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**Faculty of Computer and Information**

**Computer Science Department**

**Elserag**

**A Literacy Platform for Special Needs**

**Graduation Project Part II**

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**ABSTRACT**

**Now** we want to know more about the people with special needs.

People with special needs encompass a diverse and heterogeneous group of individuals who face various physical, intellectual, sensory, or developmental challenges that may require additional support and accommodation. These challenges can result from conditions such as autism, Down syndrome, cerebral palsy, ADHD, dyslexia, visual or hearing impairments, and more. Special needs individuals often require tailored educational, social, and healthcare services to meet their unique requirements and maximize their potential for independent living and participation in society.

**Blindness**, a sensory disability, creates unique challenges related to access to information, communication, mobility, and independence.

Focusing on blindness as the primary disability in our project represents a significant step towards fostering inclusivity and empowerment for individuals with visual impairments.

In our project, we aim to develop a **literacy platform** that caters specifically to the needs of **blind individuals**. This entails creating accessible digital content, leveraging assistive technologies, and adopting inclusive design principles to ensure that blind users can acquire and enhance their literacy skills effectively. By prioritizing blindness in our project, we contribute to the broader mission of making education and information accessible to all, regardless of their visual abilities.

Our project holds the potential to transform the lives of blind individuals, empowering them with the knowledge and skills necessary for personal growth, societal participation, and increased opportunities.

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**List of Abbreviation**

|  |  |
| --- | --- |
| **Keyword** | **Meaning** |
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**Chapter 1**

**System Overview**

Introduction

* Motivation

**Unveiling Hidden Potential: A Literacy Platform for a World Unbound by Sight**

This project arises from a fundamental curiosity about the vast spectrum of human experience. We seek to delve deeper into the unique realities of individuals with special needs, understanding the challenges they face and the potential waiting to be unlocked.

Our focus hones in on the sensory realm, specifically the world experienced by those living with blindness. This condition presents a distinct set of obstacles in accessing information, hindering communication, and limiting independence. By prioritizing blindness as the lens for our project, we embark on a journey towards inclusivity and empowerment.

We envision a digital platform crafted to bridge the literacy gap faced by blind individuals. This platform will act as a conduit, seamlessly integrating accessible content, cutting-edge assistive technologies, and inclusive design principles. Through this multifaceted approach, blind users will be equipped to acquire and refine their literacy skills with unprecedented ease and efficacy.

However, our ambition extends far beyond the platform itself. It serves as a stepping stone towards a more equitable future, where education and information are not restricted by visual limitations. We strive to dismantle barriers, fostering a world where knowledge transcends boundaries and empowers all individuals to reach their full potential.

This project is more than just about literacy; it's about unlocking the boundless potential within each person, regardless of their ability to see. It's about creating a world where everyone has the tools and resources to thrive.

* **Problem Statement**

In a world where information is a cornerstone of empowerment and progress, there exists a profound issue that warrants immediate attention. **Individuals with special needs**, including those with physical disabilities, cognitive impairments, or sensory challenges, often face significant barriers when it comes to accessing and benefiting from traditional literacy education. Existing educational materials and platforms are not always designed to cater to the diverse needs of this population. This lack of inclusivity and accessibility can limit their opportunities for personal growth, communication, and participation in society.

* Overview

This project seeks to develop a groundbreaking literacy platform specifically designed to empower individuals who are blind. Recognizing the unique challenges faced by blind users in accessing information and honing literacy skills, this platform will bridge the gap through:

* **Accessible Content:** The platform will curate and provide content optimized for blind users, ensuring compatibility with assistive technologies.
* **Assistive Technology Integration:** The platform will seamlessly integrate with screen readers, Braille displays, and other assistive technologies to provide a smooth and intuitive user experience.
* **Inclusive Design Principles:** The platform will be designed with accessibility at its core, prioritizing features like clear navigation, ease to use and many other interesting features.

By combining these elements, the platform aims to:

* **Enhance Literacy Skills:** Provide blind users with the tools and resources necessary to effectively learn, read, write, and improve their overall literacy.
* **Promote Independence:** Foster greater independence by empowering users with the ability to access and utilize information independently.
* **Bridge the Digital Divide:** Close the accessibility gap in the digital world, ensuring equal access to education and information for all.

This project goes beyond just literacy skills. It strives to create a world where individuals who are blind have the resources and support to actively participate in society, achieve personal growth, and unlock their full potential.

**Chapter 2**

**Related Work**

Introduction

This review explores apps designed to boost literacy for blind individuals. We'll look at what each app offers, how it's used, and its pros and cons.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Related Applications | Description | Key features | User Interface | Pros | Cons |
| Be my Eyes | **Connects blind users with sighted volunteers for assistance.** | **Live video assistance**  **Support various tasks** | **Simple and user-friendly, utilizing video calls for assistance.** | **Reading text, identifying objects, navigating surroundings** | **Relies on volunteer availability**  **Unsupportive UI** |
| Smart Voice(الناطق) | **Converts type of text or type of data into a recognized or spoken word voice** | **Adjustable reading speed**  **Text-to-speech for different document types** | **Simple touch or voice commands with customizable settings.** | **Easy access to information**  **Improves listening and comprehension skills** | **Pronunciation may not be perfect**  **Struggle with some extensions files** |
| Braille Academy | **Teaches braille to blind individuals.** | **Interactive braille lessons**  **Voice-guided instructions** | **Intuitive and tactile interface with audio feedback.** | **Enhances braille literacy skills**  **Independence in reading and writing** | **Limited advanced lessons**  **Limited advanced lessons** |

Conclusion

In the world of literacy apps for the blind, we've seen a variety of tools with unique strengths. While user-friendly features contribute to inclusivity, challenges like learning curves remain. Recognizing progress and addressing these challenges will shape a more accessible future for education and technology for everyone.

**Chapter 3**

**Domain Analysis and Technique**

Domain Analysis

The development of the literacy platform for individuals with special needs will follow an **iterative** and **incremental** model, combining elements of the **Agile** and **Spiral** process models. This hybrid approach is chosen to accommodate the evolving nature of user requirements, the need for continuous feedback, and the complexity of developing a solution that addresses diverse learning needs.

* Key Phases

1. **Requirements Gathering:**

* Engage with educators, special education institutions, individuals with special needs, and other stakeholders to gather detailed and evolving requirements.
* Conduct usability studies to understand user preferences and challenges.

1. **Planning:**

* Define the project scope, objectives, and constraints.
* Develop a detailed project plan, including timelines, resource allocation, and risk management strategies.

1. **Design and Prototyping:**

* Create initial design prototypes based on gathered requirements.
* Seek feedback from the target audience, educators, and individuals with special needs to refine the design iteratively.

1. **Implementation and Testing:**

* Develop the core functionalities of the platform in incremental stages.
* Conduct continuous testing and debugging to ensure the reliability, security, and performance of each implemented feature.

1. **Release and User Feedback:**

* Release functional increments of the platform to a limited user group for beta testing.
* Gather user feedback to identify areas for improvement and iterate on the design and functionality.

1. **Iterative Development:**

* Based on user feedback and testing results, iterate on the design and implement additional features.
* Regularly release updates to address identified issues and enhance the platform.

1. **Training and Support:**

* Develop comprehensive training programs for educators and administrators.
* Provide ongoing technical support and address user queries and issues.

1. **Monitoring and Evaluation:**

* Implement data analytics to monitor user engagement, track progress, and gather insights into the platform's effectiveness.
* Regularly evaluate the platform's impact on literacy skills and educational outcomes.
* Key Principles

1. **User-Centric Development:**
   * Prioritize user feedback and involve end-users in the design and testing phases to ensure the platform aligns with their needs.
2. **Agile Development Practices:**
   * Embrace agile principles such as iterative development, collaboration, and adaptability to respond to changing requirements and user expectations.
3. **Continuous Improvement:**
   * Regularly assess the effectiveness of the platform and implement updates to address emerging needs, technological advancements, and educational research.
4. **Accessibility Compliance:**
   * Adhere to accessibility standards throughout the development process, ensuring that the platform remains inclusive and usable for individuals with diverse abilities.
5. **Security Integration:**
   * Integrate security measures at every stage of development to safeguard user data and maintain the trust of educators, learners, and administrators.
6. **Stakeholder Collaboration:**
   * Foster open communication and collaboration among stakeholders, including educators, individuals with special needs, special education institutions, and advocacy groups.

Risks

|  |  |  |  |
| --- | --- | --- | --- |
| **Strategy** | **Priority** | **Effects** | **Risk** |
|  Develop partnerships with publishers and organizations to convert existing content to accessible formats.   Integrate tools for users to contribute their own accessible content.   Prioritize creation of high-demand materials in accessible formats. | **High**.  Content is the foundation of the platform. | A lack of accessible content on the platform could limit its usefulness and user engagement. | **Limited Content Availability** |
|  Conduct thorough testing with a diverse range of assistive technologies.   Follow accessibility standards and guidelines (WCAG) during development.   Design the platform for modularity to allow for future compatibility with emerging technologies. | **High**.  Ensuring seamless integration is crucial for platform adoption. | Compatibility issues between the platform and various assistive technologies could hinder user experience. | **Technological Compatibility Issues** |
|  Involve blind users in the design process through user testing and feedback sessions.   Utilize screen reader compatibility tools during development.   Ensure clear navigation, ease to use, and any other alternative solutions to provide perfect UI. | **High**.  An accessible interface is essential for user independence. | A poorly designed UI, lacking features like clear navigation and ease to use, could exclude users. | **Limited User Interface (UI) Accessibility** |
|  Partner with blindness advocacy organizations and educational institutions to promote the platform.   Develop engaging tutorials and user guides tailored for blind users.   Consider offering incentives and gamification elements to encourage platform exploration. | **Medium**. Initial user base is crucial, but the platform's value will spread with success. | Low user adoption could render the platform ineffective and limit its impact. | **User Adoption and Awareness** |
|  Explore a combination of funding models like grants, subscriptions for institutions, and partnerships with corporations.   Implement features that allow for future monetization options accessible to blind users (e.g., premium content partnerships).   Develop a strong project proposal highlighting the platform's social impact for potential investors. | **Medium**. Initial funding is crucial, but long-term planning is essential. | Without a sustainable funding model, the platform's long-term viability could be compromised. | **Long-Term Funding and Sustainability** |

By proactively addressing these potential risks through the proposed mitigation strategies, the platform can achieve its goal of empowering blind individuals and fostering a more inclusive digital world.

Constrains

Our journey to build this literacy platform might encounter some roadblocks. Here's a look at a few:

1. **Finding the right treasures** 🡺 Imagine a vast library, but some books haven't been converted into formats accessible for our users. We'll need to find ways to make more "books" accessible on the platform.
2. **Making things talk together 🡺** Different tools people use to access information (like screen readers) might not always work smoothly with our platform. We need to ensure everything chats and works together seamlessly.
3. **Building a clear and welcoming space 🡺** The platform's design needs to be clear and easy to navigate, like a well-organized room. This is important so everyone feels comfortable exploring and finding what they need.
4. **Spreading the word 🡺** Even if we build a fantastic library, if people don't know it exists, it won't be much use. We need to find ways to let people know about the platform and how it can help them.
5. **Keeping the lights on 🡺** Just like any library needs resources to stay open, our platform will need ongoing support to keep it running smoothly. We'll need to find ways to ensure it has a sustainable future.

These are some of the challenges that we might face, but by being creative and finding solutions, we can build a platform that truly empowers those who use it.

Project plan

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Phase** | **Nov** | **Dec** | **Jan** | **Feb** | **Mars** | **April** | **May** | **June** |
| **Gathering Information** |  |  |  |  |  |  |  |  |
| **Define Requirements** |  |  |  |  |  |  |  |  |
| **Analysis** |  |  |  |  |  |  |  |  |
| **Design** |  |  |  |  |  |  |  |  |
| **Implementation** |  |  |  |  |  |  |  |  |
| **Develop Elserag Platform** |  |  |  |  |  |  |  |  |
| **Testing and Final Discussion** |  |  |  |  |  |  |  |  |

Feasibility Study

This feasibility study assesses the viability of developing a literacy platform specifically designed for blind individuals. Here's an analysis of key factors:

**1. Market Need:**

* High demand: Blindness affects millions globally, and there's a critical need for accessible literacy resources.
* Limited existing solutions: While some platforms exist, a comprehensive solution with accessible content and assistive technology integration is lacking.

**2. Technical Feasibility:**

* Technology exists: The core technologies for building the platform and integrating assistive technologies are readily available.
* Development challenges: Ensuring compatibility across various assistive technologies and creating a user-friendly interface require expertise.

**3. Economic Feasibility:**

* Potential funding sources: Grants, subscriptions for institutions, and partnerships offer funding opportunities.
* Development costs: While initial development requires investment, ongoing maintenance can be streamlined.

**4. Operational Feasibility:**

* Scalable solution: The platform can be scaled to accommodate a growing user base.
* Content curation: Sourcing and creating accessible content requires ongoing partnerships and strategies.

Overall Feasibility

This project demonstrates high feasibility. The significant market need, available technology, and potential funding sources make it a viable venture. Challenges lie in technical development complexities and content curation, but these can be mitigated with proper planning and strategic partnerships.

Next Steps

* Conduct user research to refine platform functionalities.
* Develop a detailed project plan with timelines and budget.
* Secure funding through grants or partnerships.
* Assemble a development team with expertise in accessibility.

By addressing these aspects, this literacy platform has the potential to become a sustainable and impactful solution for the blind community.

Quality Assurance Plan

Building a platform that empowers blind users requires a robust quality assurance (QA) process focused on accessibility and functionality. Here's how we'll ensure a high-quality platform:

1. User-Centric Approach

* **User Testing:** Throughout development, involve blind users in testing various functionalities. This ensures the platform is intuitive and meets their specific needs.
* **Accessibility Reviews:** Conduct regular accessibility audits using industry standards like WCAG (Web Content Accessibility Guidelines) to identify and fix accessibility issues.

1. Technical QA

* **Unit Testing:** Test individual components of the platform to ensure they function as intended.
* **Integration Testing:** Verify seamless integration between the platform, assistive technologies, and content delivery systems.
* **Security Testing:** Implement security measures to protect user data and platform integrity.
* **Performance Testing:** Ensure the platform performs adequately under different user loads and internet connection speeds.

1. Content Quality

* **Content Accessibility Testing:** Verify that all content is accessible to screen readers and includes proper alternative text descriptions for images and other non-text elements.
* **Content Accuracy:** Fact-check and ensure content accuracy across all subjects and formats.

1. Ongoing Monitoring

* **Collect User Feedback:** Continuously gather feedback from users through surveys and support channels to identify and address usability issues.
* **Monitor Platform Performance:** Regularly track platform performance metrics like uptime, response times, and error rates.

Tools and Techniques for Quality Assurance

* Utilize automated accessibility testing tools to identify potential issues early in development.
* Leverage screen reader testing software to simulate the user experience for blind users.
* Implement a bug tracking system to manage and address identified issues efficiently.

Benefits of a Strong QA Process:

* **Improved User Experience:** Ensures the platform is user-friendly and accessible for all blind users.
* **Reduced Development Costs:** Early identification of issues can prevent costly rework and delays.
* **Enhanced Platform Reputation:** A high-quality platform fosters trust and positive user perception.
* **Long-Term Sustainability:** A well-maintained platform ensures a positive impact on the blind community for years to come.

By prioritizing accessibility, user-centric design, and ongoing quality assurance, we can build a literacy platform that empowers blind individuals and revolutionizes their access to information and education.

System Requirements

The system requirements for this project can be divided into two main categories:

1. Hardware and Software Requirements:

* Server-side:
  + A reliable web server with sufficient processing power and memory to handle user traffic and content delivery.
  + A database system to store user information, platform content, and user progress data.
  + Operating system compatible with the chosen server software and database system.
* Client-side (user devices):
  + Internet connection: Reliable internet access is crucial for accessing platform functionalities.
  + Operating System: The platform should be accessible on a range of popular operating systems (e.g., Android, iOS) to maximize user reach.
  + Assistive Technologies: Compatibility with screen readers, Braille displays, and other assistive technologies used by blind users is essential.

1. Accessibility Requirements:

* **WCAG Compliance:** The platform should adhere to the Web Content Accessibility Guidelines (WCAG) to ensure it meets accessibility standards for users with disabilities.
* **Keyboard Accessibility:** All platform functionalities should be fully accessible using a keyboard to cater to users who may not be able to use a mouse.
* **Screen Reader Compatibility:** Seamless integration with popular screen readers is essential for blind users to navigate the platform and access content.
* **Alternative Text Descriptions:** All non-text elements like images, charts, and videos should have clear and concise alternative text descriptions for screen readers.
* **Color Contrast:** The platform's design should maintain sufficient color contrast to ensure readability for users with visual impairments.
* **Clear Navigation:** The platform's user interface should be intuitive and have clear navigation structures to allow users to easily find desired information and functionalities.

Additional Considerations:

* **Scalability:** The platform should be designed to scale efficiently as the user base grows.
* **Security:** Robust security measures are necessary to protect user data and platform integrity.
* **Performance Optimization:** The platform should be optimized for performance to ensure smooth functionality across various internet connection speeds.

By carefully considering these system and accessibility requirements, we can develop a literacy platform that is not only functional but also truly inclusive and empowering for blind users.

Techniques and tools

* Development Tools
* GitHub
* Flutter
* Dart
* Shared preferences
* PHP
* MySQL
* Stripe
* JWT
* Assistive Technology Integration Techniques
* Screen Readers
* Braille Display Support
* Additional Techniques
* **Gamification**: Consider incorporating gamification elements like points, badges, and leaderboards to enhance user engagement and motivation.
* **Multilingual Support**: For a wider reach, explore options for offering the platform interface and content in multiple languages.

By leveraging these tools and techniques, we can create a literacy platform that is not only accessible and functional but also engaging and informative for blind users, empowering them to achieve their full potential.

**Chapter 4**

**Proposed System & Methodology**

**4.1 System Use-Cases**

**4.1.1: Client use-case**

**4.1.2: Admin Use-Case**

**4.1.3: Server use-case**

**4.2 Use Case Description (Use case scenario)**

**4.3 System Architecture**

**4.4 Analysis Class**

**4.4.1 State Diagram**

**4.4.1.1 State for Client**

**4.4.1.2 State for Admin**

**4****.4.2 Data flow diagram (Level Zero diagram)**

**4****.4.3: Context Diagram**

**4.5 interaction class diagram**

**4.5.1 System diagram**

**4.5.2 Sequence Diagram**

**4.6 Design Class**

**4.6.1 Class Diagram**

**4.7 Database Schema**

* 1. **ER Diagram**

**Chapter 5**

**Implementation & Testing**

Programming languages and Frameworks

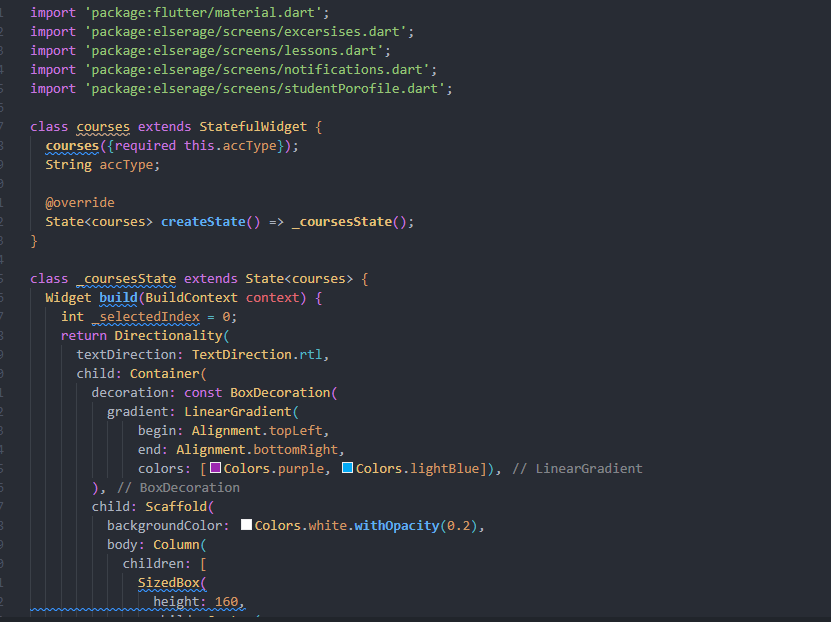
* Front-End Part
* Flutter
* Dart
* Shared preferences
* Back-End Part
* PHP
* MySQL
* Stripe
* JWT

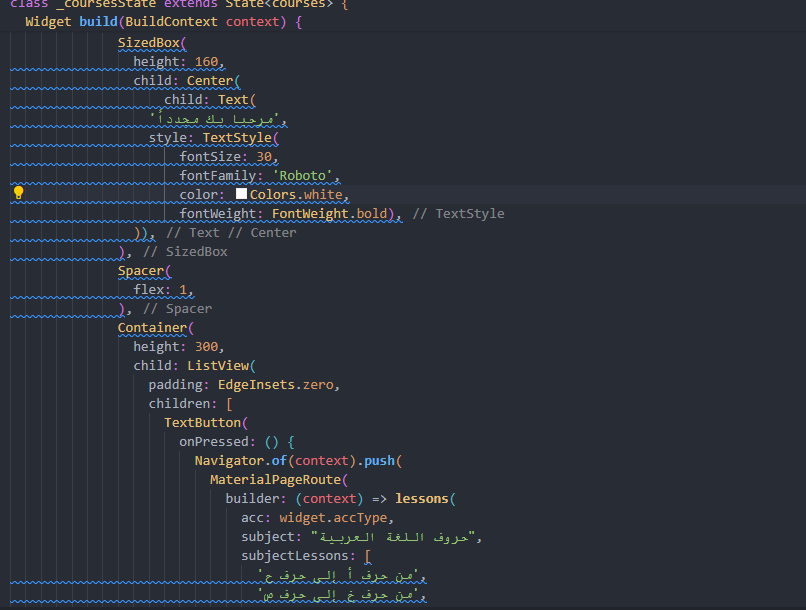
Algorithms

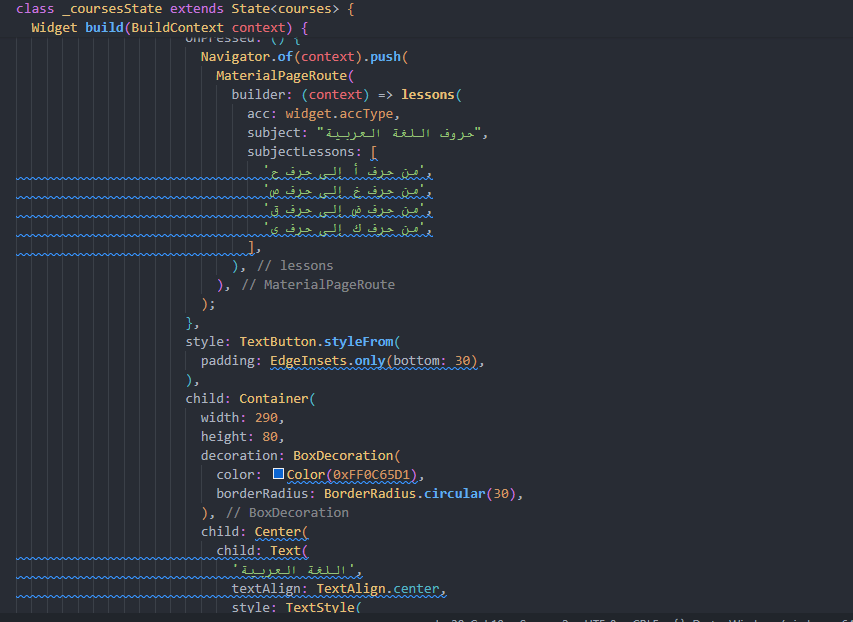
* Hash algorithm for passwords.
* Text to Speech
  + **Step 1: Add Dependencies**
    - **Open** pubspec.yaml file.
    - **Add** the following line under dependencies:
      * flutter\_tts: ^3.1.0----code
    - **Run** flutter pub get to install the package.
  + **Step 2: Import the Package**
    - **Open** the Dart file where you want to implement TTS (e.g., main.dart).
    - **Add** the following import statement at the top:
      * **import 'package:flutter\_tts/flutter\_tts.dart';**
  + **Step 3: Initialize and Configure the TTS Engine**
    - **Create** a class or method to initialize FlutterTts.
    - **Instantiate** FlutterTts:
      * **FlutterTts flutterTts = FlutterTts();----code**
    - **Set** language, pitch, and speech rate (optional)
  + **Step 4: Create a Flutter Widget to Use TTS**
    - **Define** a StatefulWidget to manage TTS state.
    - **Create** a TextField to capture user input.
    - **Create** buttons for speaking and stopping the TTS.
    - **Implement** methods to handle speaking and stopping
  + **Step 5: Configure Platform-Specific Settings**
    - **For iOS**:
      * **Open** ios/Runner/Info.plist.
      * **Add** the following permissions:
      * **code**
      * <key>NSMicrophoneUsageDescription</key>
      * <string>We need your microphone to give you a voice</string>
      * <key>NSSpeechRecognitionUsageDescription</key>
      * <string>We need your permission to use speech recognition</string>
    - **For Android**:
      * **Open** android/app/src/main/AndroidManifest.xml.
      * **Ensure** the following permission is included:
        + Code:
        + <uses-permission android:name = "android.permission.INTERNET"/>

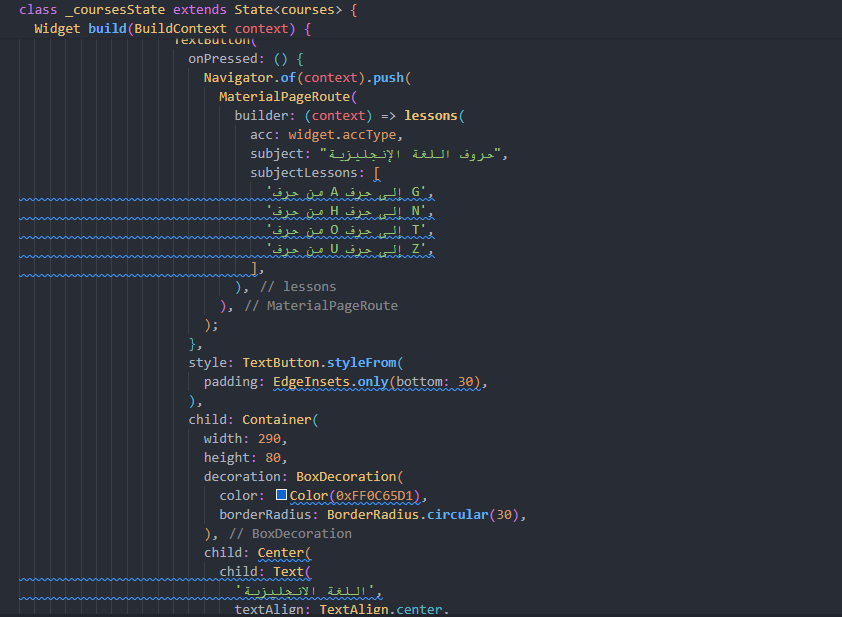
Application Essentials

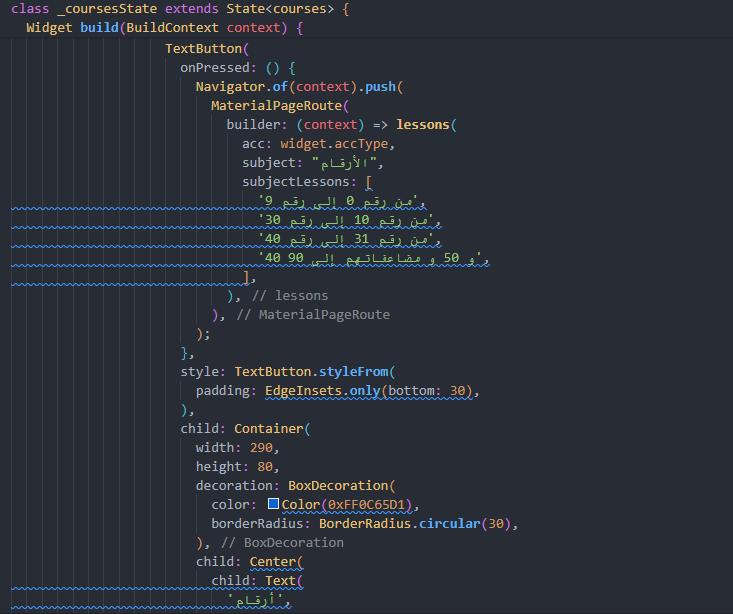
* Front-End Implementation
  + Courses 🡺

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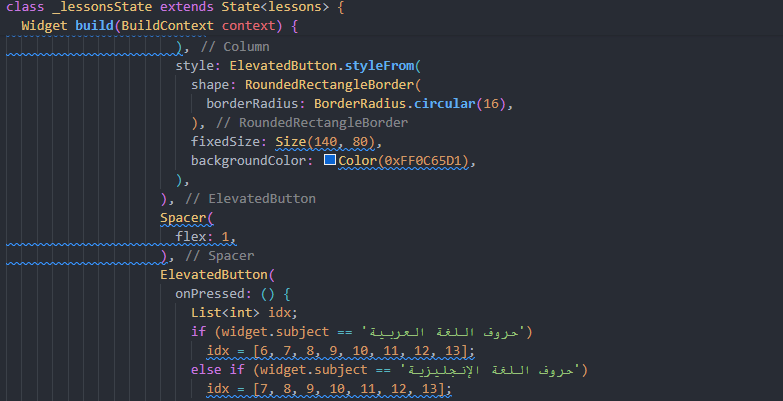
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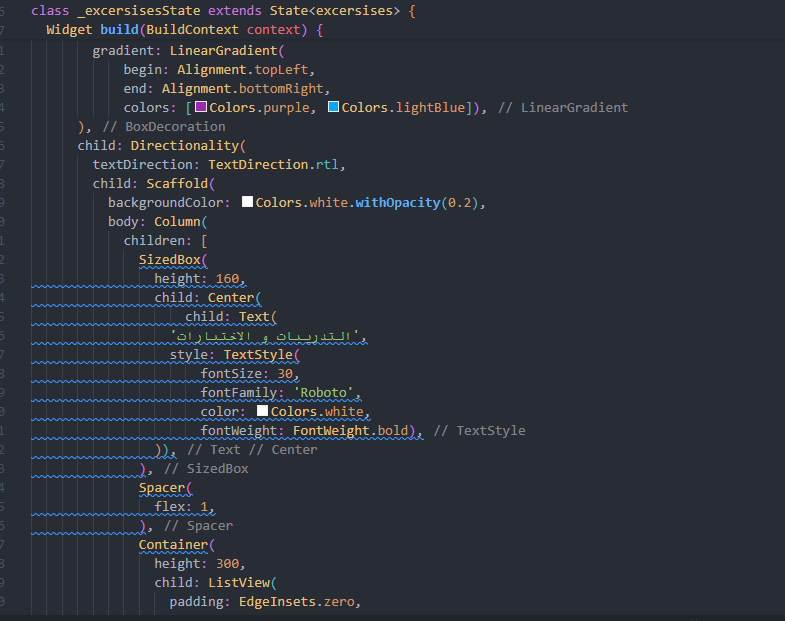
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* + Lessons 🡺

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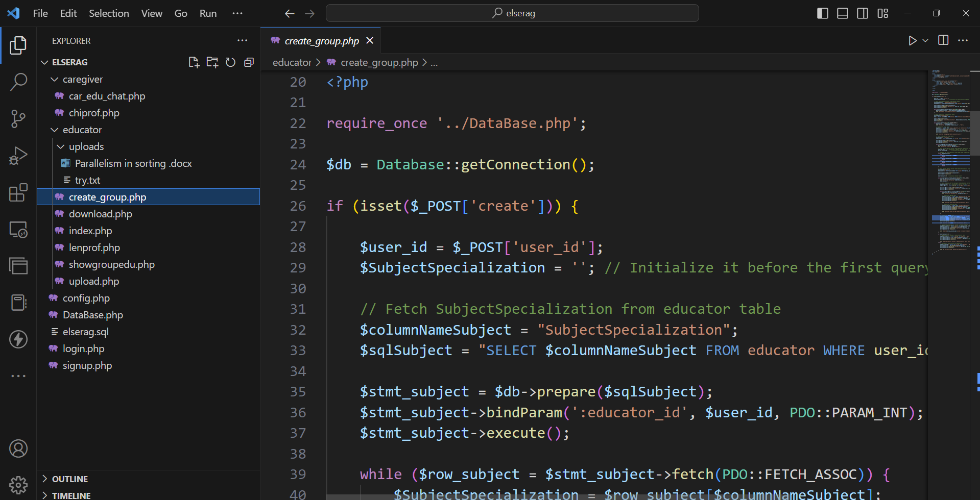
* + Exercises 🡺

****

* Back-End Implementation
  + **Backend Framework and Language**: We have chosen PHP and MySQL for database.
  + **Database Management**: MySQL is used to manage our application's relational database. The database schema includes tables for users, etc., ensuring efficient data storage and retrieval.
  + **API Integration**: Stripe is integrated into our backend to handle payment transactions securely. This involves setting up Stripe API endpoints and ensuring PCI compliance for handling sensitive payment information.
  + **Authentication and Authorization**: JWT tokens are used for user authentication. Upon successful login, a JWT token is issued, which is then used to authenticate subsequent requests to protected API endpoints.
  + **Security Measures**: We implement input validation, encrypt sensitive data (e.g., passwords) stored in the database.
  + **Error Handling**: Robust error handling mechanisms ensure that appropriate error messages are returned to the frontend for any invalid requests or server-side issues.
  + **Documentation**: Detailed documentation of API endpoints, data models, and backend architecture is maintained to aid in future development and troubleshooting.

A screen shot of a computer program

Description automatically generated



A screen shot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

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Testing Scenarios

* Front-End Testing

|  |  |  |
| --- | --- | --- |
| Test Case Description | Test Data | Expected Result |
| During the login process, the student is told to enter a username that contains 6 characters | **Username** | **Successful login** |
| The student enter valid username characters | **Invalid username** | **Try again** |
| During the login process, the student is told to enter a password that contains 6 numbers | **Password** | **Successful login** |
| The student enter valid password numbers | **Invalid Password** | **Try again** |
| When a student tries to learn a lesson and enters a letter that matches the letter for the lesson | **Correct letter** | **Successful complete lesson and take points** |
| When a student tries to learn a lesson and enters a letter that don’t matches the letter for the lesson | **Invalid letter** | **Try again the lesson** |
| When the student tries to enter the credit card number into the payment system | **Correct credit card number** | **Successful process** |
| Enter invalid credit card number | **Invalid credit card number** | **Try again the process** |

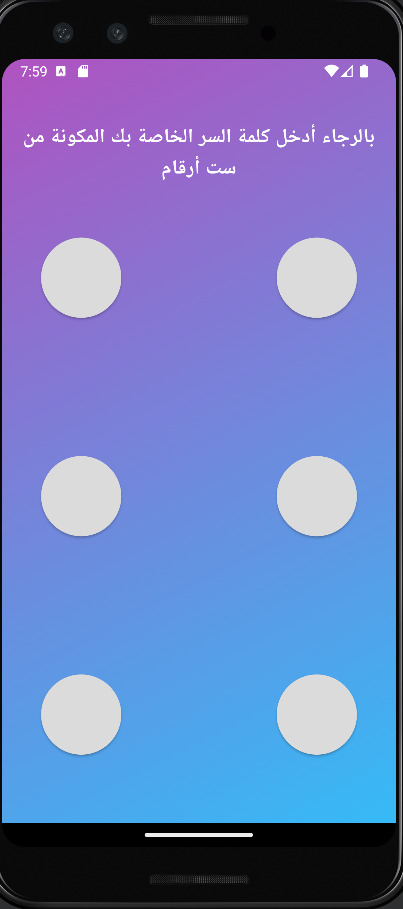
* Lessons Testing 🡺



* Username Testing 🡺



* Password Testing



* Payment System Testing



* Back-End Testing

**Chapter 6**

**Evaluation & Results**

**6.1 Evaluation Techniques**

**6.2 Front-End Results**

**6.3 Back-End Results**

**Chapter 7**

**Conclusion & Feature work**

Conclusion

The envisioned **literacy platform** for individuals with special needs represents a transformative and inclusive initiative aimed at overcoming barriers to traditional education. By integrating **adaptive learning methodologies**, personalized pathways, and robust community support, the project seeks to empower **learners**, **educators**, **caregivers**, and **institutions** within the special education domain. The commitment to accessibility, inclusivity, and privacy, coupled with innovative features such as interactive tools and multilingual support, positions the platform as a pivotal resource for fostering personalized and enriching educational experiences.

Continuous refinement, stakeholder collaboration, and adherence to special education standards underscore the project's dedication to creating a dynamic and supportive ecosystem.

As this initiative unfolds, its potential to redefine **literacy education for individuals with special needs** becomes a beacon of hope for fostering **growth**, **communication**, and **societal integration** within this diverse community.

Future work

We have great aspirations for future work, we will mention some of them below:

1. Make the application **support multilingual**, to expand the scope of application use.
2. Add more **advanced information** in the existing tracks, to help the learner be stronger and in these tracks.
3. Support **more tracks and sciences** in the near future.
4. Apply the **scanner feature** in the application, to enable the user to scan any book or image to know what it contains by voice.

References

* Unified Modeling Languages (UML)
* **Microsoft Visio** (<https://www.microsoft.com/en-us/microsoft-365/visio/flowchart-software>)
* **Flowchart Maker** (<https://app.diagrams.net/>)
* User Interfaces and Experience (UI / UX)
* **Figma** (<https://www.figma.com/>)
* **Microsoft Bing for Image Creation** (<https://www.bing.com/images/create?FORM=GERRLP>)
* Information about Special Needs
* **Wikipedia** (<https://www.wikipedia.org/>)
* **Elnour School** (Aswan City)
* **Elnour and ElAml School** (Luxor City)
* Problem with Special Needs
* Egypt - Disability: IN. (n.d.): ([https://disabilityin.org/country/egypt/#:~:text=There%20are%2012%20million%20persons,the%20United%20Nations%20Development%20Programme.](https://disabilityin.org/country/egypt/%23:~:text=There%20are%2012%20million%20persons,the%20United%20Nations%20Development%20Programme.))
* The real lives behind the data: Children with disabilities in education across Egypt, Jordan, Lebanon and the occupied Palestinian territory (September 2022) - Egypt. (n.d.). ReliefWeb. (<https://reliefweb.int/report/egypt/real-lives-behind-data-children-disabilities-education-across-egypt-jordan-lebanon-and-occupied-palestinian-territory-september-2022>)
* (n.d.). Economic Research Forum (ERF). (<https://erf.org.eg/app/uploads/2018/09/1215.pdf>)
* (n.d.). ERIC - Education Resources Information Center. (<https://files.eric.ed.gov/fulltext/EJ1300085.pdf>)
* A national screening for the prevalence and profile of disability types among Egyptian children aged 6-12 years: a community-based population study - PubMed. (n.d.). PubMed. ([https://pubmed.ncbi.nlm.nih.gov/37608272/#:~:text=Results:%20The%20prevalence%20of%20children,,%20and%20hearing%20(0.4%](https://pubmed.ncbi.nlm.nih.gov/37608272/%23:~:text=Results:%20The%20prevalence%20of%20children,,%20and%20hearing%20(0.4%25))
* Blind community in Egypt. (n.d.). MOSTAFA DARWISH. (<https://www.mostafadarwish.net/blind-community-in-egypt.html>)
* (n.d.). AUC Knowledge Fountain | American University in Cairo Research. (<https://fount.aucegypt.edu/cgi/viewcontent.cgi?filename=3&amp;article=1017&amp;context=audiovisual_student_work&amp;type=additional>)
* Solution for their problems
* Refreshable Braille Displays. (n.d.). The American Foundation for the Blind. (<https://www.afb.org/node/16207/refreshable-braille-displays>)
* An overview of Braille Devices – Perkins School for the Blind. (n.d.). Perkins School for the Blind. (<https://www.perkins.org/resource/overview-braille-devices/>)
* Braille Display Devices. (n.d.). Texas School for the Blind and Visually Impaired. (<https://www.tsbvi.edu/statewide-resources/services/braille/display>)
* 10 Apps for Learners Who Are Blind or Visually Impaired – Paths to Literacy. (n.d.). Paths to Literacy. (<https://www.pathstoliteracy.org/resource/10-apps-learners-who-are-blind-or-visually-impaired/>)
* What Are the Best Mobile or Web Apps for Blind People? | American Council of the Blind. (n.d.). Home | American Council of the Blind. (<https://www.acb.org/what-are-best-mobile-or-web-apps-blind-people>)
* The 5 Best Education Apps for Blind Students. (n.d.). The Lighthouse for the Blind, Inc. (<https://lhblind.org/blind-students-the-5-best-education-apps-for-learning/>)
* Assistive Technology | The American University in Cairo. (n.d.). The American University in Cairo. (<https://www.aucegypt.edu/digital-innovation/projects-updates/assistive-technology>)
* Digital Technology for Educating Blind. (n.d.). MIT SOLVE. (<https://solve.mit.edu/challenges/digital-inclusion/solutions/50949>)
* Technologies offer hands-on science options for blind students during remote learning. (n.d.). Purdue University. (<https://www.purdue.edu/newsroom/releases/2020/Q4/technologies-offer-hands-on-science-options-for-blind-students-during-remote-learning.html>)
* An RNIB guide to braille displays for blind and partially sighted people. (n.d.). RNIB. ([https://www.rnib.org.uk/living-with-sight-loss/assistive-aids-and-technology/everyday-tech/reading-and-writing/an-rnib-guide-to-braille-displays-for-blind-and-partially-sighted-people/#:~:text=A%20braille%20display%20or%20braille,lines%20to%2080%20cell%20lines.](https://www.rnib.org.uk/living-with-sight-loss/assistive-aids-and-technology/everyday-tech/reading-and-writing/an-rnib-guide-to-braille-displays-for-blind-and-partially-sighted-people/%23:~:text=A%20braille%20display%20or%20braille,lines%20to%2080%20cell%20lines.))