Software Engineering Documentation Project: SkillSwap

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Jira Link:

https://dua642.atlassian.net/jira/software/projects/SCRUM/boards/1/backlog?epics=visible

Testrail Link: https://skillswap2.testrail.io/index.php?/dashboard

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SkillSwap Introduction

SkillSwap is a groundbreaking platform, revolutionizing skill exchange within communities. In today's fast- paced world, the ability to learn and adapt is paramount. However, traditional learning methods often come with barriers, such as cost and accessibility. SkillSwap addresses these challenges by offering a community- driven approach to learning, where individuals can share their expertise and acquire new skills without financial transactions.

Another dynamic feature that lies at the heart of SkillSwap is the exchange of services. This innovative functionality facilitates seamless connections among community members, enabling them to exchange ser- vices without the exchange of money. Imagine a world where one individual offers their expertise in fridge repair in exchange for another's skill in creating a customized logo. This exchange of services not only exem- plifies the collaborative spirit of SkillSwap but also showcases its unique ability to meet diverse needs within the community, fostering a culture of reciprocity and mutual support from the very outset.

By leveraging the power of technology and community collaboration, SkillSwap aims to foster a culture of continuous learning and personal development. Our platform provides a user-friendly interface where members can create profiles, list their skills, and connect with others for skill and service exchange. Through features like messaging, community events, and a robust review system, SkillSwap facilitates seamless com- munication and ensures quality interactions.

Objectives

The primary objectives of SkillSwap are outlined below:

- Facilitate Skill Exchange: Our foremost goal is to create a platform that facilitates fluid transfer of skills among individuals within communities. By providing a user-friendly interface and robust communication tools, we aim to empower users to easily connect with others who can help them learn new skills and share their expertise.
- Exchange of Services: We aim to facilitate seamless connections among community members, enabling them to exchange services without the exchange of money. Users can offer their expertise in various areas, such as home repairs, graphic design, or tutoring, in exchange for receiving assistance with their own needs.
- **Empower Users:** Our objective is to empower users to take control of their learning journey. SkillSwap provides the tools and resources necessary for individuals to pursue their interests, connect with others who share their passions, and achieve their personal and professional goals through collaborative skill exchange.
- Ensure Quality and Trust: Central to our objectives is maintaining a high standard of quality and trust within the SkillSwap community. Through features like a transparent review and rating system, we aim to uphold accountability and ensure that users can engage in skill exchanges with confidence and reliability.

Scope

SkillSwap's scope encompasses a comprehensive set of features to facilitate a collaborative skill exchange, aiming to overcome challenges and provide a unique value proposition in the market.

Target Customers

SkillSwap is designed to cater to a diverse range of individuals who are eager to learn new skills, share knowledge, and engage with their local and online communities. Our target audience includes:

- **Skill Enthusiasts:** People who possess expertise in various fields and are eager to share their knowledge with others in a collaborative and supportive environment.
- **Remote Workers and Freelancers:** People who work remotely and freelancers who offer their skills in areas such as graphic design, web development, writing, consulting, and more.
- **Homeowners and DIY Enthusiasts:** Individuals who need assistance with home repairs, main-tenance tasks, gardening, or other DIY projects can offer their own skills in exchange for receiving help.

- **Students and Educators:** Students seeking tutoring or academic assistance can offer their skills in areas they excel in, such as math, science, language tutoring, etc., in exchange for receiving help in subjects they struggle with.
- **Community Builders:** Individuals passionate about building and nurturing communities, and net- working beyond traditional office settings.

Value Proposition

The main benefit of our platform is its ability to foster a sense of community and collaboration by connecting individuals based on shared skills and interests. Moreover, unlike traditional services, our platform will facilitate skill swapping without any monetary transactions, promoting collaboration, community engagement, and a supportive learning environment. Transparency is also upheld with a robust review and rating system, which allows the users to make an informed decision when selecting skill partners. The integration of calendar in our platform ensures efficient scheduling of skill exchange sessions, which prevents conflicts and enhances time management. The addition of learning plans offers structured guides and goals by providing users with a clear roadmap for progression.

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Application Features and Description

Key features and descriptions of our application:

- User Profiles: Each user will have a detailed profile showcasing their skills, interests, and the skills they are looking to acquire. Users can personalize their profiles, adding a bio, portfolio, and endorsements from other members.
- **Skill Listings**: Users can create listings for the skills they are willing to share and the skills they wish to learn. The platform will use smart algorithms to match users with compatible skill exchange partners based on their preferences and availability.

- Messaging Platform: A secure messaging system will facilitate communication between users to discuss the specifics of the skill exchange. This feature ensures that users can coordinate lessons, share resources, and provide feedback within the platform.
- **Review and Rating System:** A transparent review and rating system will allow users to provide feedback on the skill exchange's quality. This builds trust within the community and helps users choose the most reliable and effective skill partners.
- Community Events and Workshops: The platform will host virtual and local community events, workshops, and meetups to encourage face-to-face interactions and strengthen the sense of community. This feature will also enable users to connect to organize workshops covering various skills.
- Exchange of Services: Facilitate connections among community members to exchange services seamlessly for instance, one person offering fridge repair in return for another creating a customized logo.
- **Skill Progress Tracker:** Users can track their progress in acquiring new skills through the platform. This feature includes milestones, achievements, and a digital portfolio that users can showcase to potential collaborators.
- **Community Forums:** Discussion forums for advice and skill development topics. This feature will enhance community engagement and create a supportive learning environment.
- Calendar: Schedule meetings and keep track of sessions/workshops.
- **Learning Plans:** Step-by-step guides/study plans for eac k h sill that the users can follow in their sessions.

Project Requirements

Functional Requirements

| | User Requirements | System Requirements |
|--|--|--|
| User Authentication and Profiles | Users should be able to register and create personalized profiles. Profiles should include details such as skills, interests, bio, portfolio, and endorsements. | Implement secure user registration and authentication mechanisms. Ensure data integrity and privacy in user profiles. |
| Skill Listings and Matching | Users should be able to create listings for skills they are willing to share | Develop algorithms for skill matching based on user preferences. |

| | and skills they wish to learn. • Smart matching algorithms should match users with compatible skill exchange partners based on preferences and availability. | Ensure scalability and performance in matching processes. |
|-------------------------------------|---|---|
| Messaging Platform | A secure messaging system should facilitate communication between users to discuss the specifics of skill exchange. Users should be able to coordinate lessons, share resources, and provide feedback within the platform. | Implement secure messaging protocols and real-time communication technologies. Ensure message delivery reliability and data security. |
| Review and Rating System | A transparent review and rating system should allow users to provide feedback on the quality of skill exchanges. Users should be able to rate and review each other to build trust and credibility within the community. | Develop backend logic for accurate calculation and display of ratings. Implement security measures to prevent manipulation of reviews. |
| Community Events and workshop | The platform should host virtual and local community events, workshops, and meetups to encourage face-to-face interactions. These events should provide additional opportunities for skill exchange and networking. | Design infrastructure for hosting and managing community events. Ensure scalability and availability of event management features. |
| Community Forums | Discussion forums should allow users to seek advice, share tips, and discuss various topics | Implement a scalable and responsive forum system. |

| | related to skill development. This feature should enhance community engagement and create a supportive learning environment. | Ensure data integrity and security in forum interactions. |
|----------------|--|--|
| Calendar | Users should be able to schedule meetings and keep track of sessions and workshops through a calendar feature. | Develop a calendar feature with scheduling capabilities and reminders. Ensure compatibility with various devices and browsers. |
| Learning Plans | Step-by-step guides and study plans should be available for each skill to help users follow structured learning paths during sessions. Learning goals should be used for exchange rather than time taken. | Develop a structured learning plan system with customizable goals. Ensure seamless integration with user profiles and skill listings. |

Non-functional Requirements

• **Product Requirements:**

- o The platform should be responsive, provide quick loading times, and be scalable.
- The platform should have a high level of reliability, maintain data integrity, and have backup and recovery mechanisms.
- The platform should adhere to industry-standard security practices, have robust authentication and protect user data and privacy.
- The platform should have an intuitive interface, clear instructions, and accessibility features.
- The platform should be compatible with diverse devices, browsers, and operating systems, support screen readers and assistive technologies, and adapt to different screen sizes and resolutions.
- The platform should be designed with modularity and scalability, have well-documented code, and receive regular updates and patches.
- The platform should comply with relevant laws and regulations, communicate terms of service and privacy policies clearly, and ensure compliance with intellectual property rights and copyright laws.

• Organization Requirements:

- The platform should support multi-user roles with varying levels of access permissions, such as administrators, moderators, and regular users.
- User management functionalities should allow administrators to add, remove, or modify user accounts and permissions.
- Audit logging capabilities should be implemented to track user activities and system changes for accountability and compliance purposes.
- The platform should provide analytics and reporting features to monitor user engagement, system performance, and other key metrics for organizational decision-making.

• External Requirements:

- The platform should comply with external standards and regulations relevant to the industry, such as ISO standards or industry-specific certifications.
- Integration with external services and APIs, such as social media platforms, or third-party authentication providers, should be supported to enhance functionality and user experience.
- Compatibility with external devices and systems, such as IoT devices or thirdparty software applications, should be ensured to enable seamless interaction and data exchange.
- The platform should be designed with internationalization and localization capabilities to support users from different regions and language preferences.

Requirements Gathering

The requirements gathering process for the SkillSwap encompassed various stages aimed at understanding user expectations, business objectives, and technical constraints to inform the development of the software solution. Requirements were documented using a combination of use cases, user stories, and requirement specifications. These documents provided a structured framework for capturing functional and non-functional requirements, user preferences and constraints. Requirements were analyzed and prioritized to align with project objectives and stakeholder needs.

Business Model

SkillSwap's business model revolves around facilitating seamless skill exchanges, fostering a culture of reciprocity, and providing a platform where users can connect, engage, and grow together. By leveraging innovative revenue streams, SkillSwap aims to sustainably monetize its

platform while continuing to prioritize user experience and community enrichment. Here's a potential business model for SkillSwap:

Advertising and Sponsorships

- Partnership with businesses and organizations that align with SkillSwap's target audience to advertise their products or services on the platform.
- Sponsored listings or promoted content to increase visibility for businesses seeking to reach SkillSwap users.
- Sponsored community events or workshops where businesses can showcase their offerings to participants.

Partnerships and Collaborations

- Partnerships with educational institutions, corporations, or community organizations to offer co-branded programs or initiatives.
- Collaboration with freelance marketplaces, job boards, or skill development platforms to cross-promote services and expand user reach.

Data Monetization

- Aggregate anonymized user data and insights to offer analytics services or market research reports to businesses and organizations.
- Provide data-driven insights to users to help them understand their learning progress and skill development opportunities.

Technical Feasibility

Platform Development

- The development of the SkillSwap platform requires expertise in web development technologies such as HTML, CSS, JavaScript for the front-end, and backend technologies like Node.js for server-side logic.
- Additionally, a database management system like MySQL, PostgreSQL, or MongoDB will be required for storing user data, skill listings, messages, and other relevant information.
- The platform will also need to be scalable to accommodate a growing user base and handle increased traffic as the community expands.

Messaging System

- Implementing a secure messaging system requires attention to security protocols to protect user privacy and data integrity.
- Integration with real-time communication technologies like WebSockets or leveraging third-party mes- saging APIs (Application Programming Interfaces) may be necessary to facilitate seamless and respon- sive messaging between users.

Review and Rating System

- Developing a transparent review and rating system involves designing a user-friendly interface for submitting feedback and implementing backend logic to calculate and display ratings accurately.
- Ensuring the system is resistant to manipulation and spamming is essential to maintain the credibility of reviews and ratings.

Operational Feasibility

| | Strengths | Challenges |
|------------------------|--|---|
| User Adoption | The platform's user-friendly interface enhances adoption. The collaborative nature attracts users seeking skill exchange. | Initial resistance may occur due to the unconventional approach of exchanging skills without monetary transactions. |
| Training | Minimal training required due to intuitive and simple design. Users can quickly grasp the process of creating profiles, listing the skills, and engaging in exchanges. | Educating users on the platform's unique features, such as service exchanges, may require focused training efforts. |
| Ongoing Maintenance | Regular updates can be seamlessly integrated with the user-friendly interface. The platform's design allows for straightforward maintenance. | Technical issues and scalability concerns may necessitate ongoing adjustments. Regular maintenance is vital to address evolving user needs. |
| Scalability | Initial scalability is supported by a robust technology infrastructure. | As the number of users increases, technical challenges may arise, demanding continuous monitoring and infrastructure upgrades. |

Risk Analysis

As the user base grows and usage patterns evolve, SkillSwap's technical infrastructure must scale to accom- modate increased traffic and activity on the platform. Ensuring scalability, reliability, and performance while minimizing downtime and disruptions will be a significant technical challenge, Moreover, there is also the risk of emergence of similar patterns or established competitors entering the market.

To mitigate the above risks, there should be regular system audits, continuous monitoring and a backup recovery plan available. Moreover, in order to make sure that users don't lose interest and to keep up with the trends, there should be continuous innovation, and regular market analysis to stay ahead.

Market Analysis

- **Limited Learning Opportunities:** Pakistan faces a significant gap in accessible learning platforms, creating a market for SkillSwap as an alternative, community driven approach to skill development.
- **Affordability Concerns:** The inability to afford high fees or international charges on other platforms highlights the demand for a locally focused, affordable solution.
- **Gap in Service platforms:** While there are platforms for selling products, marketing skills face a gap in the market, creating an opportunity for SkillSwap to become the go-to platform for skill exchange.

Tools and Resources

| Illustrator | Graphic design software used for creating wireframes and visual designs. |
|-------------|---|
| HTML/CSS | Standard markup and styling languages for web development. |
| React.Js | JavaScript library for building user interfaces, known for its component-based architecture. |
| Node.Js | JavaScript runtime environment for server-side development, enabling scalable and efficient backend applications. |
| MongoDB | NoSQL database for storing and managing unstructured data, commonly used in modern web applications. |

| JIRA | Project management and issue tracking tool for agile software development teams. |
|----------|---|
| Testrail | Test case management tool for planning, managing, and executing software testing efforts. |

Tech Stack

| MongoDB |
|------------|
| Express.js |
| React.js |
| Node.js |

Challenges

- **Technical Infrastructure Scalability:** As the user base grows and usage patterns evolve, SkillSwap's technical infrastructure must scale to accommodate increased traffic and activity on the platform. Ensuring scalability, reliability, and performance while minimizing downtime and disruptions will be a significant technical challenge.
- Ensuring User Security and Preventing Fraud: Implementing robust security measures and identification policies to safeguard users' personal information and prevent fraudulent activities, ensuring a safe and trustworthy environment for skill exchange.
- **Promoting Fair Trade and Equitable Learning Experiences:** Ensuring fairness and transparency in skill exchanges by establishing policies and mechanisms to prevent unfair practices, such as unequal distribution of knowledge or exploitation of users' expertise, fostering a culture of mutual respect and equitable learning opportunities.

Technical Constraints

Scalability

- **Database Scalability:** MongoDB, which is a part of the MERN stack, should be set up in a way that allows horizontal scaling to handle the growing number of users and data.
- **Load balancing:** Implementing load balancing mechanisms to distribute incoming traffic across multiple servers to prevent overload and ensure consistent performance.
- Cashing strategies: Utilizing caching mechanisms to optimize the retrieval of frequently accessed data and reduce database load.
- **Asynchronous Processing:** Employing asynchronous processing techniques for time-consuming tasks like sending notifications or processing large data sets.

Testing and Quality Assurance

- **Automated Testing:** Implementing automated testing frameworks such as Jest for unit testing and Cypress for end-to-end testing to efficiently test various components of the application.
- Continuous Integration/Continuous deployment (CI/CD): Setting up CI/CD pipelines to automate the build, testing, and deployment processes, ensuring rapid and consistent delivery of updates and enhancements.
- **Regression Testing:** Using regression testing strategies to verify that new features do not introduce bugs or regressions in existing functionality.
- **Performance Testing:** Conducting performance testing to assess the responsiveness, scalability, and stability of the platform under different load conditions.
- **Security Testing:** Performing security testing, including penetration testing and vulnerability assessments, to identify and address potential security risks and vulnerabilities.

User Authentication and Authorization Mechanisms

- **Secure Authentication Tools:** Implementing secure authentication protocols such as OAuth 2.0 or JSON web tokens to authenticate users securely and prevent unauthorized access.
- **Encryption:** Encrypting sensitive user data, such as passwords and personal information, both in transit and at rest, using strong encryption algorithms to protect against data breaches and unauthorized access.
- **Multifactor authentication:** Providing support for multifactor authentication to add an extra layer of security and mitigate the risk of unauthorized access in the case of compromised credentials.

Timeline for Sprints

| Sprint 1 | Set up the MERN stack environment. Establish Firebase hosting for the website. Develop initial technical constraints and non-functional requirements documentation. Start working on the API Definition Document. Begin wireframing. Key Focus: Project infrastructure, wireframes, and initial documentation. |
|----------|--|
| Sprint 2 | Implement user and admin authentication (sign-up, login, logout). Develop a user-friendly dashboard for both end-users and admin. Refine the API Definition Document. Expand wireframes. Key Focus: User authentication, foundational UI, and API planning. |
| Sprint 3 | Implement an efficient search bar with autocomplete. Integrate advanced filtering options for search. Develop user profile interface. Develop API endpoints for search functionality. Progress wireframes. Interface for messaging platform Expand the product backlog. Key Focus: Enhanced search functionality, messaging interface, and API development. |
| Sprint 4 | Implement rating system. Add skill exchange interface. Integrate API endpoints. Refine wireframes. Refine user profile interface. Key Focus: Rating system, skill exchange interface, and API integration. |
| Sprint 5 | Conduct thorough testing of all features. Address and fix any bugs or issues identified. Prepare for the deployment of the application. Finalize documentation for future maintenance. Complete API documentation for front-end developers. Conduct final checks before deployment. |

Key Focus: Ensuring a robust and reliable application through comprehensive testing, preparing for deployment, and addressing final refinements.

Scrum Model Implementation

Roles

- **Scrum Master:** Haya will serve as the Scrum Master, responsible for facilitating the Scrum process, removing impediments, and ensuring adherence to Scrum principles and practices.
- **Product Owner:** Rania acts as the Product Owner, representing stakeholders and defining the product vision, priorities, and requirements.
- **Designer:** Dua is responsible for the design of the SkillSwap platform, ensuring an intuitive and visually appealing user interface that enhances user engagement and satisfaction.
- **Developer:** Zainab is responsible for delivering increments of working products at the end of each sprint.

Artifacts

Product Backlog

Rania, the Product Owner, is responsible for maintaining the SkillSwap product backlog. She collaborates closely with the developer and designer to gather requirements and prioritize features and enhancements. Rania regularly reviews and refines the product backlog based on the feedback from the team. She ensures that backlog items are well-defined, prioritized, and ready for implementation by the developer.

Sprint Backlog

The SkillSwap development team, led by the Scrum Master: Haya, selects items from the product backlog for implementation during each sprint planning session. The team collectively decides which backlog items to include in the sprint backlog based on their priority, complexity, and sprint capacity. Progress is tracked throughout the sprint using a task board or project management tool, where team members update the status of their tasks daily. The Scrum Master facilitates daily stand-up meetings to monitor progress, identify any impediments, and ensure that the team remains focused on achieving the sprint goals.

Increment

At the end of each sprint, the development team delivers a potentially shippable product increment. This increment represents a cohesive set of features and enhancements completed during the sprint. The team defines the increment based on the sprint goal and acceptance criteria established at the beginning of the sprint planning session. Any unfinished work or unresolved issues are carried forward to the next sprint backlog for further refinement and prioritization.

Events

Sprint Planning:

Sprint planning meetings in SkillSwap are conducted at the beginning of each sprint to plan the work for the upcoming iteration. The Product Owner presents the highest-priority items from the product backlog, and the development team collaborates to select and prioritize items for the sprint backlog based on their complexity and sprint capacity. During the meeting, the team defines the sprint goal and breaks down selected backlog items into smaller tasks. By the end of the sprint planning meeting, the team understands what needs to be accomplished during the sprint and commits to delivering a potentially shippable product increment.

Daily Standup:

Daily standup meetings are held each morning to synchronize the team's work, discuss progress, and identify any obstacles. Team members gather in a brief, time-boxed meeting where each member shares their accomplishments since the last standup, what they plan to work on next, and any blockers they're facing.

Sprint Review:

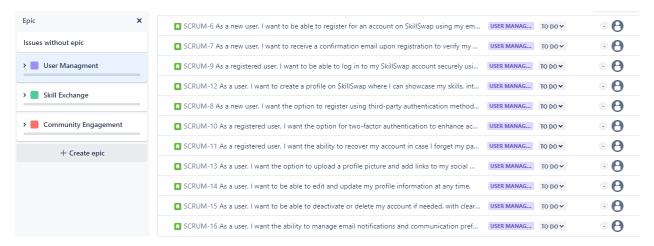
Sprint review meetings in SkillSwap are conducted at the end of each sprint to demonstrate completed work to stakeholders and gather feedback for future iterations. The development team showcases the product increment they've delivered during the sprint, highlighting new features, improvements, and any changes made since the last review. The insights gathered during the sprint review inform the product backlog refinement process and help prioritize upcoming work based on user needs and feedback.

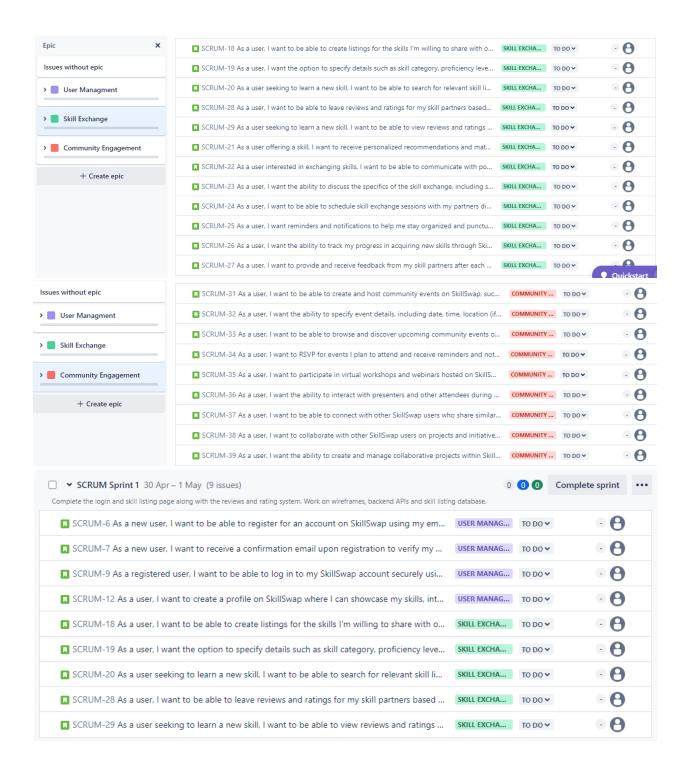
Sprint Retrospective:

The team gathers to review what went well, what didn't go as planned, and what lessons were learned. They discuss opportunities for improvement in areas such as collaboration,

communication, tools, and processes. Actionable items are identified and documented to address any issues or bottlenecks encountered during the sprint.

JIRA Snapshots:





Benefits

By implementing the Scrum model, we aim to:

• Enhance collaboration and communication among team members.

- Adapt quickly to changing requirements and priorities.
- Deliver value incrementally to our users.
- Foster a culture of continuous improvement and learning.

Communication Plan

Team Communication

- **Daily Stand-up meetings:** The team conducts daily standup meetings to synchronize their work, discuss progress, and identify any obstacles or challenges. During the standup meetings, team members share updates on their tasks, highlight any blockers or dependencies, and collaborate on solutions to overcome challenges.
- Weekly Team meetings: Weekly team meetings are scheduled to review project progress, discuss upcoming tasks and milestones, and address any issues or concerns raised by team members.

Feedback Mechanisms

SkillSwap incorporates feedback mechanisms to gather input from users and team members, enabling continuous improvement and ensuring alignment with project goals and objectives.

User Feedback

Users are encouraged to provide feedback through various channels, such as surveys, and in-app feedback mechanisms, to gather input on user experience, platform functionality, and feature requests.

Team Feedback

Feedback from team members is collected through retrospectives, one-on-one discussions, and informal channels to identify areas for improvement and implement actionable changes.

Escalation Procedures

Escalation procedures are established to address issues, concerns, or conflicts that cannot be resolved at the operational level, ensuring timely resolution and mitigation of risks. Team members are encouraged to resolve issues or conflicts at the operational level through open communication and collaboration. They should first attempt to address the issue directly with the involved parties to find a mutually agreeable solution. If the issue persists or cannot be resolved at the operational level, team members can escalate the matter to their respective team lead or

project manager. The team lead or project manager will assess the situation, gather relevant information, and work with the involved parties to find a resolution.

Documentation and Reporting

Effective documentation and reporting practices are implemented to provide transparency, accountability, and visibility into project progress, decisions, and outcomes.

Documentation Practices

- Project documentation is maintained systematically, including project plans, requirements documents, design specifications, test plans, meeting minutes, and other relevant artifacts.
- Documentation is organized and accessible to all team members to ensure consistency, clarity, and accuracy of project information.

Reporting Mechanisms

- Regular progress reports, status updates, and performance metrics are shared with stakeholders to provide visibility into project progress, milestones, and key deliverables.
- Reporting mechanisms include weekly status reports, sprint reviews and executive dashboards.
- Reporting frequency, format, and content are defined based on stakeholder requirements and project communication protocols to ensure effective communication and alignment.

Test Plan

The SkillSwap Test Plan outlines the approach, objectives, and scope of testing for the SkillSwap platform. It defines the testing strategy, identifies the testing resources, and establishes the criteria for evaluating the quality and functionality of the application.

Testing Objectives

- Ensure the functionality, reliability, and performance of the platform.
- Validate the accuracy and completeness of user authentication, skill exchange, and community features.
- Verify the compatibility of the platform with diverse devices, browsers, and operating systems.

• Assess the security, scalability, and maintainability of the application.

Testing Scope

Functional Testing

- **User Authentication:** Verify the registration, login, and profile management functionalities.
- **Skill Exchange:** Test the creation of skill listings, skill matching algorithms, and messaging features.
- **Community Features:** Validate the functionality of community events, forums, and calendar integration.
- **Service Exchange:** Test the exchange of services without monetary transactions.
- **Learning Plans:** Verify the availability and functionality of learning guides and study plans.

Non-Functional Testing

- **Performance Testing:** Assess the responsiveness, scalability, and load handling capabilities of the platform.
- **Security Testing:** Identify and mitigate potential security vulnerabilities, including data encryption and authentication mechanisms.
- **Compatibility Testing:** Verify the compatibility of the platform with various devices, browsers, and screen sizes.
- Accessibility Testing: Ensure compliance with accessibility standards and support for users with disabilities.

Testing Approach

The testing approach involves a combination of manual and automated testing methodologies:

- **Manual Testing:** Test cases will be executed manually to validate user interactions, functionality, and user experience.
- **Automated Testing:** Automated test scripts will be developed and executed to validate repetitive and regression test cases.

Testing Environment

The testing environment for SkillSwap includes:

- **Development Environment:** Local development environments for developers to build and test new features.
- **Staging Environment:** A pre-production environment for testing new releases and updates before deployment to production.
- **Production Environment:** The live environment where the SkillSwap platform is accessible to users.

Testing Schedule

| Sprint Testing | Testing activities will be conducted in parallel with development sprints, with regular regression testing and bug fixes. |
|--------------------|---|
| Release Testing | Comprehensive testing will be performed before each release to ensure the stability and quality of the platform. |

Testing Resources

| Tools | Purpose |
|----------|----------------------|
| Testrail | Test case management |
| JIRA | Defect tracking |
| Selenium | Automated testing |

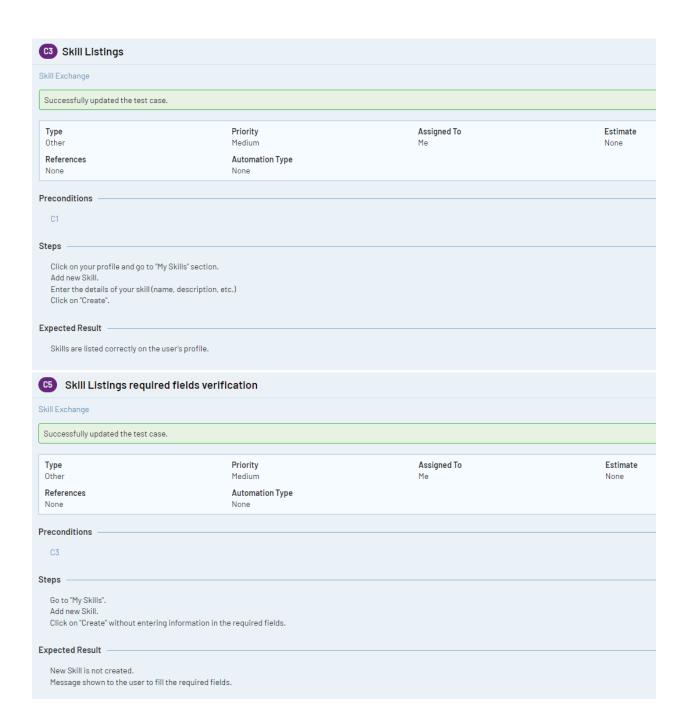
Risks and Contingencies

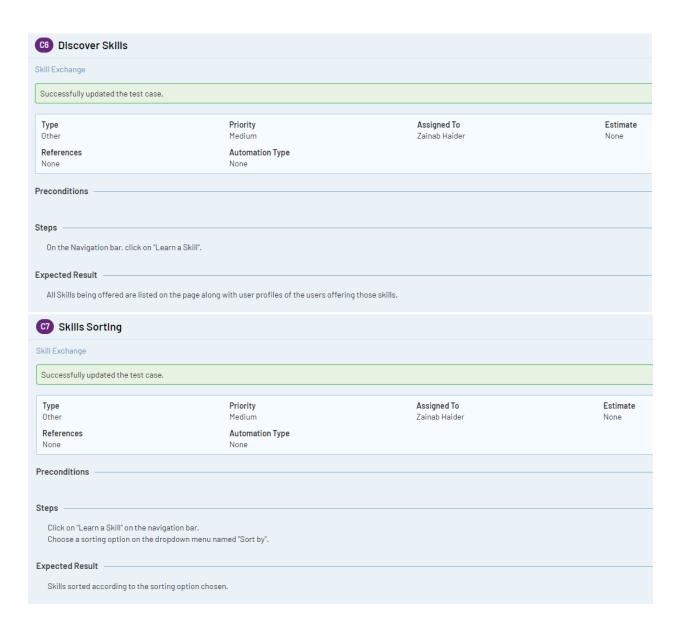
- **Risk:** Limited testing resources and time constraints may impact the thoroughness and coverage of testing.
- **Mitigation:** Prioritize testing activities based on risk assessment, allocate additional resources as needed, and adjust the testing schedule accordingly.

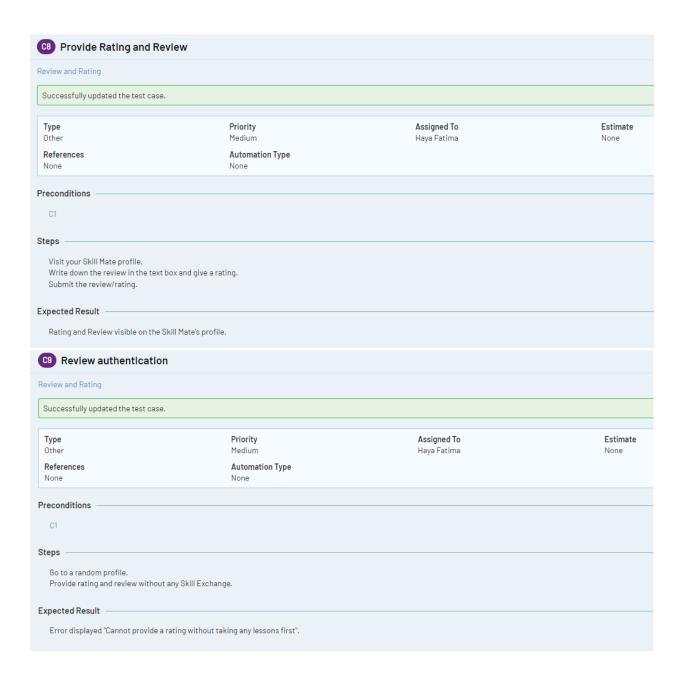
Test Cases

Top 8 test cases from testrail:

User Registration User Management Successfully updated the test case. Туре Priority Assigned To Estimate Rania Siddiqui Other High None Automation Type References None None Steps Click on "Join" on the Navigation bar of the dashboard. Enter valid registration details (username, email, password, etc). Click on the "Register" button. Expected Result The user is redirected to their home page. C2 Profile Modification User Management Successfully updated the test case. Priority Assigned To Estimate Туре Other High Rania Siddiqui None Automation Type References None None Preconditions Steps Navigate to the "My Profile" section. Edit the profile. Save the profile. **Expected Result** Profile information is displayed correctly on the user's profile page.







Test Report

This section provides a summary of the testing activities conducted on the SkillSwap platform. It outlines the test execution results, identifies any defects or issues encountered, and offers recommendations for improvement.

Test Summary

Test Scope

The testing scope included functional and non-functional testing of the SkillSwap platform, covering user authentication and skill exchange.

Test Execution Summary

| Test Category | Total Test Cases | Test Cases Passed | Test Cases Failed | Test Cases Pending |
|---------------------------|---------------------|----------------------|----------------------|-----------------------|
| Functional Testing | 20 | 9 | 8 | 3 |
| Non-Functional Testing | 5 | 0 | 0 | 5 |

Defect Summary

5 defects were identified during testing. One example of the defect found:

• In the Review Authentication test case, the platform allowed the users to post reviews on a skill that they have not taken lessons or initiated skill exchange with.

Quality Assurance Plan

Objective

The primary objective of the Quality Assurance plan for SkillSwap is to ensure that the platform meets high standards of functionality, usability, reliability, and performance to deliver a positive user experience and achieve stakeholder satisfaction.

Scope

The QA plan encompasses all stages of the software development lifecycle, including requirements gathering, design, development, testing, deployment, and maintenance, to ensure consistent quality across all aspects of the platform.

QA Processes

| Requirements Validation | Collaboration with the team to validate and clarify requirements, ensuring that they are clear, complete, and achievable before development begins. |
|----------------------------|--|
| Design Reviews | Design reviews to assess the usability, accessibility, and consistency of the platform's user interface (UI) and user experience (UX) design, providing feedback for improvements. |
| Code Reviews | Evaluation of the quality, readability, and adherence to coding standards of the platform's source code, identifying bugs, security vulnerabilities, or performance issues. |
| Testing | Comprehensive testing strategies |

Deployment

Hosting Platform

SkillSwap will be hosted on Google's Firebase Hosting platform, providing fast and secure hosting for our web application, static and dynamic content, and microservices. Firebase Hosting allows us to deploy web apps with a single command and serve content to a global CDN (Content Delivery Network), ensuring optimal performance and reliability for our users.

Deployment Process

- **Build Process:** Before deployment, the latest version of the SkillSwap application will be built and tested thoroughly to confirm its readiness for deployment.
- **Firebase Configuration:** Configuration of Firebase Hosting settings, including project setup, domain settings, and SSL certificate configuration for secure HTTPS connections.
- **Deployment Command:** Use of the Firebase CLI (Command Line Interface) to deploy the SkillSwap application to Firebase Hosting. The deployment command uploads the built application files to the Firebase servers.
- **Monitoring Deployment:** Monitor the deployment process to ensure that it completes successfully without any errors or issues. Firebase provides detailed logs and metrics to track deployment progress.
- **Rollback Procedure:** In the event of unforeseen issues or errors post-deployment, utilize Firebase Hosting's rollback feature to revert to a previous version of the application quickly. This ensures minimal downtime and disruption for our users.

Post Deployment Tasks

- **Testing:** Conduct thorough testing of the deployed application to verify its functionality, performance, and responsiveness across different devices and browsers.
- Monitoring and Maintenance: Implement monitoring tools to track application performance, uptime, and user interactions. Regularly monitor server logs, error reports, and user feedback to identify and address any issues promptly.
- **Scalability Planning:** Continuously assess the scalability of the deployed application and plan for future growth and expansion. Monitor user traffic and resource utilization to anticipate scaling requirements and adjust infrastructure accordingly.
- **Feedback Collection:** Encourage users to provide feedback on the deployed application's usability, features, and performance. Use this feedback to prioritize enhancements and improvements in future iterations.

Architectural Design

The architectural design is shown in figure 1.

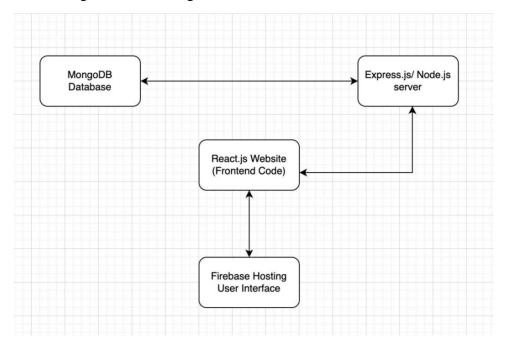
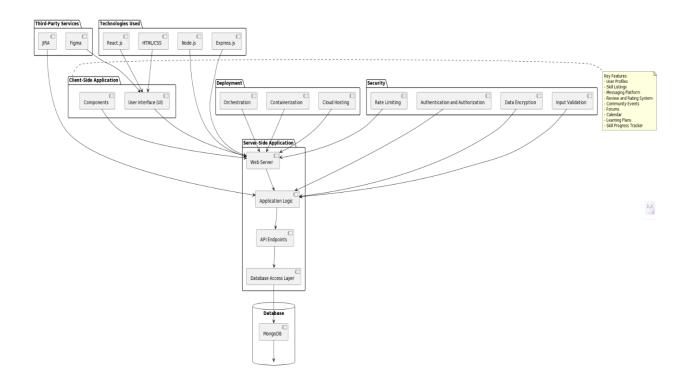
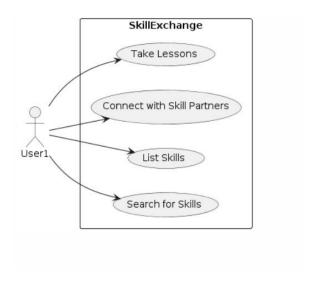


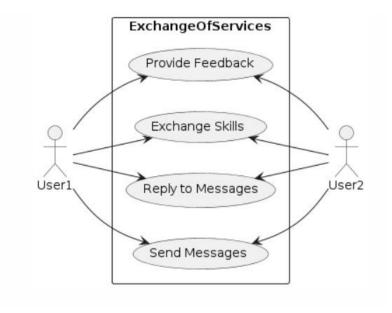
Figure 1

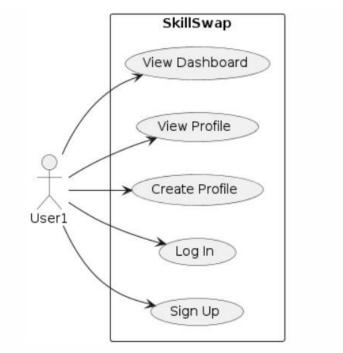
Architecture Diagram for Skill Swap



Use Case Diagrams

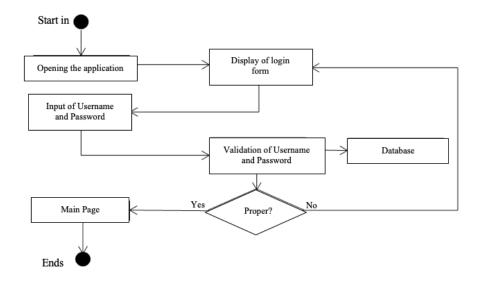




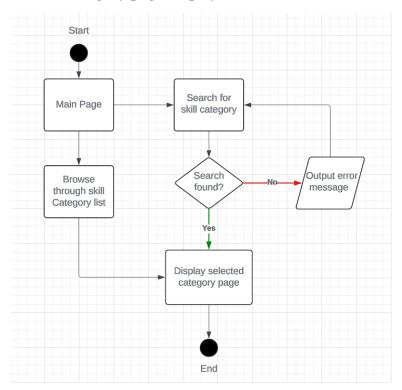


Activity Diagrams

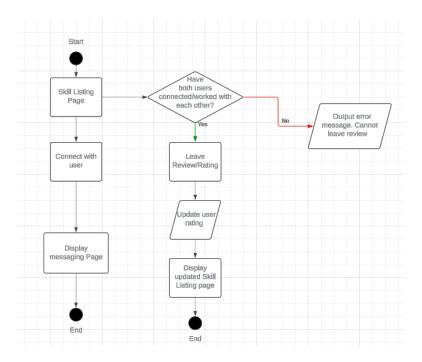
Activity diagram for user Login



Activity diagram for Skill category page Display

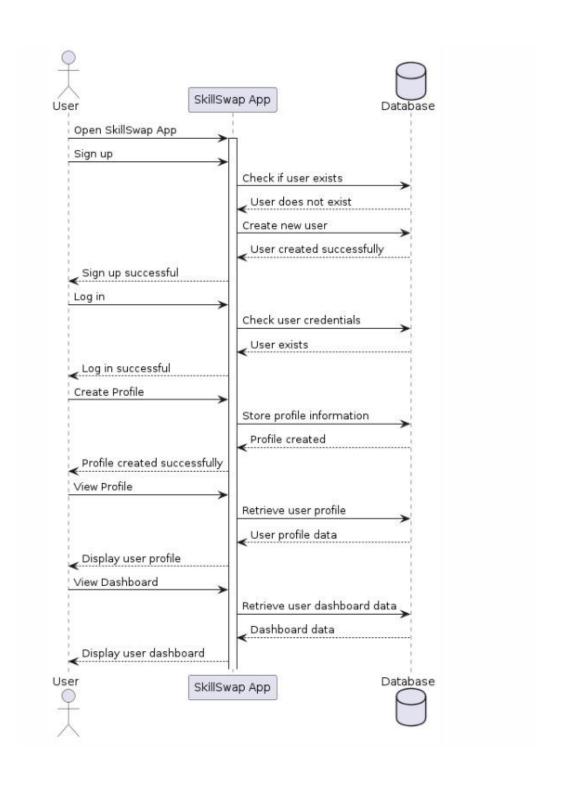


Activity diagram for Messaging page Display and review/rating

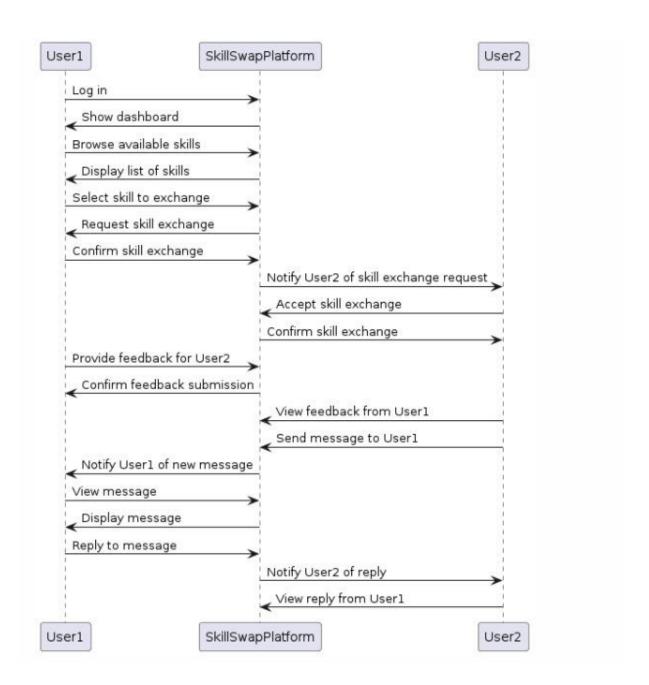


Sequence Diagrams

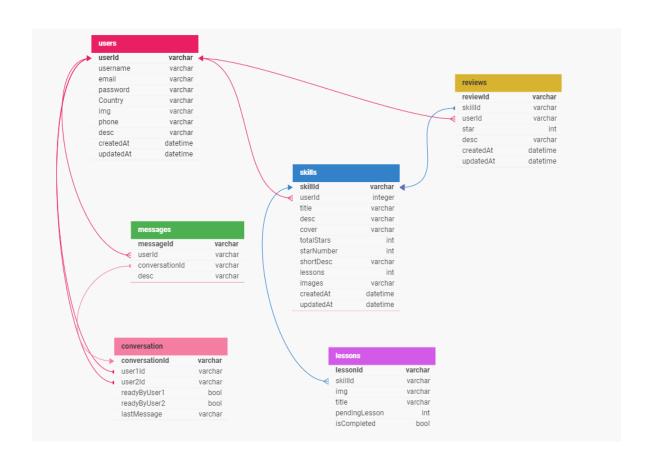
Sequence Diagram displaying Login/Signup page



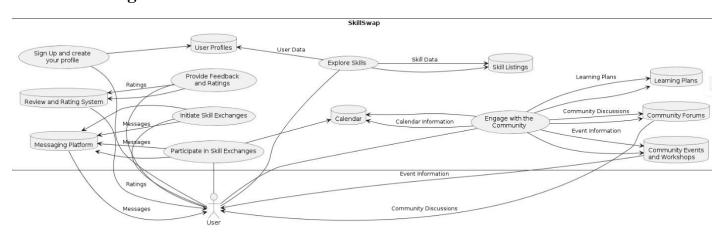
Sequence Diagram displaying skill exchange services



ERD



Data Flow Diagram



Phases of Wireframe Development for SkillSwap

Phase 1: Requirement Analysis and Research

- Review Documentation: Thoroughly review the project documentation, including project requirements, functional and non-functional specifications, and user stories.
- User Analysis: Analyze the target audience and user personas outlined in the documentation. Understand their needs, preferences, and pain points to inform the wireframe design.
- Competitive Analysis: Conduct a competitive analysis to benchmark against similar platforms and identify key features, design patterns, and best practices.

Phase 2: Conceptual Wireframing

- Storyboarding: Develop rough sketches or storyboards to visualize the user flow and interaction sequences. Outline the key screens and user actions required to achieve specific tasks.
- Low-Fidelity Wireframes: Create low-fidelity wireframes using simple tools or paper prototypes. Focus on layout, navigation, and content placement without detailed design elements.
- Iterative Feedback: Share the low-fidelity wireframes with stakeholders, including the development team, for feedback and validation. Iterate based on their input to refine the wireframe concepts.

Phase 3: Detailed Wireframe Design

- High-Fidelity Wireframes: Translate the low-fidelity wireframes into high-fidelity designs using wireframing tools or design software. Add more detail to the layout, visual elements, and user interface components.
- Functional Annotations: Include functional annotations or notes to describe the behavior and functionality of interactive elements such as buttons, forms, and navigation menus.
- Accessibility Considerations: Ensure that the wireframes adhere to accessibility standards and guidelines. Address issues related to color contrast, font size, and navigation for users with disabilities.

Phase 4: Review and Validation

- Internal Review: Conduct an internal review of the high-fidelity wireframes with the development team, product managers, and designers. Verify alignment with project requirements and design objectives.
- Usability Testing: Perform usability testing with representative users to gather feedback on the wireframes' usability, navigation, and user experience. Identify any pain points or usability issues for further refinement.

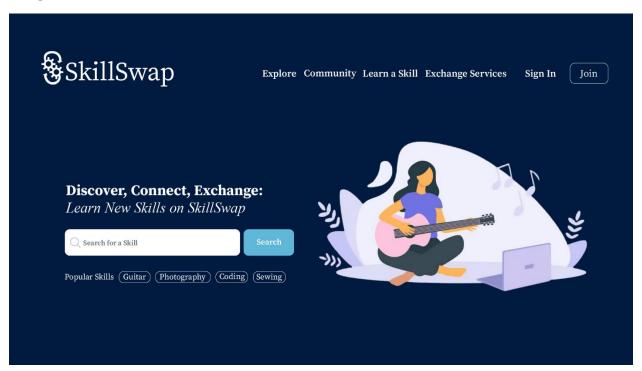
Phase 5: Documentation and Handoff

- Documentation: Document the wireframes, including detailed descriptions of each screen, user interactions, and design rationale. Provide clear instructions for developers to implement the designs accurately.
- Asset Preparation: Prepare assets and resources required for development, including design files, icons, images, and style guides. Organize files for easy access and handoff to the development team.
- Handoff to Development: Collaborate with developers to ensure a smooth handoff of the wireframes and design assets. Address any questions or clarifications regarding the design specifications and implementation details.

Phase 6: Iterative Refinement

- Feedback Integration: Incorporate feedback from usability testing, stakeholder reviews, and ongoing iterations into the wireframes. Continuously refine the designs based on user needs and project goals.
- Agile Sprint Alignment: Align wireframe iterations with the agile sprint timeline and development cycles. Coordinate with the development team to prioritize features and tasks for each sprint.

Images of Wireframes





Explore Community Learn a Skill Exchange Services

Sign In

Join

Graphic Design Video & Animation Writing & Translation Music & Instruments Sports Handycraft Lifestyle

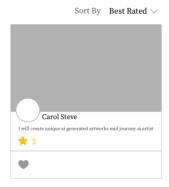
SKILLSWAP > GRAPHICS & DESIGN

AI Artists

Explore the boundaries of art and technology with SkillSwap's AI artists.









Explore Community Learn a Skill Exchange Services

Join

Graphic Design Video & Animation

Writing & Translation

Music & Instruments

Sports

Handycraft

Lifestyle

Popular Skills





Explore Community Learn a Skill Exchange Services

Sign In

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Writing & Translation

Music & Instruments Sports

Lifestyle

Categories Art & Design

Music & Instruments Programming & Tech

Sports Lifestyle Hanycrafts

Cooking Graphic Design About

Careers

Terms of Service Privacy Policy

Community

Community Hub Forum

Events Blogs Podcast

Community Standards

Contact Us

Address Location

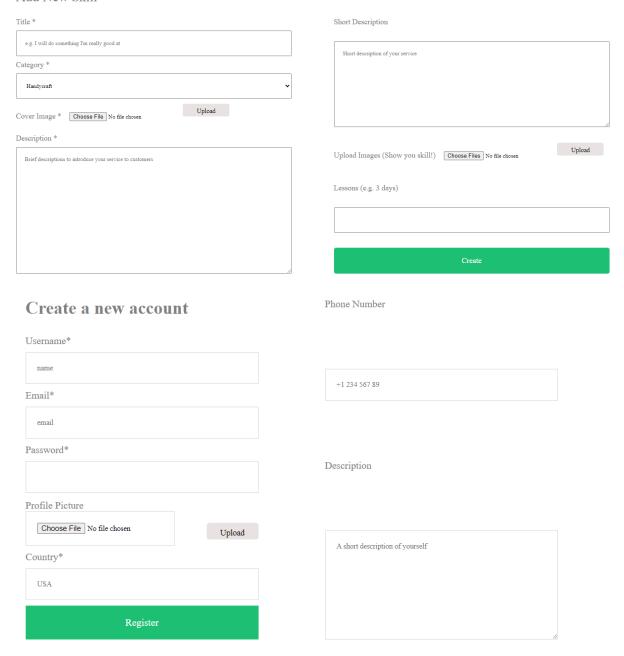
SkillSwap







Add New Skill





API Documentation

Register():

This endpoint allows users to register a new account on the platform. Users need to provide their username, email, password, country, and optionally, an image, phone number, and description. Upon successful registration, users are redirected to the homepage.

Method: POST

Endpoint: /auths/register

Request Parameters:

| Parameter | Туре |
|-----------|--------|
| username | string |
| email | string |

| password | string |
|----------|-------------------|
| country | string |
| img | (optional) string |
| phone | (optional) string |
| desc | (optional) string |

Response:

Success Response: 201 OK

Description: User is successfully registered.Redirect: User is redirected to the homepage.

Error Response:

• Status Code: 400 Bad Request

• Description: If any required fields are missing or invalid.

Login():

Registers a new user.

Method: POST

Endpoint: /auths/login

Request Parameters:

| Parameter | Туре |
|-----------|--------|
| username | string |
| password | string |

Response:

Success Response: 200 OK

• Description: User is authenticated. The user information excluding the password is returned in the response body.

• Cookie: An HTTP-only cookie named accessToken containing the authentication token.

• Body: Information about the user excluding the password.

• Output: User information

Error Response:

• Status Code: 404 Not Found

• Description: If the user is not found or if the provided password is incorrect.

Logout():

This endpoint logs out the current user.

Method: POST

Endpoint: /auths/logout

Request Parameters:

This endpoint does not require any request parameters.

Response:

Success Response: 200 OK

• Description: Current user is successfully logged out.

• Cookie Removal: The accessToken cookie is cleared from the client.

• Body: Message confirming the user has been logged out.

getUser():

This endpoint fetches the registered user from their user ID and returns the user info as the response.

Method: GET

Endpoint: /users/:id

Request Parameters:

| Parameter | Туре |
|-----------|--------|
| userId | string |

Response:

Success Response: 200 OK

- Description: User information for the specified user ID is successfully retrieved and returned in the response body.
- Body: Information about the user.

Error Response:

Status Code: 404 Not Found

• Description: If the user with the specified ID is not found.

deleteUser():

This endpoint allows users to delete their accounts. However, only the owner of the account can perform this action.

Method: DELETE

Endpoint: /users/:id

Request Parameters:

| Parameter | Туре |
|-----------|--------|
| userId | string |

Response:

Success Response: 200 OK

• Description: The user account is successfully deleted.

• Body: Message indicating successful deletion.

Error Response:

- Status code 403 Forbidden: If the user attempting to delete the account is not the owner of the account.
- Status code 404 Not Found: If the user with the specified ID is not found.

createSkill():

This endpoint allows users to create a new skill entry associated with their account.

Method: POST

Endpoint: /skills

Request Parameters:

| Parameter | Туре | Description |
|-------------|-------------------|--|
| userId | string | The unique identifier of the user. |
| title | string | The title of the skill. |
| desc | string | Description of the skill. |
| cover image | string | The URL of the cover image for the skill. |
| category | (optional) string | The category of the skill. |
| shortDesc | (optional) string | A short description of the skill. |
| lessons | (optional) Number | The total number of lessons for the skill. Default is 0. |
| imagesArray | (Optional) Array | An array of URLs for additional images related to the skill. |

Response:

Success Response: 201 Created

• Description: The skill entry is successfully created.

• Body: The newly created skill entry.

Error Response:

• Status Code: 400 Bad Request - If the request is malformed or missing required parameters.

deleteSkill():

This endpoint allows users to delete a skill entry associated with their account.

Method: DELETE

Endpoint: /skills/:id

Request Parameters:

| Parameter | Туре |
|-----------|--------|
| skillId | string |

Response:

Success Response: 200 OK

• Description: The skill entry is successfully deleted.

• Body: Message confirming successful deletion.

Error Response:

• Status Code: 403 Forbidden

• Description: If the user trying to delete the skill is not the owner.

getSkill():

This endpoint allows users to retrieve information about a single skill by providing its unique identifier.

Method: GET

Endpoint: /skills/single/:id

Request Parameters:

| Parameter | Туре |
|-----------|--------|
| skillId | string |

Response:

Success Response: 200 OK

• Description: Information about the requested skill is successfully retrieved.

• Body: Details of the skill.

Error Response:

• Status Code: 404 Not Found

• Description: If the skill with the specified ID is not found.

getSkills():

This endpoint allows users to retrieve a list of skills based on optional filters such as user ID, category, and search query.

Method: GET

Endpoint: /skills

Request Parameters:

The request URL can optionally include the following query parameters to filter the skills:

| Parameter | Туре |
|-----------|--------|
| userId | string |
| category | string |
| search | string |
| sort | string |

Response:

Success Response: 200 OK

• Description: List of skills based on the provided filters is successfully retrieved.

• Body: An array containing skill objects.

Error Response:

• Status Code: 500 Internal Server Error

• Description: If there is an error while fetching skills.

createReview():

This endpoint allows users to create a review for a specific skill, providing a star rating and description.

Method: POST

Endpoint: /reviews

Request Parameters:

| Parameter | Туре | Description |
|-----------|--------|--|
| userId | string | The unique identifier of the user. |
| skillId | string | The unique identifier of the skill. |
| desc | string | The description or comment for the review. |
| star | Number | The star rating given by the user (1-5). |

Response:

Success Response: 201 Created

• Description: The review is successfully created.

• Body: The newly created review object.

Error Response:

• 403 Forbidden: If the user has already reviewed the skill.

• 500 Internal Server Error: If there is an error during review creation.

getReviews():

This endpoint allows users to retrieve all reviews associated with a specific skill by providing the skill's unique identifier.

Method: GET

Endpoint: /reviews/:skillId

Request Parameters:

| Parameter | Туре |
|-----------|--------|
| skillId | string |

Response:

Success Response: 200 OK

• Description: All reviews for the specified skill are successfully retrieved.

• Body: An array containing review objects.

Error Response:

• Status Code: 500 Internal Server Error

• Description: If there is an error while fetching reviews

deleteReview():

This endpoint allows users to delete a review for a specific skill by providing the review's unique identifier.

Method: DELETE

Endpoint: /reviews/:id

Request Parameters:

| Parameter | Туре |
|-----------|--------|
| reviewId | string |

Response:

Success Response: 200 OK

• Description: The review is successfully deleted.

• Body: Message confirming successful deletion.

Error Response:

• Status Code: 403 Forbidden

• Description: If the user trying to delete the review is not the owner.

How to use SkillSwap: Step by Step Guide

Step1: Sign Up and create your profile

- 1. Sign Up: Visit the SkillSwap website and click on the "Join" button. Fill out the registration form with your basic information, such as your name, email address, and password.
- 2. Create Your Profile: Once registered, log in to your account and complete your profile. Add details such as your skills, interests, bio, portfolio, and endorsements. Upload a profile picture to personalize your account.

Step2: Explore Skills

- 1. Browse Skills: Navigate to the "Learn Skills" section to explore the available skill listings. You can filter listings based on categories to find skills that match your interests or learning goals.
- 2. View Skills: Click on a skill listing to view the skill and details of the user offering that skill. Review their bio, skills, endorsements, and portfolio to assess their expertise and suitability as a skill exchange partner.

Step 3: Initiate Skill Exchanges

- 1. Send Messages: Use the messaging platform to initiate conversations with other users. Discuss the specifics of the skill exchange, including your learning objectives, availability, and preferred mode of communication.
- 2. Coordinate Sessions: Once you've connected with a skill exchange partner, coordinate the details of your sessions. Schedule meetings, workshops, or lessons through the calendar feature to ensure timely and efficient exchanges.

Step 4: Participate in Skill Exchanges

- 1. Attend Sessions: Attend scheduled sessions or workshops with your skill exchange partner. Be punctual and prepared to engage in meaningful learning experiences.
- 2. Share Resources: During sessions, share resources, materials, and knowledge to facilitate learning and skill development. Collaborate on projects, exercises, or assignments to apply newly acquired skills.

Step 5: Provide Feedback and Ratings

- 1. Rate Experiences: After skill exchange sessions, provide feedback and ratings to your skill exchange partner. Rate their expertise, communication, and professionalism to help build trust and credibility within the community.
- 2. Review Partners: Write a review detailing your experience with your skill exchange partner. Highlight strengths, areas for improvement, and any recommendations for future collaborations.

Step 6: Engage with the Community

- 1. Attend Events: Participate in virtual and local community events, workshops, and meetups hosted by SkillSwap. Network with other users, share insights, and discover new opportunities for skill development and collaboration.
- 2. Join Discussions: Engage with the community by participating in discussion forums and forums. Seek advice, share tips, and contribute to conversations on various topics related to skill development and learning.

Glossary

SkillSwap: A platform revolutionizing skill exchange within communities, facilitating the exchange of expertise and services without monetary transactions.

User Authentication: The process of verifying the identity of users to grant access to their accounts securely.

User Profile: A personalized page where users can showcase their skills, interests, bio, portfolio, and endorsements.

Skill Listings: Listings created by users to indicate the skills they are willing to share and the skills they wish to learn.

Smart Matching Algorithms: Algorithms used to match users with compatible skill exchange partners based on preferences and availability.

Messaging Platform: A secure communication system within SkillSwap, allowing users to discuss skill exchange specifics and coordinate lessons.

Review and Rating System: A transparent system allowing users to provide feedback on the quality of skill exchanges and rate each other.

Community Events and Workshops: Virtual and local events hosted by SkillSwap to encourage face-to-face interactions and skill exchange.

Community Forums: Discussion forums within SkillSwap for users to seek advice, share tips, and discuss skill development topics.

Calendar: A feature allowing users to schedule meetings and keep track of sessions and workshops.

Learning Plans: Step-by-step guides available for each skill to help users follow structured learning paths during sessions.

Exchange of Services: The feature enabling users to exchange services without monetary transactions, fostering a collaborative environment.

Product Backlog: A prioritized list of features and requirements maintained by the Product Owner for implementation.

Sprint Backlog: The subset of items from the product backlog selected for implementation during each sprint.

Increment: The sum of completed product backlog items at the end of each sprint.

Scrum Master: The facilitator of the Scrum process, responsible for removing impediments and ensuring adherence to Scrum principles.

Product Owner: Represents stakeholders and defines the product vision, priorities, and requirements.

Designer: Responsible for the user experience (UX) and user interface (UI) design of the SkillSwap platform.

Developer: Responsible for delivering increments of working product at the end of each sprint.