Technology and Skill Requirements for Project Completion

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To successfully complete these projects, students will need to study and master the following technologies and concepts:

1. Java Programming Language

- Basics of Java (syntax, variables, control structures)
- Object-Oriented Programming (OOP) concepts (classes, objects, inheritance, polymorphism, encapsulation)

2. Spring Framework

- Spring Boot (creating Spring Boot applications, annotations, configuration)
- Spring Data JPA (working with databases, CRUD operations, repository interfaces)
- Spring Web (building RESTful APIs, controllers, request handling)
- Spring Security (optional, for projects requiring authentication and authorization)

3. Thymeleaf

- Basics of Thymeleaf (syntax, templates, expressions)
- Integrating Thymeleaf with Spring Boot for creating dynamic web pages

4. Database Management

- MySQL Database (database setup, queries, relationships)
- Using MySQL with Spring Data JPA (entity relationships, CRUD operations)
- Database configuration in Spring Boot

5. Frontend Technologies

- HTML & CSS (basics of web design, styling web pages)
- Bootstrap (optional, for responsive design and UI components)

6. API Integration

- RESTful Web Services (creating and consuming RESTful APIs)
- OAuth 2.0 (for projects involving third-party API integrations like Google Contacts API)

7. Project Management Tools

- Maven (project setup, dependency management)
- Git (version control, GitHub repositories, branching, merging)

8. Development Environment

- Integrated Development Environment (IDE) (IntelliJ IDEA, Eclipse, or similar)
- Setting up the development environment (JDK installation, IDE setup)

9. Testing and Validation

- **Selenium**: Automated testing of web applications.
- JUnit (writing and running unit tests)
- Spring Boot Testing (testing Spring Boot applications)

Suggested Learning Path:

1. **Java Programming Language**: Start with Java basics and OOP concepts.
2. **Spring Framework**: Learn Spring Boot, Spring Data JPA, and Spring Web.
3. **Thymeleaf**: Understand Thymeleaf syntax and integration with Spring Boot.
4. **Database Management**: Set up and manage MySQL databases with Spring Data JPA.
5. **Frontend Technologies**: Get familiar with HTML, CSS, and optionally Bootstrap.
6. **API Integration**: Learn about RESTful APIs and OAuth 2.0 integration.
7. **Project Management Tools**: Use Maven for project setup and Git for version control.
8. **Development Environment**: Set up the IDE and development environment.
9. **Testing and Validation**: Write and run tests using Selenium, JUnit, and Spring Boot Testing.