**Airport Management System**

“A dissertation submitted in partial fulfillment of the requirements of Bachelor of Technology Degree in Computer Science and Engineering of the Maulana Abul Kalam Azad University of Technology for the year 2015-2019”



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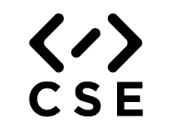
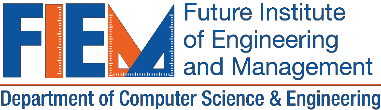
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***Certificate of Approval***

This is to certify that this report of B. Tech. 8th semester project, entitled **“Airport Management System”** is a record of bona-fide work, carried out by **Diptendu Sil, Aakash Mallick, Rahul Kumar Sahu, Srinjoy Choudhury** under my supervision and guidance.

In my opinion, the report in its present form is in partial fulfillment of all the requirements, as specified by the ***Future Institute of Engineering & Management*** and as per regulations of the ***Maulana Abul Kalam Azad University of Technology***. In fact, it has attained the standard, necessary for submission. To the best of my knowledge, the results embodied in this report, are original in nature and worthy of incorporation in the present version of the report for B. Tech. program in Computer Science and Engineering in the year 2015-2019.

It is understood that by this approval the undersigned does not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn there in, but approve this thesis for the purpose for which it is submitted.

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(**Ashish S** – Mentor) (**Krishnendu Ganguly**-Manager Academy)

**AIM OF THE PROJECT**

This document is aimed at:

• Providing the necessary inputs to the detailed requirements gathering phase and further on for the SDLC processes.

• This document also serves to establish the traceability between the Business Objectives and the requirements identified in the proposed solution and how they satisfy the stated objectives.

• Provide expectation traceability in terms of the requirements and the user expectation

• Serves as a formal template for documenting the Business Requirements which also includes statutory and regulatory requirements.

The purpose of this document is to systematically capture requirements for the project and the system to be developed. Functional requirements are captured in this document. It also serves as the input for the project scoping

# PROJECT OVERVIEW

Below are the objectives that shall be fulfilled post the execution of this project:

Airport Management System will create and maintain Plane, Pilot and Hangar information.

* Create and maintain Plane information
* Create and maintain Pilot information
* Create and maintain Hangar information
* Allocate plane to hangar
* Approve new manager registrations

Whenever somebody registers their credentials are to be stored in a database and later validated while they register. Also they can login if they are already registered.

The Admin will be able to view new manager registration. Admin can accept/reject manager request.

The Admin can add, edit and delete plane, pilot and hangar information and also change manager in charge of hangar.

The Manager can view plane, unallocated and allocated hangars and can also allocate planes to unallocated hangars.

This application uses HTML5, CSS3, Materialize CSS, JSP on the front end and **Spring** to write the business logic and **Hibernate** to establish database connectivity. Here we would make use of Oracle server.

# METHODOLOGY TO BE FOLLOWED

In this project we are going to follow **Agile** methodology

AGILE SOFTWARE DEVELOPMENT is an approach to [software development](https://en.wikipedia.org/wiki/Software_development) under which

requirements and solutions evolve through the collaborative effort of [self-organizing](https://en.wikipedia.org/wiki/Self-organization#Human_society) andcross functionalteams and their [customer(s)](https://en.wikipedia.org/wiki/Customer)[/end user(s).](https://en.wikipedia.org/wiki/End_user) it advocates adaptive planning, evolutionary development, [empirical knowledge,](https://en.wikiquote.org/wiki/Empirical_knowledge) and [continual improvement,](https://en.wikipedia.org/wiki/Continual_improvement_process) and it encourages rapid and flexible response to change.

The term agile (sometimes written agile) was popularized, in this context, by the [manifesto for agile software development.](https://en.wikipedia.org/wiki/Agile_software_development#The_Agile_Manifesto) the values and principles espoused in this manifesto were derived from and underpin a broad range of [software development frameworks,](https://en.wikipedia.org/wiki/Software_development_process) including [scrum](https://en.wikipedia.org/wiki/Scrum_(software_development)) and KANBAN [.](https://en.wikipedia.org/wiki/Kanban_(development))

There is significant anecdotal evidence that adopting agile practices and values improves the agility of software professionals, teams and organizations; however, some empirical studies have found no scientific evidence.

# AGILE SOFTWARE DEVELOPMENT PRINCIPLES

The manifesto for agile software development is based on twelve principles:

1. Customer satisfaction by early and continuous delivery of valuable software.
2. Welcome changing requirements, even in late development.
3. Deliver working software frequently (weeks rather than months)
4. Close, daily cooperation between business people and developers
5. Projects are built around motivated individuals, who should be trusted
6. Face-to-face conversation is the best form of communication (co-location)
7. Working software is the primary measure of progress
8. Sustainable development, able to maintain a constant pace
9. Continuous attention to technical excellence and good design
10. Simplicity—the art of maximizing the amount of work not done—is essential
11. Best architectures, requirements, and designs emerge from self-organizing teams
12. Regularly, the team reflects on how to become more effective, and adjusts accordingly

**FEATURES OF AGILE PRINCIPLES:**

ITERATIVE, INCREMENTAL AND EVOLUTIONARY

Most agile development methods break product development work into small increments that minimize the amount of up-front planning and design. iterations, or sprints, are short time frames [(time boxes)](https://en.wikipedia.org/wiki/Timeboxing) that typically last from one to four weeks. each iteration involves a [cross-functional team](https://en.wikipedia.org/wiki/Cross-functional_team) working in all functions: [planning,](https://en.wikipedia.org/wiki/Project_planning) [analysis,](https://en.wikipedia.org/wiki/Requirements_analysis) [design,](https://en.wikipedia.org/wiki/Software_design) [coding,](https://en.wikipedia.org/wiki/Computer_programming) [unit testing,](https://en.wikipedia.org/wiki/Unit_testing) and [acceptance testing.](https://en.wikipedia.org/wiki/Acceptance_testing) at the end of the iteration a working product is demonstrated to stakeholders. this minimizes overall risk and allows the product to adapt to changes quickly. an iteration might not add enough functionality to warrant a market release, but the goal is to have an available release (with minimal [bugs)](https://en.wikipedia.org/wiki/Software_bug) at the end of each iteration. multiple iterations might be required to release a product or new features. working software is the primary measure of progress.

EFFICIENT AND FACE-TO-FACE COMMUNICATION

The principle of [co-location](https://en.wikipedia.org/wiki/Colocation_(business)) is that co-workers on the same team should be situated together to better establish the identity as a team and to improve communication. this enables [face-to-face interaction,](https://en.wikipedia.org/wiki/Face-to-face_interaction) ideally in front of a whiteboard, that reduces the cycle time typically taken when questions and answers are mediated through phone, persistent chat, wiki, or email.

no matter which development method is followed, every team should include a [customer representative](https://en.wikipedia.org/wiki/Customer_representative) ("product owner" in [scrum)](https://en.wikipedia.org/wiki/Scrum_(software_development)). this person is agreed by stakeholders to act on their behalf and makes a personal commitment to being available for developers to answer questions throughout the iteration. at the end of each iteration, stakeholders and the customer representative review progress and re-evaluate priorities with a view to optimizing the [return on investment](https://en.wikipedia.org/wiki/Rate_of_return) (ROI) and ensuring alignment with customer needs and company goals.

in agile software development, an **information radiator** is a (normally large) physical display located prominently near the development team, where passers-by can see it. it presents an up-to date summary of the product development status. a [build light indicator](https://en.wikipedia.org/wiki/Build_light_indicator) may also be used to inform a team about the current status of their product development.

VERY SHORT FEEDBACK LOOP AND ADAPTATION CYCLE

A common characteristic in agile software development is the [daily stand-up](https://en.wikipedia.org/wiki/Stand-up_meeting) (also known as the daily scrum). in a brief session, team members report to each other what they did the previous day toward their team's iteration goal, what they intend to do today toward the goal, and any roadblocks or impediments they can see to the goal.

QUALITY FOCUS

Specific tools and techniques, such as [continuous integration,](https://en.wikipedia.org/wiki/Continuous_integration) automated [unit testing,](https://en.wikipedia.org/wiki/Unit_testing) [pair programming,](https://en.wikipedia.org/wiki/Pair_programming) [test-driven development,](https://en.wikipedia.org/wiki/Test-driven_development) [design patterns,](https://en.wikipedia.org/wiki/Software_design_pattern) [behavior-driven development,](https://en.wikipedia.org/wiki/Behavior-driven_development) [domainhttps://en.wikipedia.org/wiki/Domain-driven\_designdriven design,](https://en.wikipedia.org/wiki/Domain-driven_design) [code refactoring](https://en.wikipedia.org/wiki/Code_refactoring) and other techniques are often used to improve quality and enhance product development agility. this is predicated on designing and building quality in from the beginning and being able to demonstrate software for customers at any point, or at least at the end of every iteration.

# DETAIL PROJECT DESCRIPTION

The full project is divided into three segments. They are as follows:

* Admin Login
* Manager Login

# Admin Login

We have a designed a separate webpage that opens when an admin logs in.

Whenever an individual want to sign up as admin, his/her credentials are validated to give them access to admin functionalities.

Admin functionalities involve the following:

* Create, edit and delete plane information
* Create, edit and delete pilot information
* Create, edit and delete hangar information
* Approve new manager registrations
* Disconnecting and Logging out

Let’s discuss each functionality in details:

* **Create, edit and delete plane information**

The admin would be able to create, view and delete plane information.

* **Create, edit and delete pilot information**

The admin would be able to create, view and delete pilot information.

* **Create, edit and delete hangar information**

The admin would be able to create, view and delete hangar information.

* **Approve new manager registration**

In this section, the admin would be able to view and approve or decline new manager registrations.

# Manager-Login

This part gives access to the Managers who can further perform some functionalities.

Whenever somebody registers as a Manager, his/her credentials are authenticated to give them access to all the Manager functionalities.

The various functionalities involve:

* + Personal details registration
  + Viewing plane information
  + Viewing unallocated and allocated hangars
  + Allocating planes to unallocated hangars
  + Disconnecting and logging out

Let’s discuss the functionalities all one by one:

* **Personal Details registration**

To get a User id the user would have to get themselves signed up by giving the various details in the field boxes present in the registration page. Upon successful fulfillment of all the criterion the user name would be generated and the user will be able to login.

* **Viewing plane information**

The manager can view list of all available planes.

* **Viewing unallocated and allocated hangar information**

The manager can view all the unallocated and allocated hangars available.

* **Allocating planes to unallocated hangars**

The managers can unallocate an allocated hangar or allocate a plane to an unallocated hangar. One plane can be allocated to only one hangar and vice versa.

**TECHNOLOGIES USED**

#  HTML5

**HTML 5** (formerly and commonly spelled **HTML5**) is a [software solution stack](https://en.wikipedia.org/wiki/Solution_stack) that defines the properties and behaviors of [web page](https://en.wikipedia.org/wiki/Web_page) [content](https://en.wikipedia.org/wiki/Web_content) by implementing a [markup](https://en.wikipedia.org/wiki/Markup_language) based [pattern](https://en.wikipedia.org/wiki/Software_design_pattern) to it. HTML 5 includes detailed processing models to encourage more interoperable implementations; it extends, improves and rationalizes the markup available for documents, and introduces markup and [application programming interfaces](https://en.wikipedia.org/wiki/Application_programming_interface) (APIs) for complex [web applications](https://en.wikipedia.org/wiki/Web_application).[[11]](https://en.wikipedia.org/wiki/HTML5#cite_note-HTML5diffHTML4-12) For the same reasons, HTML 5 is also [a candidate for cross-platform mobile applications](https://en.wikipedia.org/wiki/HTML5_in_mobile_devices), because it includes features designed with low-powered devices in mind. Many new [syntactic](https://en.wikipedia.org/wiki/Syntax_(programming_languages)) features are included. To natively include and handle [multimedia](https://en.wikipedia.org/wiki/Multimedia) and [graphical](https://en.wikipedia.org/wiki/2D_computer_graphics) content.

**FEATURES**

HTML 5 introduces [elements](https://en.wikipedia.org/wiki/HTML_element) and attributes that reflect typical usage on modern [websites](https://en.wikipedia.org/wiki/Website). Some of them are semantic replacements for common uses of generic block (<div>) and inline (<span>) elements, for example <nav> (website navigation block), <footer> (usually referring to bottom of web page or to last lines of HTML code), or <audio> and <video> instead of <object>. Some deprecated elements from [HTML 4.01](https://en.wikipedia.org/wiki/HTML_4.01) have been dropped, including purely presentational elements such as <font> and <center>, whose effects have long been superseded by the more capable [Cascading Style Sheets](https://en.wikipedia.org/wiki/Cascading_Style_Sheets). There is also a renewed emphasis on the importance of [DOM scripting](https://en.wikipedia.org/wiki/DOM_scripting) in Web behavior.

The HTML 5 syntax is no longer based on [SGML](https://en.wikipedia.org/wiki/Standard_Generalized_Markup_Language)despite the similarity of its markup. It has, however, been designed to be backward-compatible with common parsing of older versions of HTML. It comes with a new introductory line that looks like an SGML [document type declaration](https://en.wikipedia.org/wiki/Document_type_declaration), <!DOCTYPE html>, which triggers the standards-compliant [rendering mode](https://en.wikipedia.org/wiki/Quirks_mode).

#  JAVASCRIPT

**JavaScript**, often abbreviated as **JS**, is a [high-level](https://en.wikipedia.org/wiki/High-level_programming_language), [interpreted](https://en.wikipedia.org/wiki/Interpreted_language) [programming language](https://en.wikipedia.org/wiki/Programming_language) that conforms to the [ECMAScript](https://en.wikipedia.org/wiki/ECMAScript) specification. JavaScript has [curly-bracket syntax](https://en.wikipedia.org/wiki/List_of_programming_languages_by_type#Curly-bracket_languages), [dynamic typing](https://en.wikipedia.org/wiki/Dynamic_programming_language), [prototype-based](https://en.wikipedia.org/wiki/Prototype-based_programming) [object-orientation](https://en.wikipedia.org/wiki/Object-oriented_programming), and [first-class functions](https://en.wikipedia.org/wiki/First-class_function).

Alongside [HTML](https://en.wikipedia.org/wiki/HTML) and [CSS](https://en.wikipedia.org/wiki/CSS), JavaScript is one of the core technologies of the [World Wide Web](https://en.wikipedia.org/wiki/World_Wide_Web). JavaScript enables interactive [web pages](https://en.wikipedia.org/wiki/Web_page) and is an essential part of [web applications](https://en.wikipedia.org/wiki/Web_application). The vast majority of [websites](https://en.wikipedia.org/wiki/Website) use it, and major [web browsers](https://en.wikipedia.org/wiki/Web_browser) have a dedicated [JavaScript engine](https://en.wikipedia.org/wiki/JavaScript_engine) to execute it.

As a multi-paradigm language, JavaScript supports [event-driven](https://en.wikipedia.org/wiki/Event-driven_programming), [functional](https://en.wikipedia.org/wiki/Functional_programming), and [imperative](https://en.wikipedia.org/wiki/Imperative_programming) (including [object-oriented](https://en.wikipedia.org/wiki/Object-oriented_programming) and [prototype-based](https://en.wikipedia.org/wiki/Prototype-based_programming)) [programming styles](https://en.wikipedia.org/wiki/Programming_paradigm). It has [APIs](https://en.wikipedia.org/wiki/Application_programming_interface) for working with text, [arrays](https://en.wikipedia.org/wiki/Array_data_type), dates, [regular expressions](https://en.wikipedia.org/wiki/Regular_expression), and the [DOM](https://en.wikipedia.org/wiki/Document_Object_Model), but the language itself does not include any [I/O](https://en.wikipedia.org/wiki/Input/output), such as [networking](https://en.wikipedia.org/wiki/Computer_network), [storage](https://en.wikipedia.org/wiki/Data_storage), or [graphics](https://en.wikipedia.org/wiki/Computer_graphics) facilities. It relies upon the host environment in which it is embedded to provide these features.

Initially only implemented [client-side](https://en.wikipedia.org/wiki/Client-side) in web browsers, JavaScript engines are now embedded in many other types of host software, including [server-side](https://en.wikipedia.org/wiki/Server-side) in web servers and databases, and in non-web programs such as word processors and [PDF](https://en.wikipedia.org/wiki/Portable_Document_Format) software, and in runtime environments that make JavaScript available for writing mobile and desktop applications, including desktop widgets.

Although there are similarities between JavaScript and [Java](https://en.wikipedia.org/wiki/Java_(programming_language)), including language name, [syntax](https://en.wikipedia.org/wiki/Syntax_(programming_languages)), and respective [standard libraries](https://en.wikipedia.org/wiki/Standard_library), the two languages are distinct and differ greatly in design. JavaScript was influenced by programming languages such as [Self](https://en.wikipedia.org/wiki/Self_(programming_language)) and [Scheme](https://en.wikipedia.org/wiki/Scheme_(programming_language)).

* **SERVLETS**

**Servlets** are the Java programs that runs on the Java-enabled web server or application server. They are used to handle the request obtained from the web server, process the request, produce the response, then send response back to the web server.

**Properties of Servlets:**

* Servlets work on the server-side.
* Servlets capable of handling complex request obtained from web server.

**Execution of Servlets :**  
Execution of Servlets involves the six basic steps:

1. The clients send the request to the web server.
2. The web server receives the request.
3. The web server passes the request to the corresponding servlet.
4. The servlet processes the request and generate the response in the form of output.
5. The servlet sends the response back to the web server.
6. The web server sends the response back to the client and the client browser displays it on the screen.

* **SPRING**

The **Spring Framework** is an [application framework](https://en.wikipedia.org/wiki/Application_framework) and [inversion of control](https://en.wikipedia.org/wiki/Inversion_of_control) [container](https://en.wikipedia.org/wiki/Servlet_container) for the [Java platform](https://en.wikipedia.org/wiki/Java_platform). The framework's core features can be used by any Java application, but there are extensions for building web applications on top of the [Java EE](https://en.wikipedia.org/wiki/Java_EE) (Enterprise Edition) platform. Although the framework does not impose any specific [programming model](https://en.wikipedia.org/wiki/Programming_model), it has become popular in the Java community as an addition to, or even replacement for the [Enterprise JavaBeans](https://en.wikipedia.org/wiki/Enterprise_JavaBeans) (EJB) model. The Spring Framework is [open source](https://en.wikipedia.org/wiki/Open-source_software).

* **HIBENATE ORM**

**Hibernate ORM** (Hibernate in short) is an [object-relational mapping](https://en.wikipedia.org/wiki/Object-relational_mapping) tool for the [Java](https://en.wikipedia.org/wiki/Java_(programming_language)) programming language. It provides a [framework](https://en.wikipedia.org/wiki/Software_framework) for mapping an [object-oriented](https://en.wikipedia.org/wiki/Object-oriented_programming) domain model to a [relational database](https://en.wikipedia.org/wiki/Relational_database). Hibernate handles [object-relational impedance mismatch](https://en.wikipedia.org/wiki/Object-relational_impedance_mismatch) problems by replacing direct, [persistent](https://en.wikipedia.org/wiki/Persistence_(computer_science)) database accesses with high-level object handling functions.

Hibernate is [free software](https://en.wikipedia.org/wiki/Free_software) that is distributed under the [GNU Lesser General Public License](https://en.wikipedia.org/wiki/GNU_Lesser_General_Public_License) 2.1.

Hibernate's primary feature is mapping from Java classes to [database tables](https://en.wikipedia.org/wiki/Table_(database)), and mapping from Java data types to [SQL](https://en.wikipedia.org/wiki/SQL) data types. Hibernate also provides data query and retrieval facilities. It generates SQL calls and relieves the developer from the manual handling and object conversion of the result set.

* **JAVA SERVER PAGES**

**JavaServer Pages (JSP)** is a technology for developing Webpages that supports dynamic content. This helps developers insert java code in HTML pages by making use of special JSP tags, most of which start with <% and end with %>.

A JavaServer Pages component is a type of Java servlet that is designed to fulfill the role of a user interface for a Java web application. Web developers write JSPs as text files that combine HTML or XHTML code, XML elements, and embedded JSP actions and commands.

Using JSP, you can collect input from users through Webpage forms, present records from a database or another source, and create Webpages dynamically.

JSP tags can be used for a variety of purposes, such as retrieving information from a database or registering user preferences, accessing JavaBeans components, passing control between pages, and sharing information between requests, pages etc.

* **ORACLE**

An **Oracle** **database** is a collection of data treated as a unit. The purpose of a database is to store and retrieve related information. A database server is the key to solving the problems of information management. In general, a [**server**](https://docs.oracle.com/cd/B19306_01/server.102/b14220/glossary.htm#i432724) reliably manages a large amount of data in a multiuser environment so that many users can concurrently access the same data. All this is accomplished while delivering high performance. A database server also prevents unauthorized access and provides efficient solutions for failure recovery.  
Oracle Database is the first database designed for enterprise grid computing, the most flexible and cost effective way to manage information and applications. Enterprise grid computing creates large pools of industry-standard, modular storage and servers. With this architecture, each new system can be rapidly provisioned from the pool of components. There is no need for peak workloads, because capacity can be easily added or reallocated from the resource pools as needed.  
The database has **logical structures** and **physical structures**. Because the physical and logical structures are separate, the physical storage of data can be managed without affecting the access to logical storage structures.

* **CSS**

**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, you can 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.

* **MATERIALIZE**

**Materialize** is a modern responsive front-end [framework](https://en.wikipedia.org/wiki/CSS_framework) based on Material design directed at responsive, mobile-first [front-end web development](https://en.wikipedia.org/wiki/Front-end_web_development). It contains [CSS](https://en.wikipedia.org/wiki/CSS)- and [JavaScript](https://en.wikipedia.org/wiki/JavaScript)-based design templates for [typography](https://en.wikipedia.org/wiki/Web_design#Typography), [forms](https://en.wikipedia.org/wiki/Form_(HTML)), [buttons](https://en.wikipedia.org/wiki/Button_(computing)#HTML), [navigation](https://en.wikipedia.org/wiki/Web_navigation#Local_website_navigation) and other interface components.

Materialize is a web framework that focuses on simplifying the development of informative web pages (as opposed to [web apps](https://en.wikipedia.org/wiki/Web_Apps)). The primary purpose of adding it to a web project is to apply Materialize's choices of color, size, font and layout to that project. As such, the primary factor is whether the developers in charge find those choices to their liking. Once added to a project, Materialize provides basic style definitions for all [HTML elements](https://en.wikipedia.org/wiki/HTML_element). The end result is a uniform appearance for prose, tables and form elements across [web browsers](https://en.wikipedia.org/wiki/Web_browser). In addition, developers can take advantage of CSS classes defined in Materialize to further customize the appearance of their contents. For example, Materialize has provisioned for light- and dark-colored tables, page headings, more prominent pull quotes, and text with a highlight.

Materialize also comes with several JavaScript components in the form of [jQuery](https://en.wikipedia.org/wiki/JQuery) plugins. They provide additional user interface elements such as [dialog boxes](https://en.wikipedia.org/wiki/Dialog_box), [tooltips](https://en.wikipedia.org/wiki/Tooltip), and carousels. Each Materialize component consists of an HTML structure, CSS declarations, and in some cases accompanying JavaScript code. They also extend the functionality of some existing interface elements, including for example an auto-complete function for input fields.

**TECHNICAL REQUIREMENTS**

The following are the technical requirements for the project:

**Front-End**

* HTML5
* CSS
* Materialize
* JavaScript/JQuery

**Back-End**

* JAVA SERVER PAGES
* Servlets
* Spring
* Hibernate

**Middleware**

* Apache Tomcat 8.5

**Database**

* Oracle

**IDE Used:**

* Eclipse(Oxygen)

# CONCLUSION

Front-end ecosystem is constantly evolving and changing on a day-to-day basis. some tools become “bestsellers” in terms of web app development, revolutionizing the workflow, while others become a dead end.

HTML5, CSS and MATERIALIZE are labelled as the best-seller, these have quickly won popular affection. Today it is maintained by the developer community and is used by all leading companies.

Its advantages can be listed as:

* It facilitates the overall process of writing components
* It boosts productivity and facilitates further maintenance
* It ensures faster rendering
* It is SEO friendly

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