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**CENTER OF INFORMATION TECHNOLOGY AND SCIENTIFIC COMPUTING**

**ASSIGNMENT 1**

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1. **History of The Internet**

**Introduction**

The Internet, a global network of networks, is a remarkably complex technical system built on the creative contributions of scientists around the world from the 1950s to the present. Throughout its evolution, the Internet and other networks have been promoted by governments, researchers, educators, and individuals as tools for meeting a range of human needs. A combination of high-level policy and improvisation has produced social benefits including easier and more widespread access to computers and information; increased scientific collaboration; economic growth; the formation of virtual communities and an increased ability to maintain social ties over long distances; the democratization of content creation; and online political and social activism. The Internet’s rapid growth has also produced technical crises and social dilemmas, including malicious and illegal activities.

**Pre-history**

Internet owes its origin largely to the cold war. The first strand of this concerns the doctrine of ‘mutual assured destruction’ (MAD) which governed the nuclear stand-off between the United States and the Soviet Union. MAD supposedly ensured national security by guaranteeing that if one side launched a nuclear attack, the other would retaliate in (devastating) kind. There was, however, one apparent flaw in the logic, in that the doctrine could give an advantage to the aggressor if his pre-emptive strike was so devastating that it rendered the enemy's command-and-control system inoperative, thereby making it impossible to retaliate.

There was therefore an urgent need to design a communications system capable of surviving a devastating thermonuclear attack. This challenge was taken up by a researcher in the RAND Corporation, Paul Baran, who came up with a design for a mesh network based on high levels of link redundancy and a digital communications technology called packet switching.

The second strand of the story opens with the Soviet Union's successful launch of the Sputnik satellite in October 1957, an event that profoundly shocked the US defense establishment and led to the setting up of the Advanced Research Projects Agency (ARPA) within the Department of Defense. Early in its organizational life, ARPA morphed into the agency within the Pentagon that funded advanced, ‘blue-skies’ research which could have military applications. In due course, ARPA found itself funding the purchase, operation, and maintenance of at least a dozen expensive mainframe computers for the various university departments and institutes which held research contracts from the agency. The problem was that these machines were incompatible with one another, and therefore could not function as shared resources for the community of ARPA-funded researchers across the US.

**Origin**

The origin of internet began in the United States as a research sponsored by ARPA (Advanced Research Projects Agency) later changed to DARPA (Defense Advanced Research Projects Agency) in 1973 which was funded by the US military. The first version of the internet was called **ARPANET** which was implemented in October29, 1969 when the first successful message was sent from a computer in UCLA to another computer (also called node) at the Stanford Research Institute (SRI).

It was made into web like network making it a decentralized network to make it withstand unforeseen events and to make all the other computers not lose connection in case one computer was destroyed. ARPANET consisted of 4 nodes: UCLA, UC Santa Barbra, Stanford Research Lab, and the University of Utah. These computers (nodes) were called Interface Message Processors (IMP).

In the beginning ARPANET benefited not just military but also research institutes, so it had its origins in the academic community though it was a military project. The system slowly evolved so it was not immediately adopted for commercial use. In the early 1980’s it was adopted by universities and research institutes through an initiative by the NSF (National Science Foundation). It was called the NSFNET Project and its aim was to promote research and education. The best way to do this was to use an interconnected network of computers that can provide a way to collaborate and share information. This provided a backbone that included the Computer Science Network (CSNET) that linked computer science research among academics.

**Centralization of Internet**

The centralization of the Internet began with its commercialization. Companies like AOL began this push as an ISP (Internet Service Provider). Microsoft then bundled IE with the Windows OS starting with Windows 95. By embracing and extending the Internet to Windows users, Microsoft effectively killed off the competition. Netscape closed shop while other browsers like Mozilla were marginalized. Offering IE for free was the starting point for most users since the majority of them had a PC running Windows. Now that there was a software to access the Internet, it would be much easier. All that was needed next was to subscribe to an Internet service. While some critics predicted the Internet would eventually fall along with the dotcom bubble toward the late 1990’s, instead it thrived thanks in part to its commercialization.

The Internet was now a competitor to news media outlets as a source of information. Meanwhile, AOL would face stiffer competition in the 2000’s, this time from broadband Internet providers who offer bundled services, not just the Internet. The big companies offered Internet with telephone and cable service at good starting rates to get more customers. This affected smaller ISP’s who can only offer Internet and so they had to close shop. This convergence of service was what led to a more centralized Internet.

**Invention of the Web drives Internet usage**

In 1990, Tim Berners-Lee invented the World Wide Web as a method of publishing information in a hypertext format on the Internet. The Web began to take off in 1993, after computer science student Marc Andreessen created the first popular Web browser, known as Mosaic. Since then the number of Web sites and Web pages has exploded.

**Security threats rise along with usage**

Back in 1988, the Morris Worm was the [first major attack on the Internet](http://www.networkworld.com/news/2008/103008-morris-worm.html), disabling 10% of the Internet's 60,000 host computers. Today, hundreds of more sinister attacks are aimed at Internet users each day. Indeed, the U.S. Computer Emergency Readiness Team (US-CERT) stopped counting the number of security incident reports it received in 2004 because attacks against Internet-connected systems had become so commonplace that it felt this figure was getting too big to track.

**Spam grows to be Costly and Dangerous**

Back in 2003, an estimated 15 billion spam messages were sent over the Internet daily. That means 45% of all e-mail messages were unsolicited pitches for things such as drugs and penny stocks. Those figures seem quaint today, compared to the 164 billion spam messages being sent daily, representing 97% of all e-mail. During the last five years, spam has changed from being annoying to being malicious, with the growth of spam-driven phishing scams.

**Summary**

The Internet would not have achieved mass adoption if not for the success of 5 important developments, in my opinion. These are:

* **TCP/IP***-*Transmission Control Protocol/Internet Protocol are the standard set of data communications protocols used on the Internet. It was developed under the DARPA (DoD Advanced Research Projects Agency) by Robert Kahn and Vint Cerf. It is now a de facto standard for the Internet and is maintained by the IETF. These protocols are what gave the Internet e-mail, file transfer, newsgroups, web pages, instant messaging, voice over IP just to name some. This is like a common language that computers use to communicate with one another on the network.
* **World Wide Web and HTML** - This is credited to Tim Berners-Lee who developed a system that would allow documents to be linked to other nodes. This was the beginning of hypertext, which are links to information stored on other computers in the network. Users would no longer need to know the actual location or computer name to access resources through the use of HTML (Hypertext Markup Language) hyperlinks. Thus, a resource called a website can be accessed that provides these links which can be clicked with the mouse. This whole linked system became called the World Wide Web and to access resources on it one must type “www” followed by the domain name “servername.com”.
* **Browser -** The World Wide Web would be useless if not for a software program called a browser. Early development of the web browser started with Mosaic in 1993. Prior to browsers, there was a software called Gopher that provided access to websites, but it was tedious and not user friendly. Eventually more robust features evolved with a new generation of browsers like Mozilla and then Netscape. It was actually Microsoft’s introduction of Internet Explorer (IE) in 1995 that led to wider adoption of the World Wide Web and use of the Internet.
* **Search Engines** - In order to get information and content from the Internet, a search engine software was needed. The early days of searching began with Gopher. It became less popular when browser-based search engines emerged. Other web-based systems evolved like Lycos, Yahoo and WebCrawler. Then Google appeared toward the late 1990’s and became the most popular search engine. It was simple and fast, offering the best way for users to get information on the Internet. The term “Google” now became synonymous with searching on the Internet and is also the most well-known search engine.
* **Internet Service Providers -** The early days of the Internet required a dial-up modem connected to a telephone line with data speeds of 14.4–28.8 kbps. That was sufficient to meet the data demands during the late 80’s and early 90’s since most Internet was text based. As the Internet grew more popular and businesses began to adopt it, more content required faster data speeds. This led to Internet Service Providers (ISP) beginning with the likes of AOL bundling service by mailing free CD software to encourage users to sign up. The catch was getting an e-mail address and free hour of Internet use. ISP’s continued to improve service by offering faster DSL and ADSL service as alternatives to dial-up. DSL service bumped speeds up to 128 kbps. Cable companies then provided even faster Internet speed using cable modems that became known as broadband service. The infrastructure was built by telecommunications companies and cable TV giants to offer even faster speeds that would allow users to stream video, chat, browse active content on the web, video conference and faster data downloads. Cable modem speeds, based on DOCSIS (Data Over Cable Service Interface Specification) offer speeds between 20 to 100 Mbps and even greater (depends on how many users are connected on the subscriber circuit).

1. **Guidelines for evaluating a Website**

Because of increased access to Internet and advancements in software development industry the number of websites is increasing and are becoming a popular educational resource. Not every site makes a good resource so for that reason every website must first be evaluated under certain criteria. These are:

* 1. **Authority**

1. **Is it clear who is responsible for the contents of the page?**

 It is critical to relate the ideas that are found on a site to a particular author, organization, or business.  In this way, there is a degree of accountability for any of the ideas expressed.  Once the individual or organization responsible for the content is known, then begin to look at other clues to help establish credibility, such as credentials and reputation. It is advised to be cautious of sites in which the author or sponsoring organization is not clearly stated.

The sponsor of a site is often responsible for the content. A sites owner can easily and quickly be determined by looking for references at the top and/or bottom of the page.  In addition, the first part of the address of a site, called the domain, contains information that allows the user to get a general idea of the sponsor. It is important to note that some sponsors are not directly responsible for the content on their site, such as personal pages hosted by universities or commercial Internet Service Providers (e.g. AT&T, UP.net, etc.).

To find out specifically who is hosting a site, first the part of the address must be removed from the current page (the page in use) and go back to the root address.

1. **Is there a way of verifying the legitimacy of the organization, group, company or individual?**

Anyone with an Internet Service Provider (AT&T, UP.net, NMU, etc.) can put up a Web page.  For safety reasons a user should have some idea whether the group claiming responsibility for the information on the Web site is legitimate. A phone number or postal address allows the user to contact the group or company and ask for more information. Be cautious of sites that do not provide contact information.  Because it is difficult to verify the legitimacy of an individual, personal home pages may be useful sources for personal opinion but must be used with caution when citing them as a source for factual information.

1. **Is there any indication of the author's qualifications (either an individual or an organization) for writing on a particular topic?**

If there is an article describing about a specific subject/topic, a user should know if the author is qualified to speak intelligently on this topic.  Clues include an author's educational background, current position, or reputation. If the content is provided by an organization, then it is recommended to consider if the organization known and respected.

1. **Is the information from sources known to be reliable?**

Statements from established and reputable organizations almost always have been seen and approved by several people. As a result, this check and balance system helps prevent the release of unsound information. Government sites (.gov) are very good examples of organizations where information is disseminated through this type of system.  For other organizations, it can be difficult sometimes to determine if they are established and reputable. Clues to look for include the date an organization was founded, the number of members, their mission, the types of publications they produce, whether they have annual conferences, etc. Generally, established organizations have been around for a while and have a good membership base.

One way of determining the reputation of an organization is to examine how it is referred to in newspaper or periodical articles. Using the library's subscription [databases](https://lib.nmu.edu/find/online-databases) to search for articles in newspapers and periodicals on a particular organization.

* 1. **Accuracy**

1. **Are the sources for factual information clearly listed so they can be verified in another source?**

A source of information is known to be scholarly when it provides references to the information presented.  In this way, the user can confirm whether the information is accurate or the author's conclusions reasonable. A page without references still may be useful as an example of the ideas of an individual, organization, or business, but not as source of factual information.

1. **Is the information free of grammatical, spelling, and other typographical errors?**

Such errors not only indicate a lack of attention and effort, but also can actually produce inaccuracies in information. Whether the errors come from carelessness or ignorance, they both put the information or writer in an unfavorable light.

* 1. **Objectivity**

1. **Does the content appear to contain any evidence of bias?**

 If the content contains bias, only one point of view is being presented. One way of determining this is by relying on the users own experience and knowledge to determine if the information appears believable or reasonable.

1. **Is there a link to a page describing the goals or purpose of the sponsoring organization or company?**

The goals or purpose of a group, organization, or company can help you assess for possible biasness.

1. **If there is any advertising on the page, is it clearly differentiated from the informational content?**

 It is visible that some websites promote products of their sponsor companies and that can sometimes lead to missing the purpose of the website.  In the Web environment, it is especially important to critically examine information presented on commercial sites (.com).

* 1. **Currency**

**a) Are there dates on the page to indicate when the page was written, when the page was first placed on the Web, or when the page was last revised?**

The information on the website should be time sensitive meaning it should be updated regularly and the date when the information was updated should also be updated with the information.

In general, a site should always provide some indication of when the information was created or the site was last updated.

* 1. **Coverage**

**a) Are the links (if any) evaluated and do they complement the documents' theme?**

**b) Is it all images or a balance of text and images?**

While using the site the user has to verify the following questions:

* Is the site filled with unnecessary images?
* Is it overshadowing the idea of the article?
* Is there too much text and not enough image to explain the articles topic?

**c) Is the information presented cited correctly?**

Cross check with other sites whether the information matches or is even closely related or not. If it is it is highly likely that the information is correct.

* 1. **Appearance**

**a)  Does the site look well organized?**

**b)  Do the links work?**

**c)  Does the site appear that it is well maintained?**

**d)  Do graphics and multimedia obscure content?**

**Wikipedia**

**Wikipedia is a multilingual online encyclopedia created and maintained as an open collaboration project by a community of volunteer editors using a wiki-based editing system.**