

# JavaSpecs

## A Web-Based Question & Answer Platform For Formal Behavioral Specifications Of Common Java Libraries

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## Project Overview

### What is JavaSpecs?

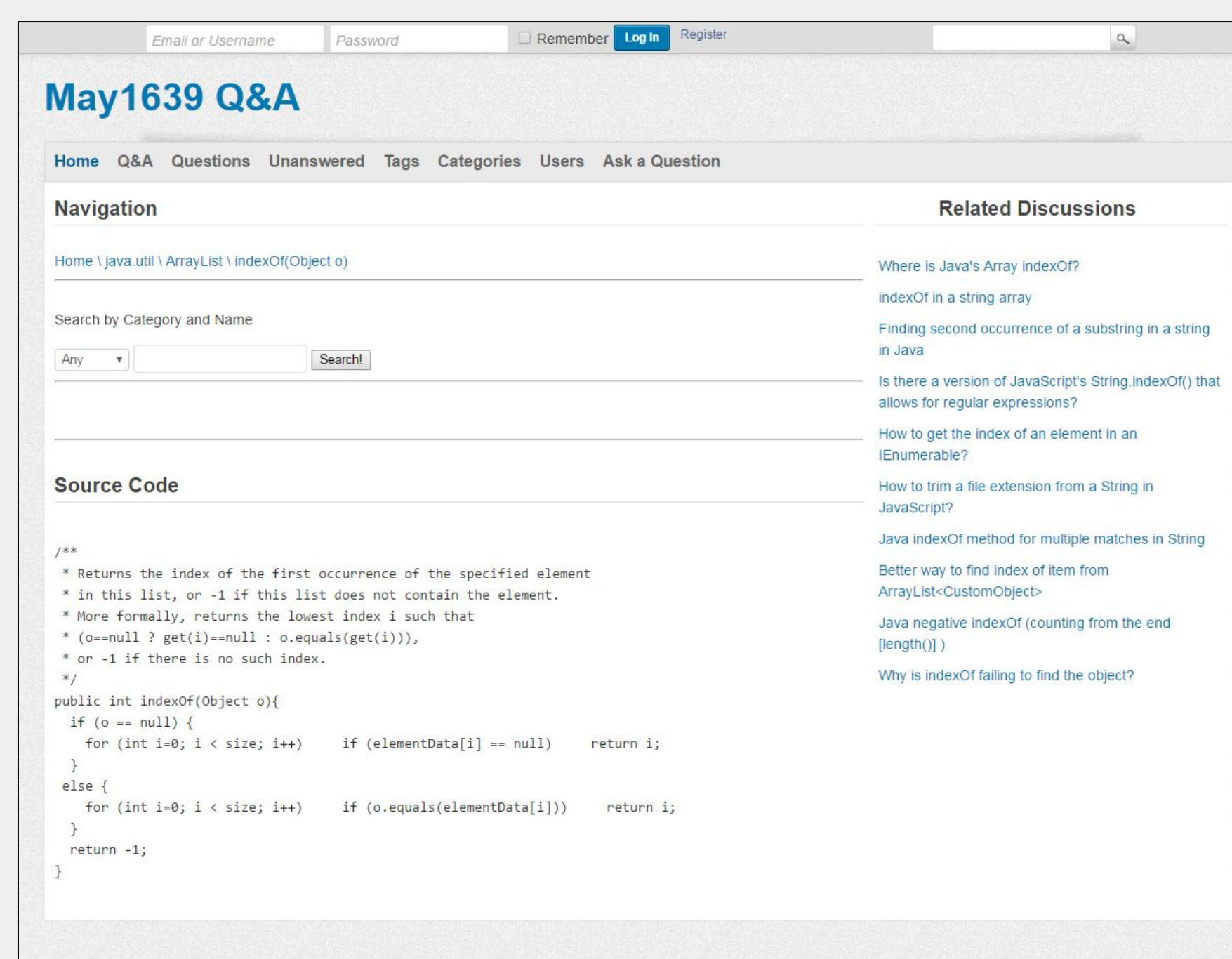
JavaSpecs is a question and answer (Q&A) website dedicated to the creation, discussion, and refinement of formal behavioral specifications for the most commonly used Java libraries.

### What are the goals of JavaSpecs?

- Increase the availability, discussion and sharing of knowledge regarding formal specifications.
- Reduce the time and effort required to learn about and make use of formal specifications.
- Encourage the creation and refinement of formal specifications.
- Leverage collective intelligence in order to study specification inference.

### Who are JavaSpecs' intended users?

- Programmers seeking information about formal behavioral software specifications.
- Experts in formal behavioral software specifications hoping to add and refine specifications.



## Project Requirements

### Functional Requirements:

- Allow users to ask and answer questions in a manner similar to Stack Exchange.
- Allow users to navigate supported Java libraries in a Library->Package->Class->Method hierarchy.
- Display source code for all classes and methods.
- Provide a RESTful API to allow external users to retrieve website information.
- Display links to relevant Stack Overflow posts.
- Allow administrators to upload new libraries.

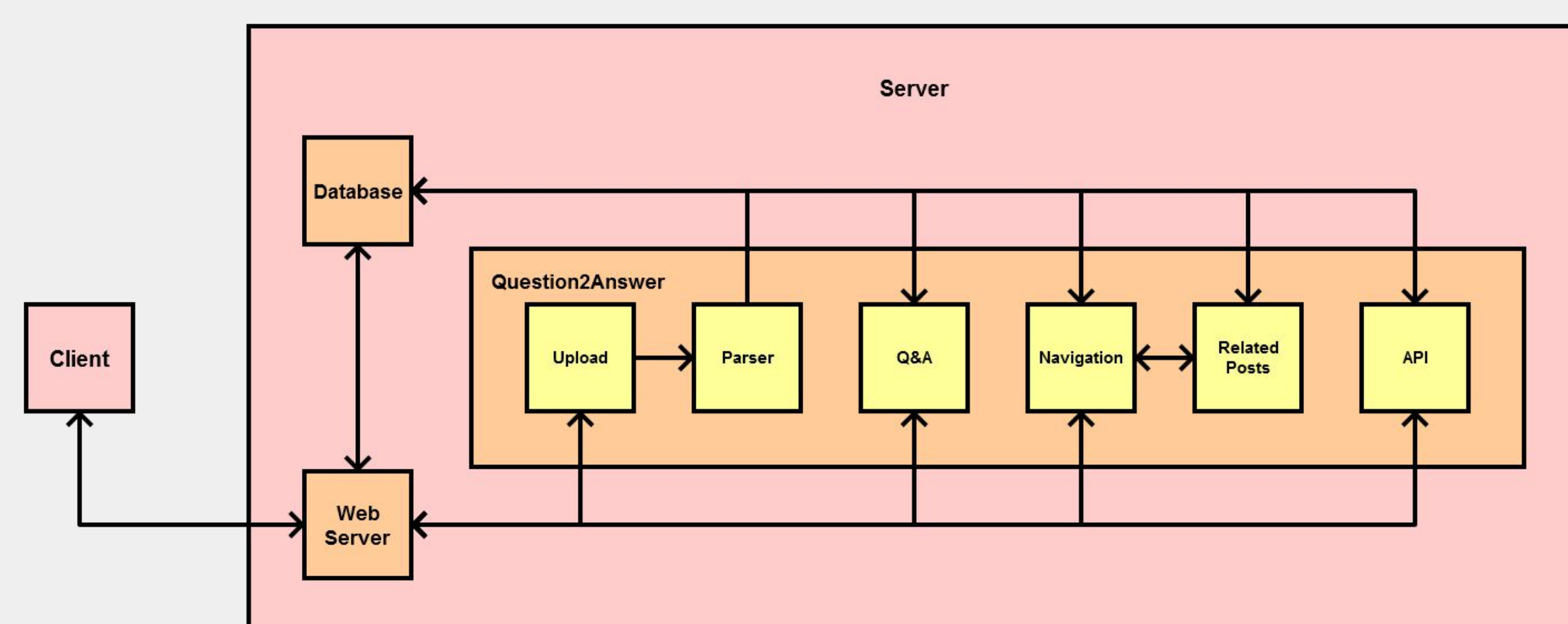
### Non-Functional Requirements:

- The website is extensible for future developers.
- Suggested posts from Stack Overflow are both relevant and related to the page a user is viewing.
- The data returned by the API will prove useful in researching specification inference.

## Operating Environment

- The forum is built on an installation of Question2Answer 1.7.2, a free Q&A platform.
- The forum is running on a server in a virtual machine provided by Iowa State University Electronics and Technology Group.
- The virtual machine is running a LAMP (**L**inux, **A**pache, **M**ySQL, **P**HP/Python/Perl) stack installation to provide web services.
- The client only needs a modern browser to access the forum.

## System Design



- Client (Web Browser)
  - Connects to the web server.
- Web Server (Apache)
  - Connects clients with the server.
- Question2Answer (Forum Software)
  - Upload (Javascript, JQuery, PHP)
    - Allows administrative users to upload .zip or .jar files to add additional Java libraries.
  - Parser (Eclipse JDT, Java, JDBC)
    - Parses Java libraries, creating database entries for each method, class, package, and library.
  - Q&A (Question2Answer Forum Software)
    - Provides general Q&A functionality; similar to Stack Exchange sites.
  - Navigation (Javascript, JQuery, PHP)
    - Provides Library->Package->Class->Method navigation.
    - Displays source code.
  - Related Posts (Javascript, MySQLi, PHP)
    - Provides a list of links to Stack Overflow posts determined to be related to the currently selected method and class.
  - API (MySQLi, PHP)
    - Enables users to submit complex, flexible queries to the database and acquire useful specification research data.
- Database (MySQL)
  - Forum Question/Answer Data.
  - Stack Overflow Post Information.
  - Java Source Code.

## Software Technologies

- **Frameworks:**
  - **Question2Answer 1.7.2**
    - Provides infrastructure for generic Q&A web platform.
- **Languages:**
  - **Java**
    - Parser development language.
  - **Javascript**
    - Client side web programming.
  - **PHP5**
    - Server language.
- **Libraries:**
  - **Eclipse JDT (Java)**
    - Provides the core functionality of the parser.
  - **JDBC (Java)**
    - Communicates between the parser and database.
  - **JQuery (Javascript)**
    - Forum GUI behavioral programming.
  - **MySQLi (PHP)**
    - Communicates between the forum and project database.

## Project Management/Testing

### Project Management

- **GitHub**
  - Collaborative code repository.
  - Version control.
- **Team Meetings**
  - Tuesday meetings to discuss progress and complete weekly reports.
  - Weekend Development Sessions.
  - Biweekly meetings with advisor/client to receive feedback and new requirements.

### Project Testing

- **Isolated Test Driven Development.**
  - Modules built and tested on local systems.
  - Component interface testing.
  - White box testing.
- **Integration Testing**
  - Tested modules locally in isolation.
  - Integration testing when combining modules.
  - Regression testing after adding new modules.