



# SNS COLLEGE OF TECHNOLOGY

*(An Autonomous Institution)  
Coimbatore - 641035.*



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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai*

## Department of Computer Applications

Course Code: 23CAT606

Course Name: Java Programming

Unit : V

Topic : Spring: Introduction,  
Architecture, Spring MVC Module





# Introduction to Spring Framework



The Spring Framework is a popular and comprehensive Java application development framework that provides a robust and flexible platform for building enterprise-level applications. It simplifies the development process by handling many of the underlying complexities, allowing developers to focus on the core functionality of their applications.



# What is Spring?

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## Lightweight Container

Spring is a lightweight, non-invasive framework that manages the lifecycle and dependencies of Java components, known as "beans".

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## Inversion of Control

Spring follows the Inversion of Control (IoC) principle, which allows the framework to manage the creation and lifecycle of objects.

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## Dependency Injection

Spring uses Dependency Injection (DI) to manage the dependencies between different components of an application.



# Key Features of Spring

## Modular Design

Spring is designed with a modular architecture, allowing developers to use only the components they need, reducing complexity and improving performance.

## Abstraction and Integration

Spring abstracts many low-level APIs, such as **JDBC** and **JMS**, and provides a consistent programming model across different technologies.

## Aspect-Oriented Programming

Spring supports Aspect-Oriented Programming (AOP), which allows for the separation of cross-cutting concerns, improving code maintainability.



# Spring Modules and Projects

## Core

The core of the Spring Framework, providing the IoC container, Dependency Injection, and other fundamental features.

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## Web and MVC

Modules for building web applications, including the Spring MVC framework and support for RESTful services.

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## Data Access

Modules for working with databases, including JDBC, ORM, and data binding.



# Spring IoC and Dependency Injection

## Inversion of Control

Spring's IoC container manages the lifecycle and dependencies of Java components, or "beans", taking control away from the application code.

## Dependency Injection

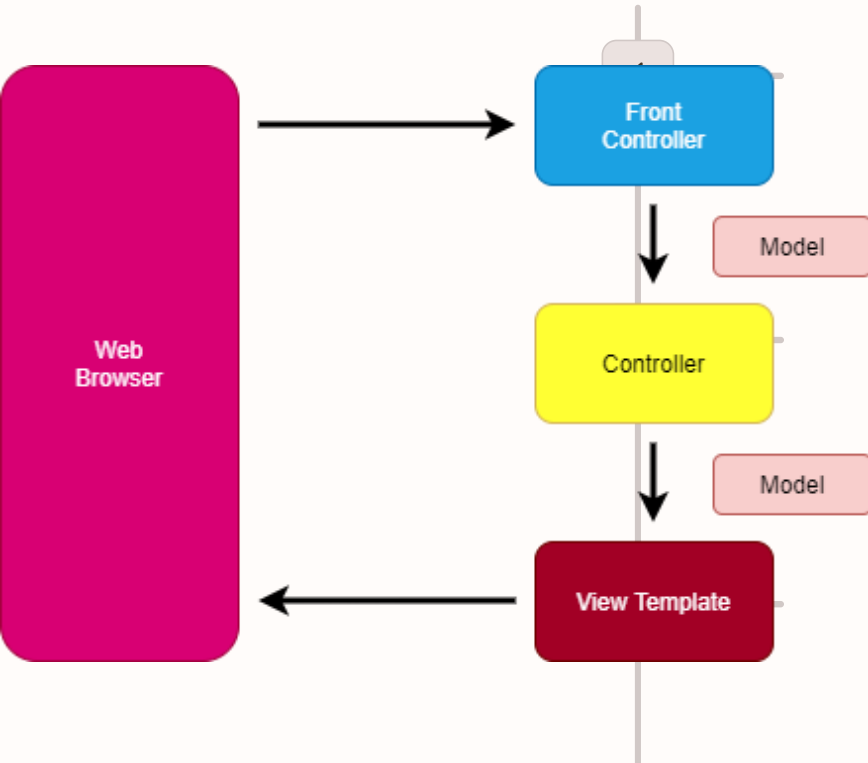
Spring uses Dependency Injection to manage the dependencies between different components, allowing for loose coupling and easier testing.

## Configuration Options

Spring provides multiple ways to configure the IoC container, including XML, Java-based, and Annotation-based approaches.



# Spring MVC and Web Development



## DispatcherServlet

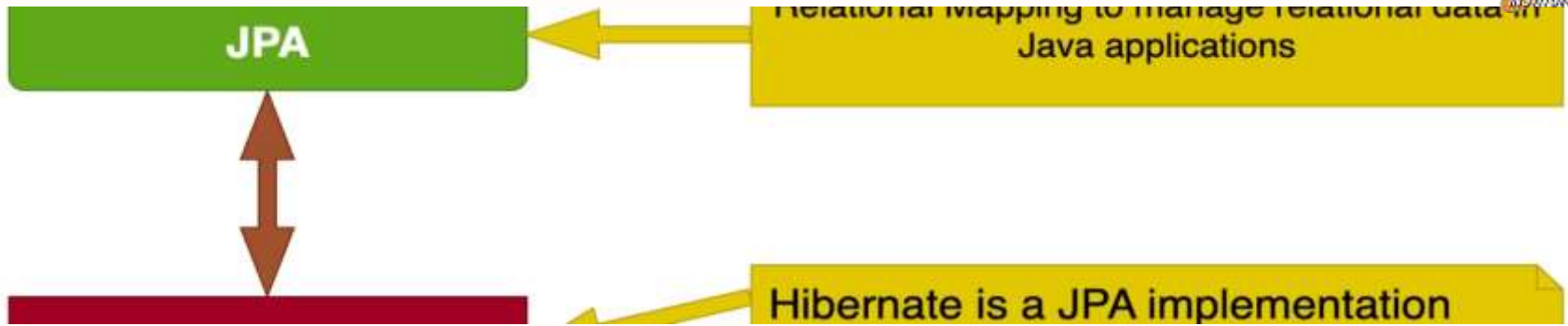
The central component of the Spring MVC framework, responsible for dispatching requests to appropriate controllers.

## Controllers

Spring MVC controllers handle incoming requests, process data, and return appropriate responses, often in the form of views.

## Views and Templates

Spring MVC supports a variety of view technologies, such as JSP, Thymeleaf, and FreeMarker, for rendering the response.



# Spring Data and Persistence

## JDBC and ORM

Spring provides abstraction layers for working with JDBC and various ORM frameworks, such as Hibernate, JPA, and MyBatis.

## Spring Data

The Spring Data project simplifies the implementation of data access layers by providing a consistent programming model across different data stores.

## Transactions

Spring's transaction management system allows developers to declaratively manage transactions, ensuring data consistency and integrity.





# Spring Security and Authentication



## Authentication

Spring Security provides a comprehensive authentication framework, supporting various authentication mechanisms, such as form-based, basic, and OAuth.



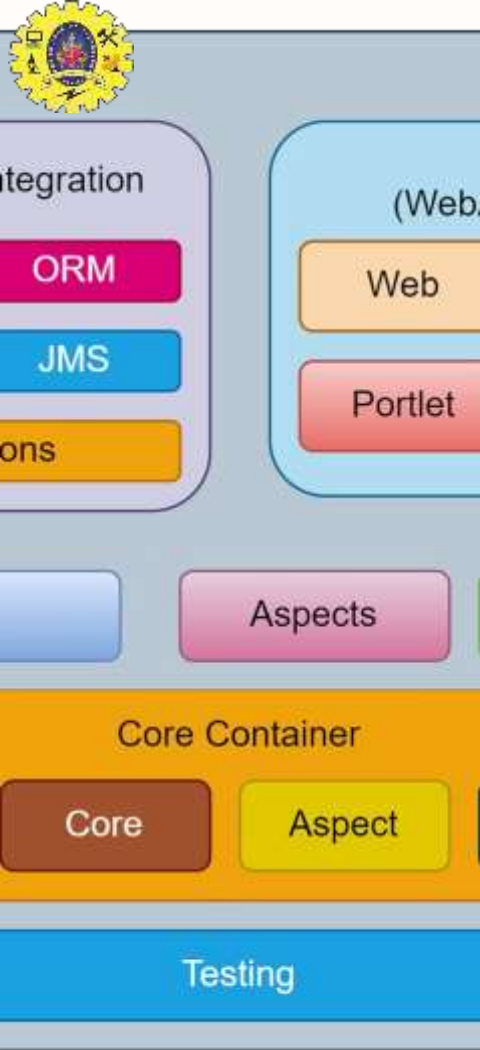
## Authorization

Spring Security's authorization mechanism allows developers to control access to application resources based on user roles and permissions.



## Web Security

Spring Security integrates seamlessly with the Spring MVC framework, providing comprehensive protection against common web application vulnerabilities.



# Conclusion and Resources

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## Conclusion

The Spring Framework is a powerful and versatile platform that simplifies the development of enterprise-level Java applications, providing a comprehensive set of features and modules to address a wide range of requirements.

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## Resources

To learn more about the Spring Framework, visit the official [Spring website](#) and explore the extensive documentation, tutorials, and community resources available.



## References

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3. “Java Programming form the group up”, Tata  
McGraw Hill, Ralph Bravaco, Shai Simonson

