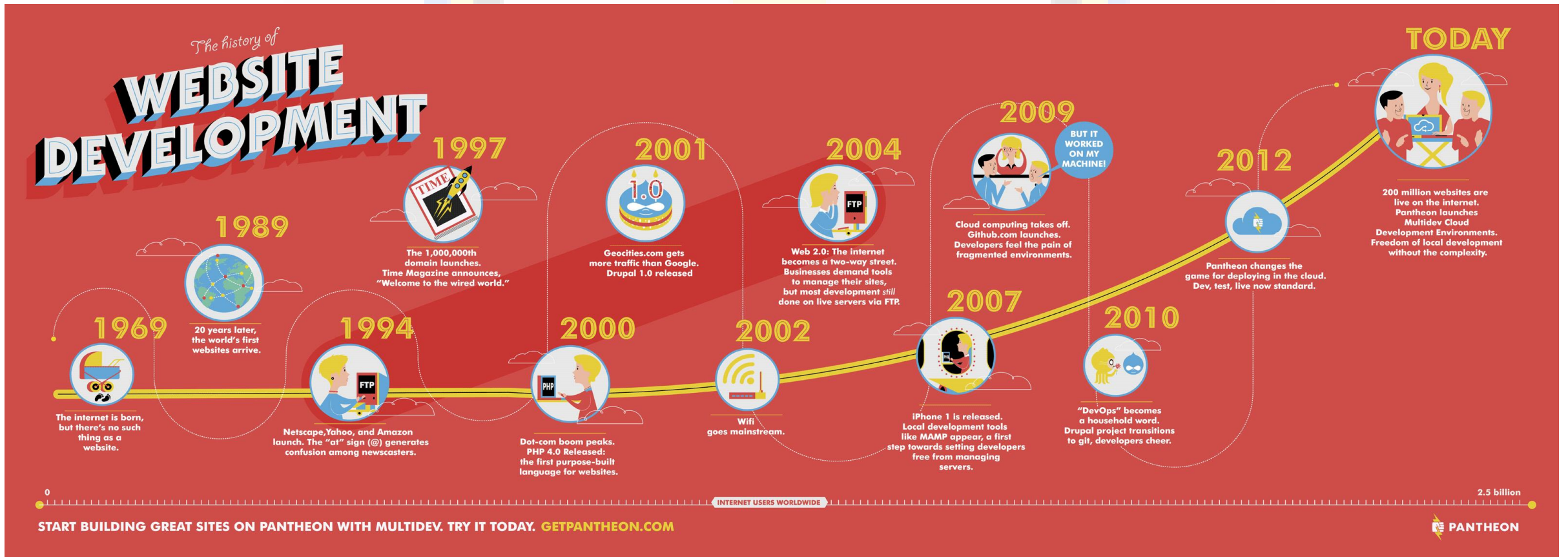
Early history of world wide web...

- In 1995, web traffic explodes!
 - There was exponential growth
 - E-commerce websites begun to spring up
 - Web infrastructure companies begun to spring up
 - MSN
 - mail.com
 - Mercury Center Web
 - MovieWeb
 - MapMyIndiaMatch.com
 - etc.
 - World Wide Web Consortium (W3C) formed
- ❑ Currently, **over 2 billion websites!!**

Mosaic web browser



Timeline of the internet



Types of websites

- There are two broad categories of websites: static websites and dynamic websites.
 - Static websites – are a type of websites which display information but do not allow direct engagement with the audience or users.
 - Examples include personal websites, blogs, advertising websites, etc.
 - Dynamic websites – are a type of websites which allow for interactivity between the site owner and site visitors or users.
 - They are also referred to as interactive websites
 - Interactive sites allow users to post content back to the site's administrator.
 - Examples of dynamic websites include: E-commerce websites, social media websites, etc.

Difference between static and dynamic websites

Static Website	Dynamic Website
Its webpages do not change in terms of design, content, etc.	The webpages keep changing as per users' requirements.
Creating does not require database.	Creating requires server-side scripting, application server, and database.
It has a limited number of pages.	It can contain many web pages in the database.
Its hosting cost is low, due to less space needed on the server.	Its hosting cost is higher as dynamic pages need more space on the server.

Difference between static and dynamic websites...

Static Website	Dynamic Website
Lacks Content management feature.	Uses Content Management Feature.
It requires low maintenance.	It requires high maintenance.
It's more secure with fewer chances of it getting hacked.	It's less secure and can easily get hacked.
It is more reliable, i.e. whenever the serving workstation is down, it's redirected to other nearby nodes.	It is less reliable, as it may go down for hours if the server breaks down.
Loads quickly.	Takes more time to load due to the more processing time.

Key benefits of choosing a static website

- It takes less time to create a static website.
- It is less costly to develop this website.
- The webpages are delivered at high speed by the servers.
- Hosting through dedicated servers is available at a low price.
- It is more secure than dynamic sites since it is not interactive.

Key benefits of choosing a dynamic website

- It is very quick and easy to make changes in a dynamic website as it is integrated with high-end programming.
- The webpages are easier to maintain despite of being full of information and graphics.
- It makes your site look professional.
- The users can get customized information as per their interests, needs, and profile, etc. For example, facebook.com, flipkart.com, etc.

Website Generations and Evolution

- 1st Generation (1990 – 1994) – was just a replacement of the paper text.
 - Static websites – fixed text content with no interactivity
 - Build using HTML and running on basic HTTP protocol.
 - Primarily text based
- 2nd Generation (1994 – 1999) – databases, pictures and dynamicity included.
 - Dynamic with HTML forms and JavaScript dynamicity
 - Support for pictures and tables
 - Support for databases and common gateway (CGI) interface scripts.
- 3rd Generation (1999 – 2004) – flashy content (Web2.0 generation).
 - Origin of social interaction
 - More dynamic with content generated on the fly
 - E-commerce and online communities increased

Website Generations and Evolution...

- 4th Generation (2004 – 2010) – content and technology integrated into the website (Web3.0 generation).
 - Semantic technologies
 - Ubiquity of social media and mobile applications
 - Rise of rich internet applications (RIAs) like Flex and AJAX.
- 5th Generation (2010 – present) – integrated with artificial intelligence (AI)
 - Responsive website development
 - AI integrated into websites for personalized experiences
 - Big data and data analytics integrated

Next Generation?

- Soon. **...what this space!!!**
- Elements:
 - Web4.0 is emerging – focusing on immersive technologies
 - Augmented Reality
 - Virtual realities
 - Internet of bodies
 - Decentralized web – decentralized web technologies
 - Blockchain
 - Decentralized networks
 - Quantum computing – using principles of quantum mechanics in performing operations, unlike the traditional computing that uses bits of 1s and 0s to process information.
 - In the development
 - For improved performance

Classifying websites based on purpose and target audience

- **Blog website** – is a class of websites designed provide information
 - Posts are added regularly in reverse chronological order
 - Latest posts or entries on top of the page, and old ones towards the bottom.
 - A blog is usually owned by a single person or a small group of people.
- **E-commerce website** – is a class of websites designed for online trade.
 - People buy products via online payment from the comfort of their home, office, etc.
 - Anyone who sells products can create an E-commerce website.
- **Informational website** – designed to provide free information to users
 - Tutorials, news, general knowledge-based sites.
 - Libraries, newspapers, novels, etc.

Classifying websites based on purpose and target audience

- **Brochure website** – comprises one or few pages to inform on an event.
 - Conference, workshop, bazaar, etc.
 - Small businesses use it to provide an overview of the businesses.
- **Online Community websites** – offer a platform for members to interact and share ideas with other members through the internet.
 - People with similar interests and backgrounds and interact with them to fulfil your objectives.
- **Social Media websites** – created to provide users with a platform where they can build their personal profiles, and interact with friends.
 - Creating a friend list, sending friend requests, accepting friend requests, sending messages, creating and/or joining groups, etc.

Why would any businesses need a website?

- **Cost-effective** – marketing of products and services through a website is less costly than print advertising, TV, and radio advertising.
- **Facilitates broader geographical reach** – helps the business reach people throughout the world.
- **Enhances business credibility** – user-friendly and professional website makes people consider the business more credible.
- **Facilitates 24/7 availability** – products keep available everytime for sale.
- **Consumer convenience** – improves the working experience of your customers as they can buy products from the comfort of their homes.
- **Improves productivity** – saves your time due to no need to explain products or services to each customer.
- etc.

Web pages

- A web page is a single web document containing content, and tags which instructs web browsers how to display the content to users.
 - Web pages are the building blocks of websites.
- The first web page that a user sees on visiting a website is called the **welcome page**.
 - It may also be the home page.
 - The **home page** is the main page on a web site around which all other pages are organized and linked back and forth to, is called the site's.
- Web pages allow access to other web resources through **hyperlinks**.
 - A resource can be another web page, an image, audio, map, service, etc.

Web pages versus website

Web Pages

- Single HTML or HTM file (Hyper Text Markup)
- All information related to a single subject
- Usually small (in physical file size)
- Requires planning for layout

Websites

- Consist of multiple pages
- Integrates several different subjects under same theme.
- Can be immense
- Requires more careful planning for design and navigation

World wide web

- The **Web (World Wide Web)** is the global information highway organized into web pages containing text and graphic images accessed via connection to the internet.
 - The numerous hyperlinks facilitate leading to related information.



Components of the world wide web

- The WWW includes both structural and semantic components.
- Structural Components
 - Servers – software or hardware that provides instructions and data.
 - Clients – browser software or hardware that receives and uses instructions and data from web servers.
 - Internet – the global infrastructure that facilitates data transfer
- Semantic Components
 - Transfer Protocol e.g. HTTP, HTTPS, TCP/IP, SMTP, ftp, telnet, etc.
 - Language specification e.g. HTML, XML, etc.
 - Uniform Resource Identifiers (URIs) - e.g. a webpage, a book, a document, etc.

How to access the Web

- Once you have your Internet connection, then you need special software called a web browser to access the contents of the Web.
 - A **web browser** is an application software which displays web pages and other documents on the web.
- A **Web browser** runs on the client user's computer to make it work as a web client software.
 - Web browsers connect to the remote servers, open and transfer the files, and then display text and images.
- ❑ All is the visitor needs is to type the website address into the address bar of the web browser.

Common web clients & server software

Clients (Browser)

- Internet Explorer
- Mozilla Firefox
- Google Chrome
- Opera
- Safari
- Amaya
- AOL
- MSN

Servers

- Apache
- Microsoft
- Netscape
- zeus
- AOLserver
- AV
- JavaWebServer
- Oracle

Advantages of web browsers

- Web browsers are advantageous because they;
 - ✓ help to access any content from the web.
 - ✓ make it possible for programmer's to test, develop and deploy websites and web applications.
 - ✓ show you network related information.
 - ✓ store information such as history information and other important details.
 - ✓ provide user friendly graphical user interface (GUI) that enable novice users to intuitively use the internet.
 - ✓ can run on many types of devices.

Web browsers...

- A web browser can be customized to user's preferences:
 - Background colour.
 - Font face.
 - Font size.
 - Text and link colours.
 - Whether or not to download images.

Practice exercise

Practice how to configure both Mozilla Firefox and Google Chrome web browsers.



Website address and URL

- Website address is the address that leads to the welcome page of a website.

e.g. <https://lirauni.ac.ug/>

- A universal resource locator (URL) is the address used to access a specific resource on the internet
- The URL contains three parts:
 - ✓ **Protocol** – http, https, ftp, etc.
 - ✓ Server **domain name** – lirauni, ura, umeme, Busiteema, google, etc.
 - ✓ **Domain extension** – .com, .net, .za, .ke, gov, .go.ug, .ac.ug, etc.
 - ✓ **Path** – intermediate directories
 - ✓ **File name** – with extension

<https://lirauni.ac.ug/programmes/fcis/day/bict.html>

Service Protocol	Domain name	Domain name extension	Resource path	File name with extension
------------------	-------------	-----------------------	---------------	--------------------------

General Approaches for Website Dev't

- As an “Ad-hoc” Process.
 - Hastily put together
 - Created on the fly
 - Using existing web tools, e.g. Microsoft Publisher, WordPress, etc.
- As a methodical, well-thought process.
 - Planning
 - Developing the website
 - Quality-assurance testing
 - Website evaluation



Web Development Tools

1. HTML/DHTML/XHTML
2. Web Design Tools e.g. Notepad, Dreamweaver, etc.
3. Cascading Style Sheets
4. Scripting Languages e.g. Javascript, VBScript, etc.
5. ...more!!!



Current Website Trends...

- The current trend in website development is "responsive design" that provides device based layout for users.
 - **Responsive websites** can change their layouts according to the device or mobile platform thus giving a rich user experience.
 - Because today's end users can access websites from many devices, such as desktop computers, laptops, tablets, smartphones, smart TVs, etc.
 - With current website technology, web browser **plug ins** may be used to add audio, video, and interactivity to a website.
 - Examples of plug-ins Adobe Flash and Java applets.
- ❑ **HTML5** includes provisions for audio and video without plugins!!!

Something to keep you busy

- Discuss the benefits of choosing to develop a static website
- Discuss the benefits of choosing to develop a dynamic website
- Why do businesses need websites
- Discuss the components of the WWW
- Discuss the classification of websites (based on target groups)
- Explain the advantages of website development as a systematic methodological process over design as a quick “ad-hoc” process



Thank you