

**VIETNAM GENERAL CONFEDERATION OF LABOUR
TON DUC THANG UNIVERSITY
FACULTY OF INFORMATION TECHNOLOGY**



**WEB PROGRAMMING AND APPLICATIONS
MIDTERM ESSAY**

SINGLE PAGE APPLICATION

Instructor: **TS. MAI VĂN MẠNH**

Excuter: **ĐOÀN THẾ KHÔI NGUYỄN – 520H0265**

PHẠM PHƯỚC TẤN – 520H0418

NGUYỄN HOÀNG PHÚC KHANG- 520H0066

Class : 20H50301-20H50204

Course : 24

HO CHI MINH CITY, 2022

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THANK YOU

We would like to thank you the faculty of information technology for creating the conditions for students to prepare midterm essay. Thank you to teacher Mai Van Manh who gave a lot of knowledge about web programming for us. We will try hard to complete this essay to achieve the best results.

THE ESSAY WAS COMPLETED AT TON DUC THANG UNIVERSITY

I hereby declare that this is our own project and is guided by Dr. Mai Van Manh. The research contents and results in this topic are honest and have not been published in any form before. The data in the tables for analysis, comments, and evaluation are collected by the author himself from different sources, clearly stated in the reference section.

In addition, the project also uses a few comments, assessments as well as data of other authors, other agencies, and organizations, with citations and source annotations.

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Ho Chi Minh City, day 27-month 5-year 2022

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TEACHER'S CONFIRMATION AND ASSESSMENT SECTION

The confirmation part of the instructor

Ho Chi Minh City, day month year
(sign and write full name)

Evaluation section of the teacher marking the test

Ho Chi Minh City, day month year
(sign and write full name)

SUMMARY

We actively search for knowledge related to single page applications and we read many documents about single page applications in order to complete this essay.

We divide the essay into 4 parts:

Part 1:The introduction,we will introduce the topic.

Part 2:The single page application,we will talk about the concept,how it works,advantages and disadvantages about SPA.

Part 3:The project of SPA, we will take about the project website about SPA using what are the technologies, the knowledge that we applied and how it works

Part 4:The result, we will talk about what we've learned during writing the essay.

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LIST OF SIGNS AND ABBREVIATIONS

ABBREVIATIONS

SPA Single page application

MPA Multi page application

CHAPTER 1– TOPIC INTRODUCTION

At the present, we've heard the phrase "Single Page Application" a lot in social media and international community, it has nearly grown to be the usual for developing web programs as it brings such a lot of advantages associated with time and personal experience.

Many single page applications websites are popular such as: Facebook, GitHub, Shopee.

And what is SPA ? How does it work? What are the advantages and disadvantages?

We will make it clear in this essay.

CHAPTER 2 – THEORY OF SINGLE PAGE APPLICATION

2.1 What is single page application

A Single Page Application (SPA) is a single web page, website, or web application that works within a web browser and loads just a single document. It does not need page reloading during its usage, and most of its content remains the same while only some of it needs updating. When the content needs to be updated, the SPA does it through JavaScript APIs.

This way, users can view a website without loading the entire new page and data from the server. As a result, performance increases, and you feel like using a native application. It offers a more dynamic web experience to the users. SPAs help users be in a single, uncomplicated web space in easy, workable, and simple ways.

2.2 How does SPA work

The architecture of Single page applications is simple. It involves client-side and server-side rendering technologies.

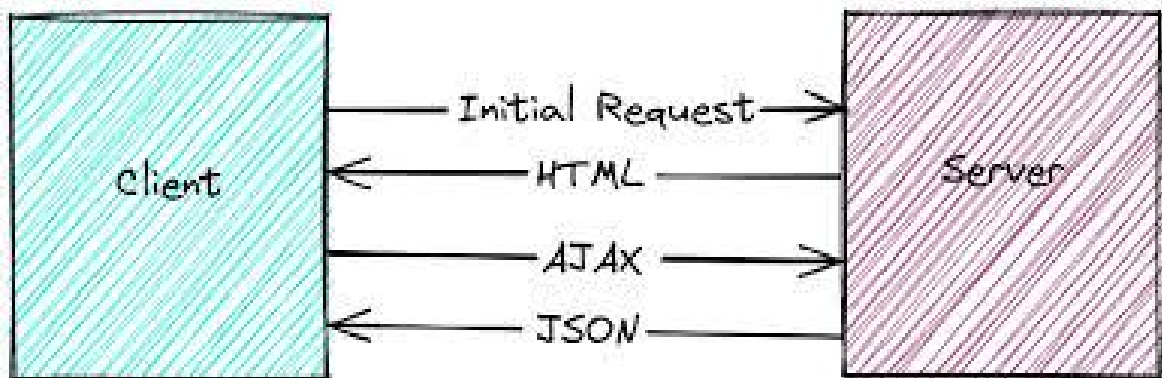


Figure 2.1 : How does SPA work

(Source: <https://www.atatus.com/blog/what-is-a-single-page-application>)

Suppose you want to visit a specific web page. When you enter its address to request access from your browser, the browser sends this request to a server and comes with an HTML document in return.

Using a SPA, the server sends the HTML document only for the first request, and for subsequent requests, it sends JSON data. This means a SPA will rewrite the current page's content and not reload the whole web page. Hence, no need to wait extra for reloading and faster performance. This capability makes a SPA behave like a native application.

2.3 The difference between SPA and MPA

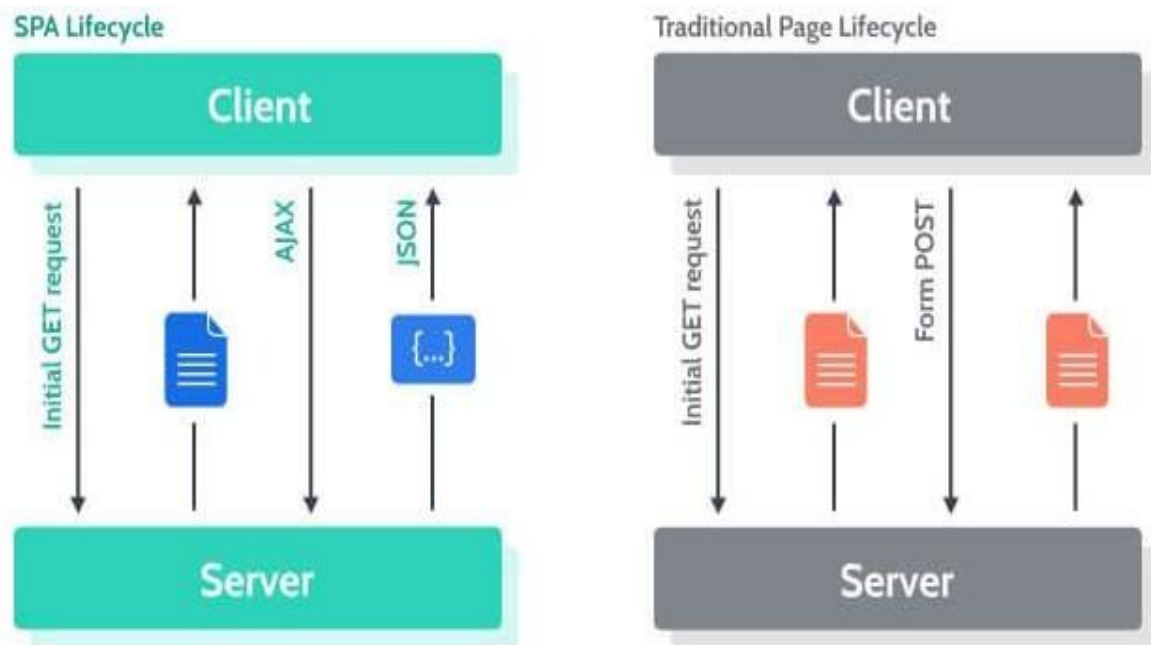


Figure 2.2 : SPA and MPA lifecycle

(Source: <https://wiredelta.com/is-single-page-application-spa-development-worth-it-in-2019/>)

	SPA	MPA
Speed & performance	No reload needed=high speed and responsiveness	Slow speed and performance affected by reloads
Coding	Reusable code for further developments	Coding from scratch for both frontend backend
Development time	Fast development	Development is more complex,so it takes more time
Maintenance	Fast and easy maintenance	Maintenance must be done for each page
Security	Simplified security	Challenging security

Table 2.1 Compare SPA and MPA

2.4 Advantages of single page applications

2.4.1 Quick loading time

A page taking over 200 milliseconds to load can significantly affect your online business and, eventually, sales.

With the SPA approach, your full page loads quicker than traditional web applications, as it only must load a page at the first request. On the other hand, traditional web apps must load pages at every request, taking more time.

2.4.2 Seamless User Experience

SPAs deliver an experience like a desktop or mobile app. Users do not have to watch a new page load, as only the content changes and not the page, making the experience an enjoyable one.

2.4.3 Ease in Building Feature-rich Apps

SPA application makes it easy to add advanced features to a web application. For example, it is easier to build a content editing web app with real-time analysis using SPA development. Doing this with a traditional web app requires a total page reload to perform content analysis.

2.4.4 Uses Less Bandwidth

It is no surprise that SPAs consume less bandwidth since they only load web pages once. Besides that, they can also do well in areas with a slow internet connection. Hence, it is convenient for everyone to use, regardless of internet speed.

2.5 Disadvantages of single page applications

2.5.1 Doesn't Perform Well With SEO

One of the metrics that search engines use is the number of pages a website has. However, since SPAs only load a single page, it serves as a disadvantage when ranking on search engines

2.5.2 Uses a Lot of Browser Resources

SPAs require many resources from the web browser since the browser is doing most of the tasks for the SPAs. Creating SPAs often need users to use the latest browsers with support for some modern features.

2.5.3 Security issues

If the developer is not careful about the data contained on the initial page load this can lead to the display of unwanted data to the user.

SPA can be unsafe because access control is difficult at a functional level. Since the features are transferred from the server to the client, the user has the ability to access the functions that are not allowed

CHAPTER 3 – EXPERIMENT

3.1 The Technologies and Library used

React: This framework of JavaScript with open source that was created by Facebook, we will design a website by using JSX instead of using JavaScript. Because JSX will simpler than JavaScript.

CSS: we use a file to design for the user interface to become lively and good looking.

MySQL: it stores the id and todo of project website.

PHP: use xampp app to connect PHP, react with MySQL.

3.2 Features

Our project website has some features below:

1. Show the full Todo list.
2. Add new todo with press “+” button or “Enter”.
3. Edit todo and save after edit.
4. Delete a todo.
5. Remove all todo
6. All todo are saved in MySQL when add, edit, delete remove all.

3.3 The Website how it works

listtodo
<i><u>-id: int</u></i>
-title: string

API to PHP backend:

- Add: POST localhost:8080/ – add the ToDo

- Read: GET localhost:8080/ – get the ToDo List
- Remove: DELETE localhost:8080/{id} – delete the ToDo
- RemoveAll: DELETE localhost:8080 – delete all the ToDo List
- Update: PUT localhost:8080/{id} – update the ToDoList

3.4 Demo by pictures.

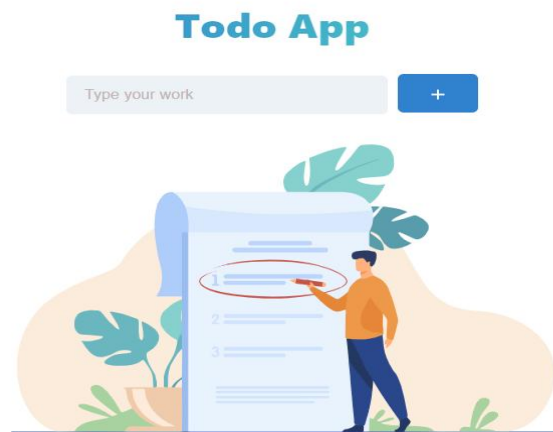


Figure 3.4.1 Home page



Figure 3.4.2 Adding ToDo

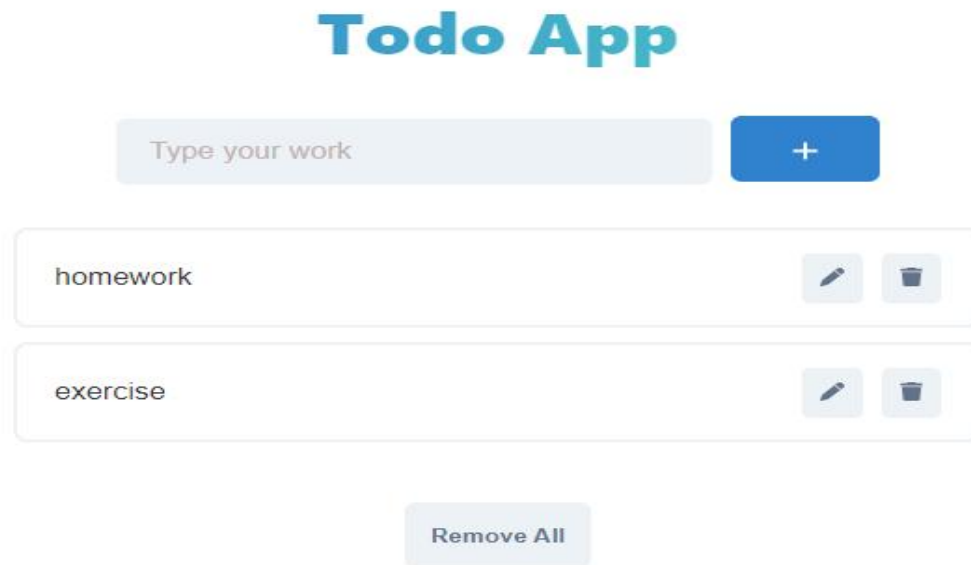


Figure 3.4.3 Display ToDo list

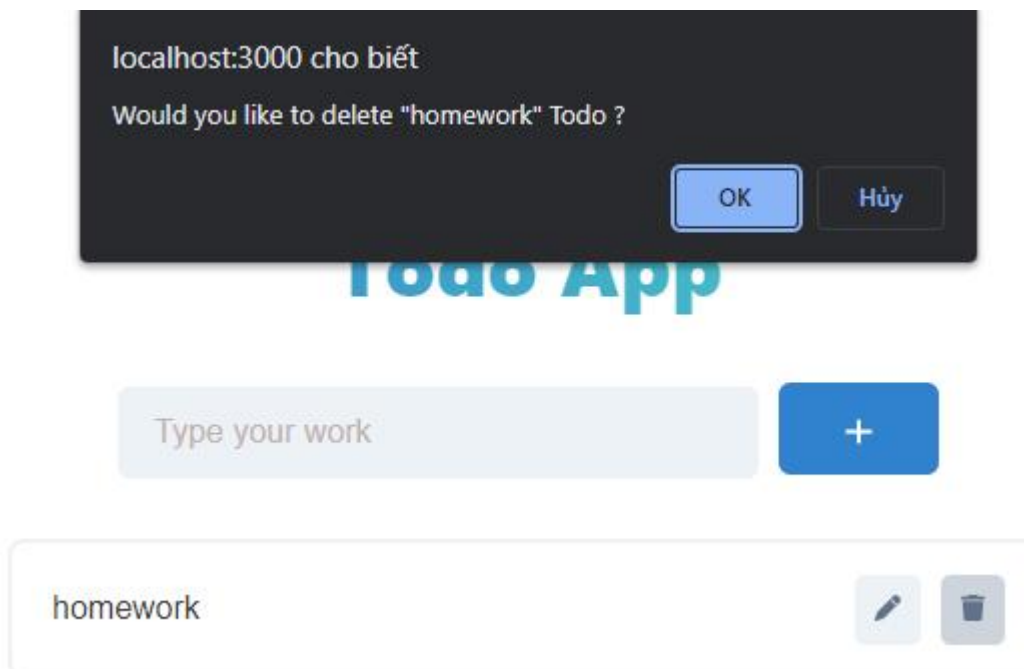


Figure 3.4.4 Delete the ToDo

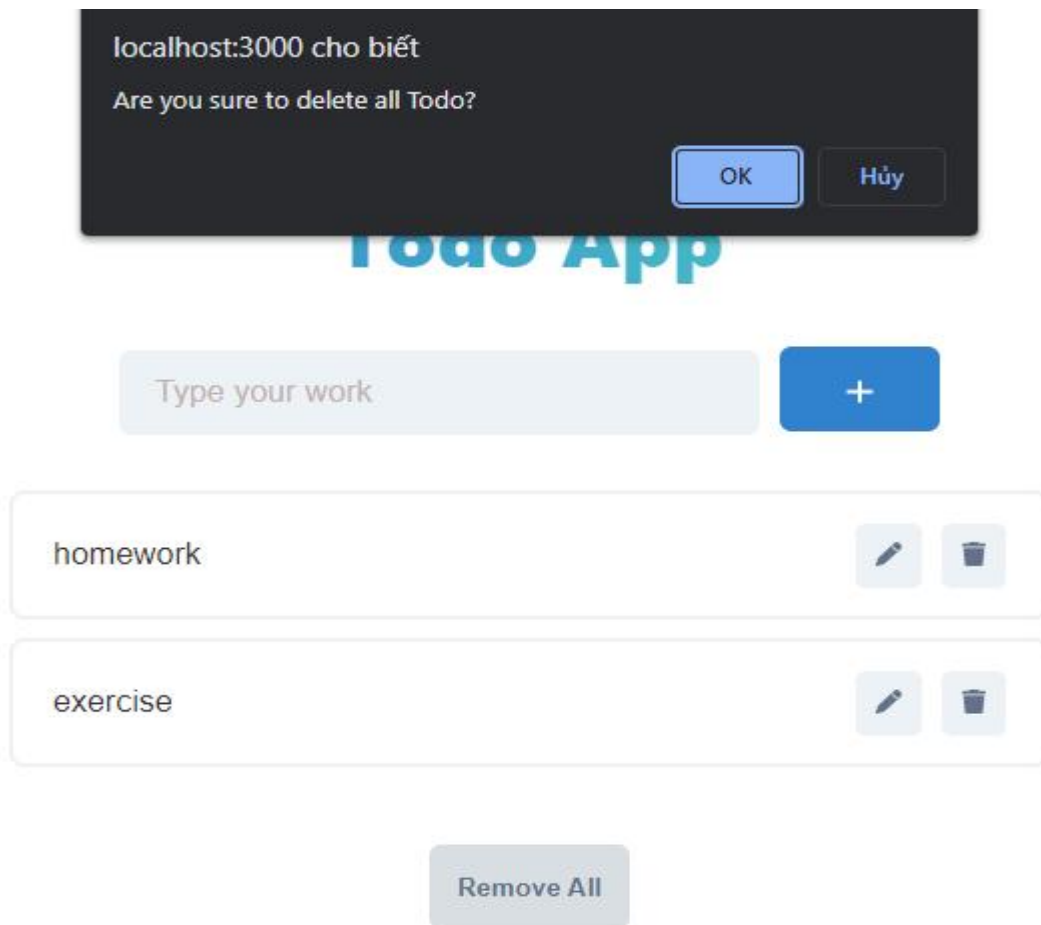


Figure 3.4.5 Delete all the ToDo list

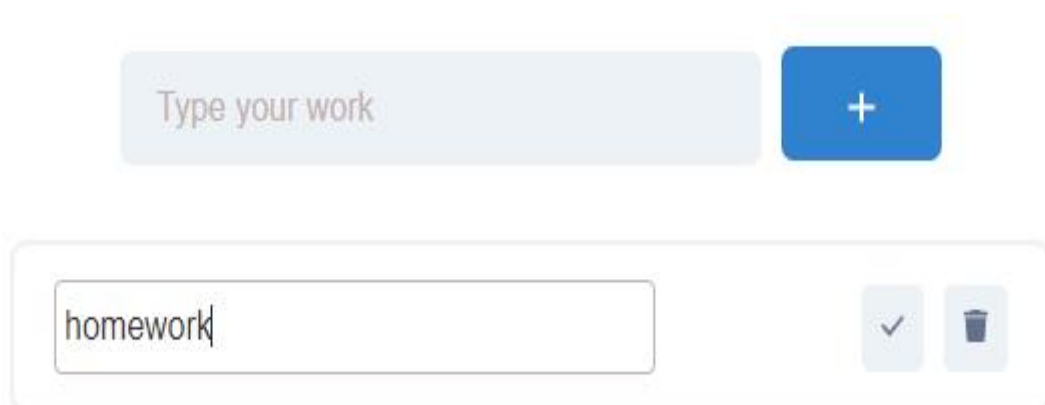


Figure 3.4.6 Edit ToDo

CHAPTER 4 – SUMMARY

4.1 Result

We had understood better about SPA, how does SPA work ? What are the advantages and disadvantages of SPA? , compare SPA and MPA which application can run source code faster than and most advantages.

This is an opportunity for us to both learn the theory and get to experience what are involved in single page application by coding a web using SPA.

4.2 Future Development

We will learn more knowledge about many things related to web programming. Learn more about the technologies involved to make web applications more functional and practical.

We are looking forward to receiving feedback from lecturer to improve our essay and future development instructions.

REFERENCES

1. <https://www.netsolutions.com/insights/single-page-application/>
2. <https://asperbrothers.com/blog/spa-vs-mpa/>
3. <https://welldoneby.com/blog/spa-vs-mpa-what-is-the-difference/>
4. [https://geekflare.com/single-page-applications/#:~:text=A%20Single%20Page%20Application%20\(SPA,some%20of%20it%20needs%20updating.](https://geekflare.com/single-page-applications/#:~:text=A%20Single%20Page%20Application%20(SPA,some%20of%20it%20needs%20updating.)