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Programme: BSc. (Hons) Software Engineering.

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Group work: please list all names of all participants formally associated with this work and state whether the work was undertaken alone or as part of a team. Please note you may be required to identify individual responsibility for component parts.

Group Coursework (C1)

10898469 - Kusal Gedara. (Overview / Introduction).

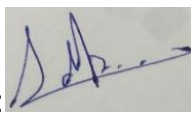
10898546 - Chamath Liyanaarachchige. (Application Features and Description).

10898561 - Samarasinghe Methmal. (Target Users and Content Editor).

10898579 - Nishshanka Niwunhella. (Time Frame).

10899707 - Peyahandi Silva. (Objectives).

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## **Overview / Introduction**

We are building a chess game that consists of augmented reality and multiplayer functionality as a core system. “AR Chess” is an educational game that consists of standard chess rules, except it utilizes AR technology to make it an immersive experience. It is primarily aimed at new players of chess as it can teach them how to play chess with other players while offering real-time advice on making the right moves.

On top of that AR Chess will provide real-time multiplayer to play among other players in a lobby, utilizing the Unity game Engine and the open-source Fishnetworking library to handle the networking backend. So players do have the capability to play with a friend or anyone they wish to battle.

Compared to popular chess games that are already available, our game is immersive and can be utilized as a learning tool to help new players improve cognitive functioning as chess is an educational game. Popular chess platforms are severely dominated by professionals in chess, so it would demotivate a lot of players causing them to quit. Our platform trains the players and gets them into a mindset where losing is okay as it will show an end summary of where exactly they went wrong. The system will analyze the data and form a showcase of the post-match details to help the player improve on their mistakes.

Unlike other chess platforms, AR Chess will have better visuals and sound design to work well with how AR makes our game immersive. The user will have options that they can tamper with to customize their experience. The game will be optimized for current-gen and previous-gen hardware so there can be a larger player base.

Furthermore, AR Chess will also consist of additional accessibility options to help players that have disabilities so that everyone can play.

## **Objectives**

- Providing an application to chess enthusiasts that they can play chess getting exposed to Augmented Reality Technology.
- Make playing chess immersive with the aid of AR technology to keep the players engaged and enhance the player's experience.
- Enhancing the application so that people with visual impairment issues can be comfortable with using it and everyone can use the application regardless of the disabilities they have giving access to almost everyone.
- Implementation of real time multiplayer functionality in the game to allow the users of the application to play as a team or with their friends.
- Allowing users to Learn standard chess rules while playing the game. The players will receive feedback and real-time insights to improve on.
- Developing a game which is healthy and useful for the majority of people, especially students, to train their brain by dealing with activity which boosts problem solving and logical thinking abilities.

## **Target Users**

- **Students of all ages:** Our platform primarily targets students of all ages who find it difficult to learn the game of chess from common traditional methods such as online documents, tutorials, books and websites. We primarily target students as it is a learning platform, according to research studies we carried out shows that augmented reality is more popular among students than other age groups of users, who can take the higher advantage of it to improve their learning outcomes which builds confidence (Chen, et al., 2018). This platform

motivates students to learn the game of chess, which can improve their cognitive, academic performance, and social skills (Bilalic, et al., 2018).

- **Chess enthusiasts of all skill levels:** This platform can be used by users who are already familiar with the concept of chess and users who are willing to improve their skills furthermore. This platform will not be limited to specific user groups, since it can be used regardless of skill level. Our main motive is to promote this platform to people who have a desire for self-improvement.
- **People with disabilities:** We also have targeted users with certain disabilities to promote our platform, such as users with visual impairment and hearing disabilities where our platform removes the barrier of learning and creates a safe and fun environment which is an effective way to learn chess than ignoring people with special needs because of their disabilities.
- **Families and friends:** People can use this platform for entertainment purposes, which can bring friends, families together, and anybody who loves chess can connect together and enjoy.
- **Educators:** There will be educational features on our platform to educate students and other users about competitive chess game standards. Primarily it can be used in classrooms, chess clubs, organizations and communities so that tutors can educate their students. We as a team believes that the use of augmented reality would be a modern and innovative way to create interest among learners in an immersive three-dimensional (3D) experience that can help to improve their visualization skills easily, which will lead to a better gameplay of chess.
- **Gamers:** This platform can be used by gamers to play which will be a new level of experience with augmented reality brought into play which we can target

them for marketing of this platform. We are planning to promote this platform through social media pages and gaming websites for more user interaction.

We as a team believes that our platform will help all kinds of user groups who are passionate and has a noble intention of mastering the game of chess, bringing them all together by aiding modern augmented reality technology of teaching the concept of chess.

## **Application Features and Description**

### **Single and multiplayer matches**

- Our chess platform allows players to engage in both single and multiplayer chess matches. In single-player matches, players can challenge A.I opponents of several difficulties.
- In multiplayer, players can challenge friends and other users online through a match-making system. A player scoring system will determine the matchups.

### **Analytics Mode (Learning)**

- This is a special mode that allows players to analyze the ongoing matches and help determine the actions they should take. This mode will allow new players to learn and master chess.
- The analytics mode will allow players to also go through matches they have already finished and receive statistics about the mistakes and misses they made and how they can improve.

- This mode can also be used on a real chessboard. By using the camera, the application will scan the ongoing chess game and analyze the match, giving players statistics and guidance with the help of an A.R overlay on the chess board.

### **Player Rating**

- Players will be rated on their skill during both singles and multiplayer matches to allow more skill-based matchmaking.

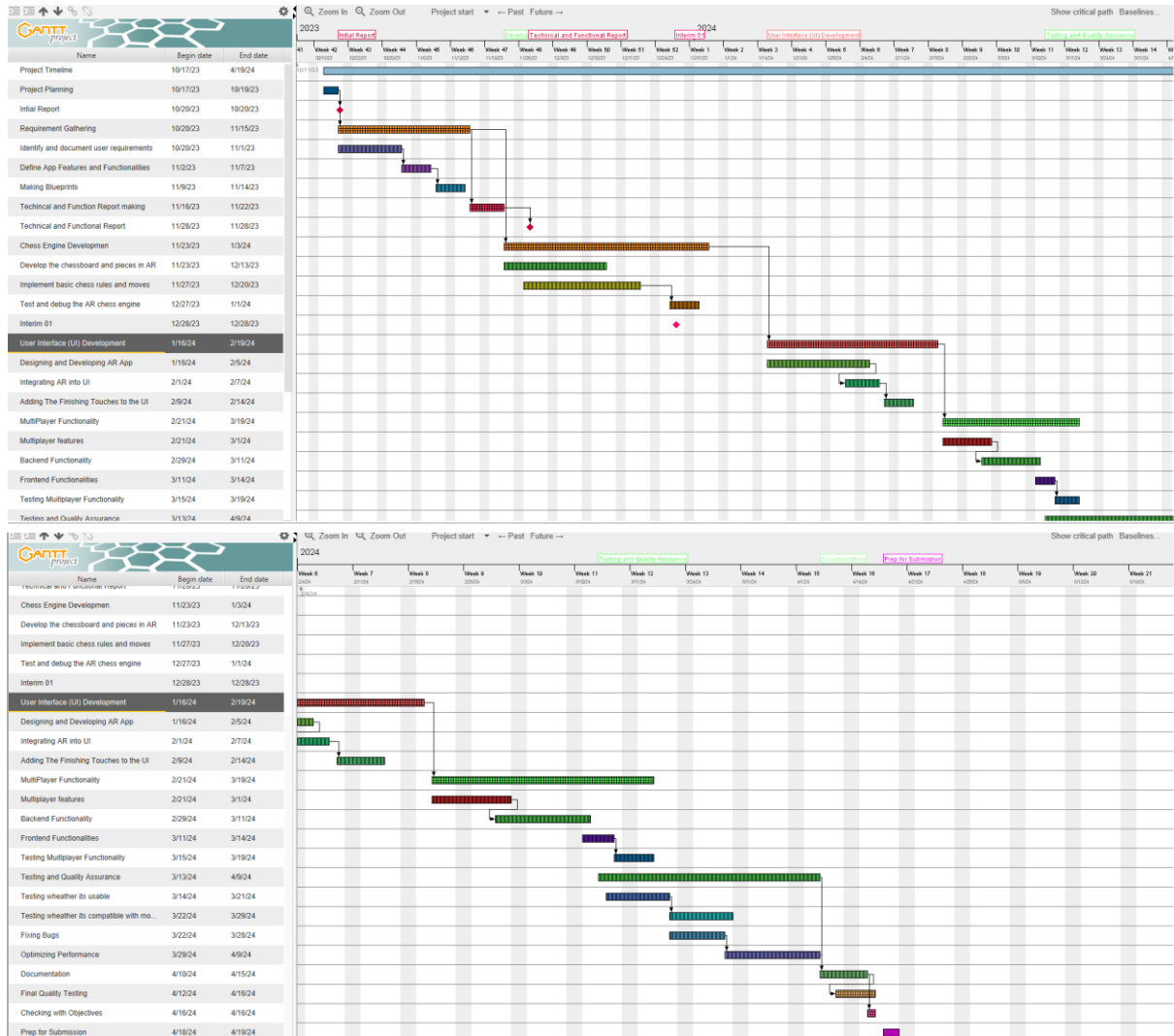
### **Player Profiles**

- Every player will be able to create a profile and connect with friends. The player profile will also contain details about past matches and the player's chess score.
- Players will be able to search for other players using their username. And view their profiles for statistics.
- Players will be able to sign up and login using their email and password.

### **Accessibility**

- For users with visual impairments, the application will have settings that highlight chess pieces and also enlarge them.
- The application will have an audio description to make it easier for players with disabilities to navigate through the menus.

# Time Frame



Note: Enlarge the figure of Gantt chart for a clear perspective or visit the link below.

Link: Click her for a better look at the [gantt chart](#)



## **Bibliography**

- Bilalic, M., Guilford, A. & Martin, G., 2018. The benefits of chess for students: A systematic review. *Educational Psychology Review*, 30(1), pp. 233-257.
- Chen, W. H., Cheng, S. F. & Tsai, C. C., 2018. The use of augmented reality in education: A systematic review. *Educational Technology & Society*, 21(1), p. 14.

## **Workload Matrix**

<b>Student ID's</b>	<b>Names</b>	<b>Workload</b>
<b>10898469</b>	Kusal Gedara	Overview / Introduction.
<b>10898546</b>	Chamath Liyanaarachchige	Application Features and Description
<b>10898561</b>	Samarasinghe Methmal	Target Users
<b>10898579</b>	Nishshanka Niwunhella	Time Frame
<b>10899707</b>	Peyahandi Silva	Objectives

## **Group Details**

<b>Student ID's</b>	<b>Names</b>	<b>Leadership Roles</b>
<b>10898469</b>	Kusal Gedara	Programming Leader
<b>10898546</b>	Chamath Liyanaarachchige	Technical Leader
<b>10898561</b>	Samarasinghe Methmal	Quality Leader
<b>10898579</b>	Nishshanka Niwunhella	Project/Group and Planning Leader
<b>10899707</b>	Peyahandi Silva	Testing and Maintenance Leader