FACULTY OF TECHNOLOGY
Information & Communication Technology
Subject: Capstone Project

Aryan Mahida – 92200133011 **Jay Mangukiya - 92200133040**

Project Definition and Scope - Intermediate Review

A brief intro…

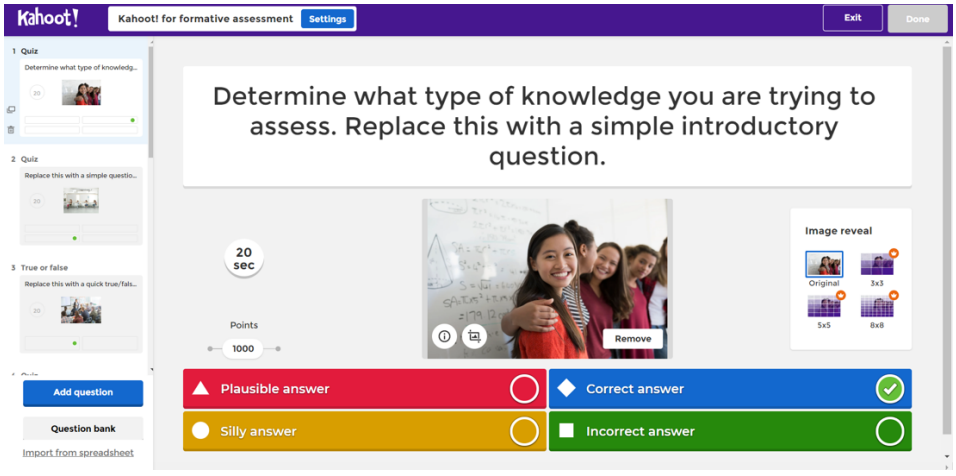
In today's time, learning is becoming more interactive and collaborative through digital devices and advance technologies, and students often look for platforms that can make studying fun as well as effective. In order to work on that, I along with my peers have already made a Generative AI based web application for educational purposes which is called **BookTube**. But it was just a platform to learn and study. There is also a need of a tool which evaluates the knowledge as well. Which can be satisfied by any quiz platform.

Although many quiz and learning apps already exist, most of them either focus on large audiences, have limited real time features, or require heavy setup and subscriptions. Just like Kahoot! And Slido. With this project, we simply aim to create a simple yet powerful quiz application which contains a unique functionality of 1v1 play mode, that works both on the web and mobile. The goal is to provide real time competition between two individuals, lightweight deployment, and easy access across devices. This idea directly connects with the ICT field where web development, real-time systems, and cloud solutions play a major role.

Problem Statement

Most of the existing quiz applications are either static or don't allow especially one to one competitive play mode. Many are designed for bigger groups like an entire class of 15-30 students, while some require complex hosting setups or even paid subscriptions. For students who just want to quickly connect with a friend through a lightweight cloud server, there are hardly any good options, that too without paying any amount also. This gap shows the need for a real time quiz platform that is simple, accessible, and encourages healthy competition in learning, which also gives reasonable accesses and authorities to a quiz admin to set up a quiz.

One of the examples include Kahoot!



Objectives

The main objectives of this project are:

- To design and build a real time quiz application for web and mobile.
- To provide an easy to attend quiz application for students.
- To include 1v1 functionality for users to play against each other.
- To design a clean, user friendly interface which is easier to use and navigate.
- To include features like a leaderboard and basic analytics to track performance and compare with competitors.
- To provide admin access to quiz, such as time allotted to a question, points per question, difficulty etc.
- To provide question banks to admin for better question management and meaningful handling.
- To provide competitive quiz environment on the go.

Relevance to ICT Domain

The project is closely related to ICT because it brings together multiple areas:

- **Web Development:** In relevance to Internet and web technology (IWT) and Advanced web technology (AWT) subject where the basics to advanced of web development are taught, is implemented for the website implementation of this application.
- Which includes frontend development, backend development, hosting of the web application.
- **Networking Concepts:** WebSockets for real-time gameplay and REST APIs for other services to make website easier to implement.
- **Mobile app Development:** In relevance to Cross platform mobile application development (CPMAD) subject, where the basics of mobile application development is taught, is implemented for the mobile side of this application
- **Database:** In relevance to Database Management System (DBMS) subject, the database schema design, management and deployment falls under this category.
- **Human centric approach:** In relevance to Human centered design (HCD) subject, developers of this application are encouraged to propose a Human centric solution which not only solves the problem but also engages the audience with application / solution in a positive way.
- **Creativity, problem solving and innovation:** In relevance to the CPSI subject, developers of this application are also encouraged to think and propose solution creatively and innovatively which not only distinguishes their solution from other conventional approaches but also makes their approach stand out among others.
- **Cloud development:** The fundamentals of AWS and cloud will be beneficial for the developers to containerize the application using Docker as well, where the external dependencies and downloads need not to be done.

- **Object oriented programming:** Concepts of object oriented programming have been explicitly and implicitly used. In sequelize ORM, the concepts are explicitly used while in coding, the class – object methodology have been thoughtfully implemented.

Now this is how the entire problem solution is related with the Information and Communication Technology domain and this is how these courses will be able to help developers to implement their knowledge to solve this issue.

Feasibility Analysis

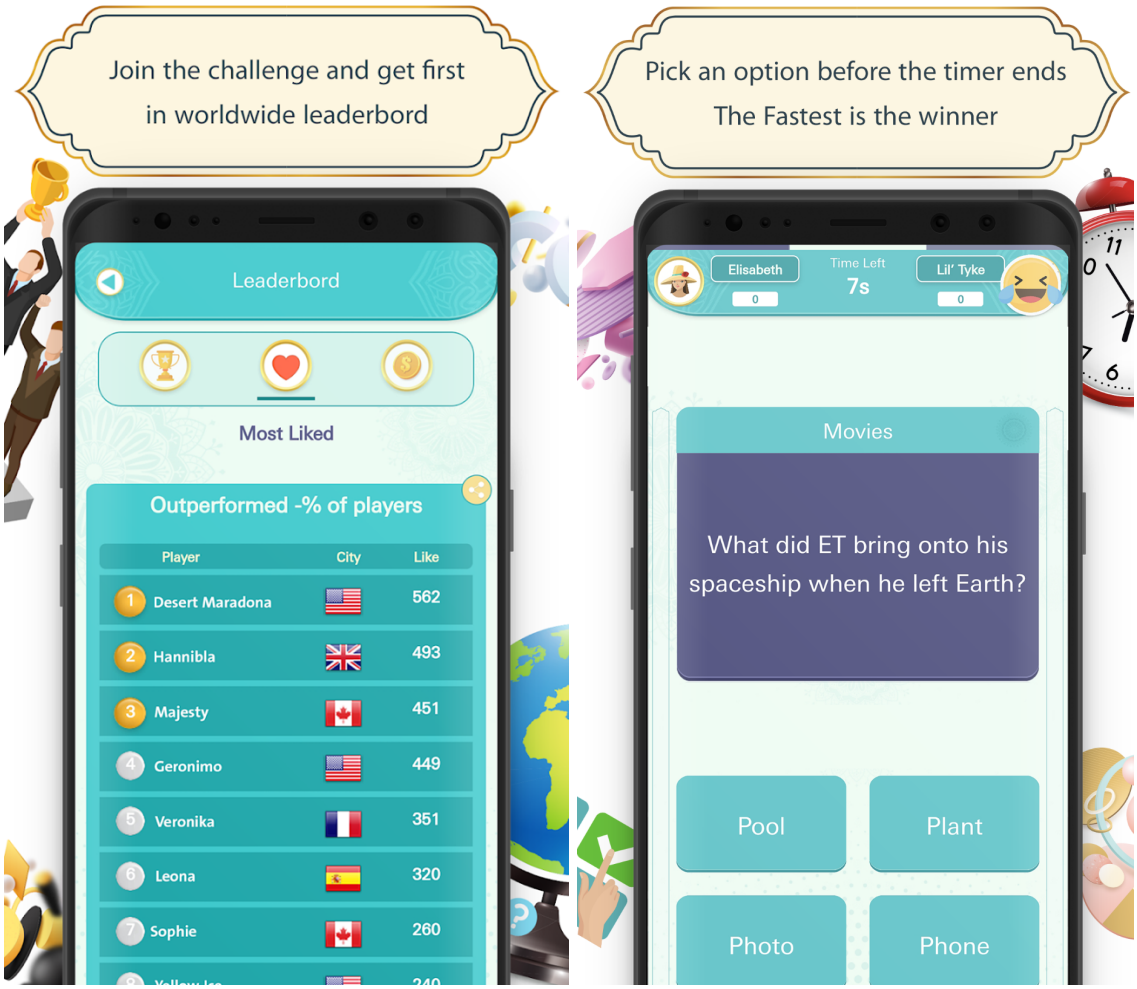
- **Technical Feasibility:** The project will rely on widely available and open source technologies such as React, Flutter (will be implemented later on), PostgreSQL, socket.io, NodeJS, Docker, Prometheus etc.
- **Economic Feasibility:** Most of the required tools come at no cost, which also makes the project affordable within academic boundaries. Yet, in order to access and get better results, some paid subscriptions might also be needed.
- **Ethical Considerations:** User data will be collected responsibly. Only minimal information will be collected, and privacy will be respected. No sensitive personal details will be stored or shared.
- **Market/User Needs:** Interactive, gamified and attractive quiz interfaces do already exist such as Kahoot.
- But functionality such as 1v1 and category wise quiz management seems non existent. To overcome this, we have targeted audience who needs competitive evaluation and efficient quiz management.
- **Novelty:** Unlike existing platforms (like Kahoot, Quizizz or QuizUp) that mainly focus on large classrooms, our project focuses one to one real time play with the flexibility of either playing over LAN or scaling up to cloud hosting.

Literature Review

Popular platforms like Kahoot and Quizizz are great for large groups but often feel heavy for casual or one to one use. Also, these requires additional paid subscriptions. Several researches highlight how competition and gamification improve learning outcomes, while ACM studies show the benefits of real time systems but also mention that complex deployment can be a barrier.

What I have observed is that these existing quizzes do solve the purpose, but they lack features such as lightweight. Our project addresses this by offering a simple local setup for LAN based games while also keeping the option of cloud scalability in upcoming future along with 1v1 play mode.

Other than that, the application of QuizUp 2 seems mainly as a social trivia game for fun, rewards and entertainment while our application serves as a platform to specifically provide educational interface. Also, our app is made to support classroom peer learning while QuizUp 2 is more entertainment oriented.



QuizUp 2 images

References: **Impact of the Use of Gamified Online Tools: A Study with Kahoot and Quizizz in the Educational Context**

Conclusion

This proposal defines a practical, feasible, and student driven solution to the lack of simple real-time 1v1 quiz applications. The project is well scoped with clear objectives, direct relevance to ICT domain, and the ability to expand from a local setup to a scalable online platform. It not only promotes learning through competition but also shows how ICT skills can be applied to create impactful, real-world solutions.