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IF184605 Framework-Based Programming

Lecture #2a

Framework in Programming

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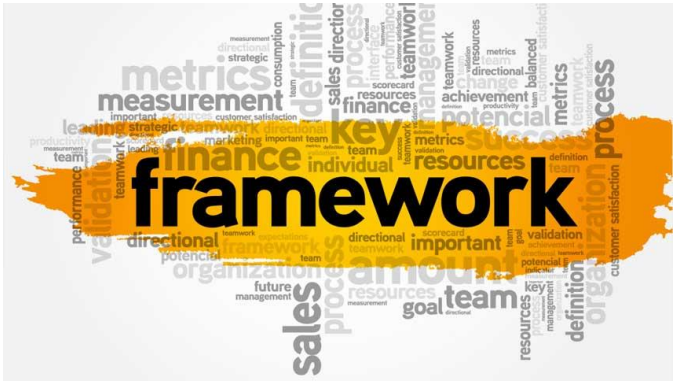
Framework: the background



- The framework is a term that often appears in the (web) developer world.
- The term has a huge function for the systematic development of program code.
- Right now, a developer – especially in web development, is required to learn and use a framework in making the web software.
- Another advantage of using the framework in developing the software is it makes the compiling of the (program) code's approach can be more structured and more consistent.
- The good (program) code is, of course, the one that is understandable to machines as well as the developers.
- What a framework is and its types are going to be described in this lecture.
- Web development's framework will be more emphasised in our discussion.

Framework: the examples

Framework: what is it?

- First, we have to know what a framework is and what functions it has.
- Then, we can begin to understand the purpose of its use in websites or software development.

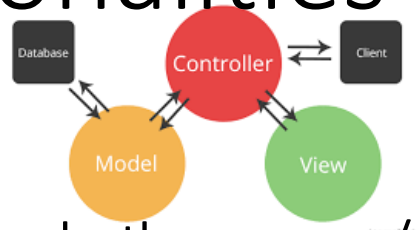
Framework: the definition

- As the name implies, the framework is a foundation/ scaffolding/helper for developing web-based and desktop-based applications. The framework is useful for the developers in writing the code in a more structured and organised manner.
- The framework has been created to simplify the programmer's works. So that, a programmer does not need to write code over and over again. It is because we only need to compose the programming components from the existing ones (reusability).

Framework: the functionalities

- As a developer, of course, we have to know the purpose of using the framework for the sake of building the application.
- Thus, the building process can be carried out using the right framework and according to the project plan.
- The following are some of the framework's functions in web development.

Framework: the functionalities (continued)



1. Program code: more structured

- The main function of the framework is to make the program/source code more structured. It means that the built program will be included in each component according to its respective functions.
- An instance of structured program code can be seen from the PHP framework, namely Laravel. It uses the concept of the MVC paradigm (Model, View, and Controller). There are three main components for developing a website by using this framework model.
- The Model serves as a place or container for the program code in the form of programming algorithms and a connector/link for the application database. View served as a container to accommodate program code to create the appearance (view, display) that will be displayed to the customer/client. And the Controller's task is connecting the Model and View so that it becomes a website as a whole.
- In other words, the Model served to handle the back-end tasks. Then, the View is used to handle the front-end tasks. With the MVC concept, the program code will be neatly arranged and shorten the works of the developer.

Framework: the functionalities (continued)

2. Increase the developers' performance

- The second function of the framework is to increase the developers' performance. We might think that in making an application, it actually can be done without any framework's support. Of course, this case only happens if the project's scope is relatively small.
- If we build an application or a website display for a big company/ organisation, without the framework, the project won't be recommended. The mindset of not using the framework has been changed immediately. The framework has been created to increase the developers' performance in terms of time efficiency and resources used.
- Furthermore, if carried out by several teams, the framework will greatly boost work effectiveness and synchronization. Everyone immediately understands and carry out their respective tasks without the necessity to check one by one of the project's component, both in terms of the back-end and the front-end.

Framework: the functionalities (continued)

3. Improve the software/website security

- In addition to increasing the performance of developers, the website and software security can also be increased. It is because the framework has been used, tested and developed by several developer experts from various countries in any circumstances.
- A framework has several versions where their features will always be updated as well as to overcome the bugs. Security will always be updated and monitored so that there won't be any serious problems on the website, such as hacking or data cracking.
- If you are interested in the application's security system, then you may also learn cyber security. Many companies and startups have several work opportunities in handling the problems of the software security system.

Framework: the functionalities (continued)

4. Easier the website's maintenance and documentation

- If we want to add or remove some features from the website which is being created, then using a framework can make it easier for these tasks. Why? Laravel framework can be used as an example, where it has a feature for performing the maintenance on the program.
- By doing the maintenance, we can change the website's version and add some features easier and safer. So that, when a website is undergoing maintenance, there will be a notification or message for the user which said that the website is still under maintaining.
- Furthermore, it is also more structured in terms of documentation. It will be bothering us if we don't use the framework in the documentation process. By using the framework, each application document being built can be identified easily and quickly.

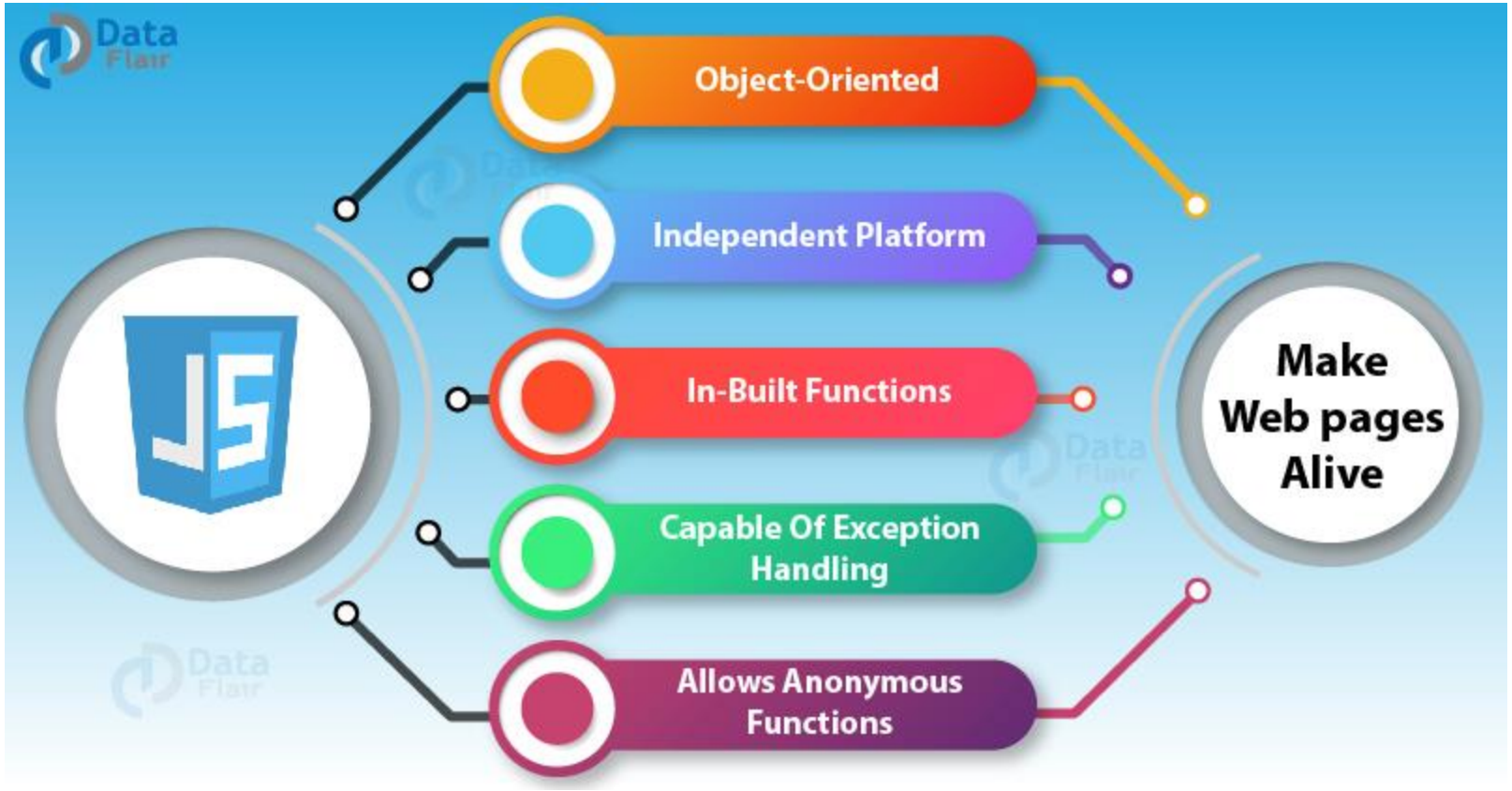
Framework: the functionalities (continued)

5. Speed up the website creation process

- The last function is to speed up the process of building the website. In this case, it doesn't mean that making a good website can be done hastily. It means, the building process can be carried out quicker and produce a high-quality product that meets the customer needs.
- The developers can develop applications by using the existing/available components in a framework. So that we don't need to build the program code from the scratch.

Further reading

- JavaScript frameworks: definition, advantages, and best frameworks

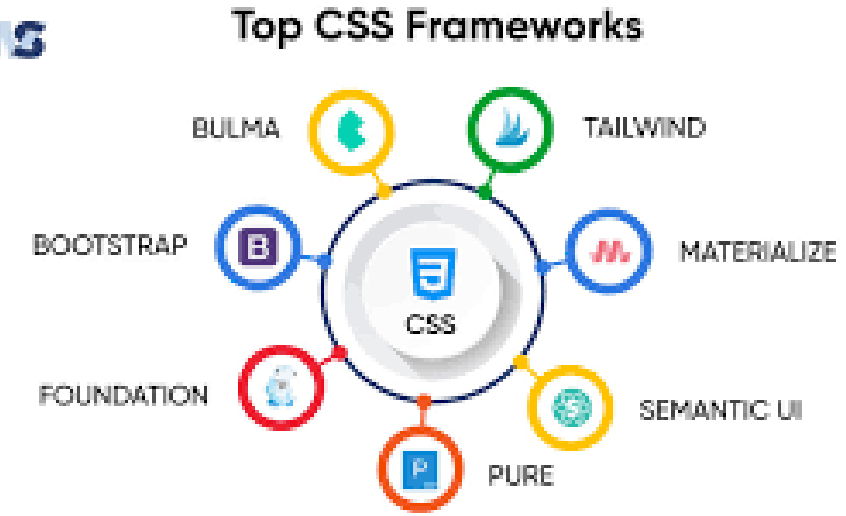


Framework: web development

- Once we understood what a framework is and its functions, then we will get to know some examples used in website development.
- The following are some frameworks which often used in the development of a website: CSS, JavaScript, and PHP.

CSS frameworks

- CSS (Cascading Style Sheet) is a programming language that has been used to make HTML layouts look better and more attractive.
- CSS has always been used for the front-end's team in building the appearance of the website.
- Some CSS frameworks can be seen below.



Bootstrap

- Bootstrap is a CSS framework that is used often by developers.
- The Bootstrap display gives the impression of being modern, dynamic, and more user friendly.
- In addition, it provides a responsive display when accessed via a cellphone.

Foundation

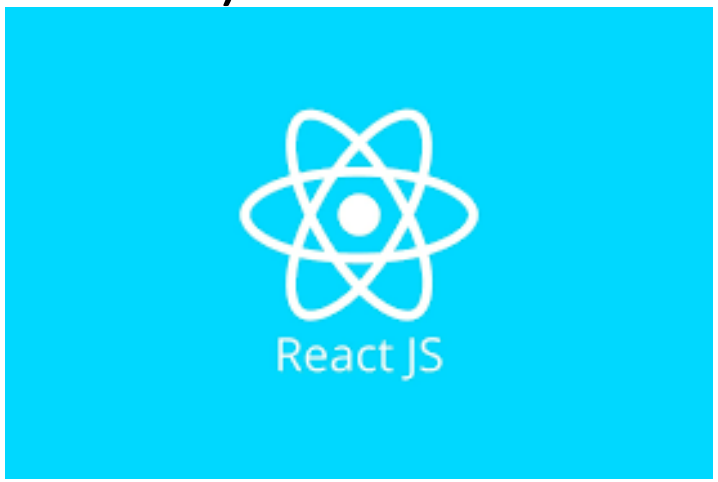
- This framework is widely used because it has advantages in terms of functionality.
- Foundation works in all browsers and it has a lot of features just like Bootstrap.

Semantic UI

- Semantic UI has the advantage of making the process of writing classes easier.
- In addition, this framework also provides user-friendly features and complete components.

ReactJS

- It is a framework developed by Facebook.
- ReactJS has been included in the front-end library which makes it possible to create reusable UI components.
- One of the advantages of ReactJS is that it can be used for multi-platform (website and mobile).



Vue.js

- Vue.js is an open-source and progressive framework for building user interfaces.
- The advantage lies in the integration process in the project by using the JavaScript library which makes it easier to develop a project.

Node.js

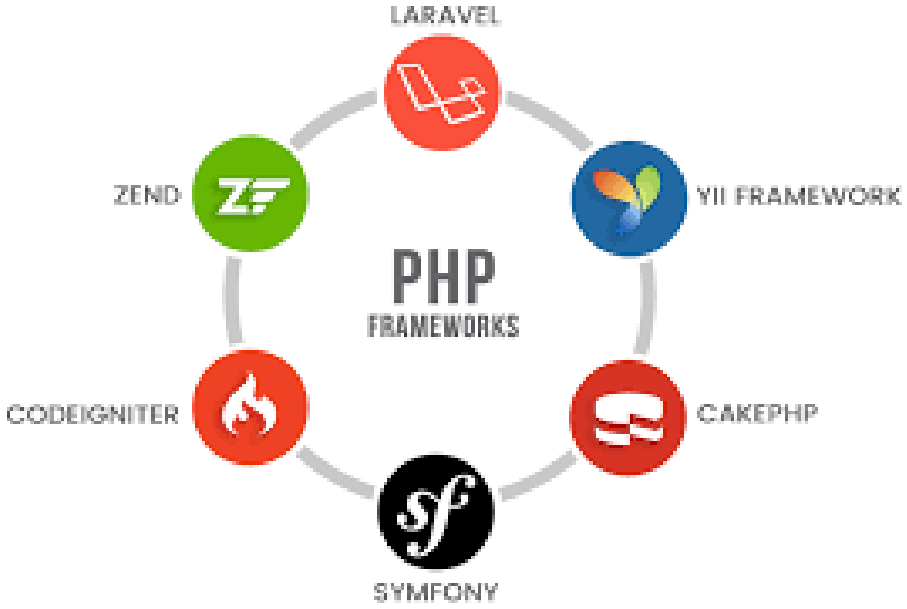
- Node.js runs on the back-end (the server). It is open-source, cross-platform in executing code.
- Node.js also allows developers for using JavaScript to dynamically create page content on the web before it is sent to the user's web browser.

EmberJS

- Adopting the MVVM (Model – View – ViewModel) paradigm.
- It means that developers can develop the websites and improve them according to their needs.
- In addition, EmberJS is an open-source JavaScript framework.

PHP frameworks

- PHP: Hypertext Preprocessor is a high-level programming language that runs on the server-side and has always been used by the back-end team.
- The following are some PHP frameworks that are often used in website development.



CodeIgniter (CI)

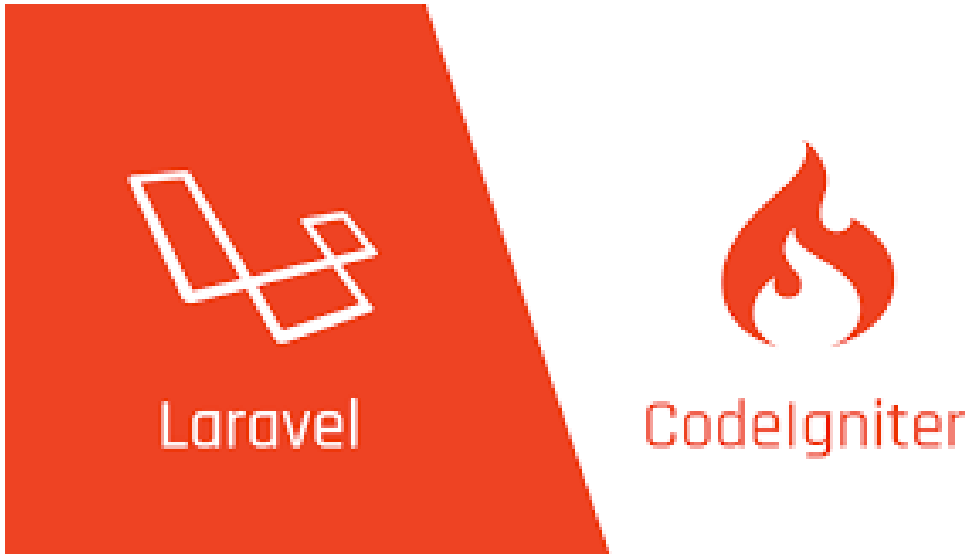
- CodeIgniter is a PHP framework that uses an MVC-based architecture.
- More specifically, CI uses different components for managing the website development tasks.
- The advantage of CI lies in its lightweight process and its reliable performance.

Laravel

- Laravel is a PHP framework that has a simple syntax and is easy to use.
- Laravel has also been integrated with third-party libraries and platforms, i.e., AWS (Amazon Web Services).
- The most important thing in terms of performance is it has reliable cores by relying on add-ons.

Further reading

- Laravel vs CodeIgniter? Which one is the best framework?



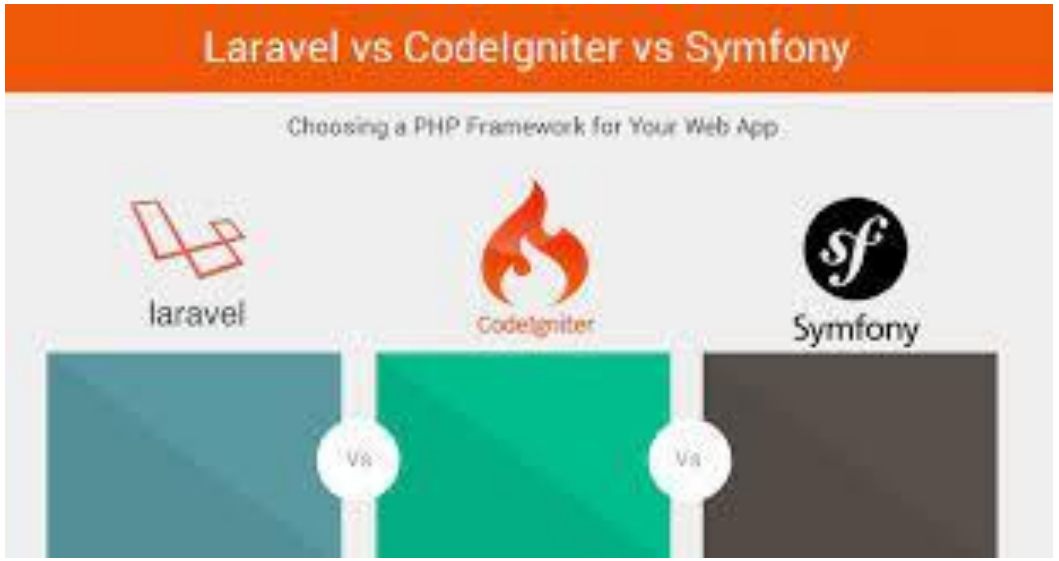
CodeIgniter

Symfony

- The third framework that is used often is Symfony.
- It has a unique name, it also has good flexibility.
- The main advantage of this framework is it has the built-in testing functionality to check whether the program is running normally or not.

Further reading

- Laravel vs CodeIgniter vs Symfony? Which one is the best framework?



Phalcon

- Phalcon has a difference in terms of writing the program code.
- It uses the C language extension from PHP.
- Phalcon is also the fastest PHP framework and has a good performance.

Zend

- Zend is an OOP (Object Oriented Programming) framework paradigm that has MVC architecture.
- The functionalities of Zend make it easy for us to focus on the necessity of components and functions in the project.
- Due to its component-based nature, Zend is widely referred to as the “Glue” framework.

Conclusion

- The framework is a foundation/scaffolding/helper for developing web and desktop-based applications. It increases the developer's performance, as well as make the program code more structured.
- Framework types for website development are divided into three: CSS, JavaScript, and PHP frameworks. It can be used both from the client and the server sides. Their usage suit the needs of companies and organizations.
- The framework is important for the development of software and websites by building a well-organized program code and able to increase the security and make the maintenance easier.

Links

- https://fajarbaskoro.blogspot.com/2019/02/pbkk-1.html
- https://www.sekawanmedia.co.id/pengertian-framework/
- https://www.sekawanmedia.co.id/laravel-vs-codeigniter/
- https://www.sekawanmedia.co.id/framework-javascript/
- https://www.scnsoft.com/blog/web-application-framework
- https://medium.com/@sathik/top-6-most-used-php-frameworks-for-web-development-2020-d090ab47cfc3
- https://blog.risingstack.com/writing-a-javascript-framework-project-structuring/
- https://santosohadi.wordpress.com/pemrograman-berbasis-framework-2/

Tutorial

- Building the application: the flow
  - https://youtu.be/3PMLwe_C-F0
- Bootstrap
  - https://www.hostinger.co.id/tutorial/apa-itu-bootstrap
  - https://youtu.be/LkR-9Z1sle8
- CodeIgniter
  - https://www.youtube.com/watch?v=VckqV2wC1gs&list=PLFIM0718LjIUkkIq1Ub6B5dYNb6IlMvtc
  - https://www.youtube.com/watch?v=VckqV2wC1gs&list=PLFIM0718LjIUkkIq1Ub6B5dYNb6IlMvtc&index=2
- Laravel
  - https://youtu.be/eRZFGSCkAnw
  - https://youtu.be/IrR1Vic4onQ