**Medicine Monitoring System**

**A**

**Project Report**

**Submitted in Complete Fulfillment of the Requirement for the Award of Degree**

**BACHELOR OF TECHNOLOGY**

**IN**

**COMPUTER SCIENCE AND ENGINEERING**

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**ACKNOWLEDGEMENT**

It is a great pleasure for us to express our earnest and great appreciation to **Aashish S**(our mentor), **Rahul Pramanik** (Batch Owner at Cognizant Academy), **Krishnendu Ganguly** (Manager of Cognizant Academy). We are very much grateful to **Aashish S** for his kind guidance, encouragement, valuable suggestions, innovative ideas, and supervision throughout this project work, without which the completion of the project work would have been difficult one and **Krishnendu Ganguly** for giving us this fantastic opportunity.

We would like to express our thanks to the Head of the Department, Prof. **Tapas Roy** for his active support.

Also we would like to sincerely appreciate:

1. **T. Senthil**

for all the efforts he has put in during the early phase of our internship that helped us a lot throughout the entire internship program.

We also express our sincere thanks to all the teachers of the department for their precious help, encouragement, kind cooperation and suggestions throughout the development of the project work.

We would like to express our gratitude to everyone at Cognizant GTP for providing us with a congenial working environment.

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(**Aashish 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:

Medicine Monitoring System will create and maintain Branch Admin and medicine related information.

* Create Branch Admin information.
* Maintain Branch Admin information.
* Stock Management of Medicines.
* Create and maintain Medicines information.
* Updating the status of request for medicine.
* Storing the requests raised by branch admin and the response from the admin.
* Storing stock details of medicines.

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

The Admin will be able to view branch admin details. Admin can accept/reject branch admin’s request.

The Admin can update the stocks of Medicine and can raise request for the same.

This application is made of HTML5, CSS, Bootstrap, Materialize CSS, JSP, jQuery on the front end and Spring, Spring MVC and Hibernate to establish database connectivity. Here we have made use of Apache Tomcat 8.5 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) [domain](https://en.wikipedia.org/wiki/Domain-driven_design) [driven 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

# 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 Branch Admin information.
* Maintain Branch Admin information.
* Stock Management of Medicines.
* Create and maintain Medicines information.
* Updating the status of request for medicine.
* Storing the requests raised by branch admin and the response from the admin.
* Storing stock details of medicines.

Let us discuss each functionality in details:

* **Create Branch Admin information.**

When the Admin clicks on the registration link, it should re-direct to registration form.

* **Maintain Branch Admin information.**

In this section, the admin would be able to validate the credentials provided by the Branch Admin.

* **Stock Management of Medicines.**

When Admin clicks on “Update stocks” the list of Medicines and the available quantity is displayed.

* **Create and Maintain Medicines information.**

Admin on clicking Edit can edit the Medicine Record and save it.

* **Updating the status of request for medicine.**

Admin can update his response. Upon saving the information in the database, the message “Your details are submitted successfully is displayed”.

* **Storing the requests raised by branch admin and response from the admin.**

Post-successful field level validation, the request information in the database is saved.

* **Storing stock details of medicines.**

Post-successful field level validation, the medicine information in the database is saved.

**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)).

* **SPRING (FRAMEWORK)**

The Spring Framework provides a comprehensive programming and configuration model for modern Java-based enterprise applications - on any kind of deployment platform.

A key element of Spring is infrastructural support at the application level: Spring focuses on the "plumbing" of enterprise applications so that teams can focus on application-level business logic, without unnecessary ties to specific deployment environments.

**Features**

* **Core technologies:** dependency injection, events, resources, i18n, validation, data binding, type conversion, SpEL, AOP.
* **Testing:** mock objects, TestContext framework, Spring MVC Test, WebTestClient.
* **Data Access:** transactions, DAO support, JDBC, ORM, Marshalling XML.
* Spring MVC and Spring WebFlux web frameworks.
* **Integration:** remoting, JMS, JCA, JMX, email, tasks, scheduling, cache.
* **Languages:** Kotlin, Groovy, dynamic languages.
* **SPRING MVC**

The Spring Web model-view-controller (MVC) framework is designed around a DispatcherServlet that dispatches requests to handlers, with configurable handler mappings, view resolution, locale and theme resolution as well as support for uploading files. The default handler is based on the @Controller and @RequestMappingannotations, offering a wide range of flexible handling methods. With the introduction of Spring 3.0, the @Controller mechanism also allows you to create RESTful Web sites and applications, through the @PathVariable annotation and other features.

In Spring Web MVC you can use any object as a command or form-backing object; you do not need to implement a framework-specific interface or base class. Spring's data binding is highly flexible: for example, it treats type mismatches as validation errors that can be evaluated by the application, not as system errors. Thus you need not duplicate your business objects' properties as simple, untyped strings in your form objects simply to handle invalid submissions, or to convert the Strings properly. Instead, it is often preferable to bind directly to your business objects.

Spring's view resolution is extremely flexible. A Controller is typically responsible for preparing a model Map with data and selecting a view name but it can also write directly to the response stream and complete the request. View name resolution is highly configurable through file extension or Accept header content type negotiation, through bean names, a properties file, or even a custom ViewResolver implementation. The model (the M in MVC) is a Map interface, which allows for the complete abstraction of the view technology. You can integrate directly with template based rendering technologies such as JSP, Velocity and Freemarker, or directly generate XML, JSON, Atom, and many other types of content. The model Map is simply transformed into an appropriate format, such as JSP request attributes, a Velocity template model.

**Features of Spring Web MVC**

* Clear separation of roles. Each role — controller, validator, command object, form object, model object, DispatcherServlet, handler mapping, view resolver, and so on — can be fulfilled by a specialized object.
* Powerful and straightforward configuration of both framework and application classes as JavaBeans. This configuration capability includes easy referencing across contexts, such as from web controllers to business objects and validators.
* Adaptability, non-intrusiveness, and flexibility. Define any controller method signature you need, possibly using one of the parameter annotations (such as @RequestParam, @RequestHeader, @PathVariable, and more) for a given scenario.
* Reusable business code, no need for duplication. Use existing business objects as command or form objects instead of mirroring them to extend a particular framework base class.
* Customizable binding and validation. Type mismatches as application-level validation errors that keep the offending value, localized date and number binding, and so on instead of String-only form objects with manual parsing and conversion to business objects.
* Customizable handler mapping and view resolution. Handler mapping and view resolution strategies range from simple URL-based configuration, to sophisticated, purpose-built resolution strategies. Spring is more flexible than web MVC frameworks that mandate a particular technique.
* Flexible model transfer. Model transfer with a name/value Map supports easy integration with any view technology.
* Customizable locale and theme resolution, support for JSPs with or without Spring tag library, support for JSTL, support for Velocity without the need for extra bridges, and so on.
* A simple yet powerful JSP tag library known as the Spring tag library that provides support for features such as data binding and themes. The custom tags allow for maximum flexibility in terms of markup code.
* A JSP form tag library, introduced in Spring 2.0, that makes writing forms in JSP pages much easier.
* Beans whose lifecycle is scoped to the current HTTP request or HTTP Session. This is not a specific feature of Spring MVC itself, but rather of the WebApplicationContext container(s) that Spring MVC uses.
* **HIBERNATE (FRAMEWORK)**

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.

**Hibernate Query Language (HQL)**

Hibernate provides an [SQL](https://en.wikipedia.org/wiki/SQL) inspired language called [Hibernate Query Language](https://en.wikipedia.org/wiki/Hibernate_Query_Language) (HQL) for writing SQL-like queries against Hibernate's data objects. Criteria Queries are provided as an [object-oriented](https://en.wikipedia.org/wiki/Object-oriented_programming) alternative to HQL. Criteria Query is used to modify the objects and provide the restriction for the objects. HQL (Hibernate Query Language) is the object-oriented version of SQL. It generates database independent queries so that there is no need to write database-specific queries. Without this capability, changing the database would require individual SQL queries to be changed as well, leading to maintenance issues.

**Hibernate Features**

* Hibernate provides Object/Relational mappings. Here is different O/R mapping strategies as multiple-objects to single-row mapping,  
  Polymorphic associations, bi-directional association, association filtering. It also provide XML mapping documents.
* It provides different object oriented query languages. Minimal object oriented Hibernate query language(HQL), native SQL queries,  
  High object oriented concept of criteria.
* It provide transparent persistence without byte code processing.
* It introduces automatic Dirty Checking concept.
* It supports Detached object concept.
* It supports tough concept of composite keys.
* Automatic generation of primary key.
* Hibernate provides Dual-layer Cache Architecture.
* It provides session level cache and optional second-level cache.
* It introduces Lazy initialization.
* Hibernate provide outer join fetching.
* It supports optimistic locking with versioning.
* Optionally provide internal connection pooling and prepared statement caching.
* At system initialization time it generate SQL.
* It provide feature of J2EE integration.
* It supports JMX and JCA.
* **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.

* **BOOTSTRAP**

**Bootstrap** is a [free and open-source](https://en.wikipedia.org/wiki/Free_and_open-source) [CSS framework](https://en.wikipedia.org/wiki/CSS_framework) 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 (optionally) [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.

Bootstrap 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 Bootstrap'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, Bootstrap 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 Bootstrap to further customize the appearance of their contents. For example, Bootstrap has provisioned for light- and dark-colored tables, page headings, more prominent pull quotes, and text with a highlight.

Bootstrap 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 Bootstrap 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.

* **jQuery**

jQuery is a [JavaScript library](https://en.wikipedia.org/wiki/JavaScript_library) designed to simplify [HTML](https://en.wikipedia.org/wiki/HTML) [DOM](https://en.wikipedia.org/wiki/Document_Object_Model) tree traversal and manipulation, as well as [event handling](https://en.wikipedia.org/wiki/Event_handling), [CSS animation](https://en.wikipedia.org/wiki/CSS_animation), and [Ajax](https://en.wikipedia.org/wiki/Ajax_(programming)). It is [free, open-source software](https://en.wikipedia.org/wiki/Free_and_open_source_software) using the permissive [MIT License](https://en.wikipedia.org/wiki/MIT_License). [Web](https://en.wikipedia.org/wiki/World_Wide_Web)analysis (from 2017) indicates that it is the most widely deployed JavaScript library by a large margin.

jQuery's syntax is designed to make it easier to navigate a document, select [DOM](https://en.wikipedia.org/wiki/Document_Object_Model) elements, create [animations](https://en.wikipedia.org/wiki/Animation), handle [events](https://en.wikipedia.org/wiki/Event_(computing)), and develop [Ajax](https://en.wikipedia.org/wiki/Ajax_(programming)) applications. jQuery also provides capabilities for developers to create [plug-ins](https://en.wikipedia.org/wiki/Plug-in_(computing))on top of the JavaScript library. This enables developers to create [abstractions](https://en.wikipedia.org/wiki/Abstraction_(computer_science)) for low-level interaction and animation, advanced effects and high-level, themeable widgets. The modular approach to the jQuery library allows the creation of powerful [dynamic web pages](https://en.wikipedia.org/wiki/Dynamic_web_page) and Web applications.

The set of [jQuery core features](https://en.wikipedia.org/wiki/JQuery#Features)—DOM element selections, traversal and manipulation—enabled by its selector engine (named "Sizzle" from v1.3), created a new "programming style", fusing algorithms and DOM data structures. This style influenced the architecture of other [JavaScript frameworks](https://en.wikipedia.org/wiki/Comparison_of_JavaScript_frameworks) like [YUI v3](https://en.wikipedia.org/wiki/YUI_Library) and [Dojo](https://en.wikipedia.org/wiki/Dojo_Toolkit), later stimulating the creation of the standard Selectors API.

[Microsoft](https://en.wikipedia.org/wiki/Microsoft) and [Nokia](https://en.wikipedia.org/wiki/Nokia) bundle jQuery on their platforms. Microsoft includes it with [Visual Studio](https://en.wikipedia.org/wiki/Microsoft_Visual_Studio) for use within Microsoft's [ASP.NET AJAX](https://en.wikipedia.org/wiki/ASP.NET_AJAX) and [ASP.NET MVC](https://en.wikipedia.org/wiki/ASP.NET_MVC) frameworks while Nokia has integrated it into the Web Run-Time widget development platform.

* **AJAX**

AJAX stands for Asynchronous JavaScript and XML. AJAX is a new technique for creating better, faster, and more interactive web applications with the help of XML, HTML, CSS, and Java Script.

* Ajax uses XHTML for content, CSS for presentation, along with Document Object Model and JavaScript for dynamic content display.
* Conventional web applications transmit information to and from the sever using synchronous requests. It means you fill out a form, hit submit, and get directed to a new page with new information from the server.
* With AJAX, when you hit submit, JavaScript will make a request to the server, interpret the results, and update the current screen. In the purest sense, the user would never know that anything was even transmitted to the server.
* XML is commonly used as the format for receiving server data, although any format, including plain text, can be used.
* AJAX is a web browser technology independent of web server software.
* A user can continue to use the application while the client program requests information from the server in the background.
* Intuitive and natural user interaction. Clicking is not required, mouse movement is a sufficient event trigger.
* Data-driven as opposed to page-driven.

**TECHNICAL REQUIREMENTS**

The following are the technical requirements for the project:

**Front-End**

* HTML5
* CSS
* Bootstrap
* jQuery
* AJAX
* Javascript

**Back-End**

* Java Server Pages
* Spring
* Spring MVC
* 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 BOOTSTRAP 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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