

Team B
CSCI 441

Flashcard

Application

Prepared for:
Dr. Mireku Kwakye

Project URL: <https://sites.google.com/view/teambflashcard/home>

GitHub URL: https://github.com/ahmedjaff90/CSCI441_flash_card_app

Team Profile:

Megan Hall

Megan, our elected team leader, excels in design, documentation, organization, and data analysis. She also has skills in programming in Python, and other front-end programming languages. With a keen eye for detail, she ensures projects exceed expectations. Megan's proficiency in data analysis and organization adds strategic efficiency to our team's endeavors.

Steven Smith

Steven is a valuable team member, excelling in documentation, organization, problem-solving, programming and markup languages such as HTML, CSS, and JavaScript. His approach to documentation ensures clarity, while his organizational skills contribute to smooth workflows. Steven's problem-solving abilities enhance our team's capability to tackle challenges effectively.

Joseph Tracy

Joseph is a key team member known for his strengths in problem-solving, programming in languages such as Java and Python, debugging, and testing. His adeptness in these areas ensures our projects not only develop seamlessly but are also rigorously tested and optimized for success. Joseph's problem-solving skills bring innovative solutions to the forefront, enhancing the overall effectiveness of our team.

Ahmed Alzehhawi

Ahmed is a standout team member with strengths in front-end programming concepts and languages, data structures and algorithms, data analysis, software architecture, and critical thinking. His expertise in front-end programming ensures a polished user experience, while his proficient in data analysis and software architecture contributes to robust and well-designed solutions.

Introduction:

Studying, especially for Computer Science students, has traditionally been perceived as an activity that demands a stationary approach for success. As technology advances, students are becoming progressively more mobile in lifestyle and seeking methods to integrate technology into their academic routine. This growing need not only shows students' preference for the accessibility allotted by digital materials (Pearson, 2020), but new studies support the idea that using electronic studying methods enhances student success rates and reduces the time it takes to achieve subject mastery. As a result of these factors, there is a steady increase in the need for electronic alternatives over physical tools. One often overlooked tool of study is the utilization of flashcards.

Flashcards play a pivotal role in achieving student success. Research indicates that students who incorporate flashcards into their study routine receive higher exam scores compared to their peers who do not employ this method (Golding, 2012). Although researchers have proven the value of flashcards, the current physical application of this tool leaves much to be desired and warrants improvement.

Our application utilizes electronic flashcards that users create and share for personal and communal use. It necessitates a concise and focused design to accommodate its primary goal: enhancing studying practices and patterns for overall student success. Our product's objective is to encourage specific user goals, including memory retention, active recall, spaced repetition, and increase in student confidence in subject matter. Using this application allows students to stray away from their desks and study anywhere they may be.

Problem Statement:

The state of physical study flash cards is outdated and not interactive for the user. There is a need for a modernized, accessible, and engaging tool for studying.

Problem domain:

This project aims to develop a flash card study application for the subject of Computer Science, a sociotechnical system that encourages human interaction with computers for educational purposes. Computer Science is a fast-paced, always-evolving field; therefore, efficient and dynamic study tools are required. The goal is to address the current challenges of manual studying methods and therefore enhance the learning experience overall through a digital flashcard program.

Current Issues:

Though proven to be a great studying tool, physical flashcards pose the risk of being damaged or lost. Due to the fact they are not easy to share with other students, they tend to also lack many collaborative abilities. In addition, updating physical flashcards to reflect new learned concepts can be meticulous and time consuming, often impeding and limiting a student's time that can be used for study. Physical flashcards also lack adaptability of learning styles and other sources of media are often left out because they are not available, making the learning experience less enriching (Hough, 2018). Issues that have yet to be addressed can also be found within current flashcard services. Issues such as: a progression system that is not tailored to each student, lack of use guidance/feedback, and confusing interface elements.

Specific Issues to Address:

- Digital experience that has accessibility from other devices, mobile, computer, etc.
- User friendly interface for creating and interacting with the flashcards
- Adaptive learning algorithms to suggest learning styles or flashcards based on an individual's learning patterns (Hough, 2018)
- Interactive algorithm games/visuals to learn complex topics

Sub Issues:

- Provide a progression system to help students not lose track of where they are.
- Limited Interactivity, live coding challenges/multimedia presentations, collaborative scenarios with other students across the world

Proposed Solution:

To address the diagnosed problem of the current, outdated state of physical flash cards; we would develop an online application utilizing digital flash cards. These flash cards would be available for free to anyone wanting to study the subject of Computer Science. The users would create a

free account, which would then give them access to the application. The flash cards would have a variety of study material, such as terms and definitions, scenario questions with answers, and many more. They will adapt to each person in a way that specific subjects and study material would be suggested to the user, based on their previous searches. These flash cards will also have varying levels of difficulty depending on the proficiency of the user. On the application, there will be different interactions that users can enjoy, such as study games, quizzes, and other things that will help users stay engaged and interested. The flash cards would also be made shareable to anyone with access to an email address, text messaging, or any other messaging app. Once these flash cards are shared, they will be available on any device, such as a mobile phone, desktop, tablet, laptop, etc., to be used by the user.

Interventions:

Reinforcing the notion that flashcards are beneficial for studying would encourage users to try them out. We could also utilize a periodic pop-up that would reveal itself after so many flashcard cycles. This pop-up would alert users, notifying them how many cards they have studied or how many days in a row they have studied and congratulate them. This positive reinforcement would be helpful and assist in ensuring that the users studying habits continue in a long-term capacity. A final intervention would be a peer-based system, that would allow multiple users to engage in a study game or quiz together and rate each other based on their performances.

Metrics of Success:

There are a few different metrics than can be used to gauge success of the application:

- Give the ability to rate flash cards and other interactions, which would gauge interest
- Users commenting on specific flash cards or games, shows they are engaged
- Users emailing the developers, to ask questions or give feedback shows they care

Customer Knowing Application Was Successful

Allowing the customer to gauge whether the flashcard application is successful or not, would require interaction with the system. Capturing data that displays the amount of traffic within the application and showing customers the quantity of users who are currently using or recently used the application can allow for visualization of success. Even a small number of users using the application will determine it to be successful. This is due to the flash card's sole purpose being a study tool for knowledge seekers.

Business/User Value

Our flash card application has a clear-cut business and user value. This value is the accessible retrieval of knowledge and a safe and welcoming environment, for students and everyday knowledge seekers alike. The idea of flashcards has been a focal point in the educational journey of people throughout history. Knowledge is sought by many individuals. With our flashcard application, people who use this technology will be able to study the concepts of Computer Science, while learning and retaining new information.

Benefits

We believe that there are many benefits to creating a flashcard application. A main benefit is giving students the tools necessary to learn a new subject or revise previously mastered concepts. With a digital flashcard application, users can have an easier time studying and retaining

information. Users are also able to interact with each other, while utilizing flashcards, by partaking in study games or taking quizzes together. This makes learning a lot more fun than learning alone. With our flashcard application being based on the concepts and foundations of Computer Science, this gives potential users the tools to learn about technology, which would be beneficial for them in today's world.

Example Scenarios

Some examples would be:

- Study game where one user picks a question and the other user attempts to answer
- A user chooses a section of Computer Science to study, and a series of flashcards are cycled through with questions/terms and answer/definitions
- A user has studied for one week straight, and the system suggests learning a more difficult portion of the subject they are currently studying
- A user enjoys the subject they are learning and likes the flash card group they are using. The system then recognizes this and suggests similar sections of the subject they initially liked

Functional Requirements:

- The system will send the new user an email when they have created a free account
- There is a search bar for the user to use to query for a specific section of Computer Science they are interested
- The system will alert the user to the amount of time they have been studying and congratulate them
- The system will have an option to email the developers with any questions or concerns
- The system will provide a list of different subsections of the subject Computer Science, to study from
- The system will suggest different flashcards based on previous searches or uses

Non-Functional Requirements:

- The system should be able to run smoothly on any device
- The system should be able to handle a certain number of users at any given time
- The system should be able to run efficiently if going from one OS to a new version OS

UI/UX Requirements:

- The system will have a title head on the main page of the application, as well as on top of each page housing the set of flashcards. This ensures the user knows what they are looking at
- The system will have an easy-to-read list of options for users to choose from, such as navigating back to home or to the different flashcard sets
- The system will have an easy to find search bar that could be surrounded by some kind of banner
- The flash cards will have some type of effect, such as appearing and disappearing, or exploding away, to give some pizzaz to the application.

Plan of work:

The Tools and Platforms: The tools that will be used for the Flash Card Application are going to be GitHub, Visual Studio code editor, HTML/CSS, and JavaScript.

Success: The success of this flashcard application depends on the student’s usage. Our aim is to build a flashcard application that is simple, user-friendly, and accessible to students of all ages. It is also crucial that any data used by students be well managed within the application. In addition, the application will be monitoring users’ usage and addressing any reported issues. Maintenance after deployment will assist in making the application preform smoothly and allow for improvements. Our team’s main goal for this flashcard application is to create a friendly flashcard app that will meet all the students’ needs while having fun during the learning process.

Outline of Scheduled Plan of Work:

To produce a quality educational application, we plan to efficiently map out tasks over the course of the upcoming months. There will be multiple stages of planning and implementation required throughout this period. **Figure 1.1** shows a more visual approach to the project timeline.

- **Planning:** The team will identify the scope and vision of the flashcard application.
- **Gather Requirements:** Establishing schedules, team roles, gathering pertinent documents and research needed for the project.
- **Design:** Software design for the flashcards (frameworks, how information is stored, which features will be built, etc.)
- **Implementation:** The team begins to build the software. Modular work is assigned to each team member and active daily communication helps to reach goals as a team.
- **Testing:** Quality assurance phase. The team takes time to test the software, address any concerns or issues when the software is in use, and assure that the software is working as intended.
- **Deployment:** First demonstration and deployment of software outside of team meetings. Allows the team to collect feedback and adjust before the final product launch.
- **Final Demonstration:** The demonstration and presentation of the finalized application.

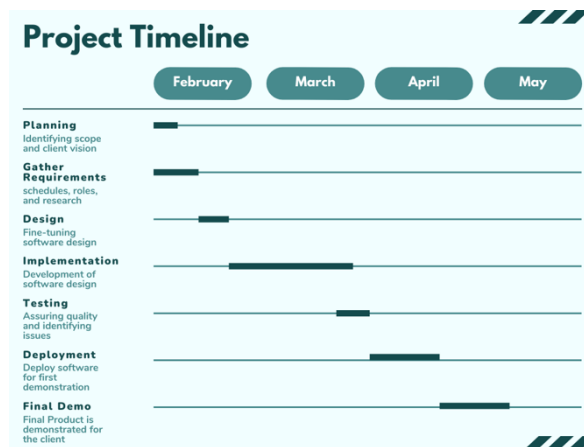


Figure 1.1 – A timeline from February 2024 through May 2024 of deliverables and general tasks

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