Game Design Document

Section 1 - Game Overview

1.1 Game Title:

a. Cyber Security Card Game

1.2 Game Genre:

a. Card Game
b. Educational

1.3 Game Perspective:

a. Orthographic 3D

1.4 Game Mode(s):

a. Single-player
b. Multi-player

1.5 Target Audience:

a. Anyone willing to learn about cyber security or try out a cool card game

1.6 Core Idea:

a. Serious game implementation to make learning fun where players can relate to situations in the game to real life.
b. No prerequisite knowledge is required, the player will be able to learn everything through the game itself.
c. Covers major scenarios instead of focusing on one or a few such as Phishing and its types, Malwares, Web based attacks, Denial of Service, Ransomwares, Identity thefts, Physical manipulation, Password attacks and Man-in-the-middle attacks.
d. Covers both attack and defence strategies equally allowing players to think from the mindset of an attacker as well as a defender which helps the users to learn more.

e. Making learning fun by gamifying it and opening it up to a much broader audience than it would normally reach, this helps spread awareness about cybersecurity and keeps users safer than they would normally be without knowing the risks and countermeasures.

1.7 Goal:

a. The main goal is to develop a cross platform card game application which will help spread awareness about various cyber-attacks and measures and defense to be taken against them.
b. To learn, understand and implement the concepts of Game Design and cross platform Game Development softwares.
c. To Spread awareness about cybersecurity in a fun intuitive way which appeals to the masses.

Section 2 - Game Flow

2.1 Login

a. The user is required to login using an email ID and password or alternatively the user can sign in using google on android.
b. If the player doesn't already have an account, they can choose to sign up and register instead.
c. This is achieved using Firebase to authenticate users and store their login information such as email ID, password and username.

2.2 Main Menu

a. After the login/signup process, the user is taken to a main menu where they can control the game settings, start the game, view tutorials or quit the game.
    i. Level 1 Tutorial Button - Starts the tutorial for level 1.
    ii. Level 2 Tutorial Button - Starts the tutorial for level 2.
    iii. Play level 1 Button - Loads the game for level 1.
    iv. Play level 2 Button - Loads the game for level 2 if it has been unlocked by playing level 1.
    v. Manual Button - Displays the manual for various cyber security terms used in the game.
    vi. Logout Button - Logs the user out of their account, the user needs to log in to access the menu.
    vii. Settings Button (Icon) - Opens the settings section where the player can control volume options.
    viii. Quit Button(Icon) - Quits the game.

2.3 User Profile

a. In the main menu, the user may click on the default profile image and select another profile image if they so desire.
b. The user can also view various stats like high score and points needed to unlock level 2 in the same panel.

2.4 Tutorial

a. When the menu loads, the player can choose to view the tutorial for level 1 and for level 2 once he unlocks level 2.
b. Level 1 and level 2 each have their own separate tutorial that introduces various aspects and differences between the two.
c. Tutorials for each level can also be accessed from within their respective settings panels.

2.5 Level 1

a. Level 1 is a single player implementation of the game and aims to teach the player about various attacks and defenses that can be used and to educate them about cybersecurity attacks and countermeasures.
b. In this level, the player will play against the system that generates scenario's in the form of a scenario card, the player will then need to select the correct attack card first before moving onto finding the correct defense card from the deck of cards in order to increase their score.
c. The player will need to increase their score enough to unlock the next level of the game.
d. Points to unlock level 2 = 200.
e. Points gained every correct answer = 5 * streak multiplier.

2.6 Level 2

a. Level 2 is a multiplayer implementation of the game which aims to make the game more competitive by having a player face off against another.
b. Level 2 is a turn based implementation with a timer that forces a player to think on their feet and figure out the correct answer quickly.
c. Level 2 introduces a health bar which is reduced on every wrong card played by the players.
d. There is no scenario card in level 2, instead we use an asset card like a phone, computer or wifi.
e. Asset cards act like a category and have their own unique attacks and defenses that can be played based on the active asset card.
f. Every round, the attacker plays first and can select any attack card since there is no wrong attack without a scenario card.
g. The defender plays second and has to find the correct defense card for the played attack card by the attacker within the time limit.
h. Correct defense increases the score while a wrong card reduces the players health bar.

i. Should a player's health bar reach 0, they lose while the last person standing is considered the winner.

2.7 Chat

a. While playing level 2, users can chat with each other in real time by clicking on the chat icon, typing and sending messages.
b. This increases interactivity and makes the game more fun to play.
c. Be careful not to take too long tho or you could miss your turn!

2.8 Game End

d. When the game ends, the players are shown their respective scores and the winner, from there they return to the main menu where they can compete against each other again or practice some more in level 1 to upskill their knowledge and gain insight.

Section 3 – Game Data

3.1 Level 1 Card Pairings data.

Scenario	**Attack**	**Defence**
Ads	Drive By Download	Ad Blocker
Amazon	Smishing	Spam
Netflix	Vishing	Block
Bank	Phishing	Phishing
Cafe	Man in the middle	VPN
No Service	DoS	Firewall
Funds	Man in the middle	VPN
Internet banking	Theft	Password
Locked	Ransomware	Backup
Lottery	Phishing	Phishing
Intranet	Network Attack	Firewall
Netbanking	Man in the middle	VPN

Outdated	DoS	Update
Passwords	Theft	Password
Printout	Theft	Clear Browsing History
Remind later	Clickjacking	Ad blocker
Subscriptions	Malware	Antivirus
Unscanned	Malware	Antivirus
USB	Ransomware	Removable Devices
WiFi Password	Man in the middle	WiFi

3.2 Level 1 Card Hints

Scenario	Attack	Defence
Ads	Drive By Download Hint: “Ask yourself, did you download these files?”	Ad Blocker Hint: “You want to stop these unwanted ads, what tool will you use?”
Amazon	Smishing Hint: “You cannot be sure that the source, for example, ‘JK-AMZN’, is legitimate”	Spam Hint: “Would you click on a link or enter personal info in any unauthorized link?”
Netflix	Vishing Hint: “Scammer calling”	Block Hint: “Hear no evil”
Bank	Phishing Hint: “Something smells fishy about this email”	Phishing Hint:”Would you provide your sensitive information to any unknown source?”
Cafe	Man in the middle Hint: “Someone could be eavesdropping”	VPN Hint:”Having some privacy is better”
No Service	DoS Hint:”Where’s all this traffic coming from?”	Firewall Hint: “Strong walls protect strong organizations”
Funds	Man in the middle Hint: “”Hello to you and the	VPN Hints: “Learn the art of

	ghost around”	deceiving”
Internet banking	Theft Hint: “Beware of pickpockets”	Password Hint: ”Your password needs to work out. It’s too weak!”
Locked	Ransomware Hint: “You wouldn’t WannaCry”	Backup Hint: “How will you access your data if you don’t want to pay the amount?”
Lottery	Phishing Hint: “Hanging by a hook?”	Phishing Hint: “Don’t accept gifts from strangers”
Intranet	Network Attack Hint: “How would the information be leaked, if no one from your organization has done it?”	Firewall Hint: “Imagine a barrier to stop intruders from gaining access to your network”
Netbanking	Man in the middle Hint: “Walls have ears”	VPN Hint:”I am not who I am”
Outdated	DoS Hint:”Response timeout : too many queries”	Update Hint: ”What’s new? Run along!”
Passwords	Theft Hint:”One key to all the rooms in the house”	Password Hint: “What’s wrong with this password - pass123?”
Printout	Theft “Someone could take away your personal data”	*****Clear Browsing History Hint: “How will you ensure that your login email & passwords are deleted from the system?”
Remind later	Clickjacking Hint: ”To click or to click?”	Ad blocker Hint: “Ads are meant for televisions”
Subscriptions	Malware Hint: “Nobody likes a can of worms.”	Antivirus Hint: “Appoint security guards”
Unscanned	Malware Hint: “You never know whether the software is	Antivirus Hint: ”How can you prevent this “viral” software from

	completely safe or not”	harming your system”
USB	Ransomware Hint: ”You may have to pay the price for freedom”	Removable Devices Hint:”Clear security check before boarding the plane”
WiFi Password	Man in the middle Hint:”Someone is watching you”	WiFi Hint:”Bandwidth is limited; use it alone.”

3.3 Level 2 Card Pairings data.

Asset: Wifi

Attack	Defence
Unauthorized access to WiFi	Password protected router
Carry out transactions over public WiFi wherein the data is transmitted “in the open”	Ensure the router you’re connecting to has at least WPA2 encryption
Connect to unsecured public WiFi with unsecured file sharing	Ensure file sharing is disabled when connecting to a public WiFi
Identify the type of router and exploit known vulnerabilities	Change the SSID to something unique, other than the manufacturer’s SSID
Tap in to the WiFi to monitor network traffic	Install a firewall
Monitor packets on public WiFi network to steal sensitive data	Ensure using a VPN when sending confidential data over public WiFi
Exploit vulnerabilities on outdated access point software	Make sure the access point software is up to date
Get access to private WiFi by cracking the password via dictionary attack	Make sure the password is random, at least 8 characters long, has uppercase and lowercase letters, special characters, and is a mixture of letters and numbers.
Denial of Service Attack	Install a firewall and configure the router to limit the amount of traffic
Set up a fake wireless access point to impersonate a legitimate network	Don’t connect to or perform any confidential activities on unsecured routers. Only visit HTTPS websites on open networks.

Asset: Phone

Attack	Defense
Phone stolen	Change account credentials/Wipe the data
Malicious Softwares	Install Anti-Virus tools and Firewalls
Vulnerabilities in the OS of the phone	Do not root or Jailbreak the device
Vishing(phishing voice calls)	Don't give personal information on the call and block the number
Smishing(phishing via SMS/MMS)	Block the sender and don't take any action suggested in the SMS
Network Spoofing	Be careful when connecting to a Public Wifi Network and always use unique passwords
Spyware/Stalkerware	Use Anti-Malware tools
Drive-By Downloads	Install Ad-Blockers
Virus/Trojans	Make sure that the phone software is updated to the latest security updates
Browser Exploits	Avoid using unverified extensions

Asset- Computer

Attack	Defense
1. Denial of service (Dos) & Distributed denial of service (DDos)	Place servers behind a firewall configured to stop inbound SYN packets.
2. Man-in-the-middle	Implement Virtual Private Networks.
3. Phishing and spear phishing	Hovering over the links, Analysing the email headers.
4. Drive-by attack	Keep the browsers and operating systems up to date, link less plug-ins.
5. Password attack	Implement an account lockout policy that will lock the account after a few invalid password attempts.
6. Cryptojacking	Install an ad-blocking or anti-crypto mining

	extension on web browsers. Incorporate the cryptojacking threat into your security awareness training, focusing on phishing-type attempts to load scripts onto users' computers.
7. Cross-Site scripting attack	Sanitize data input by users in an HTTP request before reflecting it back. Make sure all data is validated, filtered or escaped before echoing anything back to the user, such as the values of query parameters during searches.
8. Eavesdropping attack	Data encryption and best security policies
9. Malware attack	Use multiple, overlapping defense systems, including web security gateway solutions, firewalls, gateway antivirus, intrusion protection or detection, and website vulnerability with malware protection.
10. Torrent poisoning	Use VPN and download only from the trusted sources only.

Section 4 – Gameplay And Mechanics

4.1 Level 1 Gameplay (Singleplayer)

a. Level 1 is a single player implementation where the player will play against system generated scenarios and will have to select the correct attack or defense card from the deck of attack and defense cards.
b. A simple tutorial for level 1 can be found on the main menu or in the settings for level 1 itself.
c. When the level starts, a scenario card is generated and displayed to the user along with an attack card and a defense card.
d. The attack and defense cards are shuffled at the start of each scenario and can be spawned one at a time by clicking on their respective deck.

e. One card will be flipped and shown from the deck each time a user clicks on the deck (done by the user till he finds his desired card). *Online solitaire can be referenced for this :- https://www.youtube.com/watch?v=3a0mrhS094U (check the cards being drawn from the deck on the top left corner)
f. At the start of every round, the player has to find the correct attack card first by clicking through the attack deck until he/she finds the correct attack card, when the player thinks they have found the answer, they simply have to drag the card and place it into the attack card placement area which is colored the same as the attack deck.
g. Only after placing the correct attack card is the player allowed to move onto the defense deck and try finding the correct defense card next.
h. If a user gives an incorrect answer twice, they are shown a hint to help them find the correct card. If he fails to answer after the hint on the third try, the correct answer is shown to the user and we move on to the next round.
i. The hint can be reviewed again in case the player forgets and wishes to read it again, it can be toggled on by clicking on the '?' button next to the settings button at the top right side of the screen, this hint button is only accessible while the last attempt remains.
j. On answering correctly with an attack and defense card, the cards are reset and the next scenario is shown.
k. Scores :
    i. Points are given for both :- identifying the correct attack card, as well as identifying the correct defence card.
    ii. No points given if unable to answer at all.
l. Incentives given to the user :-
    i. Streak based incentives given in form of points
    ii. If a user answers two answers correctly in a row, the streak begins. Double points are earned by the user (2x).
    iii. After answering the third question correctly, the streak becomes 3x and triple points are earned by the user, and so on.
    iv. The streak will break after a question is answered incorrectly. And can start again after the user answers two consecutive answers correctly.
m. The level 1 can be considered completed once the user has collected enough points to unlock and play level 2.

4.2 Level 2 Gameplay (Multiplayer)

a. Level 2 is the multiplayer implementation where 2 players will face off against each other to test their knowledge about cyber security.
b. A simple tutorial for level 2 can be found on the main menu or within the level 2 settings as well, though you might not want to learn the tutorial while being attacked by your opponent.
c. This level introduces a health bar and introduces a new win condition for the players, i.e. the player that survives till the end and keeps their health above 0 wins the game.
d. It also introduces a time limit for each player to play their turn further raising the stakes and tension, this forces the players to think quickly on their feet and does mimic real life

where if your system is being attacked, you have a limited window of opportunity to either attack or defend against it.

e. Level 2 also replaces the scenario cards with asset cards, unlike scenario cards which have a fixed correct attack and correct defense, asset cards are more like a category which contains various possible attacks and defenses for a selected asset, for example a phone, a computer or your wifi router.
f. Due to this change, there is no wrong attack, the attacker can select any random attack he wants to play, he may even select an attack he thinks the opponent is least likely to know how to defend against.
g. When the game begins, in each round one player attacks while the other player defends.
h. Every round the attacker and defender swap their roles, i.e. if for round 1 - player A attacks while player B defends, then in round 2 - player B attacks while player A defends.
i. The attacker always plays his turn first, after the attacker places an attack card or the timer runs out, the turn then switches to the defender to figure out the correct defense for the attack that has been played by the attacker.
j. Should the defender play the correct defense, the attacker loses some of his health and the defender gains some score, while if the defense played is wrong, the attacker gains score and defender loses some of his health.
k. If the defender fails to play any card and the timer runs out, the defender will lose health and the attacker will gain score if the attacker played a card, if both attack and defense cards are not played, the turn simply ends and the next round begins anew.
l. There are no hints or multiple attempts in level 2, each player gets only a single attempt at placing the correct card, upon being placed the card is locked and the control switches to the other player, or in case both played then the round ends and the next round begins.
m. At the end when one of the players drops to 0 health, the game ends and the players are shown an end game screen where the winner is displayed along with both the players and their respective scores.

4.3 Level 1 unique mechanics

a. Level 1 uses the fisher-yates shuffle algorithm to shuffle the attack decks and defense decks in level 1 and is used to spawn the shuffled cards one by one when a user clicks on the respective deck.

4.4 Common mechanics

a. Custom layering system for 3D cards.
    i. We came up with a unique layering system that allowed us to use 3d game objects instead of ui to layer and display the cards.
    ii. All active cards are stored in an array.
    iii. The last active card to be touched/dragged/hovered over is moved to the top of the array stack and a relayer function is called.

iv. This function simply iterates over the array with all active cards sets their z-index or elevation to be index * 0.001f, that way each card is in a unity position and does not overlap but also has the last used card at the top of all the other cards for visibility and readability.

b. User data storage is handled by storing the data locally using a JSON format, this data is stored and retrieved at a persistent location and is converted to and from the json format to an object we can use ingame to read the score, and if level 2 is unlocked.
c. Gamemanager is a singleton class that holds this data that is read at the start of the game and can be updated and stored at any time, the game manager also handles loading scenes.
d. Audiomanager is a singleton class that deals with play any type of audio that is required, it holds all the audio files that will be used in the game, audio is split up into two types in our game, background music and sound effects.
e. Audio can be played anywhere in the game by simply triggering the audio manager's play function with the required audio's name so the manager can iterate through the sound array it holds and find the correct or matching audio file name to play.

4.5 Multiplayer mechanics

a. Photon unity networking 2 (PUN 2) is what we have used to implement the multiplayer part of our game.
b. Photon is a simplified networking solution which helped us achieve multiplayer, without this it would not be possible to implement all our systems in time since networking is a really complicated subject.
c. At its core, our networking can be further simplified into an event system.
d. Data is shared across the network via events raised on a user's device.
e. Each event has its own byte ID when being shared and received, when received we check the byte ID to figure out the type of data received and which event sent it so we can then apply some logic on it to do stuff in our game.
f. In photon, the first player to connect to the server is set as a master client and everyone else who follows is a normal client.
g. The master client controls the game session and handles important data like updating the timers to keep them consistent for every player's turn.
h. All other data is shared between both the players via network events that are triggered via script,
i. Example 1 -
    i. The attacker is dragging his card on his device and the card position is being updated in realtime on the opponent's device.
    ii. This is achieved by sharing the position data of the active card one device to another.
    iii. The function/event used to share data on drag is - UpdateCardPos(int cardID, DeckType attack/defense, vector3 newPosition)
    iv. The opponent receives this data and validates that he has the same active card on his screen and proceeds to update the position data of that card on his screen.

j. Example 2 -
    i. The attacker runs out of time and his timer hits 0.
    ii. The timer is controlled by the master client and is shared to all users.
    iii. When it's the attackers turn and the attacker fails to play a card and lets the timer hit 0, the function fired locally is - RaiseControlSwitch()
    iv. This event changes the turn from attack to defense and updates the active player to the defender while also resetting the timer on the master device so that the defender has the proper amount of time to play his turn.
k. This is how we have implemented multiplayer by using various events to share and receive data which we then use to make the game run smoothly.

Section 5 – Player Input Controls

5.1 Touch Input

a. The game uses Lean Touch, a simple touch input system which allows it to run the same, on mobile with finger touch as well on PC with the mouse input.
b. The game works with just 4 types of finger touch events which are:
    i. Touch Begin: fired when the finger first touches the screen or the mouse click starts.
    ii. Touch Drag: fired when a finger or mouse click is dragged across the screen.
    iii. Touch End: fired when a finger touch or mouse click/drag ends.
    iv. Tap: fired when the time between a touch start and end is small enough to be considered a tap.
c. In order to control which player can drag which type of card (attack or defense or none) based on the current turn, we use a layer mask system.
d. The cards have been assigned layers, attack, defense, none.
e. To disable a player's input (assuming it's the attackers turn and I am the defender) we simply set the defenders layer mask to ‘none’ so that he cannot affect any card until the turn switches to him and the layer mask is set to ‘defense’.
f. Layer mask is checked whenever a user tries to tap or drag a card, the play can only successfully affect a card if the card’s layer is ‘attack’ and his touch input is masked with the layer ‘attack’.
g. Single player uses a much simpler system where the user can only drag a card if the card is set to ‘canBeDragged = true’ in the card script.
h. Touch inputs occur locally, the opponents cards are updated directly via their position on screen, i.e. is a player moves a card from vector3(0,0,0) to vector3(5,5,5), that data is shared across the network and the same card is moved to the new position on the opponents device.

Section 6 – UI and Visuals

6.1 Fonts

a. All text in the game uses unity's TextMeshPro UI system which allows us to greatly customize text and even use 3D text on the cards.
b. Using TextMeshPro, we are able to set the color, size, alignment, pivot, and event format the text in various ways like bold, italic, underline, etc.
c. TextMeshPro also allows us to download google fonts and use them in the game.
d. External fonts we have used in the game are:
    i. Roboto - google fonts
    ii. Oswald - google fonts
e. Ready made fonts provided by TextMeshPro:
    i. LiberationSans
    ii. Anton SDF
    iii. Bangers SDF
    iv. Electronic Highway Sign SDF

6.2 Visuals

a. We have used simple UI provided by unity as much as possible while downloading a few public domain assets for a few icons and 2 background images from opengameart.org and pixabay.com
b. The cards used are actually simple 3D rectangles with a texture image modeled using an open source software called blender.

6.3 Level 1 UI elements

a. Integer score that displays a player's current score, this is displayed at the center top of the screen in single player.
b. Streak Multiplier, when a player is on a win streak, their score is multiplied by x2, x3, x4… as they keep winning until they get a wrong answer, this is displayed below the users score.
c. Penetration (attempts left) are displayed at the top left of the screen in the form of neon blue shields, lose all 3 and you lose the round, every time you answer incorrectly you lose one shield.
d. Hints are shown upon answering incorrectly twice, when you're down to just a single attempt left, a hint is displayed to help you figure out the correct answer.
e. Players can toggle a hint button next to the settings button on the top right side of the screen to view the hint again if they forget it and wish to review it again.
f. Settings button, opens up the settings panel where you can control the music and sound effects volume with a slider and has a button to trigger the tutorial.
g. Profile image that you selected at the center bottom of the screen to help distinguish your account from others.

h. Toast messages in the form of a small popup are displayed to inform the user of his actions such as ‘Correct Attack’ or ‘Wrong Attack’

6.4 Level 2 UI elements

a. Integer score that displays a player's current score, this is displayed at the center top or center bottom for both the players respectively
b. Streak Multiplier, when a player is on a win streak, their score is multiplied by x2, x3, x4… as they keep winning until they get a wrong answer, this is displayed below the users score.
c. Chat button to show the chat panel where users can send messages across the network to their opponent to communicate or… distract them?
d. Settings button, opens up the settings panel where you can control the music and sound effects volume with a slider and has a button to trigger the tutorial.
e. Profile images with the username and a health bar to indicate the players status during the game session.
f. Each user also gets shown a small text above or below their health bar stating if it's their turn to attack in the form of ‘PlayerX’s Attack’ or ‘PlayerX’s Defense’.
g. A timer is also displayed in the form of a countdown indicating the time left for a player's turn, it will be shown on the top or button depending on which players turn it is respectively, the profile image on top or bottom.

6.5 Login UI

a. Email ID input field for email id and password login, the email id inserted is validated against a email validation string to check if it contains all necessary elements for a valid email such as @ and .com, etc
b. Password input field hides text as it's supposed to, the only requirement from firebase is a minimum password length of 6 characters, it's up to the user to strengthen and create a strong password for their account.
c. Invalid fields are highlighted in red and their respective error message is displayed to the player as a popup.
d. There is a ‘sign in with google button on the top right for those who would like to use their google account to sign in on android automatically.
e. Login button on clicked grabs the text from the respective fields and validates them, if they are all validated, the data is then sent to firebase to be logged in if an account already exists.
f. Any error messages sent by firebase are displayed to the user such as ‘user with this email id does not exist’, error messages are generated and displayed even in cases where the fields are left empty or the email id format is invalid.
g. ‘Don't have an account? Register here’ line is actually a button with a transparent background that redirects the player to a registration screen if they click it.

6.6 Register UI

a. Email ID input field for email id and password register, the email id inserted is validated against a email validation string to check if it contains all necessary elements for a valid email such as @ and .com, etc
b. Password input field hides text as it's supposed to, the only requirement from firebase is a minimum password length of 6 characters, it's up to the user to strengthen and create a strong password for their account.
c. Passwords fields need to match the confirm password field exactly before a user can proceed to register their account.
d. Username field cannot be empty and is required to register a display name for the user across the game, it does not have to be unique as it is registered with a unique email id.
e. Invalid fields are highlighted in red and their respective error message is displayed to the player as a popup.
f. Register button when clicked, grabs the data from the respective fields and validates them, if they are all validated, the data is then sent to firebase to be registered with a new account if one doesn't already exist with the same login email id.
g. Any error messages sent by firebase are displayed to the user such as ‘user with this email id already exists’ , error messages are generated and displayed even in cases where the fields are left empty or the email id format is invalid.
h. ‘Have an account? Login here’ line is actually a button with a transparent background that redirects the player to the login screen if they click it.

Section 7 – Audio Features

7.1 Background music

a. We have chosen a public domain free background music that seems to work well with the game and does not distract the player from the game while playing it, the name of the audio track is kuia and it can be found at https://opengameart.org/content/kuia .
b. The background music runs on a loop during the level 1 and level 2 gameplay loop.

7.2 Sound Effects

a. There are 5 unique sound effects used for the gameplay of level 1 and level 2.
    i. Draw - played when the user draws a card from the deck by clicking on it.
    ii. Shuffle - played when a new scenario or round begins and the decks are shuffled and spawned into the game.
    iii. Playcard - this effect is played when a player places or plays a card onto the placement area in game.
    iv. Error - this effect is played when the placed card is incorrect and acts as feedback for the player to instantly realize that the card they placed is wrong.
    v. Winsound - this effect is played when the card placed into the card placement area is the correct card for that deck type and scenario/round, this acts as a

rewarding feeling and instantly notifies the player that the card place is indeed the correct answer.

7.3 Volume Controls

a. All audio output in the game goes through an audio mixer.
b. Audio mixers can do a lot of things with the signal like raise or lower the pitch, switch off one group of autio like background music, etc.
c. We mainly use the audio mixer to separate and target two different volume groups, one for background music and another for sound effects.
d. Players can adjust volume settings at any time by clicking on the settings icon at the top right of the screen on the main menu, level 1 or even in level 2.
e. Volume controls are modified in real time using a slider of value 0 to 1, this value is converted to and from float (0-1) into a logarithmic scale for sound (since volume in decibels is on a log scale)
f. The volume data is also stored locally and in real time so that the game remembers where you left the volume slider at in your previous playthrough of the game, this is done by storing the float value in a unity player pref.

Section 8 – System Parameters & Requirements

8.1 Game Engine

a. Unity 2019.4 LTS has been used to create this game.
b. It is recommended to use the same unity version while working with or modifying the game as everything is tested and working, it is possible to upgrade or downgrade to a different version but there always is the risk of something not working in a different version.

8.2 Hardware Requirements

a. PC
    i. Mouse
    ii. Monitor
    iii. 1GB RAM
    iv. Dual-core processor
    v. Speakers (optional)
    vi. Hard drive (at least 40mb available)
    vii. Graphics memory
    viii. Windows 7 or later
b. Android Device
    i. Touch screen input
    ii. 16:9 Ratio Display (Recommended)
    iii. 512 MB RAM
    iv. Dual-core processor

v. Memory storage (at least 100mb available)
vi. Graphics memory
vii. Android KitKat or later.

8.3 Network Requirements

a. Internet connection required to play the game (level 2 and login)
b. Registered account required to login to the game.

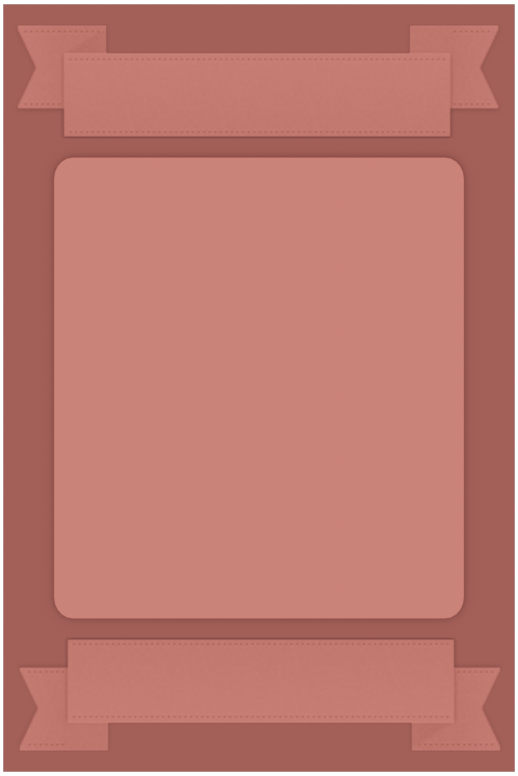
Section 9 – Game Art/Assets

9.1 External assets used

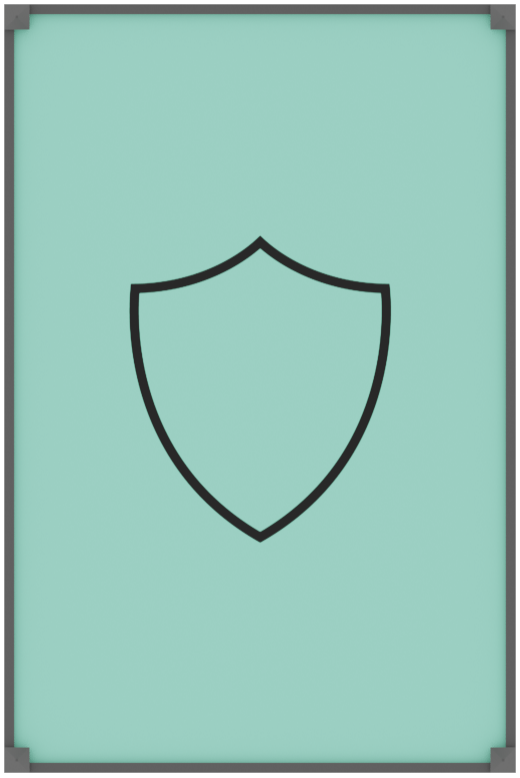
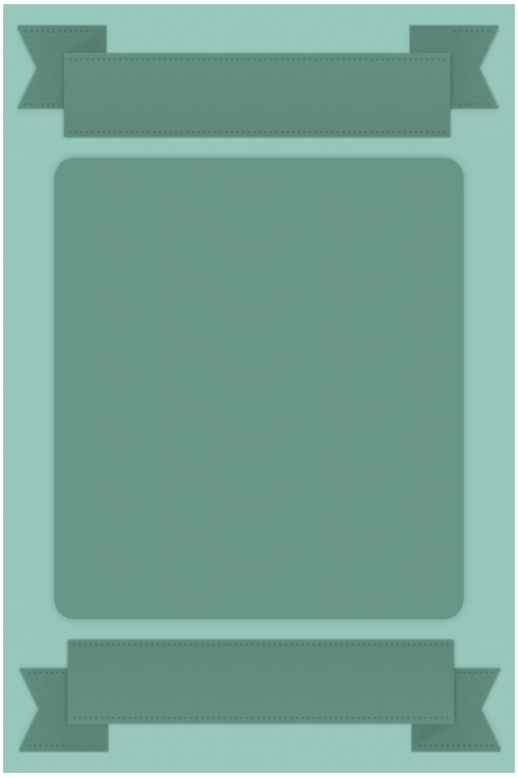
a. Photon Unity Networking (PUN 2) for multiplayer implementation which can be found on the unity asset store.
    i. Link : https://assetstore.unity.com/packages/tools/network/pun-2-free-119922
b. Lean Touch to help with cross platform touch input for mobile and desktop in a single package.
    i. Link : https://assetstore.unity.com/packages/tools/input-management/lean-touch-30111
c. Firebase SDK for registration and login.
    i. Link : https://firebase.google.com/support/release-notes/unity

9.2 Card assets

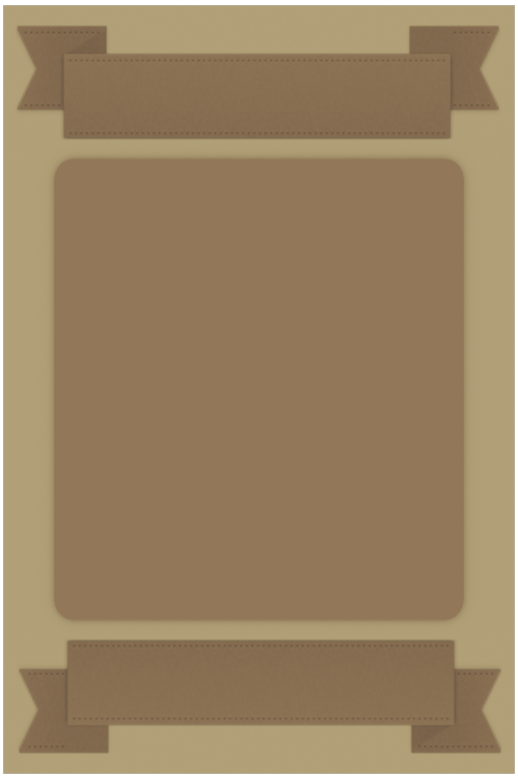
a. Attack Card asset, back and front.

b. Defense Card asset, front and back.

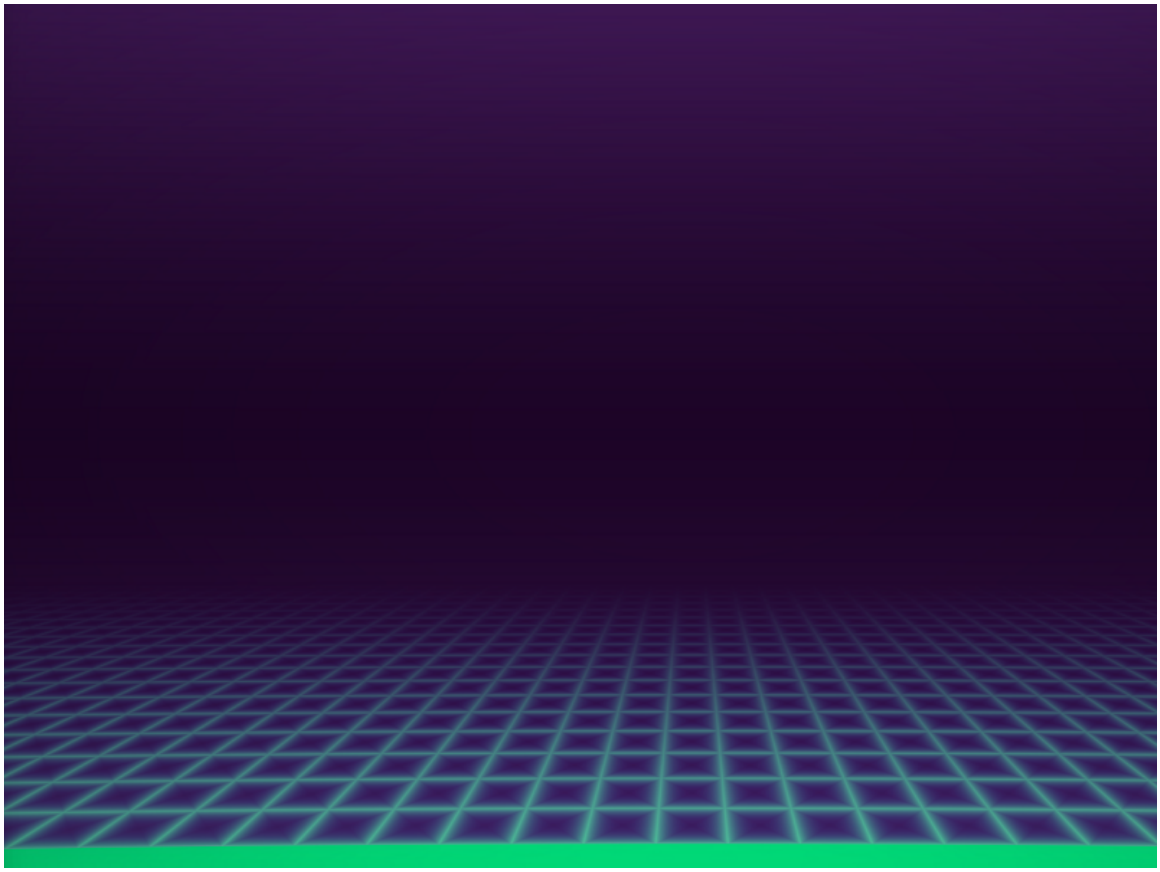



c. Scenario Card asset

9.3 Background assets

a. Menu background



b. Level Background