

Initial Architecture Document

Team Number: 2

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Project Name: CampusBattle

Project Synopsis: Location-Based augmented reality game and tour guide for KU campus

Architecture:

Our app is a location based augmented reality game and tour guide for the KU campus. There are two distinct parts to our app, the game and the tour guide. For the game aspect of the app, Users will be able to walk around the campus with their phone, and take part in a multiplayer game. Depending on where they are on campus, the app will have different mechanics and themes. The tour guide aspect will include some of the same features as the game like location based interaction. People will walk around the KU campus and be able to learn about the history and general information about the specific place or buildings they are at on campus.

The Game is the main part of our project. The goal is to have different objectives players can complete spread across campus. They will travel around campus fighting enemies and completing minigames. The enemies and minigames will also be themed based on where you are on campus. For example if you were by the football stadium, a user will use their phone and camera to throw footballs at targets (like Pokemon Go), or if you are around the engineering building users might have to battle a number of robot/computer themed enemies. Once these challenges are completed, we want to have some sort of loot system where the player will get some sort of reward/loot. These rewards will also be different based on where you are on campus. Another aspect of our game we want to implement is some type of multiplayer interaction. We want users to be able to interact with each other to complete challenges, battle enemies, and battle each other. This multiplayer feature could allow us to add limited time group events where players can group up and work towards one common goal. Just like the normal challenges, these events will be different based on where you are and what time of day it is. To go along with all of this, we want to add some sort of leveling mechanic. Every time a player completes a challenge, they will get experience points that will boost their level. Every level could unlock different parts of the game and give players something to work for.

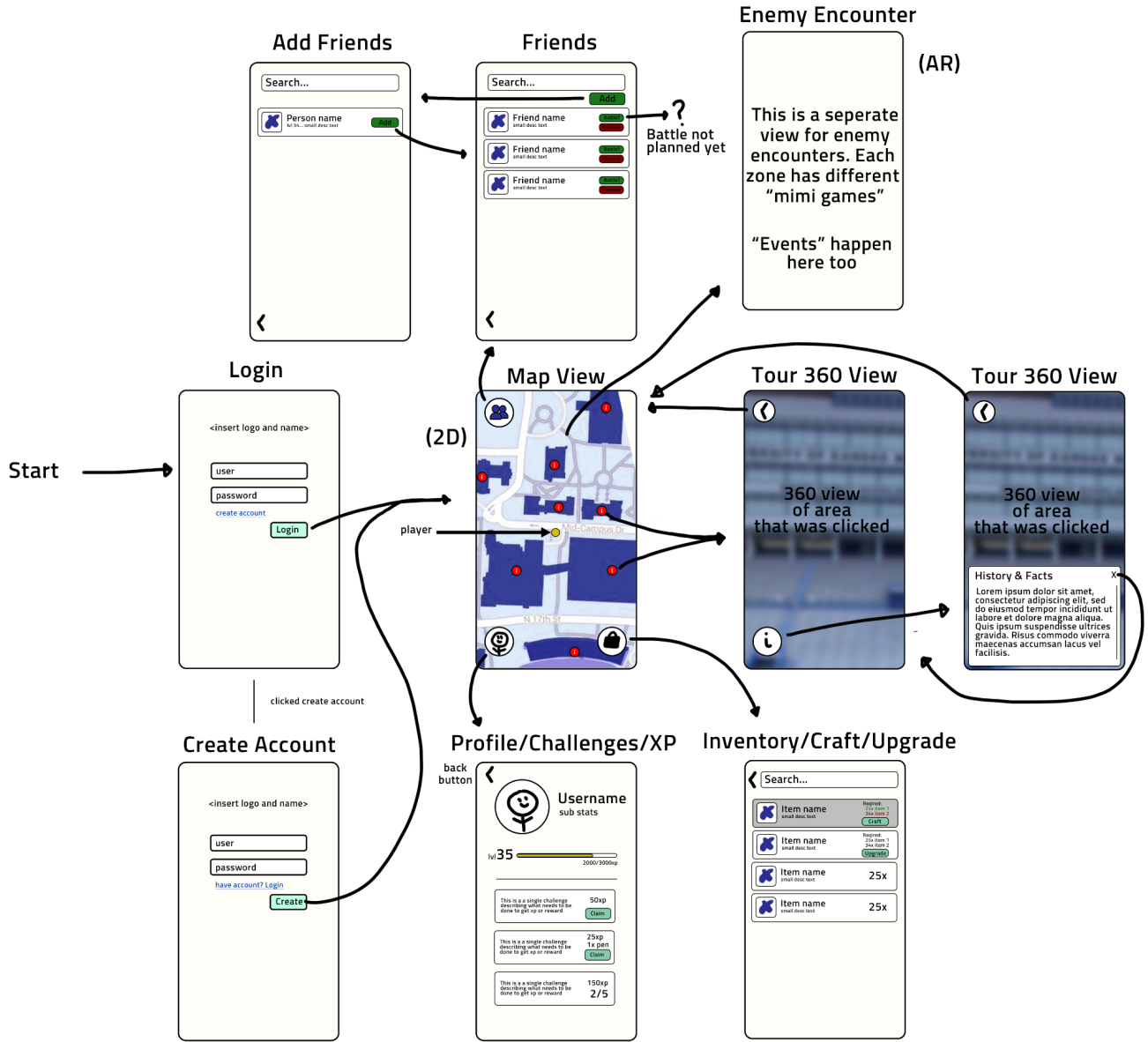
This will be a mobile game on the iOS and Android stores. As for the technical process of making this happen, we plan on looking into using Flutter and programming with Dart, as well as Javascript. Although, this is all tentative currently. On loading the application, the user will see a welcome screen that makes them either login or create an account by inputting a distinct username and password. Once they do that, they are taken to the 2D mode of the game. This is a top-down map view of campus and it will be situated wherever the user is in real life. As they

move around, more buildings and spots of interest will appear, allowing them to learn about the campus. As stated before, enemies will appear next to the user for them to attack and gain xp and/or loot. We envision a separate AR mode for when the user is encountering the enemy, and the user would then go back to the 2D map mode upon the conclusion of the encounter. As shown in our UI diagram, we plan on having a few on screen buttons that take the user to different modes. Those modes include Friends View, Profile View, and Inventory View. The Friends View will be the multiplayer section where the user can add or remove friends. The Profile View will be the section where the user can review their stats and see challenges. And in the Inventory View, the user can see the items they have received from attacking enemies. We hope to implement a vast loot system where the user can upgrade their items, so they don't get bored and can always look forward to getting something new. Apart from those on screen buttons, the tour mode will be activated through clicking on info buttons on the buildings and places of interest.

The tour mode will be marketed to incoming/potential students and visitors of KU as a way for them to learn the history of KU without having to be on an actual tour. Users will be able to adventure around the campus and get insights about campus based on where they are. For example, say they walk near Allen Fieldhouse, there will be popups they could click on and gain insight about the history of the basketball team, the current season results, or upcoming schedules. Another example could be when people walk near the engineering building, users could gain insight about the majors the school of engineering offers, current activities going on, and more. The tour mode could also recommend nearby points of interest to the user that may be worth visiting, such as the student union. This could also have a few options for what to show, such as nearby food places, to help find what you want even if you are not familiar enough with the campus to know exactly what you are looking for.

Another possible use for the tour mode would be for new students to find their classes. The map could direct students to the building, similarly to how google maps would, and then the app could provide a map of the building's floor plan to help find the specific room your class is in. This could be custom tailored to the KU campus, making it more useful than google maps, which has a more generic one size fits all map. It could even be possible to give students exact directions for navigating buildings, but each building would need to be individually integrated, so this is not ideal for the whole campus, and if implemented, will likely be limited to the engineering buildings. During this time, game functions will not be happening, since the app will know that you are headed to class and probably do not want to be distracted. If the app reaches AR development, it may even be possible for these directions to be shown over a live camera feed from your phone's camera, but once again that would not be feasible for the whole campus since every building would need to be integrated individually.

Concept images of how the app would look in use:



Here is how we expect some relations of different parts of the game/tour to look like:

