SafarNama

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Project Phase:	Phase 4 – Development
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1. Overall Solution

The prototype answers most of the issues that were highlighted in the User Research and Design Documents. The issue of children not being able to go or being taken on educational trips enough by schools and parents during the COVID-19 situation has been resolved by the concept of this prototype. The app provides an AR tour to the children, which they can play from their homes. The marker-based approach of AR encourages an active-based learning in home and in schools. Parents are also part of the experience as they will place the markers around the vicinity and at the same time track the progress of their children via the tour history feature that the app provides. During the user research we found that children are interested in history and culture and have a spark to learn more about it. The Lahore Museum tour allows the children to interact with historical models and listen to their stories via dialogues, hence also incorporating roleplaying features. The models also provide a realistic experience to the users, especially children, as they can interact with the model, by scaling, moving and rotating the model. The models interact with the children and tell them about important historical facts. The mini quizzes and the final quiz allow incorporates the educational aspect of the app. The children are expected to listen to and retain the information told by the model. They cannot go onto the next model without answering the previous quiz correctly. The gamification element is also covered in the solution. The coins earned after each quiz and after tour completion gives motivation to play well. The locked tour of "Mughal Emperors" encourages the children to play previous tours and retain information to complete the quizzes quickly and earn more coins, so that they can unlock new tours.

2. Screen Explanation

Splash Screen: The splash screen displays the app name and logo. An animation reveals the logo and the name.

Language Screen: After the splash screen, the user is asked to select the language that they want to play the tour in. This screen provides the user with 2 language options: English and Urdu. For this prototype, the app is only available in English version. Urdu version of the app has not been implemented.
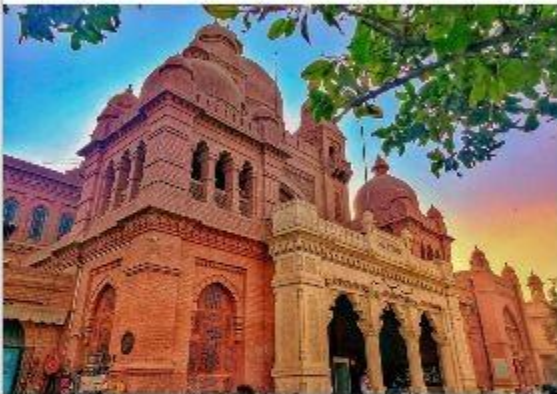
Tour Screen (Lahore Museum): Once the user selects their preferred language, they are taken to the home screen. The user can see the details of the Lahore Museum tour. The tour details are placed on a card, and includes the tour name, picture, description, expected completion time and the start button. The top bar shows the app name and a hamburger icon which, when clicked will open the menu. The user can right swipe the screen, horizontally, to see other tours that the app provides. Swiping left will take the user back to the previous tour. When the user clicks on the "START" button, they are taken to the Magic Sheet/Play screen.
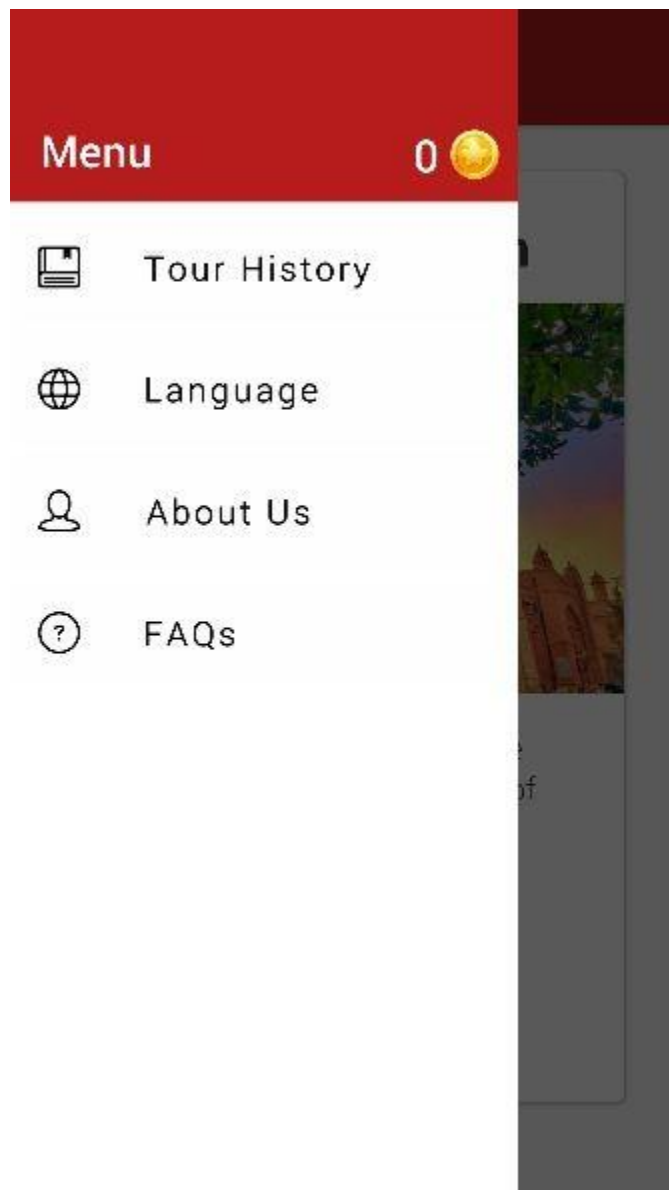
Tour Screen (Mughal Emperors): If the user has right swiped the Lahore Museum tour, they will see the "Mughal Emperors" tour. The tour is locked and requires 1000 coins to be unlocked. The tour details are again displayed on a card. This card shows the tour name, picture, description and a button which shows the number of coins required to unlock the tour.

Menu Bar: When the user clicks on the hamburger icon, in the top left of the screen, a side bar is revealed. The sidebar is the menu which shows the number of coins that the user has won, tour history, language change, about us and FAQs buttons. When the users click on a button, they are directed to the screen, associated with the button. To hide the menu, the user clicks on the black faded area, next to the menu.

Name	Time	Coins
Makhnu	10:00 min	300 🪙
Makhnu	10:00 min	300 🪙
Makhnu	10:00 min	300 🪙
Makhnu	10:00 min	300 🪙
Makhnu	10:00 min	300 🪙
Makhnu	10:00 min	300 🪙
Makhnu	10:00 min	300 🪙
Makhnu	10:00 min	300 🪙

Tour History: The tours history is a list that shows the name of a user, the time taken to complete a tour, and the coins earned by the user. This is a local history that shows the details of all the users who played a tour from the same mobile device. Each entry shows the name, time taken to complete the tour and the coins earned. The tour history can be viewed by going to the menu and clicking the tour history button. To go back to the tour screen, the user can press the back button in the top left corner of the screen.

Language: Language change can be accessed by pressing the "Language" button in the menu bar. When the user clicks on the button, a language screen will be

displayed. The user will be provided with two language options, English and Urdu.

To go back to the tour screen, the user can press the back button in the top left corner of the screen.
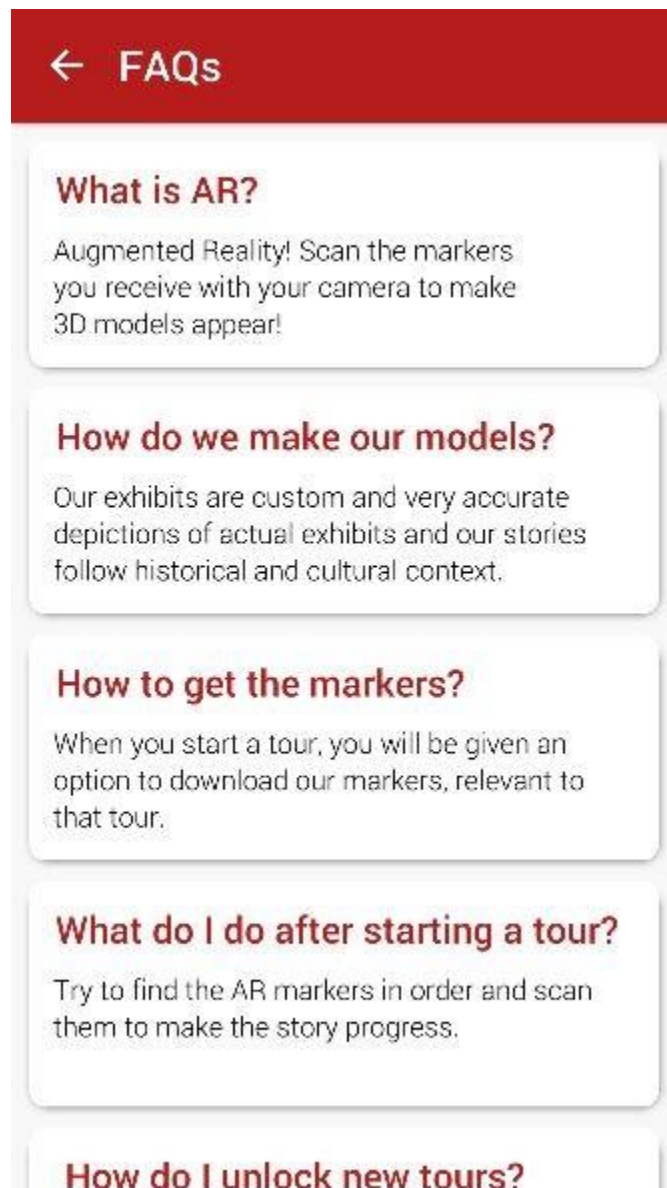
About Us: If the user clicks on the "About Us" button, in the menu, the About Us screen is displayed. This screen provides the details about the app. The back button, in the top left corner will take the user back to the tour screen.

FAQs

What is AR?
Augmented Reality! Scan the markers you receive with your camera to make 3D models appear!

How do we make our models?
Our exhibits are custom and very accurate depictions of actual exhibits and our stories follow historical and cultural context.

How to get the markers?
When you start a tour, you will be given an option to download our markers, relevant to that tour.

What do I do after starting a tour?
Try to find the AR markers in order and scan them to make the story progress.

How do I unlock new tours?

FAQs: The FAQs screen allows the user to get answers to the most common questions regarding the app. It shows a scrollable list of questions and answers. To go back to the tour screen, the user can press the back button in the top left corner of the screen.
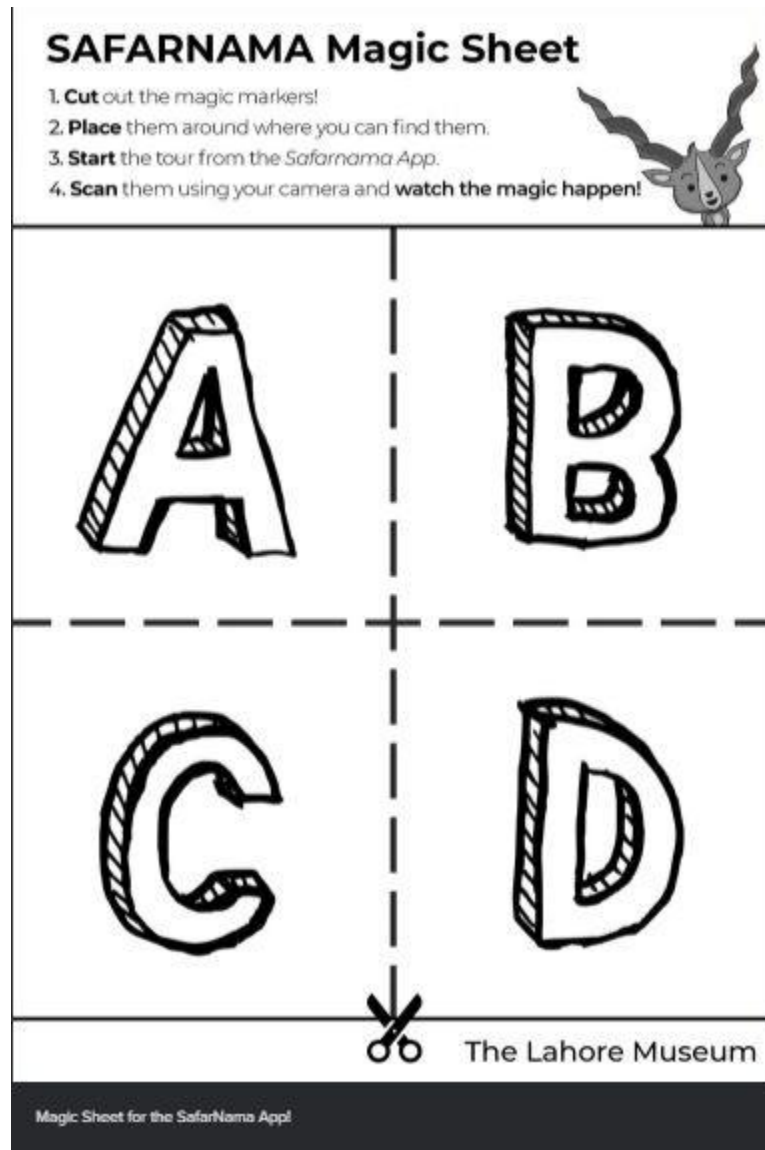
Would you like to start the tour?

Make sure you have your magic sheet ready!

GET SHEET 📄 | **PLAY** ▶

SAFARNAMA Magic Sheet

1. **Cut** out the magic markers!
2. **Place** them around where you can find them.
3. **Start** the tour from the *Safarnama App*.
4. **Scan** them using your camera and **watch the magic happen!**

A B
C D

The Lahore Museum

Magic Sheet for the SafarNama App!

Magic Sheet Screen: When the user clicks on the "START" button of a specific tour, they are redirected to this screen. It asks the user whether or not they have the magic sheet downloaded. Magic Sheet is a sheet which has all the markers, required for the AR feature of the tour. This screen has two buttons, Get Sheet and Play. If the user has downloaded the sheet before, then they will click on the "PLAY" button to start the tour. If the user does not have the screen downloaded, then they will click on the "GET SHEET" button. They will be taken to a link, from where they can download the magic sheet. The sheet has instructions about how to use it.
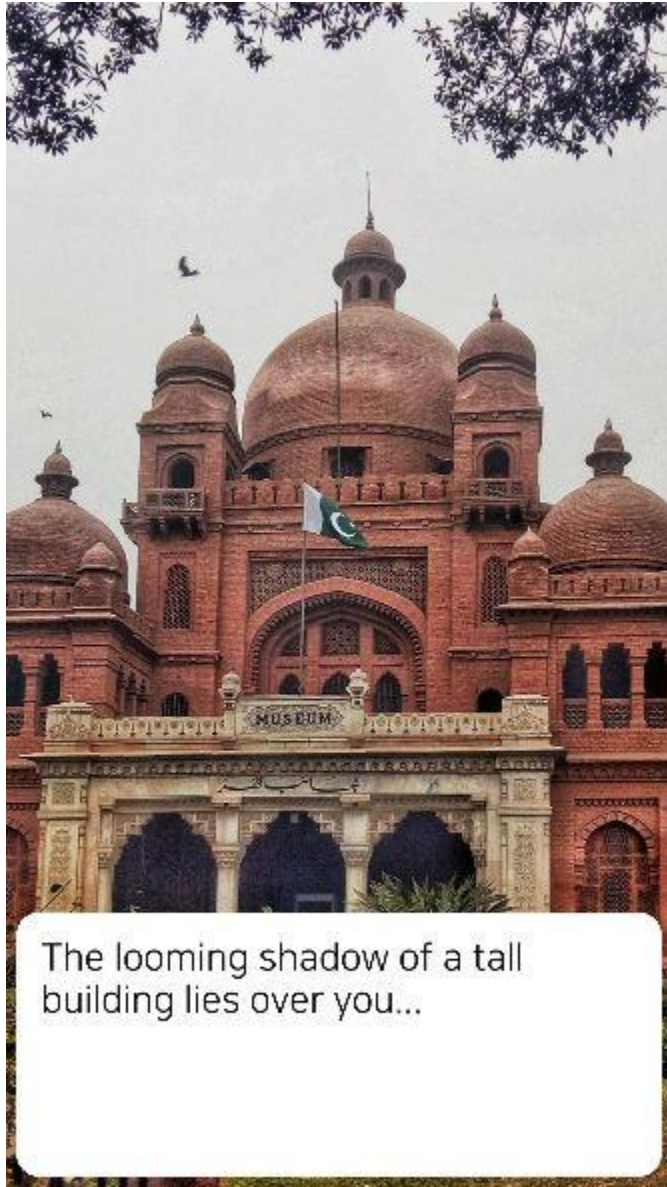
The looming shadow of a tall building lies over you...

Lahore Museum Introduction: When the user clicks on the "PLAY" button, the "Lahore Museum" tour starts. The following screen is displayed to the user. It follows a series of similar dialog boxes in the bottom, where the user is told about the Lahore Museum and given some facts.
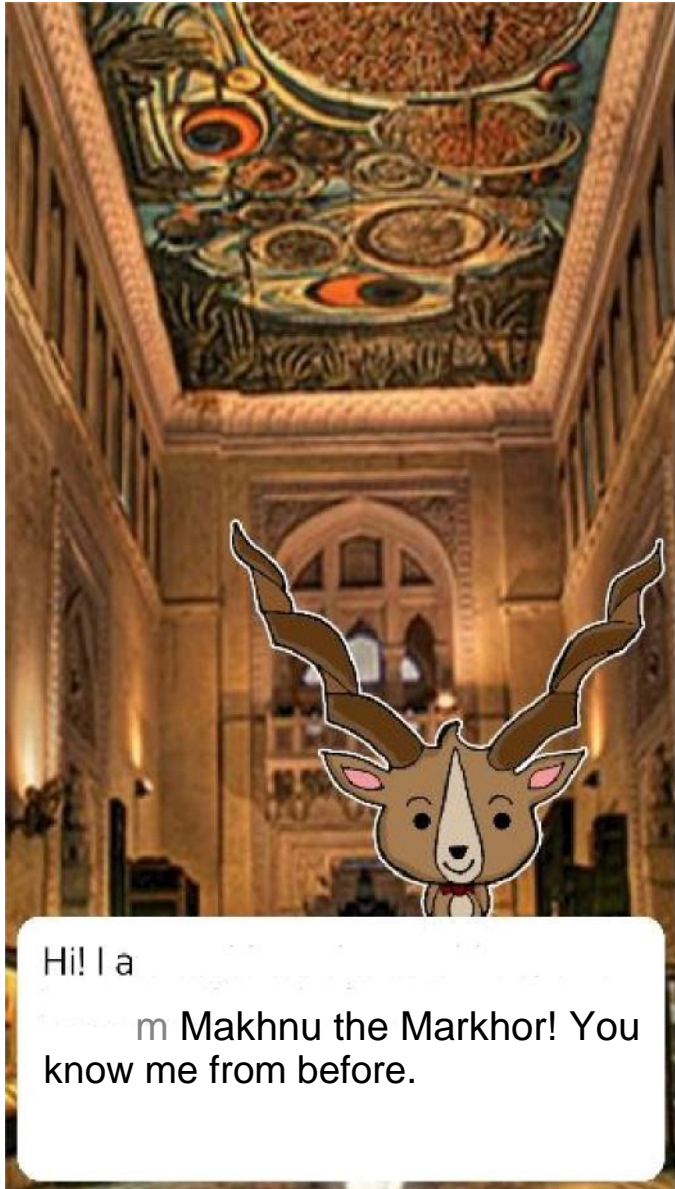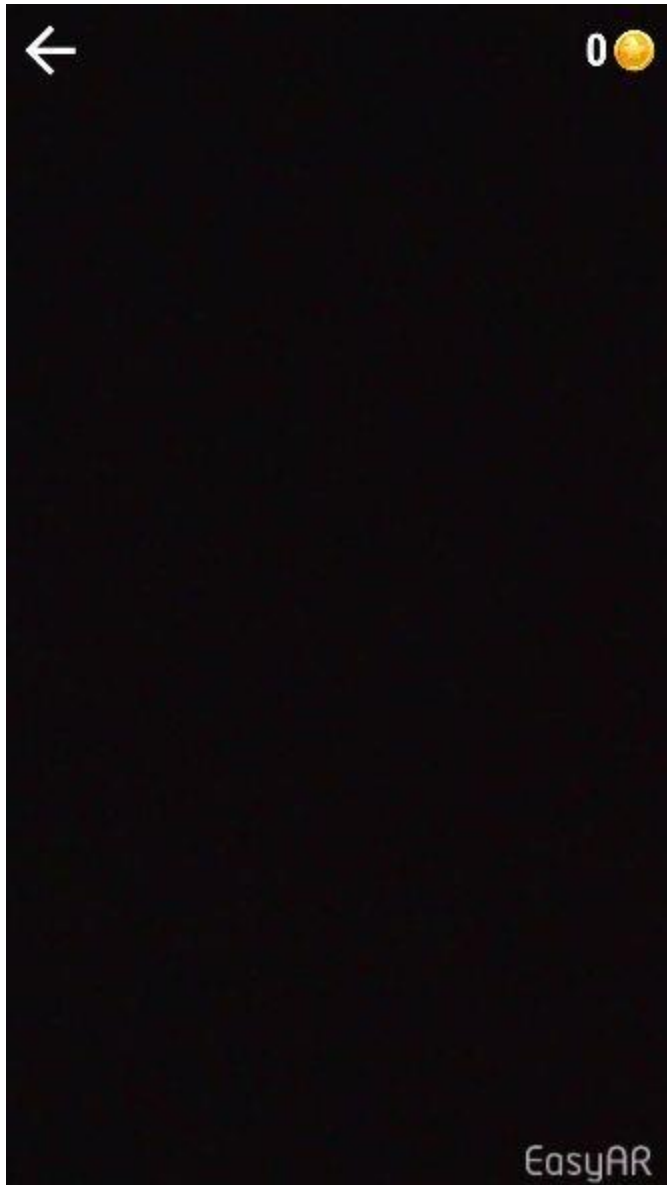
Hi! I a

m Makhnu the Markhor! You know me from before.
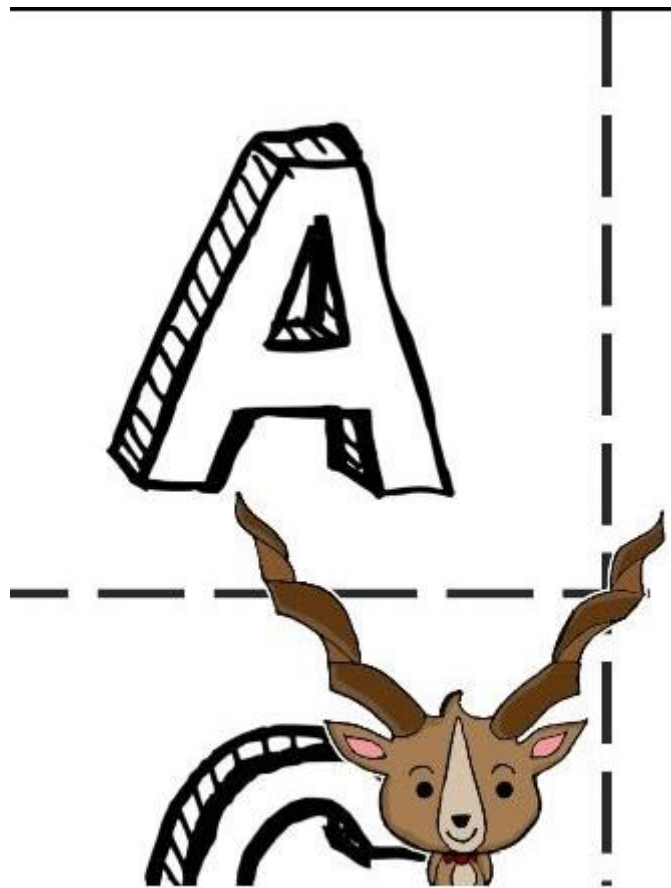
Magical exhibits are scattered over all the place.

Tour Guide Introduction: Once the player learns about the Lahore Museum, the tour guide, Makhnu introduces himself and tells the user about how to use the markers, given on the magic sheet.

Camera View: After completing the tour, the players see the following screen. This is a camera view of the player's mobile device. The back button, on the top left, takes the user back to the tour. The coins shown, in the top right of the screen, shows the player, how many coins they have won from the tour.

If the user tries to look at the marker C before markers A and B, then they will be shown a "Lock" for that marker. This means that they cannot view this model, if they have not viewed the models at markers A and B.

When the user takes the camera on the first marker, Queen Victoria's 3D model is displayed.

My Lords, Ladies and Gentlemen!
You stand in the presence of
Alexandrina Victoria,

The model will interact with the player via dialogs. Multiple screens, similar to this will sequentially. Each dialog will tell the player about the history and facts related to the model. The user will have to read and memorize them in order to answer the quiz successfully.

Since the player has already visited the Queen Victoria, now Makhnu is asking the player to look for the next character i.e The Tipu Sultan. Now the user will place the camera on the next marker for Tipu Sultan.

After successfully answering the quiz of Queen Victoria, the player will take the camera to the next marker, marker B and scan it. Upon scanning, the 3D models of Tipu Sultan will appear on the screen. Similar to the dialogues of Queen Victoria, the model of Tipu Sultan will also interact with the user via a series of dialogues.

Who was the Indian soldier who started the revolt that led to the War of Independence?

Tatia Tope

Bahadur Shah

Mangal Panday

Tipu Sultan

Before starting his own story, Tipu is asking the player to tell the information told by Queen Victoria. Above is the quiz screen. It is a quiz time.

Now to find out more about the role of the Mughal emperor Bahadur Shah in the war, you will have to speak to the emperor himself!

After answering the quiz correctly, the player earns 50 coins. The total coins won, by the player in this tour, are now updated from 0 to 50 and displayed in the top right, of the screen.
Starting from Queen Victoria, and visiting the Tipu Sultan; now the Tipu Sultan is telling the player to visit the next character in the story i.e Bahadur Shah Zafar. The image displaying in the upper left corner is of Bahadur Shah Zafar.

After successfully answering the quiz of Queen Victoria and Tipu Sultan, the player will take the camera to the next marker, marker C and scan it. Upon scanning, the 3D models of Bahadur Shah Zafar will appear on the screen. This model will also interact with the user in the same way as Queen Victoria and Tipu Sultan, via dialogues.

Now go to Rani Lakshmibai to hear what happened in Jhansi during the war.

After successfully completing the quiz, relevant to this marker, the model of Bahadur Shah Zafar is telling the player to visit the next character in the story, Rani Lakshmi Bai. The image displaying in the upper left corner is of Rani Lakshmi Bai. It can also be seen that the coins are updated to 100, once the user has successfully taken the quiz.

After successfully answering the quizzes of Queen Victoria, Tipu Sultan and Bahadur Shah Zafar, the player will scan the final marker, marker D. Upon scanning, the 3D model of Rani Lakshmi Bai will appear on the screen. This model will also interact with the user in the same way as the previous 3 models.

Now, the player has visited all the characters in the story each explaining their role in the War of Independence. Is time for the final quiz. After clicking on the start of the final quiz, a pop will appear telling the player to get ready for the quiz. The quiz comprises the major information told by each character in the Lahore Museum tour.

Who won the battle or Gawalior?

| Rani of Jhansi | British |
| Napolean | Raja of Datia |

The final quiz is a multi-question quiz that tests the user on the information learned during the entire tour. Upon successful completion of the final quiz, the tour will end.

The Final Quiz is completed and the coins gained by the player is 250. The next button will redirect the player to home screen to explore the next tour.
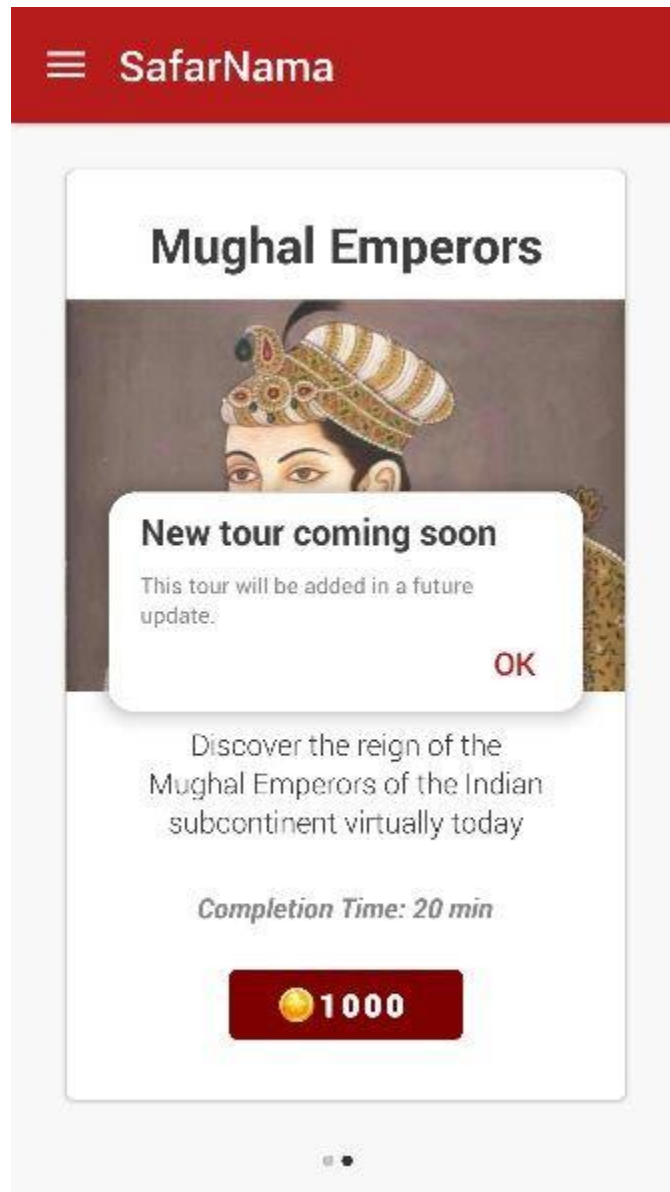
Once completed with Lahore Museum tour, the user can go to the Tours Screen and see the Mughal Emperors tour. When the user clicks on the button, with 1000 coins written, a pop up will appear, telling the user about the availability of the tour.

3. Visual Design Principles

Simplicity: The design is made to be simple so that it is easier for the target audience, children, to use. The design is approachable and recognizable as it follows

the android material design principles. It makes use of the standard hamburger menu, cards and dialog layout so that normal Android users can recognize the interface. It is Easy to follow and user friendly, where the user and designer's conceptual model can easily be united. For example, the user just needs to click the play button after downloading the sheet. The purpose of exploring the character and getting the know-how of the story can be easily achieved.

Contrast: During the development phase we have followed the contrast principle. For example, we have used white color text with a red background. Similarly we have used black text with white background.

White Space: The use of white space is implemented throughout the screens to make the content easily scannable. The use of white space between lines and left and right margins increases the comprehension for the user.

Alignment: We have followed the principle of alignment where each graphics and text are lined up in relation to each other. All elements follow a grid-like structure such as in the side menu of the device.

Consistency: The design of the app is consistent throughout the app and makes use of material design standards within each element. Additionally, the icons and typography of the app are also consistent with the Android Material Design standards.

4. Design System

Color Palette

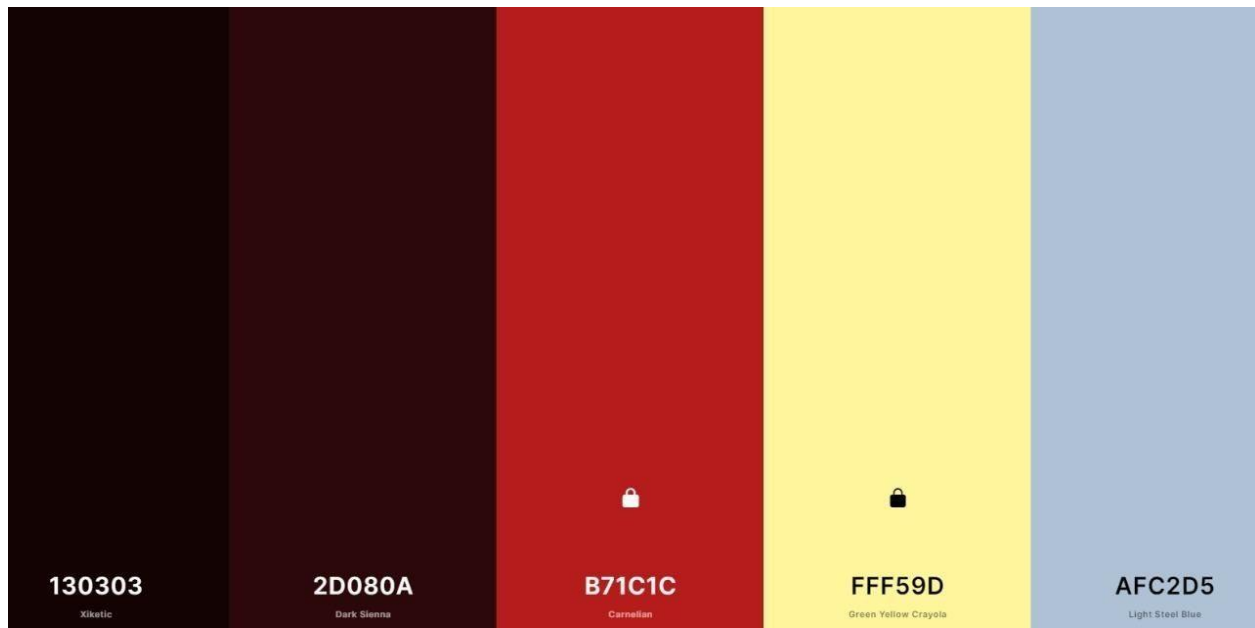**Primary Color:** #b71c1c **Primary Light Color**: #f05545 **Primary Dark Color**: #7f0000 **Secondary Color**: #fff59d
Secondary Light Color: #ffffcf
Secondary Dark Color: #cbc26d
Primary Text Color: #ffffff **Secondary Text Color**: #000000

The red (B71C1C) and yellowish (FFF59D) colors were used majorly in our app. This is because our design was consistent with these colors. At the same time yellow color usually represents happiness, and optimism, of enlightenment and creativity and is visually appealing for the children.

Icons

Most of the icons used are from Material UI. The ones that were not part of the Material UI, are used because they are more visually appealing for the children and act as a better reference. For example, we did not use the coin icon (Dollar coin) from Material Design because it had a dollar sign in it. We instead used a gamified version of the coin to make it suitable for the children. All other icons used are added to a folder and uploaded on the drive.

Illustrations/3d Models

We have made 3d models of Queen Victoria, Tipu Sultan, Bahadur Shah Zafar, and Rani Lakshmi Bai, Locks. For each model, we carefully drew the edges to give it a realistic view to the user. All models screenshots are added to a folder and uploaded on the drive.

Text Readability

In order to increase the user readability, the text is appearing one alphabet at a time. It helps to keep the audience connected with the story and establish the need of role play.

5. How the prototype was built

Softwares Used

The prototype has been made in Unity. We made the UI using the Unity built in UI manager. To add the AI feature in our app, we used the Easy AR SDK. Using Easy AR allowed us to make our AR approach be a markered one rather than markerless. This allowed us to achieve one of our goals of the app, physical activity of the children. The users will have to physically move from different places to scan the markers and complete a tour. Apart from this, we used Smoothie-3D to make our 3D models. We focussed on making one complete tour and therefore made four 3D models using this website. The models give a wholesome and realistic AR experience to the player. The tour guide graphics, its different states, e.g. happ, sad, neutral, were all made in Photoshop. The app logo was also made in Photoshop.

Animations and Sounds

We also added animations to some scenes. For example, the splash screen has an animation where the app logo and name appear one after the other. Similarly, several animations of Makhnu have also been added on the Tour Completion screen. We have also added sound of dialogue clicking.

Features covered

We have implemented almost all of the features for testing apart from the Urdu version of the application. There are a number of tasks that can be generated from the features covered. Some of them include:

The user can open and play the whole "Lahore Museum" tour. Users can interact with the four 3D models and give the mini quizzes and the Final Quiz.
After completing the tour, the coins won are updated in the Menu Bar. The user can go to the menu bar and look at the coins earned, after tour completion.
After completion of the tour, the user can go to the tour history and see the updated coins and their local rank.

The leaderboard feature was not implemented because it will be automatically synced with Google Play Services.