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The Foundation of a Professional SaaS-Lms

Unlock your potential and master web development

PROGRAMMING STEP BY STEP AND MORE INSTRUCTIONAL GUIDE

LEAP INTO THE BACKEND
THE HIDDEN ENGINEERING

Book 6 - Part One
**Parameterized Menu: Architecture,
Behavior, and Usage**

Rene F. Ruano Domínguez

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DEDICATION

TO THE GENERATIONS OF THE FUTURE: MILLENNIALS, BABY BOOMERS, AND BEYOND.

This guide is dedicated to everyone: To you, the bright young minds shaping the world with your ingenuity and creativity. To the millennials, who navigate the digital age with ease and constantly seek new ways to innovate. To the baby boomers, who pioneered the technological revolution and now contribute their experience and wisdom. To the retirees who dream of staying up-to-date, filling their free time productively, and exercising their minds.

FOREWORD

This Book 6, entitled “Book 6 - Part One: From Visual Code to Hidden System: JavaScript as Professional Engineering in the Era of Full Stack and the Cloud,” marks a turning point in the Programming Step by Step and Beyond Series. It not only represents the culmination of a progressive learning journey but also a significant contribution to the development of contemporary software and to an updated understanding of the technologies that underpin modern programming. This Volume 6 marks the transition from the visible code of the frontend to the deep, hidden logic of the backend, expanding language learning to a comprehensive view of software engineering applied to real-world systems and professional environments.

More than just another technical volume, this book is the result of a sustained journey of knowledge, practice, and critical reflection on how modern applications are built. Behind these pages lie years of study, experimentation, and systematic work with JavaScript, as well as the conviction that knowledge reaches its maximum value when shared with clarity, rigor, and a pedagogical approach.

The author has consistently demonstrated a commitment to facilitating learning for others, translating complex concepts into accessible explanations without sacrificing technical depth. This perseverance in teaching, organizing ideas, and documenting processes is reflected in the continuous improvement of the entire series and, especially, in this Book 6, conceived as a bridge between knowledge and its professional application.

Here, a training approach is consolidated that transcends the mere transmission of tools. The central purpose is to cultivate professional judgment: the ability to analyze problems, design

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coherent solutions, structure scalable systems, and make responsible decisions in real-world development contexts.

This volume aims to help the reader not only acquire new technical skills but also develop the mindset of a software engineer: critical, methodical, creative, and committed to the quality, security, and ethics of technological development.

With this conviction, Book 6 of the Programming Step by Step and Beyond Series is presented as a guide to evolving from code to system, transforming technical knowledge into true professional competence and preparing the reader for the challenges of modern development in the era of Full Stack and the cloud.

With gratitude and admiration for the author:

ChatGPT

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ACKNOWLEDGMENTS

To my family, my colleagues, my friends.

Thank you, a thousand times thank you, for the unconditional support you have given me since I embarked on this project. And to those who didn't believe in me, I thank you for motivating me to prove that it was worthwhile.

Without the encouragement, suggestions, trust you placed in me, and the personal challenge of creating a useful product, this project would not have been possible.

Introduction __ Interface Engineering and Modularity in the Web Ecosystem

In today's software development era, interface design is no longer just about aesthetics; it's an engineering discipline that demands scalability, efficiency, and maintainability. This tutorial is designed as a comprehensive guide for developing advanced navigation systems, focusing on Visual Architecture Optimization and Component Encapsulation.

Throughout these chapters, we'll explore how encapsulation is not just an organizational technique, but a defensive strategy that protects the integrity of our application. By isolating components like the lms-menu, we allow rendering logic and visual design to coexist without interfering with the rest of the web ecosystem, enabling seamless and robust integration.

The reader will delve into the study of highly specialized HTML and CSS algorithms, from vector-based drawing methodologies for custom icons to the precise synchronization of collapsible elements and corporate logos. We will explore the extreme customization of responsive behavior, allowing complete control over the menu's position and state across various devices and screen resolutions.

Finally, this document goes beyond theory by presenting Practical Integration, where we will transform blocks of code into a functional tool using JavaScript and building dynamic insertion systems. The ultimate goal is to equip developers with the skills necessary to build interfaces that are not only visually striking but also technically flawless and geared towards superior usability.

What we will study in this course:

Architecture Mastery: Implementation of modular design principles and encapsulation.

Geometric Precision: Use of vector drawing and coordinates for unique interfaces.

Surgical Adaptability: Fine-tuning selectors and labels for a seamless mobile experience.

Insertion Logic: Development of JavaScript scripts for the implementation of dynamic menus in real systems.

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Conclusions

The culmination of this volume marks a fundamental milestone in the transition from conventional web development to the creation of a robust Software as a Service (SaaS) infrastructure. Following the detailed analysis and implementation of the algorithms that bring the lms-menu system to life, the following key conclusions emerge:

a. The Sovereignty of Encapsulation

Modular architecture and encapsulation have proven to be not merely aesthetic preferences, but critical engineering necessities. By isolating the menu and its styles (`lms-style.css`) using specific selectors and JavaScript-controlled injection, we have shielded the component from rendering conflicts, ensuring that the interface remains intact regardless of the complexity of the webpage hosting it.

b. Mastery of Geometry and Style

The fine-tuning performed in this book—from the coordinate-based vector drawing methodology to the precise synchronization of the logo and collapsed width—underscores the importance of visual usability. The ability to move elements like navigation bars (hamburger menu) and adjust link spacing ensures that the tool is not only functional but also offers a smooth and adaptive user experience (UX).

c. The Menu as a Security and SaaS Cornerstone

The integration of the drop-off/drop-down menu in a real-world environment, validated through the creation of registration forms and database connections, confirms that the system is ready for information compartmentalization. We have laid the foundation for a multi-user environment where the menu acts as an intelligent "navigation map," capable of differentiating access and protecting the integrity of each visitor's data.

d. Scalability and Operational Efficiency

Automating menu injection via `menu.js` eliminates code redundancy and optimizes maintenance. This methodology allows developers to focus on educational content and business logic, confident that the navigation interface will behave predictably and efficiently throughout the entire mega-course ecosystem.

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Final Reflection

This book doesn't just deliver code; it delivers a systemic thinking methodology. Readers and developers now possess the tools to build interfaces that not only "look good" but are designed to withstand the growth, concurrency, and technical challenges of the modern web. Security, order, and visual elegance are now the pillars upon which the following modules of this ambitious project will be built.

8. Appendix

8.1 Appendix 1. Bootstrap Icons for the Web

A clear, organized, and practical guide with the most commonly used icons in dashboards, LMS, SaaS, and administrative systems.

1) Required links for inserting icons

a) Link that loads the Bootstrap Icons library.

```
<link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap-icons@1.11.3/font/bootstrap-icons.css">
```

b) Link that resets the browser's default styles and unifies behavior across Chrome, Firefox, Safari, etc.

```
<link rel="stylesheet" href="https://public.codepenassets.com/css/normalize-5.0.0.min.css">
```

These two links have different functions but complement each other.

The complete list of Bootstrap Icons bi bi-... icons to replace those in your menu is presented here in a clear, organized, and practical guide, featuring the most commonly used icons in dashboards, LMSs, SaaS, and administrative systems.

These are the exact names so you can copy them directly into your menu.

Essential Icons for an LMS/SaaS

(Always use the format: `<i class="bi bi-ICON"></i>`)

- Main Navigation

Función	Icono
Dashboard	bi-speedometer2
Inicio	bi-house
Cursos	bi-journal-bookmark
Lecciones	bi-journal-text
Estudiantes	bi-people

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Función	Icono
Profesores	bi-person-badge
Certificados	bi-award
Calendario	bi-calendar-event
Notificaciones	bi-bell
Mensajes	bi-chat-dots
Archivos	bi-folder2-open

- Management - Content Management

Función	Icono
Crear	bi-plus-circle
Editar	bi-pencil-square
Guardar	bi-save
Subir archivo	bi-upload
Descargar	bi-download
Adjuntar	bi-paperclip
Publicar	bi-megaphone

- User

Función	Icono
Perfil	bi-person-circle
Ajustes	bi-gear
Seguridad	bi-shield-lock
Logout	bi-box-arrow-right
Login	bi-box-arrow-in-right

- Administration

Función	Icono
Reportes	bi-graph-up
Estadísticas	bi-bar-chart
Configuración general	bi-sliders
Roles	bi-person-gear

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Función	Icono
Usuarios	bi-people-fill
Base de datos	bi-database

- Educational icons

Función	Icono
Libro	bi-book
Biblioteca	bi-bookshelf
Examen	bi-clipboard-check
Tareas	bi-clipboard-data
Evaluación	bi-check2-circle
Progreso	bi-graph-up-arrow

- Communication

Función	Icono
Inbox	bi-inbox
Enviados	bi-send
Favoritos	bi-star
Borradores	bi-envelope-exclamation
Archivo	bi-archive
Papelera	bi-trash

- Status and alerts

Función	Icono
Error	bi-x-circle
Advertencia	bi-exclamation-triangle
Información	bi-info-circle
Éxito	bi-check-circle
Cargando	bi-arrow-repeat

- How to insert an icon in the code

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```
<span class="icon">  
  <i class="bi bi-speedometer2"></i>  
</span>
```

9. MOTIVATIONAL QUOTES

"Success is the sum of small efforts repeated day in and day out."

Robert Collier

"The only limit to your achievement of tomorrow will be your doubts of today."

Franklin D. Roosevelt

"It doesn't matter how slowly you go as long as you don't stop."

Confucius

"The path to success and greatness lies in developing what you already have."

ZigZiglar

"The secret of success lies in knowing something more than others."

Aristotle Onassis

"It's not how many times you fall, it's how many times you get back up."

Vince Lombardi

"Success is not the key to happiness. Happiness is the key to success. If you love what you do, you will be successful."

Albert Schweitzer

"The only way to do great work is to love what you do."

Steve Jobs

"The biggest risk is not taking any risk. In a world that's changing really fast, the only strategy that's guaranteed to fail is not taking any risks."

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Mark Zuckerberg

"Motivation gets us started, and habit keeps us going."

Jim Ryun

"It's not enough to tell the truth; you have to prove you have it."

Baltasar Gracián

"If you can't fly, run; if you can't run, walk; if you can't walk, crawl, but keep moving toward your goal."

Martin Luther King Jr.

"No matter your physical age, you can always motivate your mind to face tomorrow."

From the Author

10. ABOUT THE AUTHOR

After several decades dedicated to improving the energy efficiency of heating and cooling equipment and systems, I faced a major change: retirement. Upon retiring, I felt disoriented and without purpose, which affected my emotional well-being. To combat this feeling, I sought a new occupation that would keep me active and motivated.

I decided to share my experiences and knowledge accumulated after more than four decades working in the industry. Thus, this project was born, with the goal of publishing articles, calculation tools, and tutorials on the various disciplines in which I had worked throughout my career as an engineer. I acquired these computer skills and knowledge through self-study, delving into technical, theoretical, and practical topics. This includes web programming, which I used as an auxiliary tool to optimize project management, investments, finance, and marketing.

From my experience, web programming is a powerful tool, key to solving complex problems in industrial environments, technical services, and everyday life.

My new perspective on the future, focused on the information technology revolution, has been key to keeping my mind active, staying up-to-date, and learning new technologies empirically. In this context of constant and accelerated change, my vision expands toward a horizon where AI not only optimizes processes but also redefines industries and creates previously unimaginable opportunities.

This guide highlights the importance of programming languages as essential tools in the modern world and is designed to support people of all ages in developing their professional skills and achieving their career goals. It provides valuable resources for both those starting their careers and those seeking new ways to apply their experience.

The Author

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