* ***HTML5****:*
* Definition:  
   - HTML is a language used to create webpages. It's the foundation of the internet and helps developers structure and present content in a standardized format. HTML uses tags to define elements like headings, paragraphs, images, and links. These tags instruct web browsers on how to display content. HTML ensures websites are accessible, interactive, and compatible across devices and browsers. It shapes the visual and structural aspects of webpages, making browsing seamless for users.

- Markup language, standard text-encoding system consisting of a set of symbols inserted in a text document to control its structure, formatting, or the relationship between its parts. The most widely used markup languages are SGML (Standard Generalized Markup Language), HTML (Hypertext Markup Language), and XML (Extensible Markup Language). The markup symbols can be interpreted by a device (computer, printer, browser, etc.) to control how a document should look when printed or displayed on a monitor. A marked-up document thus contains two types of text: text to be displayed and markup language on how to display it. [3]

- [4] HTML gives authors the means to:

* Publish online documents with headings, text, tables, lists, photos, etc.
* Retrieve online information via hypertext links, at the click of a button.
* Design forms for conducting transactions with remote services, for use in searching for information, making reservations, ordering products, etc.
* Include spread-sheets, video clips, sound clips, and other applications directly in their documents.
* Advantages:

- The organized architecture of HTML makes it easier to increase accessibility and search engine optimization, resulting in more accessible and useable websites. Another advantage of HTML's versatility is its ability to interface smoothly with different frameworks and technologies, allowing programmers to construct dynamic and interactive web sites. Because HTML is platform neutral, it can be viewed and shown on a wide range of devices, increasing web content accessibility and usability. HTML is an important tool in software architecture because it allows programmers to design dependable, scalable, and aesthetically beautiful websites.

- [5] Simplicity, Basic Design: There is no doubt HTML is extremely easy for beginner, the fundamental of HTML is friendly to learn, easy learning curve.

- [5] Browser friendly: every browser supports HTML.

- Free Open-source and Huge Community Support: HTML is the indispensable language for web development, easy to connect with HTML user at everywhere.

- [6] Use of template: HTML allows the use of templates for programmers. So, it makes the task of the web developers a lot easier by reducing the time taken to write the design codes.

* Disadvantages:

- HTML is primarily intended for content structuring and presentation, with no advanced interactive capabilities. Additional languages, such as JavaScript, are necessary to offer dynamic functionality, resulting in increasing complexity.

- Lack of Data Handling: HTML is not well-suited to efficiently handling and processing massive volumes of data. It lacks in-built data storage, retrieval, and manipulation tools, necessitating the use of server-side technologies or APIs.

- Limited Styling Options: While HTML offers rudimentary styling features via CSS (Cascading Style Sheets), it has inherent limits in terms of layout control and graphical representation. Complex designs may necessitate considerable CSS alterations.

- Lack of Modularization: HTML lacks significant support for modularization and component-based development, making efficient code reuse and maintenance difficult, particularly in larger and more sophisticated applications.

- [6] Static Language: HTML is static language, cannot produce dynamic web page with plain HTML. Develop dynamic web page needs to combine HTML with others web development programming language.

- [7] Security: With the introduction of VPNs as a commodity and the emergence of new risks to online privacy and security, accessing the Internet unprotected became a concerning pastime. HTML does not make matters any easier. It lacks significant security safeguards, particularly when it comes to standard components like data encryption and login forms. Furthermore, it has no effect on others studying the source code and using/selling it as an HTML template.

- [8] HTML is a structuring language that allows to attach a virtual label to sections of the content. While HTML is excellent at structuring text, it falls short when it comes to displaying that content in an aesthetically acceptable manner. To get around this issue, a new language called Cascading Style Sheets was created to handle the presentation of Web pages. This limitation effectively forces Web designers and developers to maintain two separate sets of files: HTML files that contain the website's content and structure, and CSS files that specify how a page should look.

* ***CSS:***
* Definition:
* Cascading Style Sheets, fondly referred to as CSS, is a simple design language intended to simplify the process of making web pages presentable.
* CSS handles the look and feel part of a web page. Using CSS, easy to control the color of the text, the style of fonts, the spacing between paragraphs, how columns are sized and laid out, what background images or colors are used, layout designs, variations in display for different devices and screen sizes as well as a variety of other effects.
* CSS is easy to learn and understand but it provides powerful control over the presentation of an HTML document. Most commonly, CSS is combined with the markup languages HTML or XHTML. [9]
* Advantages:

- Separation of Concerns: CSS allows for a clear separation of design and structure, enabling developers to maintain clean, modular code. This separation promotes code reusability, easier maintenance, and enhances the overall development workflow.

- Consistency and Efficiency: CSS enables developers to define styles once and apply them to multiple elements across the website, ensuring consistency in appearance. This approach reduces redundancy and promotes efficient development by avoiding the need for repetitive styling.

- Responsive Design: CSS supports responsive design techniques, enabling websites to adapt and provide optimal user experiences across various devices and screen sizes. Media queries and other CSS features facilitate the creation of adaptive layouts and fluid designs.

- Browser Compatibility: CSS is supported by all modern web browsers, ensuring consistent rendering of styles across different platforms. It reduces the need for browser-specific code and helps maintain compatibility and uniformity in the user experience.

- Third-Party Integration: CSS seamlessly integrates with other technologies and frameworks, such as JavaScript and libraries like Bootstrap. This interoperability allows for the incorporation of additional functionalities and enhances the overall capabilities of web applications.

- [10] Consistent Design: One thing common to all these websites is consistency in design. CSS enables developers to ensure the style elements are applied consistently across several web pages.

- [11] SEO-friendly: CSS allows to create external files for determining design attributes. That way can make your HTML code less crowded. This is especially beneficial when it comes to SEO. The reason is, search engine spiders don’t really go through all those HTML codes to get the indexed ones. Therefore, keeping the code clean ultimately improves the search engine rankings of the website.

- [12] Cross-Browser Compatibility: One of the biggest challenges for web developers is ensuring that their websites look and function the same across different browsers. CSS can help to solve this problem by providing a consistent way to style and layout web pages.

* Disadvantages:

- Lack of Variables and Modularity: CSS traditionally lacks native support for variables, making it tedious to maintain consistent styles across a project. Additionally, the absence of true modularity can result in code duplication and decreased reusability.

- [13] Security Issues: Security is important in today’s world driven by technology and data. One of the major disadvantages of CSS is that it has limited security.

- [14] Dependency on external stylesheets: CSS is typically stored in external stylesheets, which are accessed via links from a website’s HTML. This means that if the stylesheet is not loaded correctly or if the link to the stylesheet is broken, the website may not display properly. This could be a problem if the stylesheet takes a long time to load or your internet connection is slow.

* ***Boostrap:***
* *Definition:*

- [15] Bootstrap is a powerful, feature-packed frontend toolkit. Build anything—from prototype to production—in minutes.

- [16] Powerful, extensible, and feature-packed frontend toolkit. Build and customize with Sass, utilize prebuilt grid system and components, and bring projects to life with powerful JavaScript plugins.

- Bootstrap is the most well-known CSS framework or building responsive, mobile-first sites, with jsDelivr and a template starter page.

* *Advantages:*

- [17] Fast development: Today's B2B and B2C marketing requirements are frequently time-sensitive, and a quick development option is required to compete with other agile organizations. Bootstrap allows designers to easily create new web pages or websites by utilizing pre-existing code blocks.

- [18] Extremely user-centric: When designing landing pages, it is critical to consider the user's perspective. Only when a landing page is engaging does it appeal to the audience. One of the most notable advantages of Bootstrap is the ability to create landing pages that meet the needs of your target audience. It makes recommendations for features such as pictures and call-to-actions (CTA) that will look best for your audience and improve user experience. Furthermore, it facilitates making simple changes to the landing page elements in order to reach out to a larger audience.

- Save Time, Lightweight: Bootstrap is framework for CSS which have great documentation on every component makes developer no need to coding much that give save time. Easy to use and maintain.

- Excellent Grid System: Bootstrap definitely gives the best responsive grid system thanks to usage of predefined classes that makes grid easier to use and faster to get a grasp on.

- Free Open-source, Easy to Learn and Huge Community Support: Bootstrap is free to use software, vast documentation. The fundamental of it is easy for beginner to catch with. The widen community user of Bootstrap is also good point to boost up quality of Bootstrap, give better teamwork.

* *Disadvantages:*

- [19] Financing, Increased chance of business failure: For early-stage companies, bootstrapping may not provide sufficient resources to build traction and survive beyond the startup phase.

- [20] Lower Survival Rate: According to empirical evidence, companies that use the bootstrap approach have a very poor likelihood of survival. This is due to the fact that the most common reason for startup failure is a lack of cash. They may have a viable product that adds value to customers and other stakeholders. However, if they don't have enough money to stay afloat long enough for the product to succeed, the startup will collapse.

- [21] A Slight Learning Curve to Learn the Classes and Workflow: Bootstrap represents a methodological approach that might entail a significant shift in mindset. Personally, embracing a mobile-first workflow has posed challenges, necessitating the deliberate process of designing, developing, and testing primarily for mobile devices. Furthermore, understanding the specific order of component classes and their combinations requires dedicated learning. To simplify this task, employing a Bootstrap cheat sheet and class reference can prove immensely valuable.

- Could be Heavy: Some verbose styles affect the unnecessary redundancy of output of HTML. Bootstrap makes easier to build responsive we page, however, size of files generated might huge.

* **JavaScript:**
* Definition:

- [22] JavaScript is a high-level, dynamic, and interpreted language. It is object-oriented, prototype-based, imperative, and poorly typed. It is one of the three fundamental technologies in the world's web production, together with HTML and CSS: most websites use it, and it is interoperable with all modern browsers without the need for plug-ins. Text, lists, dates, and regular expressions are all supported by the JavaScript API.

* Advantages:

- [23] Speed: JavaScript is a client-side script which means web browser processes the code, not the web server. For that reason, JS is fast running language. Furthermore, JS is the interpreted language so that it reduces the time required by the programing language.

- [24] Simplicity: JS has easy learning curve, make it easier for both of users and developers.

- [25] Validation on Browser: During the process of completing online forms, one may observe validation errors regarding email validity or incorrect formatting, among others. These validations are solely performed using JavaScript on the client side. Consider the absence of client-side validation and contemplate the consequences of users submitting incorrect data. In such a scenario, the data would have been transmitted to the server for validation, resulting in unnecessary bandwidth usage and time wasted on invalid data. Consequently, client-side validations safeguard the bandwidth, minimize time wastage, and ensure efficient server utilization. This advantage proves to be truly remarkable.

- Interoperability: The ability to work with others language of JS is awesome. They could run well together to develop application. JS is easy to be embedded into the code script of another programming language.

- Various of interfaces: JS provides rich resources of interfaces. This greatly improves the user interface interactivity of the website.

- Versatility: JS is a language that works and builds well for both back-end and front-end. A great language that has a lot of libraries, frameworks, and runtime environments, popular examples nowadays like NodeJS supporting JS to build back-end, AngularJs, VuejS and ReactJS are frameworks and libraries support JS to build front-end.

* Disadvantages:

- Client-side Security: Client-side is the paradox of JS. It speeds up the time, however JS executed on client-side is viewable, so the security is not good. Bugs and oversights possible to exploited for malicious purposes.

- Browser Support: The output of JS scripts produced by server-side are probably the same. However, different browser interpretations would give different results, this affects the JS program. Fortunately, this has been fixed in many browsers. It is important to test the JS program using all popular browsers today.

* ***PHP***:
* Definition:

- [26] PHP (recursive acronym for PHP: Hypertext Preprocessor) is a widely used open source general-purpose scripting language that is especially suited for web development and can be embedded into HTML.

- PHP is a server side scripting language that is embedded in HTML. It is used to manage dynamic content, databases, session tracking, even build entire e-commerce sites.

* Advantages:

- [27] Open Source and Free of Cost: One of the most important advantages of PHP is that it is available to everyone. It is available for free download from an open-source repository. It is freely available for download and use in web application development.

- [28] Good flexibility: PHP's flexibility allows it to efficiently combine with many different programming languages, allowing the software product to use the most effective technology for each specific feature. Furthermore, PHP is a cross-platform language, which implies that developers can code on any principal operating system - Windows, Linux, or macOS. This level of adaptability considerably speeds up and reduces the cost of development.

- [29] Independent of platforms and has a good library: PHP is platform-independent, which means that applications written in it can operate on Windows, Linux, Mac, UNIX, and other operating systems. Furthermore, PHP has extensive library support, which means you may use a plethora of additional function modules to represent data in this programming language. It also allows for frameworks like Symfony or Laravel, file types like PDF, and handy stuff like graph creation.

- [30] The MVC Pattern: Model-View-Controller Architectural pattern of the PHP framework helps developers in organizing their codes. PHP framework also allows them to keep data manipulating logic separate from the bits handling the display which helps in easy modification of codes.

- [31] Loading Speed: Compared to other programming languages, PHP offers considerably higher loading speed for webpages. In the case of many programming languages, it is not easy to connect to a database. Because it takes significant amount of time connecting to a database. The lightweight design of PHP makes site load lot faster. Even in situations of a bad internet connection. Currently, there are no other programming languages faster than PHP.

- [32] Strong community support: With its long history and widespread use, PHP today has a sizable and devoted community to back it up. There is a tone of tutorials, FAQs, and suggestions available to help new PHP developers and prevent the language's capabilities from plateauing.

* Disadvantages:

- [33] Troubleshooting Errors: Error detection is critical for an application’s correct operation. It is common for developers to make mistakes when writing code. Without adequate debugging tools, PHP lacks the capacity to handle errors. If the final product is released with these unidentified issues, the application will fail.

- [33] Lack of dedicated libraries for modern needs: For example, machine learning is currently popular and will undoubtedly remain so in the near future. While PHP has its own set of libraries, it cannot compete with Python in the development of machine learning-powered web applications. Currently, PHP cannot compete with Python's TensorFlow, Scikit-learn, Theano, and Keras in terms of speed and effectiveness. As a result, if your app requires machine learning functionality or may require it in the future as your business grows, PHP is not the ideal solution.

- [34] Affect website speed and performance: Nevertheless, certain PHP frameworks incorporate additional functionalities and resources that can expedite the development of extensive and intricate websites. The incorporation of PHP framework components may not be essential for creating modest or uncomplicated web applications. Moreover, the augmented features associated with these frameworks can adversely affect the performance and speed of websites.

* ***MySQL:***
* Definition:

- [35] MySQL is a database management system: A database is a structured collection of data. It may be anything from a simple shopping list to a picture gallery or the vast amounts of information in a corporate network. To add, access, and process data stored in a computer database, you need a database management system such as MySQL Server. Since computers are very good at handling large amounts of data, database management systems play a central role in computing, as standalone utilities, or as parts of other applications.

- MySQL is relational database management system (RDBMS) based on structured query language (SQL), it is a free database server.

- [36] A relational database stores data in separate tables rather than putting all the data in one big storeroom. The database structures are organized into physical files optimized for speed. The logical model, with objects such as databases, tables, views, rows, and columns, offers a flexible programming environment. You set up rules governing the relationships between different data fields, such as one-to-one, one-to-many, unique, required or optional, and “pointers” between different tables. The database enforces these rules, so that with a well-designed database, your application never sees inconsistent, duplicate, orphan, out-of-date, or missing data.

* Advantages:

- Fast, Reliable, Scalable, Easy to Approach: MySQL requirement for running on applications is very little or even none. MySQL is also easy to configure and adjust give better efficient for memory, CPU power, also I/O capacity available. MySQL server is the first choice for many large database management and highly efficient accessing databases on the Internet.

- [37] Open-source: Open Source refers to the accessibility for all individuals to utilize and modify the software. The MySQL software can be freely obtained from the Internet, enabling anyone to employ it without any monetary obligations. For those interested, the source code can be studied and adjusted to cater to specific requirements. The usage guidelines of the MySQL software are governed by the GPL (GNU General Public License), accessible at http://www.fsf.org/licenses/, which outlines the permissible actions in different scenarios. Should the GPL be unsuitable or if there is a need to incorporate MySQL code into a commercial application, a commercially licensed version can be purchased directly.

- [38] The MySQL Database Server is very fast, reliable, scalable, and easy to use: If the desired outcome aligns with your intentions, it is worth considering. The MySQL Server has the capability to operate seamlessly on a desktop or laptop, alongside various other applications, web servers, and similar systems, requiring minimal or no supervision. Allocating an entire machine exclusively for MySQL allows you to optimize the settings to utilize the available memory, CPU power, and I/O capacity to its fullest. Moreover, MySQL has the ability to scale up to clusters of interconnected machines. MySQL Server was initially designed to enhance the speed of handling large databases compared to existing solutions and has proven its effectiveness in demanding production environments over several years. While MySQL Server continues to undergo continuous development, it presently provides a comprehensive and valuable array of functions. Its connectivity, speed, and security make it an excellent choice for accessing internet-based databases.

* Disadvantages:

- [39] Performance: Even while MySQL is built to manage massive amounts of data, it lags behind in terms of performance. MySQL suffers most when there are too many read/write operations. In this scenario, you should look into other options such as Oracle or SQL server.

- [40] Not Suitable For Game And Mobile Applications: For those of you who want to develop game applications or mobile devices, it’s a good idea to reconsider if you want to use MySQL. Most game and mobile application developers don’t use it, because this system management database is still not good enough to use for the application system.