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| **International School**  Đồ Án CDIO  **CMU-CS 447**    Implement  Version 1.0  Date: 05- April - 2025  Airline Reservation System  Submitted by  Nguyen Pham Anh Huong  Cao Minh  Le Minh Hieu  Nguyen Thi Thanh Huong  **Approved by**  **Capstone Project 1 - Mentor:**  Name Signature Date  Tinh, Le Van \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_04 - April- 2025 |

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# PROJECT INFORMATION

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| **PROJECT INFORMATION** | | | |
| **Project Acronym** | ARS | | |
| **Project Title** | Airline Reservation System | | |
| **Project Web URL** |  | | |
| **Start Date** | 5-Apr - 2025 | | |
| **End Date:** | 24 - May - 2025 | | |
| **Lead Institution** | International School, Duy Tan University | | |
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Table 1 - Project Information

# DOCUMENT INFORMATION

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| --- | --- | --- | --- |
| **DOCUMENT INFORMATION** | | | |
| **Document Title** | Implement | | |
| **Author(s)** | Group 3 | | |
| **Role** | Implement\_v1.0 | | |
| **Date** | 5-Apr - 2025 | File name | Implement\_v1.0 |
| **URL** | https://github.com/nnkq/myproject.git | | |
| **Access** | Project and CMU Program | | |

Table 2 - Document Information

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# REVISION HISTORY

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Version** | **Person(s)** | **Date** | **Description** | **Approval** |
| 1.0 | All members | 12-Apr - 2025 | Finish contents of implement document | x |
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Table 3 - Revision History

# INTRODUCTION

## PURPOSE OF DOCUMENT

This document describes the implementation approach of the Airline Reservation System. It outlines the technologies, tools, and processes used during development.

## DOCUMENT OBJECTIVES

* The To provide technical guidance for the development team
* To document the key technologies and decisions made
* To support future maintenance and scaling.

## INTENDED AUDIENCE

* Developers
* Project Supervisors
* System Architects
* Testers.

## ACRONYMS AND ABBREVIATIONS

|  |  |
| --- | --- |
| **Acronym/Abbreviation** | **Meaning** |
| **ARS** | **A**irline **R**eservation **S**ystem |

# MAIN DECISIONS TO CHOOSE TECHNOLOGIES

We have some key decisions to choose our technologies stack:

* Open-source technologies: We would like to choose all the frameworks and technology stacks for the Airline Reservation System that are licensed under MIT license (or other open-source licenses) so that we can have more support from the community, reduce software costs, and gain the flexibility to adjust or extend the system when needed.
* New but proven technologies We use React, Redux, and Node.js for building the Airline Reservation System because they are modern and allow us to learn new technologies while developing the project. At the same time, they have been used in many production systems across the industry, so we know they are safe, reliable, and scalable for a real-world booking system.
* Document rich: We want to use frameworks and libraries that provide good and well-organized documentation so that we can save time reading the docs, speed up the development of key features like flight search, booking, and payment integration, and solve any issues efficiently during the project.

# PROGRAMING LANGUAGE

## JAVASCRIPT

JavaScript often abbreviated as JS, is a high-level, dynamic, weakly typed, prototype-based, multi-paradigm, and interpreted programming language. It’s the most popular language nowadays and can be used everywhere. JavaScript is so popular that we can easily find a solution for our problem on Google and Stack overflow.

## HTML/CSS

HTML (the Hypertext Markup Language) and CSS (Cascading Style Sheets) are two of the core technologies for building Web pages. HTML provides the structure of the page, CSS the (visual and aural) layout, for a variety of devices. Along with graphics and scripting, HTML and CSS are the basis of building Web pages and Web Applications.

## SQL

SQL (Structured Query Language) is the standard language for managing and manipulating relational databases. It is used to store, retrieve, and manage data efficiently. SQL is widely supported, well-documented, and plays a key role in developing reliable and scalable web applications, including airline reservation systems.

# TECHNOLOGIES OF WEB APPLICATIONS

## REACT

Home page: <https://reactjs.org/>

React is the current industry standard that offers a lot of out of the box benefits. It is fast, efficient, and scalable. Due to the large community, finding solutions to potential problems and reference material is much easier, even for a potential dev without a lot of experience who would like to contribute to the Main Course.

**Pros of React**

**The community**

Like with most online developer communities, the React one is growing and offers a great network of experienced developers.

**Faster development**

Speed is often the name of the game where development is concerned. Anything that can speed up the development of an application is much appreciated!

With React, the development time is considerably shorter.

## REDUX

Home page: <https://redux.js.org/>

Redux is a predictable state container for JavaScript apps.

It helps you write applications that behave consistently, run in different environments (client, server, and native), and are easy to test. On top of that, it provides a great developer experience, such as live code editing combined with a time traveling debugger.

You can use Redux together with React, or with any other view library.

## RESTful API

RESTful API is an architectural style for an application program interface (API) that uses HTTP requests to access and use data. We build APIs based on RESTful principles for easy data accessing and interacting between different levels of the system.

## SpringBoot

Spring Boot is a popular Java-based framework that simplifies the creation of stand-alone, production-ready backend applications. For the Airline Reservation System, Spring Boot is used to build robust backend services, handle business logic, and connect securely with the database.

# Database / Data Cubes

## 5.1. MYSQL

MySQL is one of the most well developed and mature relational databases

management systems, with its development, ongoing for more than 20 years now, from

supporting small websites on single machines to data warehouses and large scale

concurrent setups.

## 5.2. Data Warehouses

Data warehouses utilize PostgreSQL for storing large-scale aggregated data, supporting efficient reporting, historical data analysis, and business intelligence. The system ensures reliable data processing and quick access for decision-making.

## 5.3. Data Cubes

OLAP cubes are created using tools like SSAS or Mondrian to enable multidimensional data analysis. Data is converted into RDF format using Open Refine, and users can access the cubes via REST APIs, allowing efficient querying and data extraction for advanced analysis.

# DEVELOPMENT STACK

## VISUAL STUDIO CODE

Home page: <http://code.visualstudio.com/>

Visual Studio Code (Vscode) is a great open-source code editor developed by Microsoft, it provides a rich and easy to use user interface as well as thousands of extensions that we can install to suit our needs.

# VERSION CONTROL

## GITHUB

Home page: <https://github.com>

GitHub is a repository hosting service. Think of it as the "cloud" for code.

GitHub will host your source code projects in a variety of different programming languages and keep track of the various changes made to every iteration. It is able to do this by using git, a revision control system that runs in the command line interface.

Using GitHub has numerous benefits including easier collaboration with colleagues and peers, ability to look back on previous versions, and tons of easy integration options.

# DEPLOYMENT

## Cloud Environment: Google Cloud Platform (GCP)

**Home page:** [https://cloud.google.com/](https://cloud.google.com/" \t "_new)  
Google Cloud Platform (GCP) will host the backend services and database for the system, offering scalability and high availability. Google App Engine will be used for deploying the backend application, while Cloud SQL will manage the PostgreSQL database.