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# **6COSC022W Coursework1 Advanced Server-Side Web Programming**

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# 1. CHOOSE WHAT APPLICATION TO DEVELOP

The Coursework requirement contains four themes. The developer chooses to design a technical question-and-answer website where people can pose questions on technical issues or problems, and other people can help answer them.

The developer believes it addresses a crucial need in today's rapidly advancing technological landscape. In our interconnected world, individuals encounter various technical issues and problems daily, ranging from troubleshooting software bugs to understanding complex coding concepts. However, finding reliable and timely solutions can often be challenging. Therefore, the main aim of this application is to provide a platform where individuals can seek assistance for their technical inquiries and where experts can offer insightful answers and guidance. The website aims to empower users to overcome technical hurdles efficiently and effectively by facilitating this exchange of knowledge and expertise.

Additionally, a technical question and answer website offers several distinct benefits:

- **Community Support:** It fosters a sense of community among users who share common technical interests, allowing them to collaborate, learn from each other, and build valuable connections.
- **Accessible Knowledge:** It provides a centralized repository of technical information and solutions, making it easier for individuals to access relevant resources and learn new concepts.
- **Real-time Assistance:** Users can receive immediate assistance for their technical queries, reducing downtime and improving productivity.
- **Learning Opportunities:** It serves as a valuable learning resource for individuals at all skill levels, offering opportunities to explore new technologies, enhance problem-solving skills, and stay updated on industry trends.
- **Expert Guidance:** Knowledgeable experts and professionals contribute to the platform, offering authoritative advice and mentorship to users seeking guidance in their technical endeavours.

By harnessing these benefits, the technical question and answer website aims to empower users to navigate the complexities of technology with confidence and proficiency.

## 2. DECIDE REQUIRMENTS

The success of a web application hinges on its essential requirements, the absolute necessities without which it simply would not function. While not mandatory, desirable requirements enhance the quiz web application by adding features that users appreciate. Finally, luxury requirements represent the "nice to have" features that further refine the user experience but are not vital to the application's core functionality.

Essential Requirements	Desirable Requirements	Luxury Requirements
<b>Signup</b> – To create an account for the technical question and answer application, user will need to provide users personal information and register.	<b>Rate for Question</b> – When users log into the application to ask questions or provide answers, they can also rate the previous questions or answers.	<b>Gamification Elements</b> - Adding features such as badges, points, leader boards, or virtual rewards for active participation and contribution can enhance user engagement and encourage users to provide high-quality answers.
<b>Login</b> – To use the full functionality of the application, such as asking questions, answering questions, and rating questions, users need to log in with their email and password. However, simply viewing questions and answers does not require logging in.	<b>Bookmark Questions</b> – Users can bookmark questions if they want to check them later.	<b>Rich Media Support</b> - Allowing users to upload and share rich media content such as images, diagrams, code snippets, or video tutorials can enhance the clarity and effectiveness of technical explanations and solutions.
<b>Logout</b> – The user must be able to log out of the application. Logging out should remove all the user's sessions.	<b>User Profile Page</b> – Users can update their existing details.	<b>Mobile Optimization</b> - Ensuring the website is fully optimized for mobile devices with

		responsive design, native app support, or progressive web app features can improve accessibility and usability for users accessing the platform on smartphones or tablets
<b>Forget Password</b> – The "Forgot Password" feature allows users to reset their password by entering their email address on a designated page.	<b>Tagging and Categorization</b> - The ability to tag and categorize questions based on topic, technology, or problem type, making it easier for users to find relevant content.	<b>Advanced Search and Filtering Options</b> - Implementing advanced search filters based on categories, tags, popularity, or relevance can help users find specific technical questions and answers more efficiently.
<b>Home Page</b> – the main page of the technical question and answer application, like a website's home page. It acts as the central hub where all the application's functionalities are accessible.		
<b>Create Question</b> –Users can create questions, and other users can answer them. User can also delete user's own questions if user want.		
<b>Answer Question</b> – Users can answer the questions, and other users can see the question and answer. The answer given user can		

delete the answer if that user wishes to delete it.		
<b>Search Engine</b> – User can search the question using keywords or tags.		

*Table 1 - Decide Requirements*

## 3. Outline Design

### 3.1. Class Diagram

This class diagram provides a visual representation of the system's architecture, specifically focusing on the interaction and relationships between the three key components: views, controllers, and models. It not only depicts these classes but also delves into their inner workings by illustrating the attributes and methods associated with each class. Through this comprehensive visualization, the diagram offers valuable insights into how the system is structured and functions.

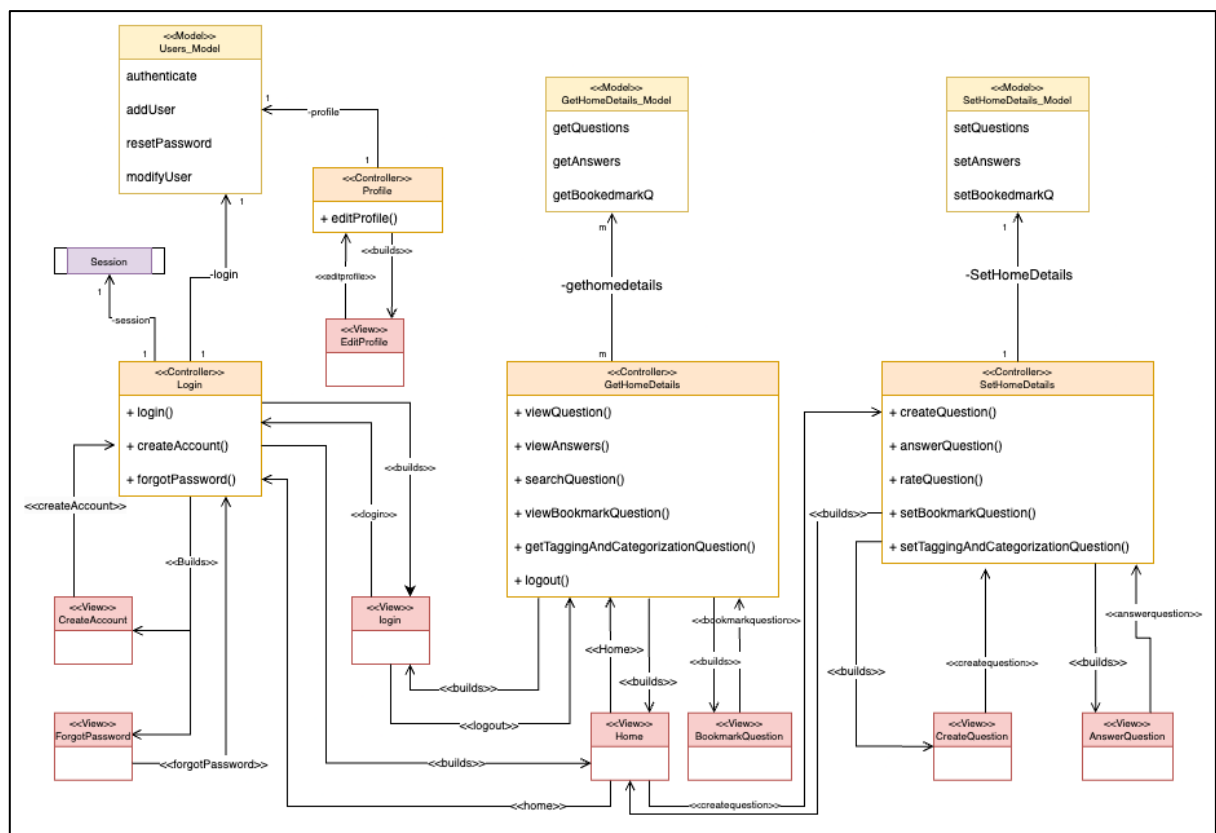


Figure 1 - Class Diagram

Accessible Link: [https://drive.google.com/file/d/1A1u8GNRYon28l\\_oR9i-KnDdisLjHWe3q/view?usp=drive\\_link](https://drive.google.com/file/d/1A1u8GNRYon28l_oR9i-KnDdisLjHWe3q/view?usp=drive_link)

### 3.2. Database Schema

The provided database diagram serves as a blueprint for the four interconnected tables that are necessary to fulfil the functionalities described in the preceding 'requirements' section. This diagram not only depicts the tables' columns, but also illustrates the nature of the relationships between them and the degree to which these relationships occur. Additionally, it identifies the primary and foreign keys within each table.

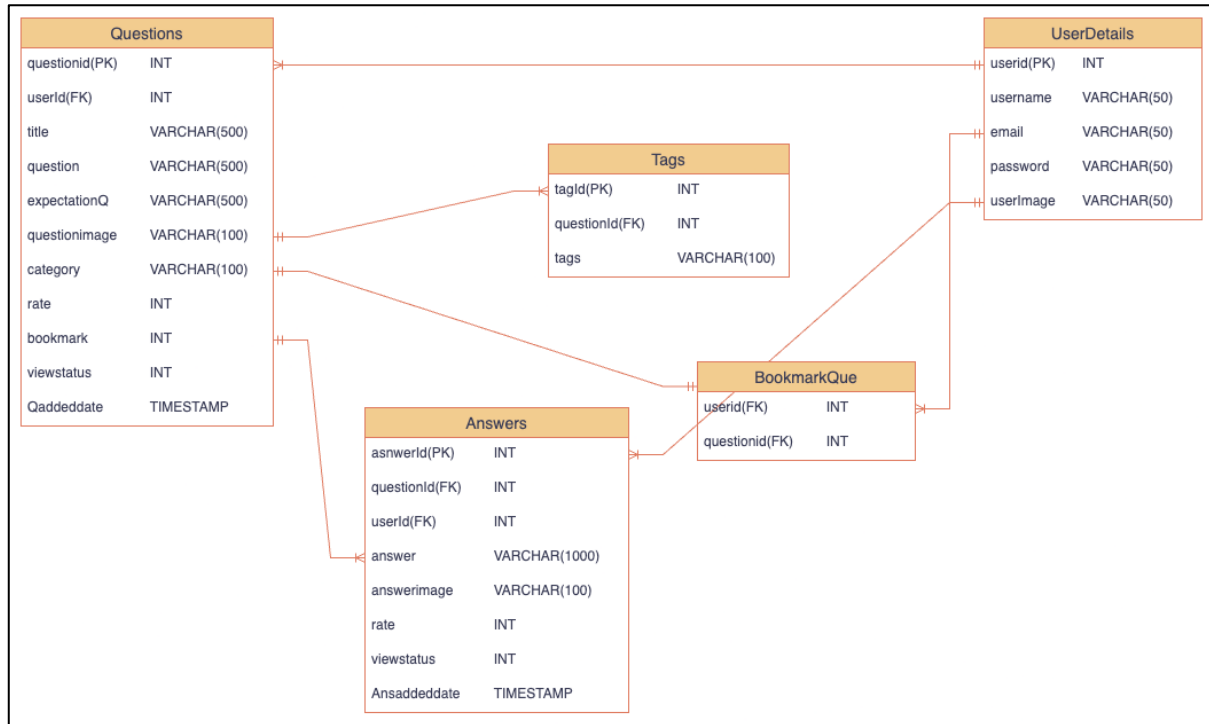


Figure 2 - Database Schema

Link:

[https://drive.google.com/file/d/1VlugudZuk6q1skeF4gij9n0zL9A1Na\\_t/view?usp=sharing](https://drive.google.com/file/d/1VlugudZuk6q1skeF4gij9n0zL9A1Na_t/view?usp=sharing)



### 3.3. Wireframes

Below is Figure 3, which illustrates the wireframes and their interconnectedness through arrows.

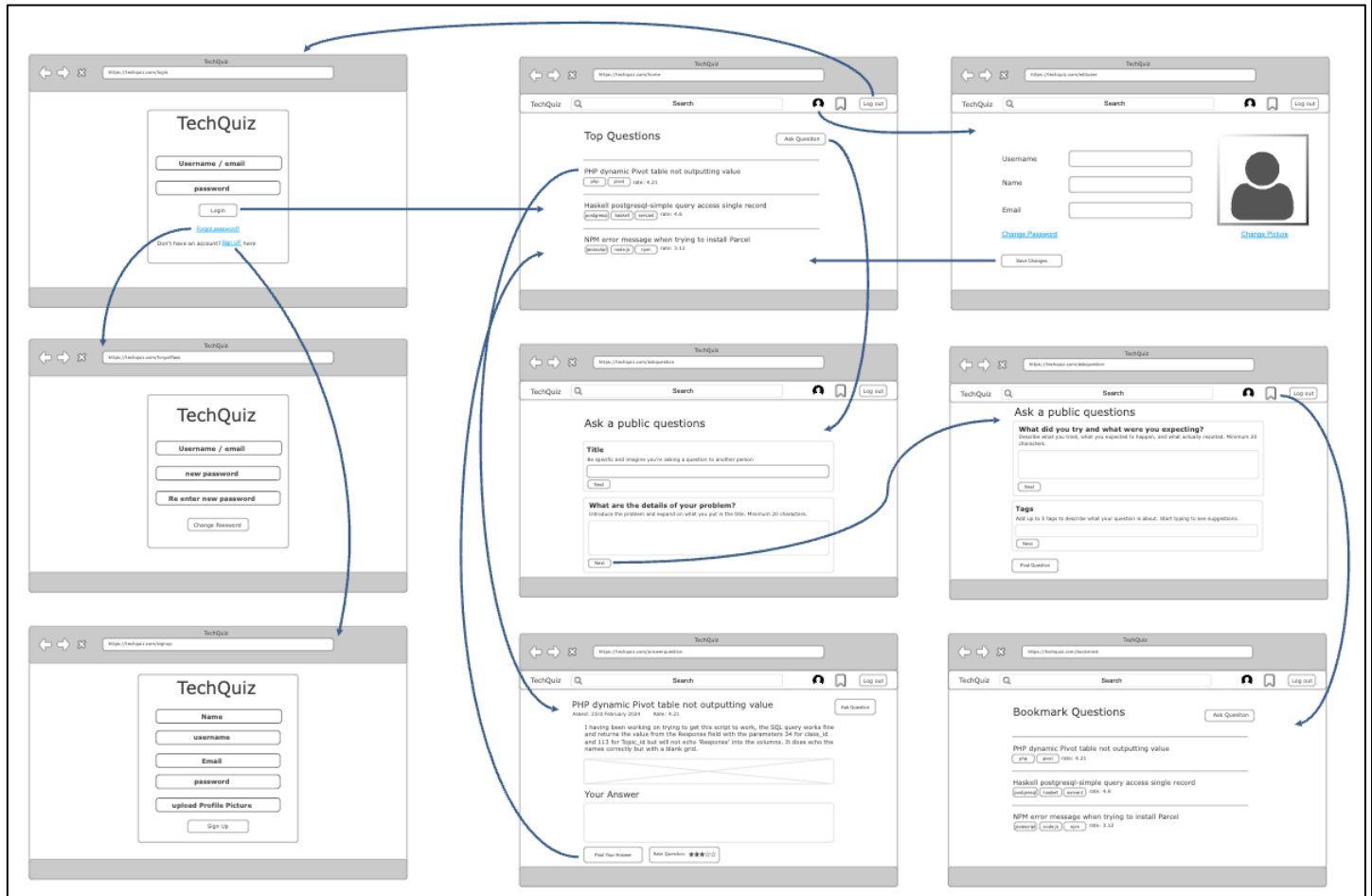
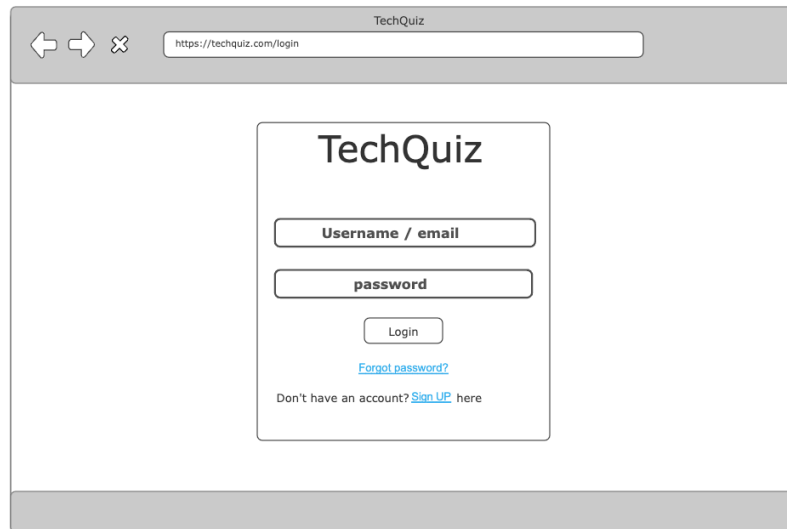


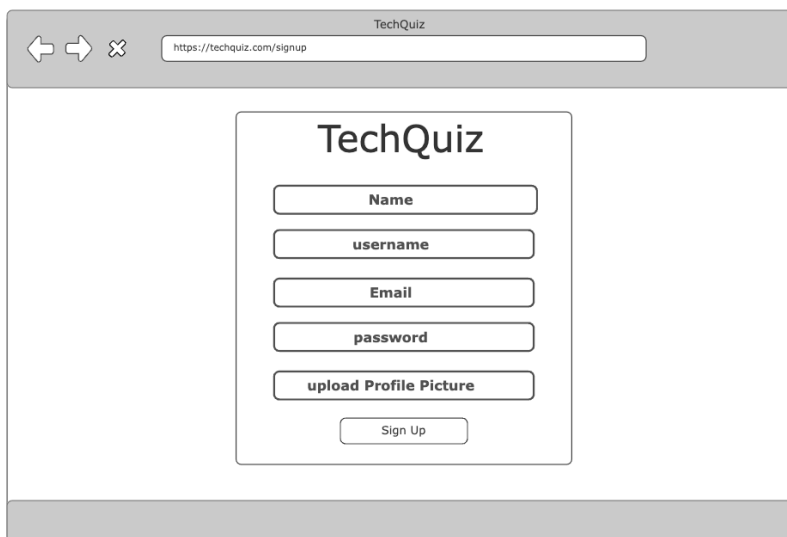
Figure 3 - All wireframes

The login and signup processes are illustrated in figures 4 and 5, respectively. New users can create an account by clicking on "Sign Up," while users who forget their password can reset it through the "Forgot Password?" link on the page depicted in figure 6.



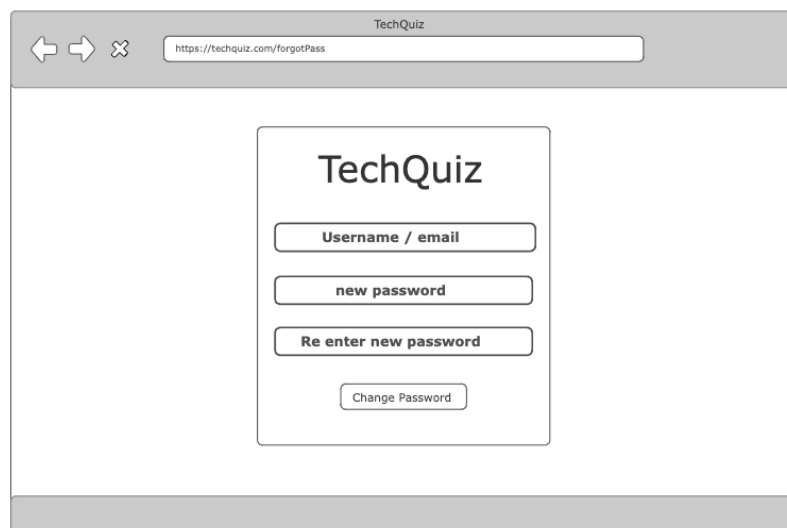
The image shows a web browser window with the title "TechQuiz" and the address bar displaying "https://techquiz.com/login". The page content is centered and features the "TechQuiz" logo at the top. Below the logo are two input fields: "Username / email" and "password". A "Login" button is positioned below these fields. A link labeled "Forgot password?" is located below the "Login" button. At the bottom of the form, there is a text prompt: "Don't have an account? [Sign UP](#) here".

Figure 4 - Login Page



The image shows a web browser window with the title "TechQuiz" and the address bar displaying "https://techquiz.com/signup". The page content is centered and features the "TechQuiz" logo at the top. Below the logo are five input fields: "Name", "username", "Email", "password", and "upload Profile Picture". A "Sign Up" button is positioned below these fields.

Figure 5 - Sign Up



The image shows a web browser window with the title "TechQuiz" and the address bar displaying "https://techquiz.com/forgotPass". The page content is centered and features the "TechQuiz" logo at the top. Below the logo are three input fields: "Username / email", "new password", and "Re enter new password". A "Change Password" button is positioned below these fields.

Figure 6 - Change Passwor

After logging into the application, users are directed to the homepage (Figure 7) adorned with a navigation bar featuring links that lead to various sections of the website. This includes options for asking questions, viewing questions posed by other users along with their ratings, and browsing questions categorized by tags. Users can also access answers to these questions, as depicted in Figure 8 below.

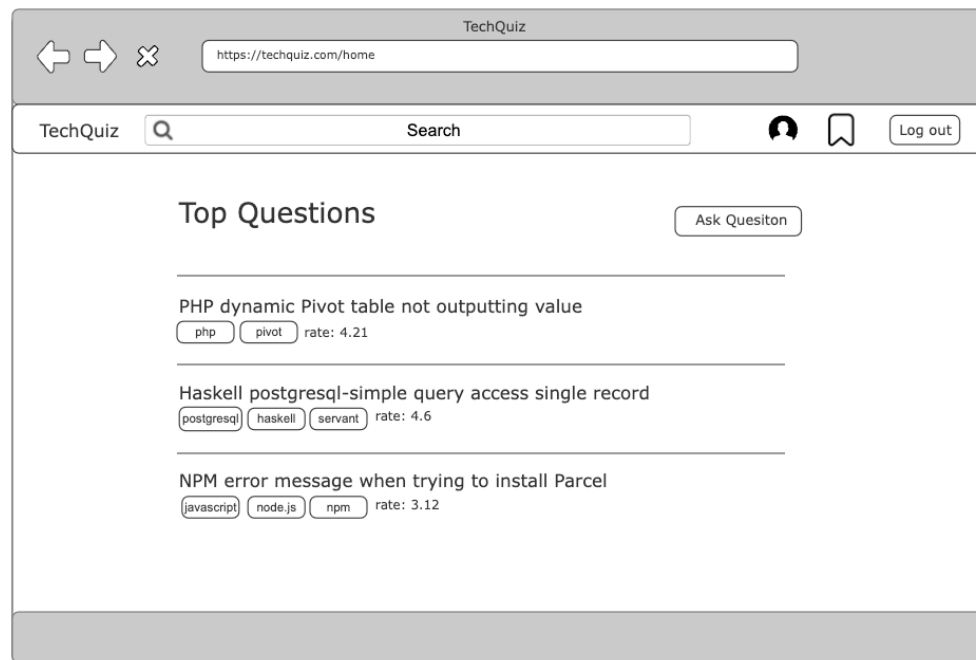


Figure 7 - Home Page

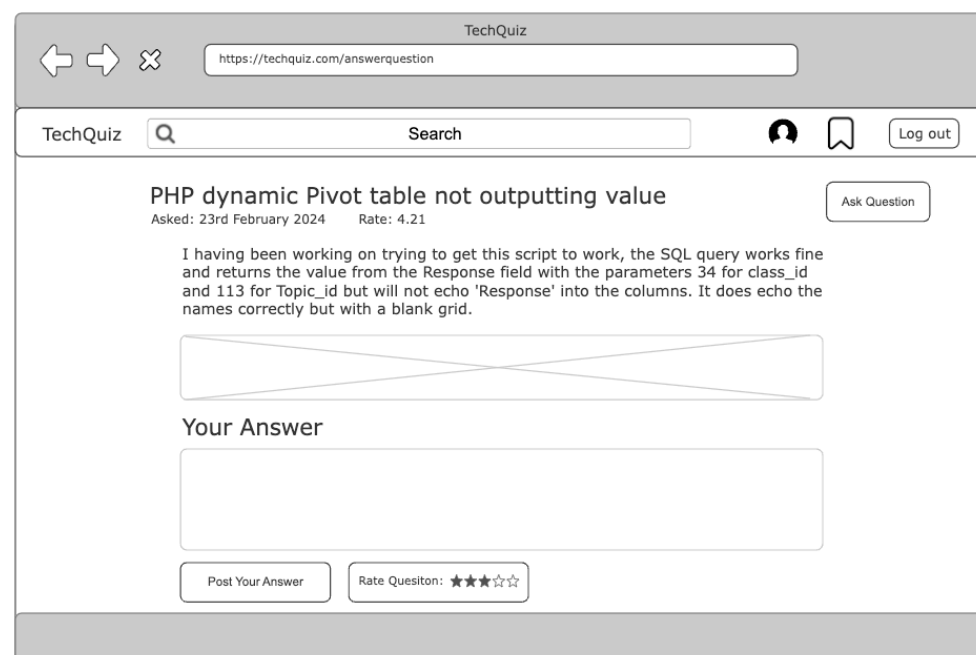


Figure 8 - Answer Question Page

On the homepage, users can navigate to the question creation page. By entering the question details, users can create questions that will be visible to others. The question creation page is depicted in Figures 9 and 10.

TechQuiz

https://techquiz.com/askquestion

TechQuiz Search

Log out

### Ask a public questions

**Title**  
Be specific and imagine you're asking a question to another person

Next

**What are the details of your problem?**  
Introduce the problem and expand on what you put in the title. Minimum 20 characters.

Next

Figure 9 - Ask Question Page1

TechQuiz

https://techquiz.com/askquestion

TechQuiz Search

Log out

### Ask a public questions

**What did you try and what were you expecting?**  
Describe what you tried, what you expected to happen, and what actually resulted. Minimum 20 characters.

Next

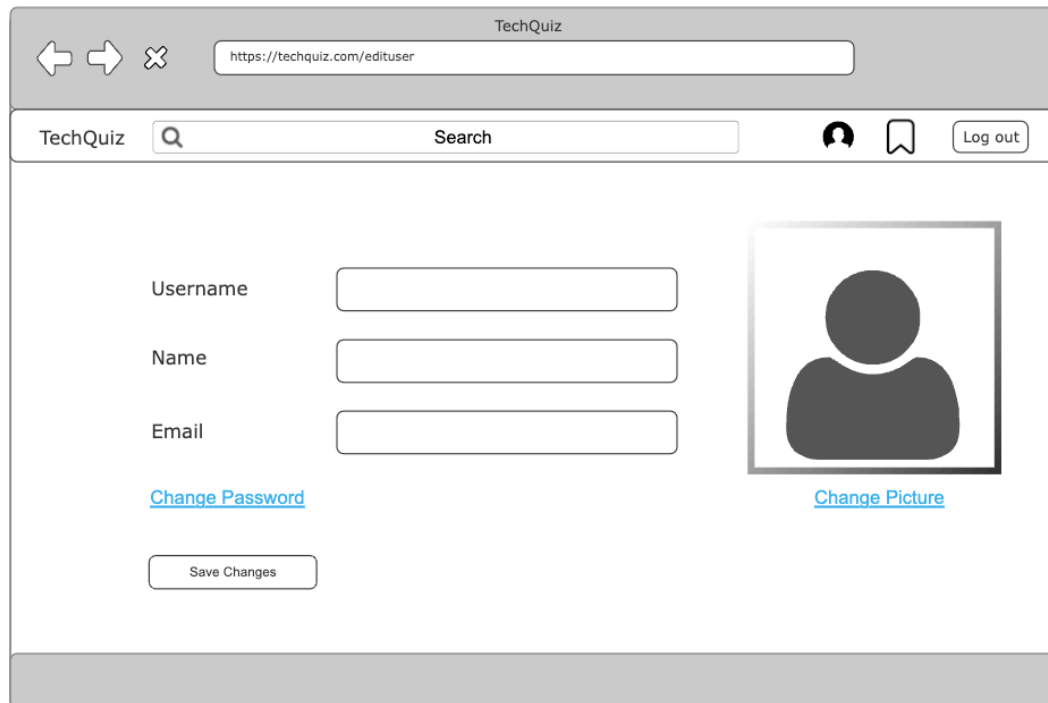
**Tags**  
Add up to 5 tags to describe what your question is about. Start typing to see suggestions.

Next

Post Question

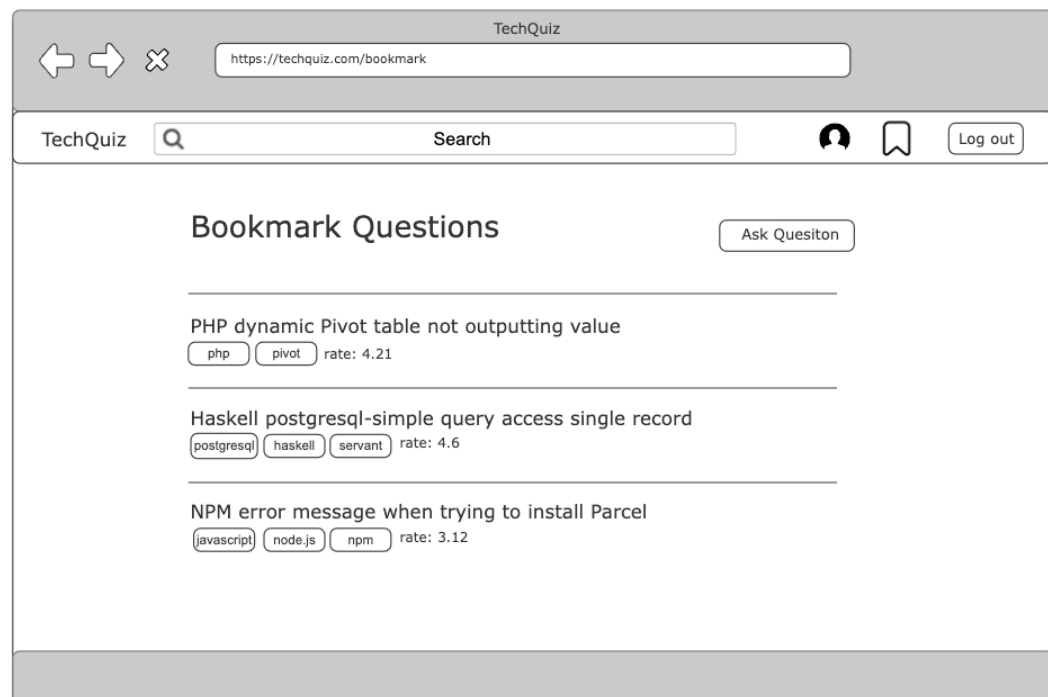
Figure 10 - Ask Question Page2

On the home page, users can navigate to their profile page (Figure 11). In this page, they can edit their user details if desired. Additionally, users can view the questions they have bookmarked on the bookmark page (Figure 12) from the home page.



The screenshot shows the 'User Details' page in a web browser. The browser's address bar displays 'https://techquiz.com/edituser'. The page header includes the 'TechQuiz' logo, a search bar, and a 'Log out' button. The main content area features three input fields for 'Username', 'Name', and 'Email'. Below these fields are two links: 'Change Password' and 'Change Picture'. A 'Save Changes' button is positioned at the bottom left. On the right side, there is a placeholder for a user profile picture with a 'Change Picture' link below it.

Figure 11 - User Details Page



The screenshot shows the 'Bookmark Questions' page in a web browser. The browser's address bar displays 'https://techquiz.com/bookmark'. The page header includes the 'TechQuiz' logo, a search bar, and a 'Log out' button. The main content area is titled 'Bookmark Questions' and features an 'Ask Question' button. Below the title, there are three bookmarked questions, each with a title, tags, and a rate:

- PHP dynamic Pivot table not outputting value  
tags: php, pivot rate: 4.21
- Haskell postgresql-simple query access single record  
tags: postgresql, haskell, servant rate: 4.6
- NPM error message when trying to install Parcel  
tags: javascript, node.js, npm rate: 3.12

Figure 12 - Bookmarked Question Page

## 4. Essay

### **What Makes a Programming Language Suitable for Server-Side Web Development? Is PHP a good language for server-side web programming?**

This essay explores suitable programming languages for back-end development, focusing on whether PHP remains a viable option in this field. Server-side web development, also known as back-end development, deals with the aspects of a website that run on the server and interact with client-side components like web browsers to deliver information.

Scripting languages, unlike traditional programming languages, are translated into machine code on the fly, during execution, making them ideal for shorter programs. Examples include PHP, JavaScript, Python, and Ruby. Commonly used for web development, PHP is a versatile open-source server-side scripting language that can also create graphical user interfaces. Server-side scripting languages, like PHP in WordPress, power dynamic websites by handling user requests, processing data, and delivering content. Other popular server-side scripting languages include Python, Node.js, Perl, and Ruby. These languages are often preferred for their ease of use, rapid development capabilities, and suitability for automating tasks in web applications.

In 1993, Rasmus Lerdorf's creation of CGI applications in C to manage his personal website marked the genesis of PHP. Initially named PHP/FI (Personal Home Page/Forms Interpreter), it evolved to handle web forms and interact with databases. Despite its server-side dominance for over 25 years, PHP continues to spark debate among programmers, with some labeling it a "dead language" when newer technologies emerge (Is PHP Worthy of Developers Hate? | Altamira Softworks). While its popularity ranking has declined (8 Reasons Why PHP Is Still So Important for Web Development), PHP remains a leading server-side language, powering over 80% of websites and even giants like Facebook and WordPress (8 Reasons Why PHP Is Still So Important for Web Development). Although some developers might criticize its functionality, widespread negativity towards PHP often lacks substantial justification.

While originally used for simple tasks, PHP has become a powerful tool for web development. Unlike HTML, PHP allows for interactive features, making websites more engaging. Its ease of use, especially for those familiar with HTML, makes PHP a popular choice for building features like online forms, forums, and shopping carts.

According to both (Is PHP Worthy of Developers Hate? | Altamira Softworks) and (8 Reasons Why PHP Is Still So Important for Web Development), PHP presents several advantages that have solidified its position as a favoured choice for server-side development. These advantages encompass its user-friendly nature, cost-effectiveness, and adaptability. PHP boasts a straightforward syntax, which makes it particularly accessible for newcomers to programming, requiring minimal prior experience. Moreover, being an open-source language, PHP is freely available for use and benefits from a thriving community of developers, ensuring ample resources and support. Its compatibility with various operating systems and web servers underscores its platform independence, facilitating deployment across diverse environments. Additionally, PHP's capability to securely interface with numerous databases such as MySQL, Postgres, Oracle, and Microsoft SQL Server highlight its versatility. This flexibility extends to design, thanks to PHP's dynamic typing feature, granting developers greater latitude in feature development. Lastly, PHP's request-level structure, coupled with a full state reset for each request, streamlines the development process and aids in debugging, ultimately enhancing programmer productivity.

In a comparative study by Purer (2009), three dynamic server-side programming languages—PHP, Python, and Ruby—were evaluated to determine their suitability for web application engineering. PHP was noted for its rapid setup and adaptability to common tasks like content management, making it ideal for sites such as shops or news platforms. However, its lack of flexibility posed a drawback. While PHP ranked highest in popularity and availability, Python excelled in code readability, and Ruby was deemed most usable. In terms of security, database abstraction, exception handling, and functional features, both Ruby and Python surpassed PHP. Speed and execution time were the only criteria where no significant difference was observed among the languages. Purer recommended Python for general application usage based on the research findings, albeit with the disclaimer that language development might impact these results over time.

According to Lei et al. (2015), Node.js has gained popularity for developing data-intensive web applications. The author conducted performance and scenario tests to evaluate Node.js, Python-Web, and PHP. The tests showed that Node.js outperformed PHP in high concurrency conditions. However, I disagree with this conclusion because PHP is widely used, powering 80% of websites. Despite past scalability and performance issues, PHP 7 addressed many concerns and improved performance. Major companies like Facebook and Disney

continue to use PHP effectively. Therefore, PHP is likely to remain a significant player in web development for the foreseeable future.

In conclusion, PHP remains a robust choice for server-side development despite its drawbacks in performance, security, and expandability when compared to newer technologies like Python or Node.js. Its simplicity, familiarity, and ease of learning, reminiscent of languages such as 'C' or Pascal, make it a popular choice for developers. PHP's integration with HTML allows for seamless addition of functionality to websites, and its continuous updates introduce new features and enhance its capabilities over time.



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