University of Dhaka

Department of Computer Science and Engineering

CSE-3112 : Software Engineering Lab

Project Title: **TestCraft**

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1 Statement of the Project

1.1 Statement of the Project

TestCraft is a comprehensive online test designing and test-taking platform, offering a solution for tutoring individuals and institutions alike. With this web application, users can effortlessly create mock exams, practice tests, or online assessments designed for their specific audience.

The web application offers some advanced features, including automated assessment capabilities for Multiple Choice Questions (MCQs). This ensures a seamless and efficient evaluation process, saving time for both test creators and participants. Additionally, **TestCraft** provides automated notification services, keeping users informed about important timelines, results, and any pertinent updates from their associated institutions. This feature enhances communication and ensures that all stakeholders stay well-informed throughout the testing process.

1.2 Justification

Frequent test administration poses a significant challenge for millions of individuals, and institutions engaged in tutoring. Managing the diverse needs of students and facilitating regular test practice becomes a demanding task. **TestCraft** emerges as a practical solution to this challenge, providing a user-friendly online platform for swift test creation and automated assessments.

Designed with the unique requirements of tutors and educational institutions in mind, **TestCraft** streamlines the process of designing quick tests and ensures automated assessments. This convenience enables tutors to focus more on personalized instruction and less on the administrative aspects of test management. With **TestCraft**, maintaining a consistent and efficient testing regimen becomes effortlessly achievable for both tutors and their students.

1.3 Objectives and Goals

The primary objective of **TestCraft** is to deliver a user-friendly test creation tool tailored for individuals or institutions involved in tutoring. This empowers tutoring professionals to unwind and focus on personal aspects while efficiently managing their tutorship responsibilities.

An equally crucial goal of our project is to afford students an easily affordable practice tool, enhancing their abilities. Students, hopefully, will

be able to reflect on past assessments, get insights into their strengths and weaknesses for further development. Additionally, **TestCraft** provides tutors with enhanced vision into the progress of each individual student they tutor.

In essence, **TestCraft** serves as a dynamic medium for interaction between educators and students, ensuring an optimized educational experience that yields the best possible outcomes for both.

2 Background to the Project

2.1 Technical Background

Authentication and Accessibility

TestCraft uses **RBAC (Role Based Access Control)** to implement security and accessibility

Technology Stack

TestCraft is developed using full stack **JavaScript** along with **HTML** for styling

- **Technologies and Tools:** **HTML**, **CSS**, **JavaScript**, **N**o**de**JS
- **Frontend Tools:** **ReactJS**
- **Backend Tools:** **Express** **JS**, **MySQL**

Database Management

The application database is managed using **MySQL** and **SQLite** in the backend

Development Tools

- **Integrated Development Environemt(IDE):** Visual Studio Code
- **Version Control and Collaboration:** **Git**, Git Hub

Documentation

The full documentation for **TestCraft**: https://github.com/saged-sama/TestCraft/

2.2　Commercial Background

Revenue Model

- **Subscription Fees:** Implementing a subscription-based model where users, such as educational institutions or individual tutors, pay a recurring fee for access to premium features, increased test limits, or advanced analytics.

- **Freemium Model:** Offering a free basic version with limited features and enticing users to upgrade to a paid version for additional functionalities or higher usage limits.

Pricing Strategy

- **Tiered Pricing:** Offering different pricing tiers based on the needs of users. For example, providing different packages for individual tutors, small coaching centers, and large educational institutions.

- **Custom Plans:** Offering customized plans for institutions with specific requirements, allowing flexibility in pricing based on the user's needs.

Partnerships and Collaborations

- **Collaboration with Educational Institutions:** Forming partnerships with schools, colleges, and universities to integrate the platform into their curriculum or assessment processes.

Advertising and Sponsorship

- **Advertisements:** Integrating non-intrusive advertisements within the platform for free users, with an option for a premium ad-free subscription.

- **Sponsorship:** Collaborating with educational content providers, publishers, or other relevant companies for sponsorships and strategic partnerships.

Continuous Development and Support

- **Maintenance Plans:** Providing ongoing support and maintenance plans for institutions, ensuring continuous updates, feature enhancements, and technical support.

- **Training and Consultation Services:** Offering additional paid services such as training sessions or consultation for institutions looking to maximize the use of the platform.

2.3   Scientific Background

Educational Psychology

- **Feedback Mechanisms:** Implementing effective feedback mechanisms based on educational psychology research to provide constructive feedback that aids learning and improvement.

Assessment Design

- **Validity and Reliability:** Adhering to established guidelines for test validity and reliability to ensure that assessments accurately measure what they intend to measure consistently.

Adaptive Learning

- **Learning Analytics:** Employing learning analytics to track user progress, store previous assessments.

Technology-Enhanced Learning

- **E-Learning Pedagogy:** Incorporating effective e-learning pedagogies to ensure that the online platform aligns with modern educational practices.

Ethical Considerations

- **Ethics in Educational Technology:** Addressing ethical considerations related to data privacy, security, and fairness in assessments to ensure responsible and equitable use of the platform.

3   Project Description

3.1   Product Perspective

TestCraft stands out as an inventive platform for designing and taking tests in the ever-evolving world of educational technology. It serves as an independent system, allowing educators, schools, and individuals to smoothly

create, organize, and conduct assessments. With a user-friendly interface, automated assessment features, and advanced analytics, the platform is dedicated to improving the overall experience for both test creators and takers.

3.2 General Capabilities

TestCraft advertises a range of capabilities designed to meet the diverse needs of its users:

- **Channel Based Interaction:** Both individual and institutional educators must create exclusive channels for test arrangements and announcements, ensuring selective access through invitation-only participation.

- **Intuitive Test Design:** The platform offers a straightforward and intuitive test creation process, allowing users to design various types of assessments, including multiple-choice questions, quizzes, and practice tests.

- **Real-time Notifications:** Users benefit from automated notifications, ensuring timely updates about assessment timelines, results, and other relevant information.

- **Automated Assessments:** Simplifying the evaluation process, particularly for multiple-choice questions (MCQs), by enabling educators to pre-define answers and total marks. This ensures swift and precise results, offering instant feedback to test-takers.

- **Learn from Your Own Mistakes:** Test designers can incorporate comprehensive explanations for each question during the test creation process. Following the assessment, test-takers can promptly access detailed answers, providing them with immediate insights into their mistakes and enhancing the learning experience.

- **Subject Tags:** Test administrators are required to categorize each question into relevant subjects, allowing **TestCraft** to organize and store individual student performance data for each specific subject. This categorization system facilitates a detailed analysis of students' performance across different subjects, promoting effective tracking and assessment.

- **Topic Tags:** Educators can assign topic-based tags to each test questions, enabling students to identify their strengths and weaknesses in

a particular subject easily. This feature assists test-takers in gaining insights into their performance and focusing on specific areas for improvement.

- **Learning Analytics: TestCraft** systematically archives past assessments, providing targeted insights into strengths and weaknesses through problem tags or subject tags. Users can effortlessly filter and identify their strengths and areas for improvement, empowering them with personalized data-driven feedback.

3.3   General Constraints

While **TestCraft** is designed to be versatile and user-friendly, certain constraints should be considered:

- **Resource Constraints:** Adhering to budget limitations for development, maintenance, and marketing.

- **Technical Requirements:** Ensuring compatibility across various devices, browsers, and operating systems. Handling a large number of users concurrently might pose challenges in terms of server capacity and performance.

- **Security Measures:** Adhering to data protection regulations and ensuring the privacy and security of user data. Implementing robust encryption methods and protocols to safeguard sensitive information.

- **Regulatory Compliance:** Complying with educational standards and regulations in different regions.

3.4   User Characteristics

TestCraft has a diverse set of users, including:

- **Educators and Tutors:** Those responsible for creating and managing assessments.

- **Institutions:** Schools, colleges, and coaching centers looking for an efficient and effective online assessment solution.

- **Students:** Individuals seeking a user-friendly platform for practicing and taking assessments.

4 Innovation and Entrepreneurship

4.1 Innovation Requirements

- **Engaging Study Spaces:** Create fun and interactive study spaces within QuizNook, where teachers can plan tests and share updates in an exciting way.

- **Smart Test Suggestions:** Make QuizNook smarter by suggesting the best types of questions as teachers create tests, making the whole process easier.

- **Personalized Alerts:** Have QuizNook send smart alerts that not only tell you about upcoming tests but also suggest ways to get better based on your past work.

- **Cool Smart Tests:** Make QuizNook tests cooler by using smart technology that changes the questions based on how well you're doing.

- **Custom Learning Paths:** Introduce a feature that makes a special learning plan just for you, guiding you through tests and lessons to help you improve where you need it most.

4.2 Entrepreneurship Requirements

- **Getting More People:** Plan how to get more people to use QuizNook by teaming up with others and reaching out to schools and colleges.

- **Making Money Ideas:** Think of new and cool ways for QuizNook to make money, like having special features or working with other companies.

- **Easy Learning for Everyone:** Make sure it's easy for people to start using QuizNook. Create simple guides to help teachers and students learn how to use everything.

- **Following the Rules:** Set up clear rules for QuizNook so that it follows all the laws about education and keeping your information safe.

- **Always Getting Better:** Make a plan to keep getting better by asking people what they think and making QuizNook even more awesome based on their ideas.

5 Conclusion

In summary, the creation and use of **TestCraft** have a big chance to change how online tests work. By setting clear goals and adding new and creative features, the platform wants to make taking tests online easy and helpful for both teachers and students.

The platform uses ideas from how people learn to not just test but also improve how people learn. Including new technologies shows that the platform is thinking about the future of education in the digital world.

Also, the business side of things makes sure the platform is well-planned and considers everything needed for success. This includes looking at the market, figuring out how the business will work, getting users, and following the rules.