UNIT 1: INTRODUCTION TO COMPUTER NETWORK AND IT' S APPLICATIONS

CS-04 Networking & Internet Environment

- **INTRODUCTION TO J2EE**
- **COMPUTER NETWORK**
- **TYPE OF COMPUTER NETWORK**
- **DIFFERENT TERMINOLOGIES USED IN COMPUTER NETWORK INTERNET, ISP (INTERNET SERVICE PROVIDER), INTRANET, VSAT (VERY SMALL APERTURE TERMINAL), URL, PORTAL, DOMAIN NAME SERVER, WORLD WIDE WEB (WWW), SEARCH ENGINE, REMOTE LOGIN, TELNET, EMAIL, E- COMMERCE, E-BUSINESS, E-GOVERNANCE, MOBILE COMMERCE**
- **WEBSITE BASICS (WEBPAGES; HYPER TEXT TRANSFER PROTOCOL, FILE TRANSFER PROTOCOL, DOMAIN NAMES; URL; PROTOCOL ADDRESS; WEBSITE[STATIC, DYNAMIC, RESPONSIVE ETC], WEB BROWSER, WEB SERVERS; WEB HOSTING**

-: ASSINMENT 1: -

1. **GIVE FULLFORM OF FOLLOWING:**
   - **A. LAN**
   - **B. MAN**
   - **C. WAN**
   - **D. IP**
   - **E. ISP**
   - **F. VSAT**
   - **G. URL**
   - **H. DNS**
   - **I. OSI**
   - **J. FTP**
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2. **EXPLAIN FOLLOWIN TERMS IN DETAILS**
   - **A. TYPES OF NETWORK**
   - **B. URL**
   - **C. ISP**
   - **D. VSAT**
   - **E. DNS**
   - **F. INTRANET VS EXTRANET**
   - **G. DYNAMIC, STATIC, RESPONSIVE WEBSITE**
   - **H. WEB BROWER, SERVER AND HOSTING**
   - **I. E-COMMERCE, E-GOVERNANCE, M-COMMERCE**
   - **J. DOMAIN NAME, EMAIL, DOMAIN NAME, WWW**

COMPUTER NETWORK

A computer network is a system in which multiple computers are connected to each other to share information and resources.

- Network is a group of computers connected to each other.
- Using network, we can share resources and services.
- The shared resource can be data, a printer, a fax modem, or a service such as a database
- or an email system.
- The individual systems must be connected through a pathway (called the transmission
- medium) that is used to transmit the resource or service between the computers.
- All systems in the network must follow a set of common communication rules for data transmission.
- These set of common rules for data communication are known as protocols.

Advantages of Networking:

- The goal of computer networking is not simply to exchange data but to understand and use data received from other entities on the network.
- It reduces equipment costs.
- Networking is to provide different services like... filing services, printing services etc...
- Enabling centralized administration and security of the resources within the system.
- Supporting network applications such as electronic mail and database services.

Types of Network

Local Area Networks (LANs)

A Local Area Network (LAN) is a group of computers and network communication devices interconnected within a geographically limited area, such as a building or a campus.

- LANs are characterized by the following:
- They transfer data at high speeds (higher bandwidth).
- They exist in a limited geographical area.
- LANs are designed to allow resources to be shared between personal computers or workstations.

Metropolitan Area Networks (MANs)

- MAN is a connected network that spans the geographic boundaries of a city.
- By interconnecting smaller networks within a large geographic area, information is easily disseminated throughout the network.
- Local libraries and government agencies often use a MAN to connect to citizens and private industries.
- Examples of MAN are Cable TV network, Cable through Internet service.

Wide Area Networks (WANs)

- A Wide Area Network (WAN) provides long-distance transmission of data, voice, image and video information over large geographical areas that may comprise a country or whole world.
- WANs are characterized by the following:
- They exist in an unlimited geographical area.
- They usually interconnect multiple LANs.
- They often transfer data at lower speeds (lower bandwidth).
- Connectivity and resources, especially the transmission media, usually are managed by a third-party carrier such as a telephone or cable company.

INTERNET TERMINOLOGY

Cookie: Information (in this case URLs, Web addresses) created by a Web server and stored on a user's computer. This information lets Web sites the user visits to keep of a user's browsing patterns and preferences. People can set up their browsers to accept or not accept cookies.

Domain Name: A method of identifying computer addresses. Your e-mail address has a domain address. If you have an "edu" at the end of your e-mail address that means your account is affiliated with an educational institution. A "com" extension means you have a business account. A government account has a .gov suffix.

Hyperlink: Text, images, graphics that, when clicked with a mouse (or activated by keystrokes) will connect the user to a new Web site. The link is usually obvious, such as underlined text or a "button" of some type, but not always.

IP Address: (Internet Protocol) The number or name of the computer from which you send and receive information on the Internet.

ISP

ISP is An Internet Service Provider (ISP) is an organization that provides dial-in Internet accounts, usually PPP, CSLIP or SLIP accounts, and also, sometimes Unix shell accounts

Choosing an ISP: We should consider following features before choosing any ISP.

Features of ISP:

- **Local phone number**: Most of ISPs have many phone numbers that your computer can call to connect to the Internet. By having a local phone number, you don’t need to spend more on long-distance charges for Internet connection.
- **Price**: ISPs generally charge for the hours or speed they provide. So, you can select your ISP by calculating your usage or speed required.
- **Software**: Some ISPs provide a CD-ROM or diskette with software that you can use to connect to and use the Internet. If you have Windows 95 or later or Mac with System 7.6.1 or later then your computer is already has the software that you need. But, for older versions you need to choose any ISP who can provide you software for Internet connection compatible to your OS.
- **Support**: You never know when you’re going to have a problem, so your ISP’s technical support phone number (and e-mail help desk) should be open 24 hours a day, 7 days a week.
- **Speed**: Some ISPs have local access numbers that work with 28.8 Kbps, 33.6 Kbps, and 56 Kbps modems. Some also support high-speed connections such as ISDN and ADSL at extra cost.

- **Accessibility**: If the ISP's access numbers are frequently busy, you can waste a lot of time redialling until you connect. Ask Internet users in your area whether they have trouble getting connected to the ISP.

In addition to connection, you to the Internet, here are some other features that your Internet account may provide:

- **Pop mailboxes**: Your account almost certainly comes with an e-mail mailbox on a POP server. Some ISPs provide more than one mailbox, so that each member of your family can read his or her mail separately, either as a part of the cost of the account or for an extra fee.
- **Web server space**: Most Internet accounts include a modest amount of disk space on a Web server, so that you can make your own Web pages accessible to the Internet.
- **Domain hosting**: If you want your own domain name, most of ISPs can host your domain, so that e-mail to the domain lands in your mailbox, and Web addresses in your domain refer to Web pages that you store on your ISP's a Web server.

INTRANET

- An intranet is a private network that allows employees and staff in an enterprise to securely share knowledge and information easily within the company or organization.
- Information, tools, directories, and services available on a company's intranet are typically unavailable to the general public.
- The prefix "intra" implies that an intranet is designed for internal communications only. Intranets are usually restricted to specific local area networks (LANs) or wide area networks (WANs).

FEATURES OF INTRANET:

- Improved internal communication.
- Efficient project management and workflow systems.
- Centralized information that connects members.

EXTRANET

- An extranet is a private network that powers internet technology and public telecommunication system to share part of a business's information or operations over a secure system with suppliers, vendors, partners, customers, or other businesses.
- An extranet is often considered part of a company's intranet that is extended to authorized users outside of the organization.

FEATURES OF INTRANET:

- Streamlines repetitive business processes.
- Increases customer satisfaction.
- Highly secure when properly designed

VSAT

- VSAT (Very Small Aperture Terminal) is a satellite communications system that serves home and business users.
- A VSAT end user needs a box that interfaces between the user's computer and an outside antenna with a transceiver.
- The transceiver receives or sends a signal to a satellite transponder in the sky. The satellite sends and receives signals from an earth station computer that acts as a hub for the system.
- Each end user is interconnected with the hub station via the satellite in a star topology.
- For one end user to communicate with another, each transmission has to first go to the hub station which retransmits it via the satellite to the other end user's VSAT.
- VSAT handles data, voice, and video signals.

URL

- A URL identifies a particular Internet resource; for example, a web page, a gopher server, a library catalogue, and image or a file.
- URLs represent a standardized or unique addressing scheme for the Internet resources, and help users to locate these resources by indicating exactly where they are.
- Every resource available via the WWW has a unique URL.

  Every URL contains the following information:

- The scheme name or protocol.
- A colon, two slashes.
- A host, normally called a domain name but sometimes as a literal IP address.
- A colon followed by a port number.
- Full path of the resource.

Example: http://kscpac.org/about_trust.php

protocol: http

host or domain: www.kscpac.org

Path of the resource: /about_trust.php

DNS

- The Domain Name System (DNS) is the phonebook of the Internet.
- Humans access information online through domain names, like google.com or facebook.com.
- Web browsers interact through Internet Protocol (IP) addresses. DNS translates domain names to IP addresses so browsers can load Internet resources.
- Each device connected to the Internet has a unique IP address which other machines use to find the device.
- DNS servers eliminate the need for humans to memorize IP addresses such as 192.168.1.1 (in IPv4), or more complex newer 2400:cb00:2048:1::c629:d7a2 (in IPv6).

Working of DNS

- Nameservers store DNS records which are the actual file that says “this domain” maps to “this IP address”.
- They are actually distributed all around the world. These nameservers are called the root nameservers and instead of storing every domain ever, they store the locations of the TLD (top level domains).
- TLD’s are the two or three character like .com that end a domain name. Each TLD has their own set of nameservers that store the information that says who is authoritative for storing the DNS records for that domain.
- The authoritative nameserver is typically the DNS provider or the DNS registrar (like GoDaddy that offers both DNS registration and hosting). And here we can find the DNS record that map example.com to the IP address 127.66.122.88.

Portal

- A portal is a web-based platform that collects information from different sources into a single user interface and presents users with the most relevant information for their context. Over time, simple web portals have evolved into portal platforms that support digital customer experience initiatives.
- Portal is a term, generally synonymous with gateway, for a World Wide Web site that is or proposes to be a major starting site for users when they get connected to the Web or that users tend to visit as an anchor site.
- There are general portals and specialized or niche portals. A number of large access providers offer portals to the Web for their own users. Most portals have adopted the Yahoo style of content categories with a text-intensive, faster loading page that visitors will find easy to use and to return to. Companies with portal sites have attracted much stock market investor interest because portals are viewed as able to command large audiences and numbers of advertising viewers.
- Typical services offered by portal sites include a directory of Web sites, a facility to search for other sites, news, weather information, e-mail, stock quotes, phone and map information, and sometimes a community forum. Excite is among the first portals to offer users the ability to create a site that is personalized for individual interests.

WWW

- The World Wide Web (abbreviated as WWW or W3, commonly known as the Web) is a software application that makes it easy and possible for nearly anyone to publish and browse hypertext documents on the Internet.
- WWW is a most common access method of internet resources(elements of web).

Elements of Web

- **Web Page:** A web page is a hypermedia document or we can say it is an HTML document that is stored on a web server. That has a URL so it can be accessed via the web.
- **Web Site:** A web site is a collection of World Wide Web files that includes beginning file called home page and it belongs to particular person or organization.
- **Web Server**: Web server is a computer that is connected via Internet and runs a program that takes responsibility of storing, retrieving, distributing web files.

- **Web Browser/Web Client**: A web browser is a software application that functions as the interface between a user and the Internet. We can also say that it requests web resources from web servers on the internet.

SEARCH ENGINE

A search engine is a program that does the following things

- Allow you to submit a form containing a query that consists of a word or phrase
- describing the specific information, you are trying to locate on the web.
- Searches its database to try to match your query.
- Collects and returns a list of clickable URLs containing presentations that match your query.
- Permits you to revise and resubmit a query.

Example: Google, Yahoo, Bing etc.

Meta Search Engine:

- A meta search engine is all-in-one search engine performs a search by calling on more than one other search engine to do the actual work.
- The results are then collected and duplicates are eliminated and the results are then ranked as how it matches your query. Then you are presented with the list of URLs.

REMOTE LOGIN

- Remote access refers to the ability to access a computer, such as a home computer or an office network computer, from a remote location.
- This allows employees to work offsite, such as at home or in another location, while still having access to a distant computer or network, such as the office network.
- Remote access can be set up using a local area network (LAN), wide area network (WAN) or even a virtual private network (VPN) so that resources and systems can be accessed remotely.
- Remote access is also known as remote login. To establish a remote connection, both the local machine and the remote computer/server must have remote-access software.
- Alternatively, there are service providers that offer remote access via the Internet.
- Remote login requires three basic components
    - **Software Download**
    - **Internet Connection**
    - **Secure desktop sharing network**
- To work with remote login both the host computer and all remote users have to download and install the same desktop sharing software. Desktop sharing software typically includes two different programs.
    - **The desktop sharing client that runs on the host computer.**
    - **A viewer program that allows the remote user to view the contents of the host computer's desktop in a resizable window.**

TELNET

- TELNET (**TELecommunication NETwork**) is a network protocol used on the Internet or local area network (LAN) connections.
- A Telnet program allows a user on one system to login to a remote system and issue commands in a command window of the remote system.
- The telnet program runs on your computer to connect PC to a server on the network. You can then enter commands from your telnet program and they will be executed as if you were entering them directly on the server console.
- Telnet is a computer protocol that provides two-way interactive communication
- compatibility for computers on the internet and local area networks.
- Telnet is considered insecure because it transfers all data in clear text.

FTP

- FTP (File Transfer protocol) is a standard Internet protocol for transmitting files between computers on the internet.
- FTP is an application protocol that uses the Internet's TCP/IP protocols.
- FTP is commonly used to transfer web pages files from their creator to the computer that acts as their server for everyone on the internet. It's also commonly used to download programs and other files to your computer from other servers.
- As a user, you can use FTP with a simple command line interface (for example, from the Windows MS-DOS Prompt window) or with a commercial program that offers a graphical user interface.
- Your Web browser can also make FTP requests to download programs you select from a Web page. Using FTP, you can also update (delete, rename, move, and copy) files at a server. You need to logon to an FTP server.

E-MAIL

- Email, e-mail or electronic mail is the transmission of messages (emails or email messages) over electronic networks like the internet. It is also a method of exchanging digital messages from an author to one or more recipients.
- The first e-mail was sent by Ray Tomlinson in 1971. Tomlinson sent the e-mail to himself as a test e-mail message, containing the text "something like QWERTYUIOP."
- Email uses multiple protocols within the TCP/IP suite. For example, SMTP(Simple Mail Transfer Protocol) is used to send messages, while the POP(Post Office protocol) is used to retrieve messages from a mail server.

E-mail address breakdown:

principal@kscpac.org

- The first portion of all e-mail addresses, the part before the @ symbol, contains the alias, user, group, or department of a company. In our above example, principal is the Principal at Kamani Science College.
- Next, the @ (at sign) is a divider in the e-mail address; it's required for all SMTP e-mail addresses since the first message was sent by Ray Tomlinson.

- Finally, kscpac.org is the domain name to which the user belongs. The .com is the TLD (top-level domain) for our domain.

E-COMMERCE

E-commerce is the buying and selling of products and services by businesses and consumers over the Internet. People use the term "ecommerce" to describe encrypted payments on the Internet.

Benefits of E-Commerce:

- Reduced costs by reducing labour, reduced paper work, reduced errors in
- keying in data, reduce post costs.
- Reduced time. Shorter lead times for payment and return on investment in advertising, faster delivery of product
- Flexibility with efficiency. The ability to handle complex situations, product ranges and customer profiles without the situation becoming unmanageable.
- Improve relationships with trading partners.

E-BUSINESS

- E-business (electronic business), derived from such terms as "e-mail" and "e- commerce," is the conduct of business on the Internet, not only buying and selling but also servicing customers and collaborating with business partners.
- For example, a successful shop front business may decide to create a website to promote their business but not actually sell products directly through the internet. Almost all businesses are now an e-business to at least some extent; however, many have taken a step further and are involved with e-commerce.

M-COMMERCE

- The phrase mobile commerce was originally coined in 1997 by Kevin Duffey at the launch of the Global Mobile Commerce Forum, to mean "the delivery of electronic commerce capabilities directly into the consumer's hand, anywhere,
- via wireless technology." Many choose to think of Mobile Commerce as meaning "a retail outlet in your customer's pocket."
- M-commerce (mobile commerce) is the buying and selling of goods and services
- through wireless handheld devices such as cellular telephone and personal digital assistants (PDAs).
- Known as next-generation e-commerce, m-commerce enables users to access the
- Internet without needing to find a place to plug in.
- The emerging technology behind m-commerce, which is based on the Wireless Application Protocol (WAP), has made far greater strides in Europe, where mobile devices equipped with Web-ready micro-browsers are much more common than in the United States.

E-GOVERNANCE

- Electronic governance or e-governance is adopted by countries across the world. In a fast-growing and demanding economy like India, e-governance has become essential.

- The rapid growth of digitalisation has led to many governments across the globe to introduce and incorporate technology into governmental processes.
- E-governance can be defined as the usage of Information and Communication Technology (ICT) by the government to provide and facilitate government services, exchange of information, communication transactions and integration of various standalone systems and services.
- it is the use of technology to perform government activities and achieve the objectives of governance.
- Through e-governance, government services are made available to citizens and businesses in a convenient, efficient and transparent manner. Examples of e-governance include Digital India initiative, National Portal of India, Prime Minister of India portal, Aadhaar, filing and payment of taxes online, digital land management systems, Common Entrance Test etc.

WEB PAGES

- A web page (or webpage) is a web document that is suitable for the World Wide Web and the web browser.
- A web browser displays a web page on a monitor or mobile device. The web page is what displays, but the term also refers to a computer file, usually written in HTML or comparable markup language.
- Web browsers coordinate the various web resource elements for the written web page, such as style sheets, scripts, and images, to present the web page.
- Typical web pages provide hypertext that includes a navigation bar or a sidebar menu to other web pages via hyperlinks, often referred to as links.
- On a network, a web browser can retrieve a web page from a remote web server. On a higher level, the web server may restrict access to only a private network such as a corporate intranet or it provides access to the World Wide Web.
- A static web page is delivered exactly as stored, as web content in the web server's file system, while a dynamic web page is generated by a web by server-side software or client-side scripting.
- application that is driven Web pages usually include information as to the colors of text and backgrounds and very often also contain links to images and sometimes other types of media to be included in the final view.
- Layout, typographic and color-scheme information is provided by Cascading Style Sheet (CSS) instructions, which can either be embedded in the HTML or can be provided by a separate file, which is referenced from within the HTML.

HYPER TEXT TRANSFER PROTOCOL

- The Hypertext Transfer Protocol (HTTP) is an application protocol for distributed, collaborative, hypermedia information systems.
- HTTP is the foundation of data communication for the World Wide Web.
- Hypertext is structured text that uses logical links (hyperlinks) between nodes containing text. HTTP is the protocol to exchange or transfer hypertext.
- HTTP functions as a request–response protocol in the client–server computing model.
- A web browser, for example, may be the client and an application running on a computer hosting a web site may be the server.
- The client submits an HTTP request message to the server. The server, which provides resources such as HTML files and other content, or performs other functions on behalf of the client, returns a response message to the client.

- The response contains completion status information about the request and may also contain requested content in its message body.
- HTTP is designed to permit intermediate network elements to improve or enable communications between clients and servers.

PROTOCOL ADDRESS

- An Internet Protocol address (IP address) is a numerical label assigned to each device (e.g., computer, printer) participating in a computer network that uses the Internet Protocol for communication.
- An IP address serves two principal functions: host or network interface identification and location addressing.
- Its role has been characterized as follows: "A name indicates what we seek. An address indicates where it is. A route indicates how to get there."
- The designers of the Internet Protocol defined an IP address as a 32-bit number and this system, known as Internet Protocol Version 4 (IPv4), is still in use today.
- However, because of the growth of the Internet and the predicted depletion of available addresses, a new version of IP (IPv6), using 128 bits for the address, was developed in 1995.
- IPv6 was standardized as RFC 2460 in 1998, and its deployment has been ongoing since the mid-2000s.
- IP addresses are usually written and displayed in human-readable notations, such as 172.16.254.1 (IPv4), and 2001:db8:0:1234:0:567:8:1 (IPv6).
- The Internet Assigned Numbers Authority (IANA) manages the IP address space allocations globally and delegates five regional Internet registries (RIRs) to allocate IP address blocks to local Internet registries (Internet service providers) and other entities.

WEB BROWSER

- A web browser (commonly referred to as a browser) is a software application for retrieving, presenting, and traversing information resources on the World Wide Web.
- An information resource is identified by a Uniform Resource Identifier (URI/URL) and may be a web page, image, video or other piece of content.
- Hyperlinks present in resources enable users easily to navigate their browsers to related resources.
- Although browsers are primarily intended to use the World Wide Web, they can also be used to access information provided by web servers in private networks or files in file systems.
- The major web browsers are Firefox, Internet Explorer/Microsoft Edge, Google Chrome, Opera, and Safari.

WEB SERVERS

- Web servers are computers that deliver (serves up) Web pages. Every Web server has an IP address and possibly a domain name. For example, if you enter the URL http://www. kscpac.org/index.html in your browser, this sends a request to the Web server whose domain name is kscpac.org.
- The server then fetches the page named index.html and sends it to your browser.
- Any computer can be turned into a Web server by installing server software and connecting the machine to the Internet.

- There are many Web server software applications, including public domain software and commercial packages.

WEB HOSTING

- A web hosting service is a type of Internet hosting service that allows individuals and organizations to make their website accessible via the World Wide Web.
- Web hosts are companies that provide space on a server owned or leased for use by clients, as well as providing Internet connectivity, typically in a data center.
- Web hosts can also provide data center space and connectivity to the Internet for other servers located in their data center, called colocation, also known as Housing in Latin America or France.
- The scope of web hosting services varies greatly. The most basic is web page and small-scale file hosting, where files can be uploaded via File Transfer Protocol (FTP) or a Web interface. The files are usually delivered to the Web "as is" or with minimal processing.

TYPES OF WEBSITE

- A web page or webpage is a document commonly written in Hyper Text Markup Language (HTML) that is accessible through the Internet or other network using an Internet browser.
- A webpage is accessed by entering a URL address and may contain text, graphics, and hyperlinks to other web pages and files.

Static v Dynamic Website Design

- There are basically two main types of website - static and dynamic.
- A static site is one that is usually written in plain HTML and what is in the code of the page is what is displayed to the user.
- A dynamic site is one that is written using a server-side scripting language such as PHP, ASP, JSP, or ColdFusion.
- In such a site the content is called in by the scripting language from other files or from a database depending on actions taken by the user.

Static sites - Advantages

- Flexibility is the main advantage of a static site - every page can be different if desired, to match the layout to different content, and the designer is free to put in any special effects that a client may ask for in a unique way on different pages.
- This allows theming - for instance an author may want a different theme for a different book and associated pages or perhaps for a series of books, in order to match the cover designs or the context of the stories.
- Cost is generally lower up-front than a dynamic site.

Static sites - Disadvantages

- The main problem with any static site appears when you wish to update the content. Unless you are conversant with HTML and the design methods used in the site then you have to go back to the designer to have any content changes made.

- This may be perfectly ok when a new page is required which needs design input, but if all you want to do is change some text then it can be a nuisance for both client and designer.
- The second main problem is scalability. If you wish to sell products on your site and you have a lot of them then you may have to construct individual pages for each one, which can take considerable time, effort and cost.

Dynamic sites – Advantages

- The main advantages of dynamic sites are that by connecting them to databases you can easily pull in information in an organized and structured way to create product pages or categories of related products sorted in a variety of different ways depending on how the user wants to view them.
- This ability to connect to a database means that you can also create a content management system - an interface which allows the client to input and manage data via a web-based series of administration pages.

Responsive Website

- Responsive web design (RWD) is an approach to web design aimed at crafting sites to provide an optimal viewing and interaction experience—easy reading and navigation with a minimum of resizing, panning, and scrolling—across a wide range of devices (from desktop computer monitors to mobile phones).
- A site designed with RWD adapts the layout to the viewing environment by using fluid, proportion-based grids, flexible images, and CSS3 media queries, an extension of the @media rule.
- The fluid grid concept calls for page element sizing to be in relative units like percentages, rather than absolute units like pixels or points.
- Flexible images are also sized in relative units, so as to prevent them from displaying outside their containing element.
- Media queries allow the page to use different CSS style rules based on characteristics of the device the site is being displayed on, most commonly the width of the browser.
- Responsive web design has become more important as the amount of mobile traffic now accounts for more than half of total internet traffic. Therefore, Google announced Mobilegeddon (April 21, 2015) and started to boost the ratings of sites that are mobile friendly if the search was made from a mobile device. This has the net effect of penalizing sites that are not mobile friendly.