



Independent University, Bangladesh

Game Development of Ludo Club

Ulka Games Ltd

Subsidiary of Moonfrog Labs Pvt Ltd. (India)

An undergraduate internship report submitted by

Jisan Haider Joy (1731447)

Bachelor of Science

in

Computer Science

Department of Computer Science and Engineering

Autumn 2021

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Game Development of Ludo Club At Ulka Games Ltd

An undergraduate internship report submitted by
Jisan Haider Joy (1731447)

Has been approved on --/--/--

Sanzar Adnan Alam

Internship Supervisor & Lecturer

Department of Computer Science and Engineering

School of Engineering and Computer Science

Independent University, Bangladesh

Letter of Submission

18th January 2021
Sanzar Adnan Alam
Lecturer,
Department of Computer Science and Engineering
Independent University, Bangladesh

Subject: Letter of Submission for Internship Report, Autumn 2021

Dear Sir,

This is to inform you that with due honor and respect, I, Jisan Haider Joy (ID: 1731447) from Internship Course of Autumn 2021, Section 9, would like to submit my Internship Report. This report is based on my internship program and the project I have worked on. My Internship was conducted from 1st November 2020 to 15th January 2021 and it has been completed at Ulka Games Ltd.

This report is based on my experience and the work I did at Ulka Games Ltd during my internship program. The primary objective of this internship was to gain experience from the industry experts in the field of Game Development, including research and development, documentation, software development, and to get acquainted with software development process and practices.

Over the period of my internship at Ulka Games Ltd, I had to learn and adapt to the evolving technologies being used in different situations and requirements and to be able to apply them in real life projects.

I hope the following report can achieve your approval and is adequate.

Sincerely,
Jisan Haider Joy, 1731447
jisan@moonfroglabs.com

Acknowledgements

First and foremost, I would like to thank Almighty Allah for giving me the endurance and the ability to work hard. It is my privilege that I had the opportunity to do an internship in the Ulka Games Ltd. I would like to thank all the people who helped me to carry out my internship.

I express my deep gratefulness to my supervisor Sanzar Adnan Alam, Lecturer, Department of Computer Science and Engineering, Independent University, Bangladesh, for his invaluable guidance, constructive criticism and thoughtful advice during pursuing my internship and preparation of this report.

I also want to express my gratitude to my mentor Mr. Inderpal Singh (General Manager, Moonfrog Labs) andt my external supervisor MD Rezaul Hasan Evan (Project manager, Ulka Games Ltd) for giving me the opportunity to be a part of this Game. Their support and guidance were the driving force behind the project.

Finally, I proudly acknowledge the great sacrifices, good wishes, moral support, fruitful advice, inspirations and encouragements from my family members, relatives and friends.

Jisan Haider Joy

January, 2021



Abstract

With the development of so many fun and addictive games out there in the mobile application market, people are spending more time on their phones than ever. While this does seem like a good way to spend the time, A lot of work goes into making these games. Ludo Club, by Moonfrog Labs, is one of the top games that went viral during this pandemic. With 50million+ Installs and DAU ~4.5m, they went into the top charts in mobile games.

I have been lucky enough to work on a game at such scale. In this internship report, Development of Ludo Club game, it's scope, objectives and other analytical points will be discussed. The company profile of Ulka Games (A subsidiary of Moonfrog Labs) will also be addressed.



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Introduction

Game Development is the art of creating games and describes the design, development and release of a game. It may involve concept generation, design, build, test and release. While someone creates a game, it is important to think about the game mechanics, rewards, player and engagement and level design.

Background

With the development of so many fun and addicting games out there in the mobile app market, people are spending more time on their phones than ever. This can be a good way to spend the time in situations like Covid pandemic, where we are all stuck at home and need some social recreation virtually.

Ludo is a strategy board game for two to four players, in which the players race their four pawn from start to finish according to the rolls of a single dice. Ludo is derived from the Indian game Pachisi, but simpler. The game and its variants are popular in many countries and under various names.

The Ludo Board has 4 bright colored sides, Yellow, Green, Red and Blue. Each player is assigned a color and has four pawn of that color. The board is normally square with a cross-shaped playspace, with each arm of the cross having three columns of squares, usually six per column. The middle columns usually have five squares, which is represented as the player's home column. A Sixth Coloured Square not on the home column is a player's starting square. At the center of the board is a large finishing square.

The rules are very simple. Each player has to roll a dice. On every 6, the player can start out with his puck, and will get a bonus roll again. On every other roll, the player will try to keep on moving towards the center square. One player can kill another player's puck, if they fall on the same square.



Objective

- **Join Online Games** - The game allows players to play online games with Friends/Random. Any ludo player can also join/create a match by sharing a private table code with their friends and family.
- **Entry Fee** - There is a bet amount, using which player will be able to join a match with another player of similar rank and same bet amount. Player who wins will get the largest chunk of the bet, and in case of four players, the 2nd player will also get a small portion.
- **Dice Roll** - The game has dice rolls that lets the player move their pawn.
- **Pawn Movement** - Once the player rolls the dice, he/she can move the available pawn on the playing squares and also the move has to be valid based on the overall game rules.
- **Emoji & Chat** - While in the game, the players will be able to send Emojis and Chat with each other to make the game social. A player will also be able to add another player as Ludo Friend.
- **Friends** - Once connected to Facebook, players will be able to see the status of their friends who played this game connecting to facebook. Also Ludo Friends is an added feature to play with friends made in Ludo Club.
- **Inventory** - Adding Dice/Frames/Emoji as collectibles, the game is made more interesting. They can be bought through collected coins from the game.
- **Gift** - An In-game feature that allows users to send Gifts to other players in the match using in-game currency.
- **IOS/Android Platform** - A Cross platform game available on both Play Store and App Store.



Scope of the Project

As this has been a game that was already there in the production, Almost many features were already there available to the users.

Features/Tasks that were associated with my internship are:

- **Gift Feature**
- **IOS Porting**
- **CPU Performance Analysis**
- **Bug Fixes**

Company Profile

Overview of Ulka Games Ltd

Ulka Games Ltd is one of the valuable software companies in Bangladesh. It is a game development studio, where your ideas count, where your determination creates a new world, where your talent and hard-work are rewarded. At Ulka Games Ltd we always endeavour to lead towards development and creating a flexible, dynamic and cooperative team culture. Ulka Games Ltd is one of the promising game development studio of Bangladesh which aims at creating a new standard in the era of software technology.

Company Profile of Ulka Games Ltd

Founded in early 2019, Ulka Games Ltd (UGL) is the fastest growing game development studio in Bangladesh. UGL focuses on Card, Board and Casual mobile games for South Asia. UGL is committed to the development of the Game industry of Bangladesh.

ULKA GAMES LIMITED has 45+ passionate game professionals and are constantly looking for great talents to join our team. We are part of Moonfrog Labs Private Limited, India's and south asia's one of the top game development studios.

Combinedly we own IPs like Teen Patti Gold, Ludo Club, Adda, Alia Bhatt, Bahubali, Jalebi and many more. Moonfrog was formed in 2013 and raised USD 15M+ from world's top two VC firms Sequoia Capital and Tiger Global.

Mission, Vision, Value:

We believe the Indian market is the best opportunity in the world right now. The number of Indians with Internet and smartphone access is skyrocketing year after year. This puts Moonfrog at a multi-point advantage. As industry legend, Mark Skaggs, likes to say, “Moonfrog knows India.”

Our flagship hit Teen Patti Gold has been downloaded more than 20 million times and features among the top five highest-grossing games in India on both Android and iOS. In 2017, Moonfrog developed and launched games for two huge Indian IPs — Baahubali: The Game and Alia Bhatt: Star Life.

What more? We are backed by two of the world’s biggest investors — Sequoia Capital and Tiger Global. We expect no less because as you’ll learn, the Moonfrog Executive Team has its roots in deep gaming, product development and technology.

We have seen, bitten, lived and played hard enough to know the magical revolution a brilliant mix of product design, disruptive platforms and technology can bring about. We're the team who has worked on Mafia Wars, CastleVille, Bubble Safari, Cafe World, Yoville, Hidden Chronicles, Empires & Allies, games loved by hundreds of millions of people. At Moonfrog labs, we intend to squeeze our collective experience from building multiple #1 game on Facebook into Mobile with creative new products and tools.

Product and Services:

Game Development: Our passionate game professionals are very experienced in developing Ludo Club, Teen patti, 2D like Word Battle, Knife, Adda, 29 Card, Poker, Hazari, and so on.



Literature

Introduction

Game Development is the art of creating games and describes the design, development and release of a game. It may involve concept generation, design, build, test and release. While you create a game, it is important to think about the game mechanics, rewards, player engagement and level design.

A game developer could be a programmer, a sound designer, an artist, a designer or many other roles available in the industry.

Undergraduate Courses related to the Project

- CSC 101 (Introduction to Computer programming)
- PHY 101 (University Physics-I)
- CSC 201 (Discrete Mathematics)
- CSC 203 (Data Structure)
- CSC 305 (Object-Oriented Programming)
- CSC 306 (Algorithms)
- CSC 405 (System Analysis & Design)
- CSC 445 (Software Engineering)

Related Works

Coding – To implement the game needs lots of codes, without having any introductory programming knowledge no one can write code that I have gained from CSC 101 course.

Data Structuring – A project has lots of different categories of data which need to be structured properly. In this project, CSC 203 and CSC 305 courses' knowledge helped me to structure this project data in a good



Game Logic – Without valid logic no application runs properly. For better understanding of game logic, the knowledge of CSC 201 is applied here.

Logic Application – To implement any logic need to choose a write approach which is also called an efficient Algorithm. The knowledge of CSC 305 is applied here.

Project Management – To complete any project needs a proper management in workloads. The knowledge of CSC 445 is applied here.

System Analysis – Every system needs to be analysed. Hence, The knowledge of CSC 405 is applied here.



Methodology

A software development methodology or system development methodology in software engineering is a framework that is used to structure, plan, and control the process of developing an information system. There are several software development methodologies. Such as

- Waterfall Model
- Prototype Methodology
- Rapid Application Development
- Dynamic System Development Model Methodology
- Agile Software Development Methodology
- Spiral Model

We choose agile process as the methodology for this project. The Agile Methodology is based on iterative and incremental development instead of a linear approach. It does not build an entire system at once, but rather develops incrementally. Less time is invested upfront for documentation and analysis, as clients are constantly seeing and testing the product and providing feedback. The development and feedback process adds accountability (tangible milestones of completed work, not just documentation), and tends to improve client satisfaction by allowing ongoing input.



There are several reasons for choosing agile process.

Better product quality: Agile methods have excellent safeguards to make sure that quality is as high as possible by

- Taking a proactive approach to quality to prevent product problems
- Embracing technological excellence, good design, and sustainable development
- Defining and elaborating on requirements just in time so that knowledge of product features is as relevant as possible
- Incorporating continuous integration and daily testing into the development process, allowing the development team to address issues while they're fresh Taking advantage of automated testing tools in order to develop during the day, test overnight, and fix bugs in the morning.
- Conducting sprint retrospectives, allowing the scrum team to continuously improve processes and work
- Completing work using the definition of done: developed, tested, integrated, and documented



Higher customer satisfaction: Agile project teams satisfy customers by

- Keeping customers involved and engaged throughout the project.
- Having a product owner who is an expert on product requirements and customer needs.
- Keeping the product backlog updated and prioritized in order to respond quickly to change.
- Demonstrating working functionality to customers in every sprint review.
- Delivering products to market quicker and more often with every release.
- Possessing the potential for self-funding projects.

Customized team structures: Self-management puts decisions that would normally be made by a manager or the organization into scrum team members' hands. Because of the limited size of development teams – five to nine people – agile projects can have multiple scrum teams on one project. Self-management and size-limiting mean that agile projects can provide unique opportunities to customize team structures and work environments.

More relevant metrics: The metrics agile project teams use to estimate time and cost, measure project performance, and make project decisions are often more relevant and more accurate than metrics on traditional projects. On agile projects, you provide metrics by

- Determining project timelines and budgets based on each development team's actual performance and capabilities
- Having the development team that will be doing the work provide effort estimates for project requirements
- Using relative estimates, rather than hours or days, to tailor estimated effort to an individual development team's knowledge and



- Refining estimated effort, time, and cost on a regular basis, as the development team learns more about the project
- Updating the sprint burn down chart every day to provide accurate metrics about how the development team is performing within each sprint. Comparing the cost of future development with the value of that future development, which helps project teams determine when to end a project and redeploy capital to a new project.

Project Management

Work Breakdown Structure

The WBS is a method for getting a complex, multi-step project done. It is a way to divide and conquer large projects, so things are done faster and more efficiently. Work breakdown structure (WBS) is a hierarchical tree structure that outlines a project and breaks it down into smaller portions. The goal of a WBS is to make a large project more manageable. Breaking it down into smaller chunks means work can be done simultaneously by different team members which leads to better team productivity. Below is the WBS of “Ludo Club”



Gantt Chart

A Gantt chart has been produced to help plan and schedule project tasks. It helped assess how long the project should take, determine the resources needed and plan the order in which tasks will be completed. It also helped in managing the dependencies between tasks.

The Gantt chart was also useful for monitoring the project's progress once it has started. It helped in having a clearer vision of what should have been achieved by a certain time frame and when the project fell behind schedule; appropriate actions were taken to bring it back to course.

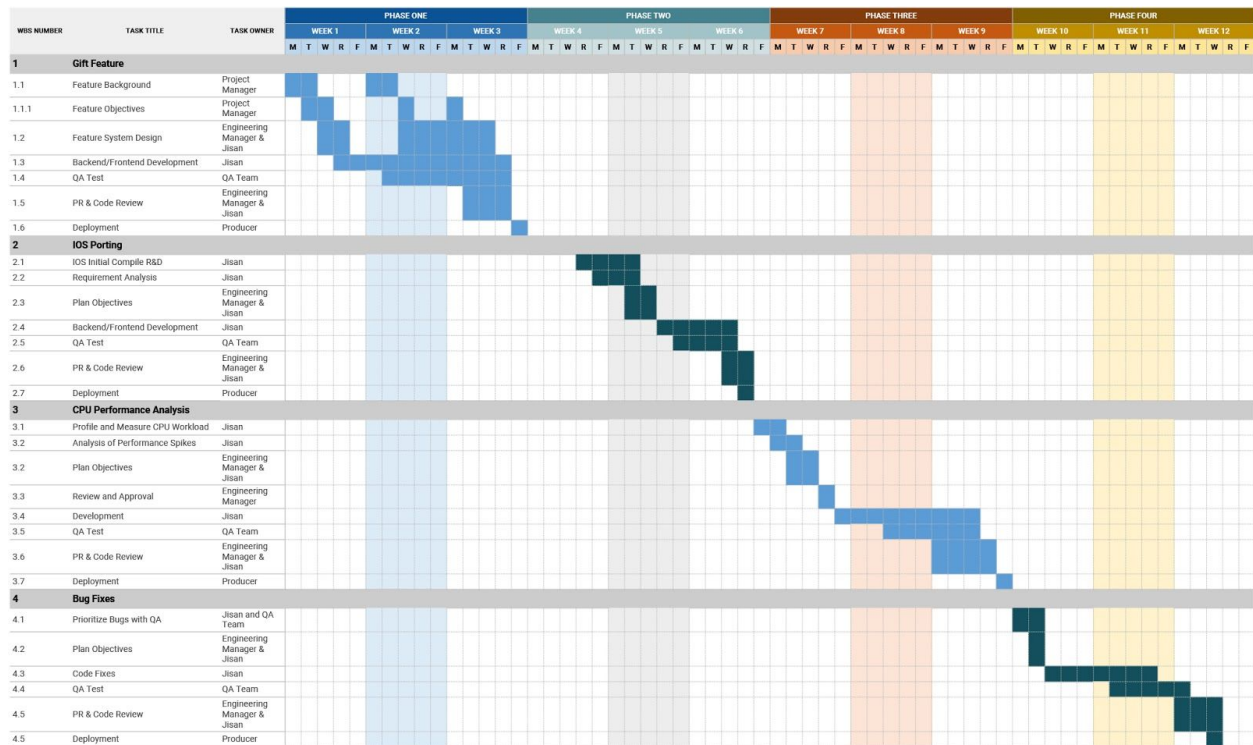
Below is the produced Gant chart for Features of "Ludo Club". Since the chart is quite wide, it proved difficult to input full names of the people for



Jisan Haider Joy - 1731447

Ludo Club - Fun Dice Game

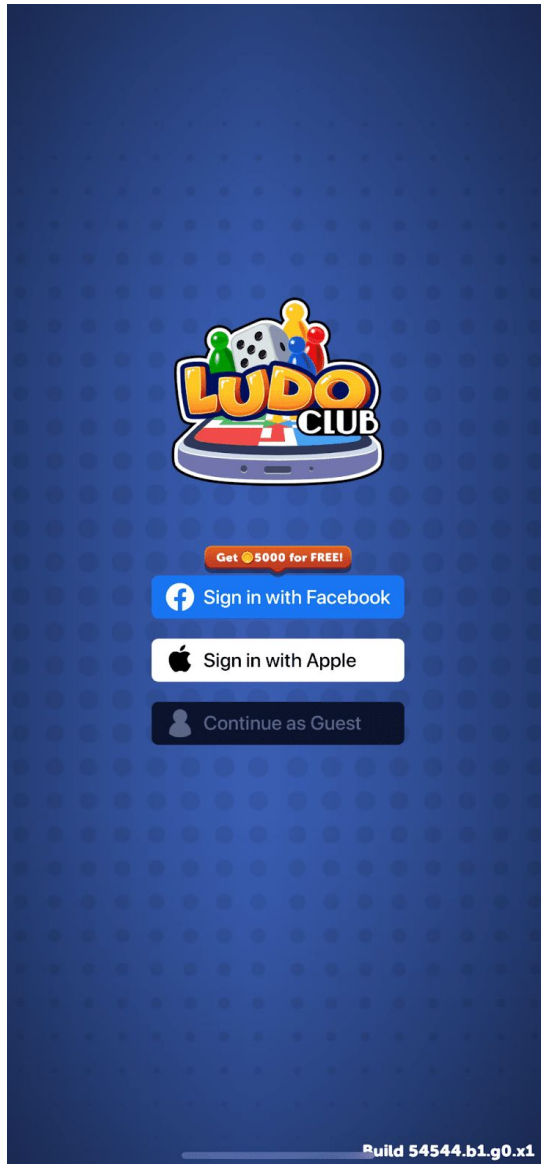
the “Designation” column and hence only designations of them were put.



Results

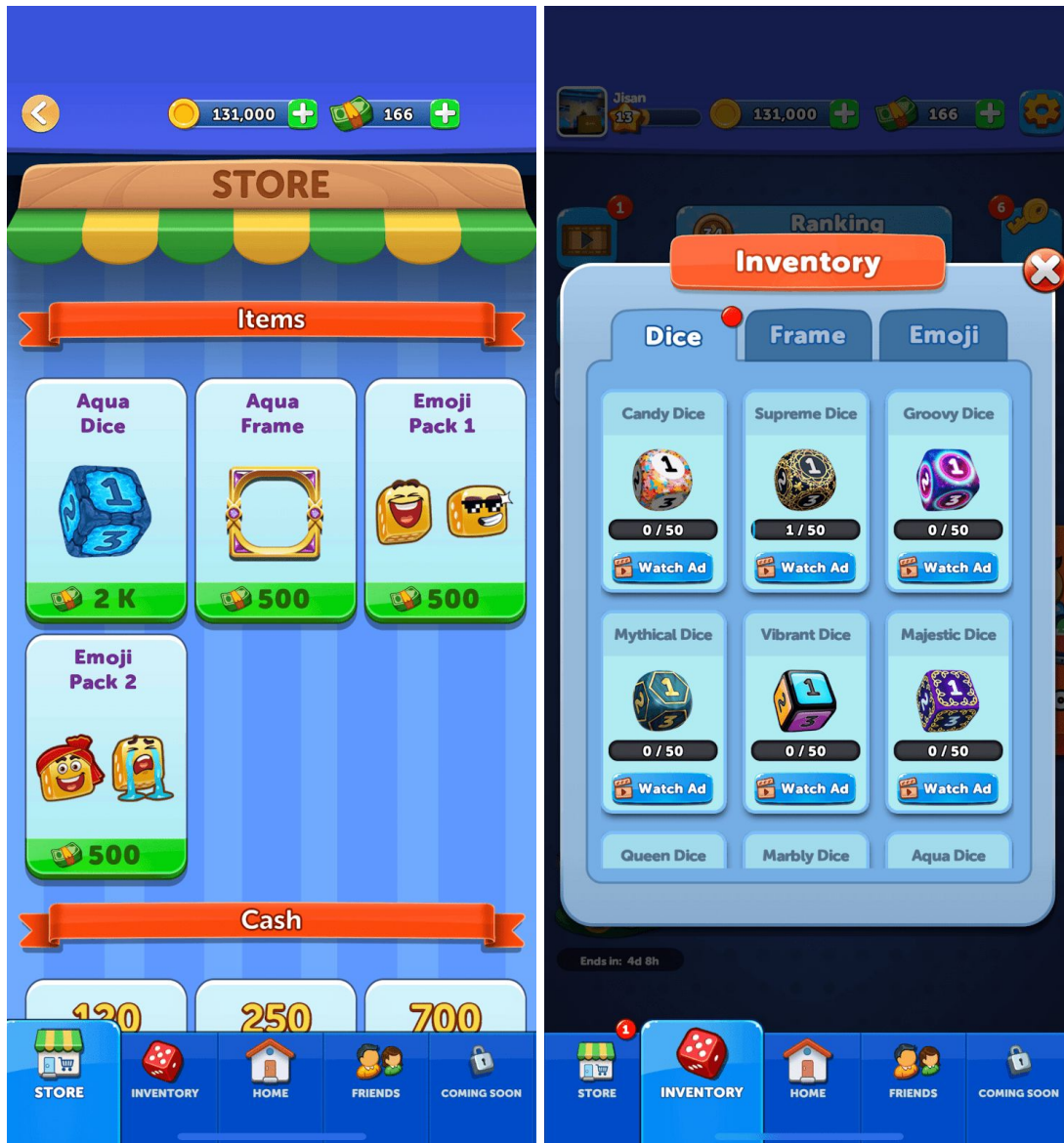
This chapter contains screenshots of the mobile application so it can be seen about how the actual application looks like:

- **Loading Scene** : In Loading Scene, the game will communicate with the server, and fetch user data for Auto Login, otherwise it will load the game and prompt the user for Login Methods.

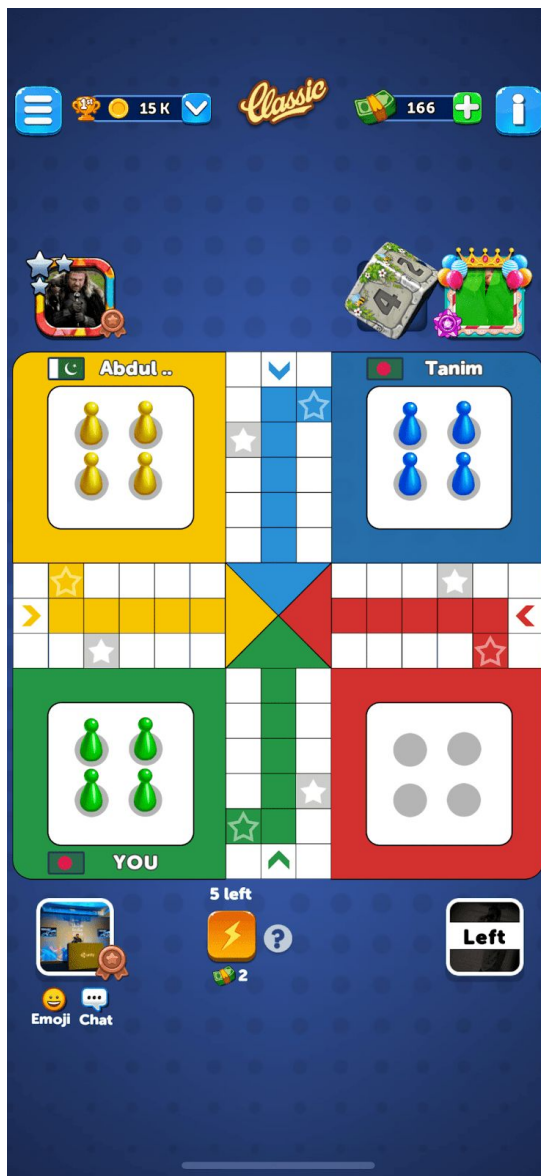


- **Lobby Scene** : Once a user has logged in, this is how the lobby looks. From here the player interacts with almost all the features of the game. Player can invite his/her friends to a match, join an online match, purchase dices/frames/emojis from inventory and store.





- **Game Scene** : Once a player enters a game, this is the game scene. Here the players play with their opponents/friends for coins.



- **Gift Feature** : In a game scene, this is how the gift feature popup looks like. From here a player can choose a gift which will be sent to



Jisan Haider Joy - 1731447

Ludo Club - Fun Dice Game

the other player in the match.



Engineering Problem Analysis

Sustainability of the product

The title explains the ability of maintaining the app and keeping it up to date, so that the users don't get bored, or face issues with bugs. Ludo Club is one of the biggest games in the Mobile application market, which has been in production for more than 2 years now. It has always been kept updated, and the game has a dedicated Customer Success Management team to make sure the users don't face any problems.

A product can be sustainable in three main categories:

- **Community Sustainability** : it means how much and how actively the users will support the project. Support comes in many forms such as downloading and installing the application, using the application, subscribing to paid services giving rating and feedback, referring to other people, etc.
- **Financial Sustainability** : This refers to how the application's running cost will be maintained, and whether it will generate enough revenue to maintain it's team.
- **Organizational Sustainability** : It relates to how the organization will continue to operate the application. Usually, an organization maintains the application via its team, an extended team or by a fresh new team. Also, organizations update their project by adding newer features to it and organization may pivot to other projects, expand the teams, create new teams, etc.

Ulka Games Limited, and Moonfrog Labs Pvt Ltd. manages such a Team for Ludo Club, therefore all above mentioned points are met. They make sure people are being entertained through our game without any issue. We try our best to make it bug free and better everyday.

Social and Environmental Effects and Analysis

Smartphones are popular among people for the applications they offer to users. Smartphones make communication with people quite easier. People enjoy a lot of benefits in various forms of their daily work. Some advantages smartphones provide - better communication, learning options to users, great exposure to the latest things, simple ways to access applications, ideas to succeed in business, platforms to grow their applications and more.

Ludo Club is made to bring the game that is there in our culture, into smartphones, and connect people virtually in the world of ludo.

Social Effect:

Ludo Club aims to connect people virtually through the game. People are now spending more time with their friends and family, through this game. This has its own social impact. During this Covid-19 situation, people were locked in their home, with no means of outside communication. In that time, Ludo Club provided a way for people to enjoy with their family virtually.

Environmental effect:

Ludo Club is just a game to entertain people, which has no direct aim to harm the Environment. In fact, this doesn't have any relation with being affecting the environment in any way.