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WEB APPLICATION DEVELOPMENT

ASSIGNMENT 1

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Contents

| | | |
|----------|--|----------|
| 1 | Web services | 2 |
| 1.1 | Definition | 2 |
| 1.2 | Common web services | 2 |
| 2 | Tools utilizing Internet resources | 2 |
| 3 | Terminologies of The Internet, The Web, and Computer Networking | 3 |
| 4 | References | 4 |

1 Web services

1.1 Definition

- Two common definitions for the term **web service** are:
 - A service offered by an electronic device to another electronic device, communicating with each other via the Internet. [16]
 - A server running on a computer device, listening for requests at a particular port over a network, serving web documents (HTML, JSON, XML, images). [16]

1.2 Common web services

- Some web services that are commonly implemented:
 - **REST (Representational State Transfer)**: an architectural style for providing standards between computer systems on the web, making it easier for systems to communicate with each other. REST-compliant systems, often called **RESTful** systems, are characterized by how they are **stateless** and **separate the concerns of client and server**. [10]
 - **SOAP (Simple Object Access Protocol)**: a messaging protocol specification for exchanging structured information in the implementation of web services in computer networks. It uses XML Information Set for its message format, and relies on application layer protocols, most often HTTP. **SOAP** allows developers to invoke processes running on different operating systems to authenticate, authorize, and communicate using XML. Since Web protocols like HTTP are installed and running on practically all operating systems, **SOAP** allows clients to invoke web services and receive responses independent of language and platforms. [13]
 - **XML-RPC**: a remote procedure call (**RPC**) protocol which uses XML to encode its calls and HTTP as a transport mechanism. In **XML-RPC**, a client performs an RPC by sending an HTTP request to a server that implements **XML-RPC** and receives the HTTP response. A call can have multiple parameters and one result. The protocol defines a few data types for the parameters and result. Some of these data types are complex, i.e. nested. For example, you can have a parameter that is an array of five integers. In comparison to **RESTful** protocols, where resource representations (documents) are transferred, **XML-RPC** is designed to call methods. The practical difference is just that **XML-RPC** is much more structured, which means common library code can be used to implement clients and servers and there is less design and documentation work for a specific application protocol. [19]

2 Tools utilizing Internet resources

- The modern-day Internet offers unparalleled convenience and speed to access the vast and expansive information that are public on the Internet, and it also brought the ability to telecommunicate onto the Internet domain. Some notable tools to utilize the resources provided by the Internet:
 - **World Wide Web (WWW)**: commonly known as **the Web**, is an information system that enables information sharing over the Internet through user-friendly ways meant to appeal to users beyond IT specialists and hobbyists. It allows documents and other web resources to be accessed over the Internet according to specific rules of the **Hypertext Transfer Protocol (HTTP)**. [18]
 - **Electronic mail (email)**: a method of transmitting and receiving messages using electronic devices. It is a ubiquitous and very widely used communication medium. In current use, an **email** address is often treated as a basic and necessary part of many processes in business, commerce, government, education, entertainment, and other spheres of daily life in most countries. **Email** operates across computer networks, primarily the Internet, and also local area networks. [2]

- **Instant messaging (IM) technology**: a type of online chat allowing real-time text transmission over the Internet or another computer network. Messages are typically transmitted between two or more parties, when each user inputs text and triggers a transmission to the recipient(s), who are all connected on a common network. It differs from **email** in that conversations over **instant messaging** happen in real-time (hence "instant"). [7]

3 Terminologies of The Internet, The Web, and Computer Networking

- **Website**: a collection of **web pages** and related content that is identified by a common domain name and published on at least one **web server**. **Websites** are typically dedicated to a particular topic or purpose, such as news, education, commerce, entertainment or social networking. [17]
- **Web page**: a **hypertext** document on the **World Wide Web**. **Web pages** are delivered by a **web server** to the user and displayed in a **web browser**. A **website** consists of many **web pages** linked together under a common domain name. The name "**web page**" is a metaphor of paper pages bound together into a book. [15]
- **Web browser**: an application for accessing **websites**. When a user requests a **web page** from a particular **website**, the **browser** retrieves its files from a **web server** and then displays the page on the user's screen. **Browsers** are used on a range of devices, including desktops, laptops, tablets, and smartphones. [14]
- **Homepage**: the main **web page** of a **website**. The term may also refer to the start page shown in a **web browser** when the application first opens. Usually, the **homepage** is located at the root of the website's domain or subdomain. For example, if the domain is example.com, the **homepage** is likely located at www.example.com/. [4]
- **Hyperlink**: a digital reference to data that the user can follow or be guided to by clicking or tapping. A **hyperlink** points to a whole document or to a specific element within a document. **Hypertext** is text with **hyperlinks**. The text that is linked from is known as **anchor text**. [6]
- **Internet Service Provider (ISP)**: an organization that provides services for accessing, using, managing, or participating in the **Internet**. **ISPs** can be organized in various forms, such as commercial, community-owned, non-profit, or otherwise privately owned. Internet services typically provided by **ISPs** can include Internet access, Internet transit, domain name registration, web hosting, Usenet service, and co-location. An **ISP** typically serves as the access point or the gateway that provides a user access to everything available on the Internet. [8]
- **Internet Access Provider (IAP)**: a company or organization that provides **Internet access** to private customers and businesses. **IAPs** connect their customers to the Internet through the use of technology such as dial-up modems, Digital Subscriber Lines (DSL), wireless routers or dedicated high-speed modems. An **access provider** buys or rents bulk Internet links from an **ISP**. The **access provider** then resells portions of the purchased connections to the general public. [1]
- **Search engine**: a software system that finds **web pages** that match a **web search**. They search the **World Wide Web** in a systematic way for particular information specified in a textual web search query. The search results are generally presented in a line of results, often referred to as **search engine results pages (SERPs)**. The information may be a mix of hyperlinks to web pages, images, videos, infographics, articles, and other types of files. [11]
- **Hypertext Transfer Protocol (HTTP)**: an application layer protocol in the Internet protocol suite model for distributed, collaborative, hypermedia information systems. **HTTP** is the foundation of data communication for the **World Wide Web**, where hypertext documents include hyperlinks to other resources that the user can easily access, for example by a mouse click or by tapping the screen in a web browser. [5]

- **File Transfer Protocol (FTP)**: a standard communication protocol used for the transfer of computer files from a server to a client on a computer network. **FTP** is built on a client-server model architecture using separate control and data connections between the client and the server. **FTP** users may authenticate themselves with a plain-text sign-in protocol, normally in the form of a username and password, but can connect anonymously if the server is configured to allow it. An **FTP** client used to be commonly integrated in web browsers, where file servers are browsed with the URI prefix "ftp://". Throughout 2021, the two major web browser vendors, Google Chrome and Firefox, removed this ability. [3]
- **Simple Mail Transfer Protocol (SMTP)**: an Internet standard communication protocol for electronic mail transmission. Mail servers and other message transfer agents use **SMTP** to send and receive mail messages. User-level email clients typically use **SMTP** only for sending messages to a mail server for relaying, and typically submit outgoing email to the mail server on port 587 or 465 per **RFC 8314**. For retrieving messages, **IMAP** (which replaced the older **POP3**) is standard, but proprietary servers also often implement proprietary protocols. [12]
- **Post Office Protocol version 3 (POP3)**: version 3 of the **Post Office Protocol (POP)**, an application-layer Internet standard protocol used by e-mail clients to retrieve e-mail from a mail server. This version of **POP** is the most commonly used version. Together with **IMAP**, it is one of the most common protocols for email retrieval. The **Post Office Protocol** provides access via an Internet Protocol (IP) network for a user client application to a mailbox (maildrop) maintained on a mail server. The protocol supports list, retrieve and delete operations for messages. POP3 clients connect, retrieve all messages, store them on the client computer, and finally delete them from the server. [9]

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