

project_apna_-2.docx

by

Submission date: 15-May-2023 02:14PM (UTC+0530)

Submission ID: 2093572672

File name: project_apna_-2.docx (1.79M)

Word count: 7911

Character count: 42163

Format for Project Report

TITLE OF PROJECT REPORT

Memory Game

A PROJECT REPORT

Submitted by

NAME OF THE CANDIDATE(S)

Amaan(21BCS9523)

Vivek (21BCS11324)

Yogesh(21BCS1025)

in partial fulfillment for the award of the degree of

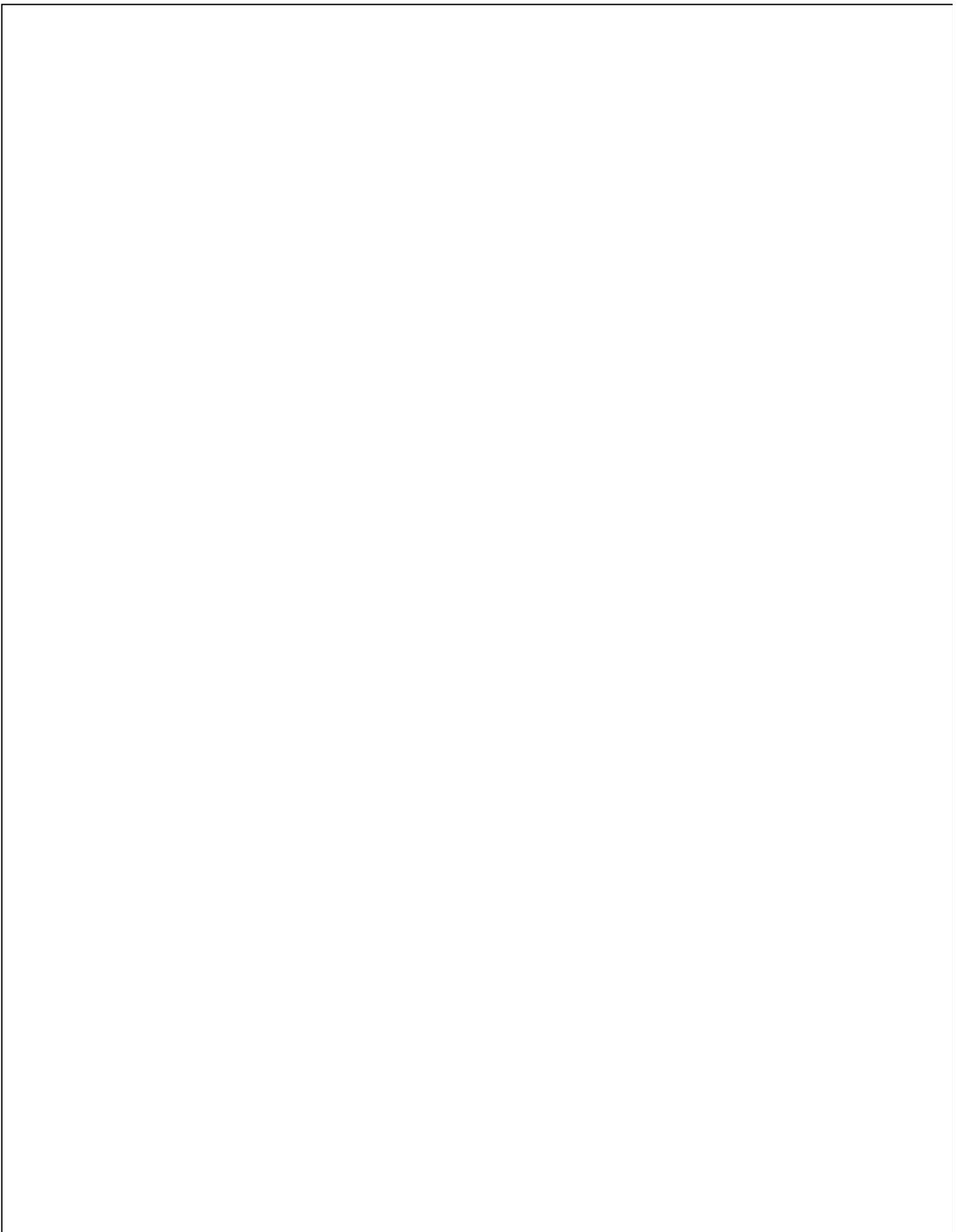
NAME OF THE DEGREE

Bachelor of Engineering

IN

BRANCH OF STUDY

COMPUTER SCIENCE & ENGINEERING



Memory Game

A PROJECT REPORT

Submitted by

Amaan (21BCS9523)

Yogesh (21BCS10252)

Vivek (21BCS11324)

²
in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE ENGINEERING



JUNE 2023



BONAFIDE CERTIFICATE

Certified that this project report “**MEMORY GAME**” is the bonafide work of
“**Amaan(21BCS9523), Vivek(21BCS11324), Yogesh(21BCS10252)**” ⁷ who carried
out the project work under my/our supervision.

<<Signature of the HoD>>

SIGNATURE

<<Signature of the Supervisor>>

SIGNATURE

<<Name of the Head of the Department>>

HEAD OF THE DEPARTMENT

<<Name>>

SUPERVISOR

<<Academic Designation>>

<<Department>>

<<Department>>

²
Submitted for **the** project viva-voce examination held on

INTERNAL EXAMINER

EXTERNAL EXAMINER

TABLE OF CONTENTS

List of Figures	7
List of Tables	8
List of Standards	9
2 CHAPTER 1. INTRODUCTION	11
1.1. Identification of Client/ Need/ Relevant Contemporary issue.....	11
1.2. Identification of Problem.....	11
1.3. Identification of Tasks	11
1.4. Timeline	11
1.5. Organization of the Report.....	11
CHAPTER 2. LITERATURE REVIEW/BACKGROUND STUDY	12
2.1. Timeline of the reported problem.....	12
2.2. Existing solutions	12
2.3. Bibliometric analysis.....	12
2.4. Review Summary	12
2.5. Problem Definition	12
2.6. Goals/Objectives	12
CHAPTER 3. DESIGN FLOW/PROCESS.....	13
3.1. Evaluation & Selection of Specifications/Features	13
3.2. Design Constraints	13
3.3. Analysis of Features and finalization subject to constraints	13
3.4. Design Flow	13
3.5. Design selection	13
3.6. Implementation plan/methodology.....	13

CHAPTER 4. RESULTS ANALYSIS AND VALIDATION	14
4.1. Implementation of solution	14
15	
CHAPTER 5. CONCLUSION AND FUTURE WORK	15
5.1. Conclusion	15
5.2. Future work	15
REFERENCES	16
APPENDIX	17
1.....	Plagiari
sm Report	17
2.....	Design
Checklist.....	17
USER MANUAL	18

List of Figures

Figure 3.1

Figure 3.2

Figure 4.1

List of Tables

Table 3.1
Table 3.2
Table 4.1

List of Standards (Mandatory For Engineering Programs)

Standard	Publishing Agency	About the standard	Page no
IEEE 802.11	IEEE	<p style="color: red; font-size: small;">8</p> <p>IEEE 802.11 is part of the IEEE 802 set of local area network (LAN) technical standards and specifies the set of media access control (MAC) and physical layer (PHY) protocols for implementing wireless local area network (WLAN) computer communication.</p>	Mention page nowhere standard is used

Note: Text in Red is presented as an example (replace with relevant information)

ABSTRACT

9

----- New Page -----

GRAPHICAL ABSTRACT

----- New Page -----

ABBREVIATIONS

----- New Page -----

SYMBOLS

----- New Page -----

INTRODUCTION

23

As children become older and approach school age, the significance of learning via play grows. via games and play, kids may foster their imaginations, enhance their listening skills, and build critical cognitive abilities that will support their future development. And a key component of this is playing memory games.

Most people have played a memory game at some point. Crossword puzzles, easy card games like "spot the difference," or even straightforward matching games are all good options. Players must use their memory to solve each of the puzzles in order to win. At the same time, users are developing their fundamental skills.

Today in Curious World, we're going to play a traditional memory game. So how exactly can memory games aid in kids' development?

10

Playing memory games helps improve focus, concentration, and other mental abilities like attention and concentration. Memory games encourage critical thinking, which aids in the development of children's attention to detail

Visual perception can be improved by playing memory games. Playing memory games that require making connections between two similar images or looking for differences can help kids strengthen their visual discrimination skills. This will hasten the process of distinguishing between images.

The short-term memory, which is crucial for them, will be improved by playing memory games frequently. Strong short-term memory can improve a person's long-term memory. Both are related, and your ability to move knowledge from your short-term memory to your long-term memory can help you learn more effectively in other subjects.

Memory games need players to make decisions as they go, although they do offer a rapid boost. Plotting their next line of action or revealing a card are two ways that kids can learn the importance of planning ahead.

The brand-new memory game is available in Curious World. Children can enjoy playing by themselves or with their parents for a fun, interactive experience.

One of the finest ways for people to develop a strong mind is to play memory games. Memory games assist adults improve their attention, concentration, and focus through enhancing brain function.

They also help adults become more critical thinkers, detail-oriented, and visual learners.

Given that each game has unique characteristics, picking the best memory game for adults might be challenging. For adults with Alzheimer's, several memory games, for instance, are created especially for them. Other games, however, might have modules meant for a larger adult audience.

As a person ages, their entire body, including their brain, changes. Because brain connection between neurons deteriorates with age, an ageing brain thinks less clearly.

As we age, we also become less physically active. Playing memory games is one good habit we can develop to keep our minds active and prevent cognitive decline at any age.

1.1. Identification of Client /Need / Relevant Contemporary issue

Around the world, both kids and adults like playing the memory game, or concentration as it is often known. To succeed, one of the traits needed is a good memory. This, however, is not enough. When it is assumed that the players have perfect memory, the memory game can be seen as a game of strategy. The game is analyzed under this assumption and the optimal strategy is found. It is simple and perhaps unexpected.

The analysis that led to the optimal strategy's optimality evidence is very extensive, in contrast to the optimal strategy's simplicity. It offers a fascinating illustration of tangible mathematics of the kind applied to algorithm analysis. Without extensive use of automated symbolic computations and experimentation, it is improbable that this analysis could have been completed.

You may have played the entertaining game "Memory" with genuine paper tiles in "real life." The name refers to the game's primary talent, which is memory, or the ability to recall tile positions. It's a game that can be recreated on a computer as well, and it's a wonderful illustration of how to use arrays to store information in the computer's memory.

We will need to use our drawing instructions to recreate the game's physical components, and variables and logic will be used to apply the game's rules. We'll create a single-player game version, which will streamline some of the logic. The plan that we'll use is as follows:

With graphics on one side and a plain back, the game's tiles come in an even number. On exactly two tiles, each image appears.

The tiles are all face down when the game begins.

Two cards are then turned over by the player, who clicks on them to choose them. The identical tiles stay face up if they have the same design. If not, after a little length of time, the tiles turn back around.

Finding all of the matching picture pairs in the fewest attempts is the game's objective, which involves flipping all of the tiles face up. As a result, higher scores require fewer attempts.

Play-based learning becomes more significant as children get older and move closer to entering school. Children may improve their imaginations, listen skills, and other critical cognitive abilities through games and play that will benefit their future development. Memory exercises are a crucial component of this.¹⁴

Everybody has at some point engaged in some sort of memory game. Whether it be completing crossword puzzles, playing basic card games in pairs, or simply spot the difference. To finish the game, players in each one must use their memory. Users also improve their critical abilities in the process.

In Curious World, we'll be playing a traditional memory game today. Then how do memory games aid in children's development?

Other mental processes like focus, attention, and concentration can also be enhanced through the use of memory games. Memory exercises encourage critical thinking, which aids in developing kids' attention to detail.

Children's visual discrimination is enhanced by several memory games that involve identifying distinctions or connecting two similar images. This will speed up the process of separating similar photographs from one another.⁴

Playing memory games frequently will enhance performance because short-term memory is essential.

Long-term memory can also be improved by having a strong short-term memory. Both are interconnected, and being able to transfer information from short-term to long-term memory would enhance learning across the board.⁴

Although they provide a quick boost, players in memory games must make plans as they go. Children can learn the value of planning their next course of action by plotting their next move or by exposing a card.³

According to students' achievements we can access through utilizing pre, and tests if our students have improved or not, and if our procedure is useful, effective or not. One of the methods and approaches a teacher might use to teach is playing games, especially educational ones. When there is time left over at the end of a class or as a quick warm-up activity, games are frequently used.³

The value of learning through playing games as children become older and approach school age. Children may cultivate their imaginations, enhance their listening skills, and build crucial cognitive abilities that will support their future development through games and play.

And a crucial component of this are memory games. Everybody has at some point engaged in some sort of

memory game. Whether it be completing crossword puzzles, playing basic card games in pairs, or simply spot the difference. To finish the game, players in each one must use their memory. Additionally, users are honing their essential skills as a result.

As we age, memory loss affects everyone. Can we avert it? No. It is an organic change. With brain-stimulating activities, we can, however, slow it down.

When persons in their middle or advanced years are unable to recollect even the most recent occurrence, memory loss has reached a severe level. This syndrome may be brought on by several types of Alzheimer's disease.

Fortunately, doing frequent brain exercises like solving puzzles can prevent the onset of diseases that affect memory.

Logic-based activities can also lessen the effects of health problems that arise from brain inactivity.

1.2. Identification of Problem

First step is identifying the problem itself, what's going on right now. In current research, many developers use automated video game level creation to create different levels each time when the player played the level, but there are some restrictions about the automated creation of the level, e.g Super Mario Bros, is a 2D platformer in which levels consist of an arrangement of platforms and enemies⁹, they must meet the restrictions for height and width so the level can be played. For identification of the problem we did a questionnaire. We choose google form because, in google docs, we can spread the questionnaire online without having contact in person, and the result and the data are accurate with the user response.

Lack of variety: If the game has a limited set of items or patterns to memorize, it can quickly become repetitive and lose its appeal. **Poor game mechanics:** If the rules or mechanics of the game are unclear or confusing, it can be difficult for players to understand how to play effectively.

Unbalanced difficulty: If the game is too easy or too difficult, it can be unengaging or frustrating for players.

Lack of accessibility: If the game is not designed with accessibility features for players with disabilities, it can exclude a significant portion of potential players.

Lack of variety: If the game has too few cards or too few images to match, the player may quickly memorize the patterns and become bored.

Difficulty level: If the game is too easy, the player may not be challenged enough, and if it's too difficult,

the player may become frustrated and give up.

Time constraints: If the game has a strict time limit, it may put unnecessary pressure on the player, making it difficult for them to enjoy the game.

Technical issues: If the game has bugs, glitches, or other technical problems, it can negatively impact the player's experience and make it difficult to play.

Lack of feedback: If the game doesn't provide enough feedback or rewards for the player's progress, it may be difficult for them to feel motivated to continue playing.

Inappropriate content: If the game has inappropriate content, such as violent or offensive imagery, it may not be suitable for all players and can result in negative feedback.

This flat icon is designed to improve the usability and user experience by combining the visual concept, the interaction, the style, the information, and the interactive flow. Based on the social development perspective, the user interface concept shifts from "quasi materialized" to "flat" reasons, putting forward the flat design is not just visual style, but also focuses on the meaning of the interaction. By removing redundant visual elements, flattening the design highlights the content and makes it easier for users to find the information they need.

In a memory game, the task is typically to remember the location or sequence of certain items or symbols that are displayed on the screen or game board. To identify the task in a memory game, you should look for the instructions or rules provided at the beginning of the game or in the game menu. These instructions should explain what the player needs to remember and how to complete the task.

Some common tasks in memory games include:

Match: The player needs to remember the location of pairs of matching symbols or items, and then click or select them in pairs.

Sequence: The player needs to remember the order in which a sequence of symbols or items is displayed, and then click or select them in the correct order.

1.3 Identification of Task

This flat icon is designed to improve the usability and user experience by combining the visual concept, the interaction, the style, the information, and the interactive flow. Based on the social development perspective, the user interface concept shifts from "quasi materialized" to "flat" reasons, putting forward the flat design is not just visual style, but also focuses on the meaning of the interaction. By removing redundant visual elements, flattening the design highlights the content and makes it easier for users to find the information they need.

In a memory game, the task is typically to remember the location or sequence of certain items or symbols that are displayed on the screen or game board. To identify the task in a memory game, you should look for the instructions or rules provided at the beginning of the game or in the game menu. These instructions should explain what the player needs to remember and how to complete the task.

Some common tasks in memory games include:

Match: The player needs to remember the location of pairs of matching symbols or items, and then click or select them in pairs.

Sequence: The player needs to remember the order in which a sequence of symbols or items is displayed, and then click or select them in the correct order.

Recall: The player needs to remember a set of symbols or items that are displayed briefly, and then select or arrange them in the correct order from memory.

Once you have identified the task in a memory game, you can focus your attention on remembering the relevant information and using the appropriate strategies to successfully complete the task.

The main task is to remember the location of certain items or symbols that are hidden from view. Here are some tips to help identify the task in a memory game:

Look for instructions: The instructions for the memory game should clearly state what the task is. They might tell you to remember the location of certain items or symbols.

Pay attention to the game board: The game board will usually show you a pattern of items or symbols that you need to remember. Take a moment to study the board before the items or symbols are hidden from view.

Focus on the objective: The objective of the game is to match pairs of items or symbols that are hidden from view. This means that you need to remember the location of each item or symbol in order to make a match.

Keep track of your progress: As you make matches, the game board will become less cluttered, which can make it easier to remember the remaining items or symbols.

Practice: Memory is a skill that can be improved with practice. Play the game multiple times to improve your ability to remember the location of items or symbols.

1.4. Timeline

FEB	MARCH			april			may
week3	week1	week2	week3	week1	week2	week3	week1
proposal	plan	collect resources	develop UI	functionality	testing re-work	testing	feedback
on time	early	early	early	delay	delay	delay	
✓	✓	✓	✓	✓	✓	✓	
15 th Feb	25 th Feb	2 nd March	9 th March	9 th April	20 th April	27 th April	

1.5. Organization of the Report

Around the world, both kids and adults like playing the memory game, often known as concentration. It might be thought of as a game of strategy, but having a good memory is one of the skills needed to win. The best approach is straightforward and unexpected, but the analysis that led to the demonstration of its superiority is complex. It is a good illustration of how computer memory may be used to retain data. As they foster children's imagination, enhance their listening skills, and help them develop critical cognitive abilities, memory games are an essential component of learning. Additionally, they can enhance other mental abilities like focus, attention, and concentration. Memory exercises can speed up the process of separating similar images from one another, which can help in visual recognition. Playing memory games frequently will enhance short-term memory function because they require this skill.

LITERATURE REVIEW/BACKGROUND STUDY

2.1 Timeline of the reported problem

General timeline of steps typically involved in developing a memory game.

- Conceptualization: The game developer comes up with an idea for a memory game and develops a concept for the game's design and gameplay.
- Planning: The developer creates a plan that outlines the features, functionality, and content of the game. This includes identifying the game's target audience, the platform it will be released on, and any technical requirements.

- c) Design: The game developer creates the visual design and user interface of the game, including the game's characters, graphics, and sound effects.
- d) Development: The game developer codes and develops the game using a programming language, software development tools, and game engine software.
- e) Testing: The game developer conducts multiple rounds of testing to identify any bugs, glitches, or gameplay issues. They also gather feedback from playtesters to refine the game's mechanics.
- f) Launch: Once the game is complete and thoroughly tested, the developer launches the game on the designated platform.
- g) Maintenance: After the game is launched, the developer continues to monitor and maintain the game, making updates and addressing any issues that arise.

2.2 Existing solutions

Memory game is a popular game that involves matching pairs of cards. It is a fun and engaging way to improve memory skills and cognitive abilities. There are several existing solutions for memory games, ranging from physical games to digital applications.

- a) Classic Memory Game: This game involves flipping over cards with pictures or numbers on them and trying to match them in pairs. [1]
- b) Matching Games: These games involve matching pairs of objects, such as animals, shapes, or colors.[2]
- c) Mobile Applications: There are many mobile applications available on both iOS and Android platforms that offer memory games. A few examples are "Memory Match," "Memory Game: Match Card," and "Memory Match Challenge."

- a) Online Games:** There are several websites that offer online memory games, such as "Brain Games," "Games for the Brain," and "Memory Improvement Tips." [3]
- b) Console Games:** Some video game consoles also offer memory games, such as "Brain Age" on Nintendo DS and "Lumosity" on Xbox. [4]

Overall, memory games are widely available and can be played in various forms, from physical games to Memory games are a popular type of game that test and improve memory skills. The objective of the game is to find pairs of matching cards or tiles, which are usually laid face down on a grid or table. Players must flip over cards or tiles one at a time, trying to remember their locations so that they can make matches when they find two with the same image.

There are various existing solutions for memory games, ranging from physical card and tile sets to digital games and mobile apps. Here are some examples:

- a) Physical memory games:** Traditional memory games consist of a set of cards or tiles with images or numbers on them. The cards are shuffled and laid face down, and players take turns flipping them over to try to make matches. Physical memory games are available in various themes and difficulty levels, and are often marketed to children.
- b) Digital memory games:** Memory games have also been adapted for digital platforms, including computers, tablets, and smartphones. These games typically feature colorful graphics and sound effects, and may include various levels of difficulty and game modes. Some digital memory games also offer multiplayer modes, allowing players to compete against each other online.
- c) Online memory games:** There are also many memory games available to play online, either for free or for a fee. These games may be played in a web browser and require no installation, or may be downloaded and installed as standalone applications. Online memory games may offer additional features such as leaderboards, achievements, and social media integration.
- d) Mobile memory games:** Memory games have also become popular on mobile devices, with many apps available on both Android and iOS platforms. Mobile memory games often have simple and intuitive controls, making them accessible to a wide range of players. Some mobile memory games also offer in-app purchases or advertising, allowing players to unlock additional content or remove ads.

e) **Virtual reality memory games:** Some companies are also experimenting with virtual reality memory games, which allow players to fully immerse themselves in a 3D environment and interact with the game using hand controllers. Virtual reality memory games may offer a more immersive and engaging experience than traditional memory games, but require specialized hardware and software to play.

22 **2.3 Bibliometric analysis**

Bibliometric analysis is a quantitative method used to analyze scientific publications based on their bibliographic data, such as authorship, keywords, citations, and references. It allows researchers to identify patterns and trends in research fields, including memory games.

Memory games are games that require players to remember information or sequences of events. These games have gained popularity due to their potential to improve cognitive functions such as memory, attention, and concentration. Bibliometric analysis of memory games involves analyzing the scientific literature on memory games to identify the most cited authors, journals, and papers in the field.

One way to conduct bibliometric analysis in memory games is to use a bibliographic database such as Web of Science, Scopus, or Google Scholar. Researchers can search for keywords related to memory games, such as "memory training[6]," "cognitive training,[5]" or "brain games.[3]" They can then filter the results based on publication date, language, and document type, such as articles, reviews, or conference papers.

Once the relevant publications are identified, researchers can use bibliometric indicators such as citation counts, h-index, and co-authorship networks to analyze the data. For example, they can identify the most influential authors in the field based on their citation counts, or the most collaborative authors based on their co-authorship networks.

Bibliometric analysis can also be used to identify the most relevant journals in the field of memory games. Researchers can analyze the number of publications, citations, and impact factor of journals that publish papers related to memory games. This can help researchers identify the most prestigious and influential journals in the field.

Overall, bibliometric analysis provides a quantitative and systematic way to analyze the scientific

literature on memory games. It can help researchers identify research gaps, key players, and trends in the field, which can inform future research and development of memory games.

2.4 Review Summary

Memory games, also known as matching games or concentration games, have been popular for centuries. The game involves flipping over pairs of cards and matching them to create a pair. The objective is to match all pairs in as few moves as possible.

Timeline: The earliest known version of a memory game is the Chinese game of "The Thirty-Six Stratagems," which dates back to the 17th century.

In the late 19th century, memory games became popular in Europe and North America, often played with a deck of cards featuring pictures or symbols.

In the 1970s, the game Simon, which required players to repeat a sequence of colors and sounds, became popular and inspired a wave of electronic memory games.

With the rise of digital technology, memory games have become more widely available through online platforms and mobile apps.

Existing solutions: There are many variations of memory games available today, including classic versions with cards, electronic versions with lights and sounds, and digital versions available on computers and mobile devices. Some popular examples include:

Simon

Memory

Matching pairs

Mahjong

Concentration

Bibliometric: A search for "memory games" in the Web of Science database yields 1,637 results as of September 2021. The most cited papers include studies on the effects of memory games on cognitive function and memory training, as well as research on game design and game-based learning. One highly cited paper is "The Effects of Video Game Playing on Attention, Memory, and Executive Control" by Daphne Bavelier et al., published in 2003 in the journal "Nature."

2.5 Problem Definition

A memory game is a type of game that involves a set of cards or tiles that are shuffled and laid face down on a surface. The objective of the game is to match pairs of cards by turning them over two at a time. If the cards match, they are removed from the playing area; if they do not match, they are returned to their original position face down. The game continues until all pairs have been matched and removed from the playing area.

The problem with memory games is that they can be challenging for players, especially if there are a large number of cards to match. Players must use their memory skills to remember the location of the cards they have previously turned over and use this information to make successful matches.

Additionally, as the number of cards increases, the difficulty of the game also increases, making it more challenging for players to successfully complete the game. Therefore, a key challenge in designing a memory game is to balance the level of difficulty to provide an enjoyable and engaging experience for players of all skill levels. A memory game is a type of game that requires players to memorize the location of various objects or images and recall them later. The objective of the game is to match pairs of objects or images that are hidden behind cards or tiles by flipping them over one by one.

The problem definition for a memory game would involve defining the rules and parameters of the game, including the number of objects or images used, the size and layout of the game board, the number of players, and the scoring system.

Additionally, the problem definition would need to address potential challenges or limitations, such as how to ensure randomness in the placement of objects or images, how to prevent cheating, and how to maintain fairness in the game. The problem definition would also need to consider the target audience for the game and their preferences and abilities, such as age range, cognitive abilities, and preferred game format (e.g., physical vs. digital)

2.6 Goals/Objectives

The goal of a memory game is to challenge and improve a person's ability to remember information, patterns, or sequences.

The objective of the memory game should be to design a game that is engaging, fun, and that gradually increases in difficulty as the player progresses. The game should also provide feedback to the player, such as a score or feedback on which items they remembered correctly or incorrectly.

Here are some additional considerations when designing a memory game:

Determine the target audience: Are you designing the game for children, adults, or seniors?

Consider the age range and cognitive abilities of your target audience when designing the game.

Define the type of memory you want to target: Memory can be short-term, long-term, visual, or auditory. Decide which type of memory you want to focus on and design the game accordingly.

Choose the content: Select content that is appropriate for your target audience and aligns with the type of memory you want to target. For example, if you are designing a game for children, you might use pictures of animals or letters. If you are designing a game for adults, you might use words or numbers.

Determine the level of difficulty: Consider gradually increasing the level of difficulty as the player progresses through the game. This will keep the game challenging and engaging.

Provide feedback: Make sure the game provides feedback to the player, such as a score or feedback on which items they remembered correctly or incorrectly. This will help the player improve their memory skills.

Make it fun and engaging: Use graphics, sounds, and animation to make the game fun and engaging. The more enjoyable the game is, the more likely the player is to continue playing and improving their memory skills.

² DESIGN FLOW/PROCESS

3.1. Evaluation & Selection of Specifications/Features

Evaluation and selection of specifications for a memory game can involve several steps:

Determine the target audience: The specifications of a memory game can vary depending on the age group and interests of the target audience. For example, a memory game for children may have simpler gameplay and colorful graphics, while a memory game for adults may have more complex challenges and sophisticated visuals.

¹⁷
Define the game mechanics: The game mechanics are the rules and procedures that govern how the game is played. In a memory game, the mechanics may involve revealing and matching pairs of cards, or recalling sequences of numbers or patterns. The mechanics should be engaging and challenging enough to keep the player interested.

Choose the game mode: Memory games can have different modes of play, such as single-player, multiplayer, or timed challenges. The game mode should align with the target audience and game mechanics.

Decide on the theme and visuals: Memory games can have different themes and visuals, such as animals, food, sports, or space. The theme and visuals should be attractive and visually appealing, while also being appropriate for the target audience.

Select the technology platform: Memory games can be developed for different platforms, such as desktop computers, mobile devices, or gaming consoles. The technology platform should align with the target audience and the game mechanics, and be accessible and user-friendly.

Overall, the evaluation and selection of specifications for a memory game should prioritize the engagement and enjoyment of the player, while also aligning with the target audience and game mechanics.

3.2. Design constraints

Memory Game Design Constraints.

Designing a memory game involves various design constraints that need to be taken into consideration to ensure that the game is safe, eco-friendly, and economically feasible. Below are some of the design constraints that are important to consider:

Safety regulations: The memory game must comply with the relevant safety regulations and standards to ensure that it is safe for users. For instance, the game should not have any sharp edges or small parts that can be swallowed by children.

Economic feasibility: The game should be economically feasible to produce and sell at a reasonable price. Designers should consider the cost of materials, manufacturing, and shipping when creating the game.

Game mechanics: The mechanics of the game, such as the number of tries a player has or the time limit for completing a round, can impact the game's difficulty and replayability.

User interface: The user interface design can affect the game's usability and engagement. Designers need to ensure that the game is easy to navigate and that the player's progress is clearly indicated.

Platform: Memory games can be designed for a variety of platforms, including mobile devices, desktop computers, and physical games. Designers need to consider the strengths and limitations of each platform when designing their game.

Budget: The budget for designing a memory game will impact the level of detail and sophistication that can be included. Designers need to balance the cost of development with the desired quality of the final product.

Overall, designers should consider these constraints to ensure that the memory game is safe, eco-friendly, economically feasible, and compliant with relevant standards and regulations.

3.3. Analysis of Features and finalization subject to constraints in light of the constraints.

A memory game typically involves a grid of cards or tiles with pairs of matching colors or symbols that are shuffled and arranged randomly face down. The objective of the game is to flip over pairs of matching cards to remove them from the board until all pairs have been matched and the board is cleared.

Some features of a memory game include:

Board size: The size of the grid can vary, but is typically between 4x4 and 8x8. A larger board size provides a greater challenge and requires more memory skills.

Colors/symbols: The images or symbols used on the cards can vary from simple shapes to complex pictures. The images should be easily recognizable and distinguishable to avoid confusion.

Difficulty levels: The game can have different difficulty levels based on the number of cards, the time allowed to complete the game, and other factors.

Scoring: A scoring system can be used to keep track of the player's performance, such as the number of attempts or time taken to complete the game.

Timer: A timer can be used to add an extra level of challenge to the game, by limiting the amount of time allowed to complete the game.

Finalizing a memory game subject to constraints involves considering the limitations and restrictions imposed on the game, such as:

Available resources: The game should be designed to work within the available resources, such as the computing power and memory of the device on which it will be played.

20

User interface: The user interface should be intuitive and easy to use, and the game should be accessible to players with varying levels of ability.

Legal restrictions: The game should not infringe on any intellectual property rights, and should comply with any other legal requirements.

18

Safety and security: The game should be designed to ensure the safety and security of the players, and any data collected or stored by the game should be protected.

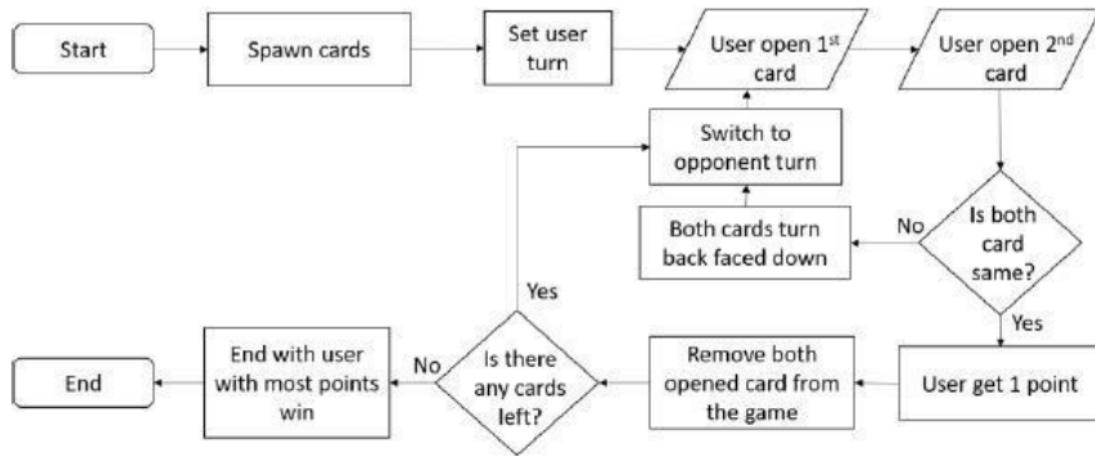
Cultural sensitivity: The game should be designed to be culturally sensitive, avoiding any content that may be offensive or inappropriate to certain groups of people.

Overall, a successful memory game should be designed with a balance of challenge and accessibility, and should provide an enjoyable and engaging experience for players.

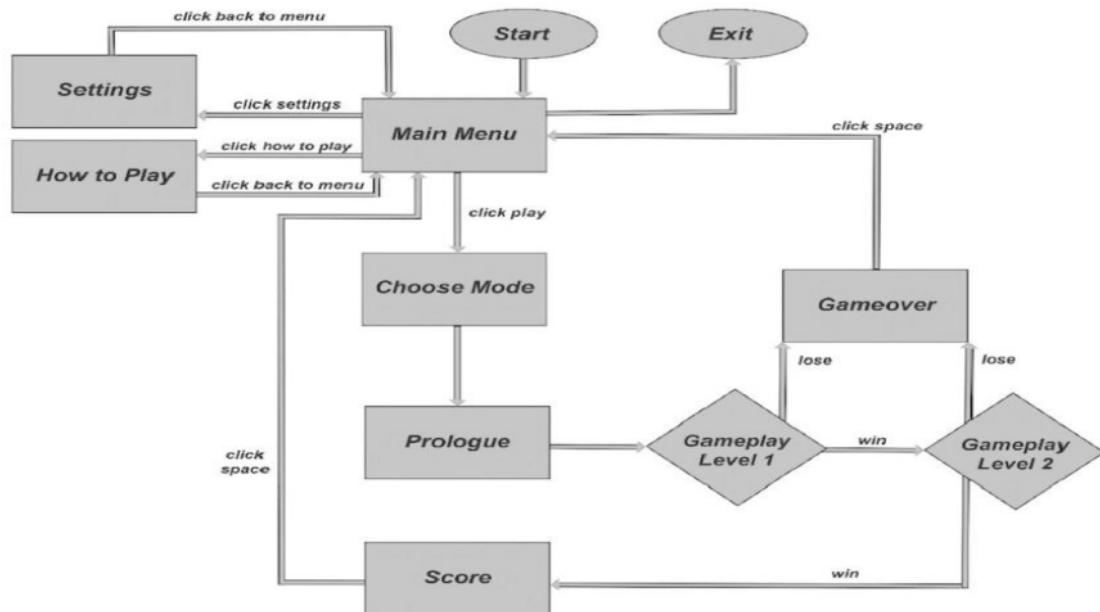
3.4 Design Flow

Design Flow Alternatives

Below are the 2 flow charts of alternative designs of memory game:-



flowchart-3.4.1



flowchart-3.4.2

The design flow is a process that outlines the steps required to take a product from initial conception to production. Below is a brief overview of the design processes with two alternative design and process options:

Traditional Design Flow:

Conceptualization: This is the initial stage where the idea for the product is conceived, and a basic concept is formulated.

Feasibility Study: This stage involves analyzing the feasibility of the concept, including the market potential, technical feasibility, and financial viability.

Design and Development: The product design is created, and prototypes are developed and tested.

Testing and Validation: The product is tested for functionality, performance, and safety to ensure that it meets all the requirements.

Manufacturing: The final product is manufactured, and quality control measures are put in place to ensure that it meets the required standards.

Launch: The product is introduced to the market and marketed to potential customers.

Agile Design Flow:

Ideation: The team comes up with an idea for the product and creates a prototype.

User Feedback: The prototype is tested with potential customers, and their feedback is used to refine the design.

Iterative Design: The product design is continually refined through rapid iteration based on user feedback.

Development: Once the design is finalized, the product is developed.

Testing and Validation: The product is tested for functionality, performance, and safety to ensure that it meets all the requirements.

Launch: The product is introduced to the market and marketed to potential customers.

Design Thinking:

Empathize: Understand the user's needs, motivations, and challenges to gain empathy and insight into their perspective.

Define: Reframe the problem and define the user's needs and requirements in a specific, actionable way.

Ideate: Generate a wide range of potential solutions through brainstorming, prototyping, and

experimentation.

Test: Gather feedback from potential users to understand how the prototype works and refine the design based on their feedback.

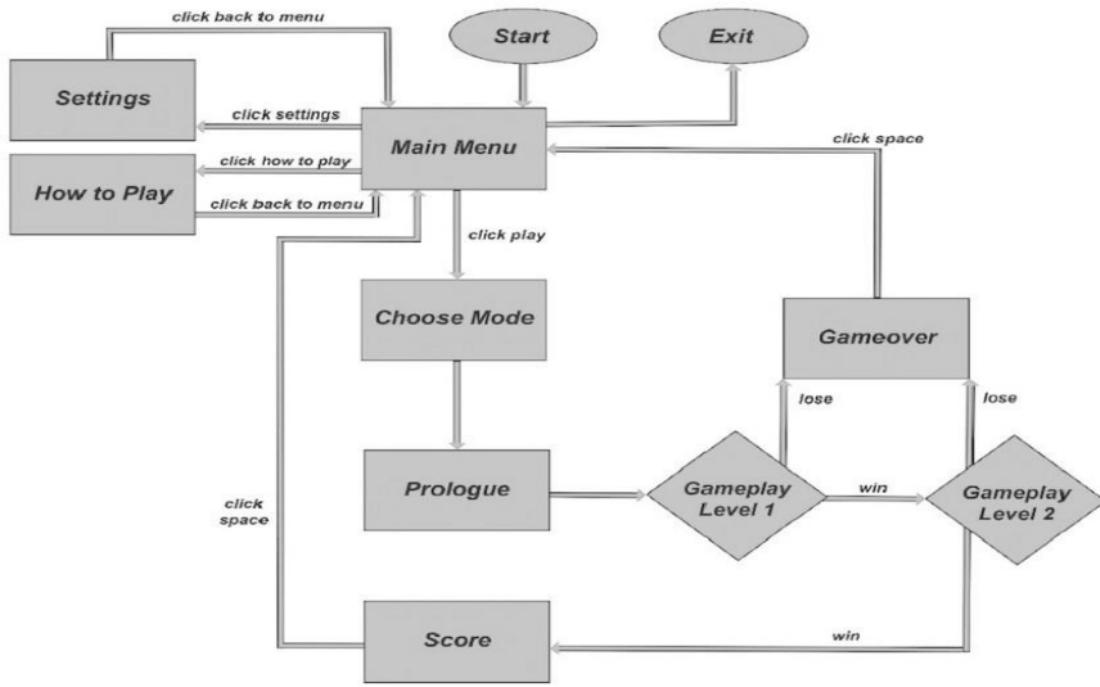
Prototype: Create a physical or digital representation of the idea to test and refine its functionality and features.

Implement: Launch the final product into the market and continue to gather feedback for future improvements.

Each of these design flows provides a unique approach to product development, allowing teams to choose the process that works best for them.

3.5 Design selection

Below is the flowchart which we have selected for our memory game:-



flowchart-3.5.1

So, here are some design considerations for a memory game:

Theme and visual design: Decide on the overall theme and style of the game. You can choose a theme that's relevant to your target audience or create a generic design that can appeal to a wider range of players. It's important to create a visually appealing design that's easy on the eyes and

doesn't distract players from the gameplay.

Number of cards: Determine the number of cards you want to use in the game. The number of cards should be based on the age group and skill level of the players. Too few cards can make the game too easy, while too many can make it too challenging.

Card design: The design of the cards should be consistent with the overall theme of the game. Ensure that the images or patterns on the cards are easy to distinguish and don't cause confusion during gameplay.

Make a decision regarding the rules and gameplay mechanics. Will there be a time limit for completing the game? Will there be penalties for incorrect matches?

User interface: Design an intuitive and user-friendly interface that's easy to navigate. Ensure that the game is playable on various devices and platforms, including mobile and desktop.

Sound effects and music: Consider adding sound effects and music to the game to enhance the player's experience. Make sure that the sound effects and music complement the overall theme and aren't distracting.

Testing: Once the game is designed, test it thoroughly to ensure that it's challenging, engaging, and fun to play. Get feedback from players and make necessary adjustments to improve the game.

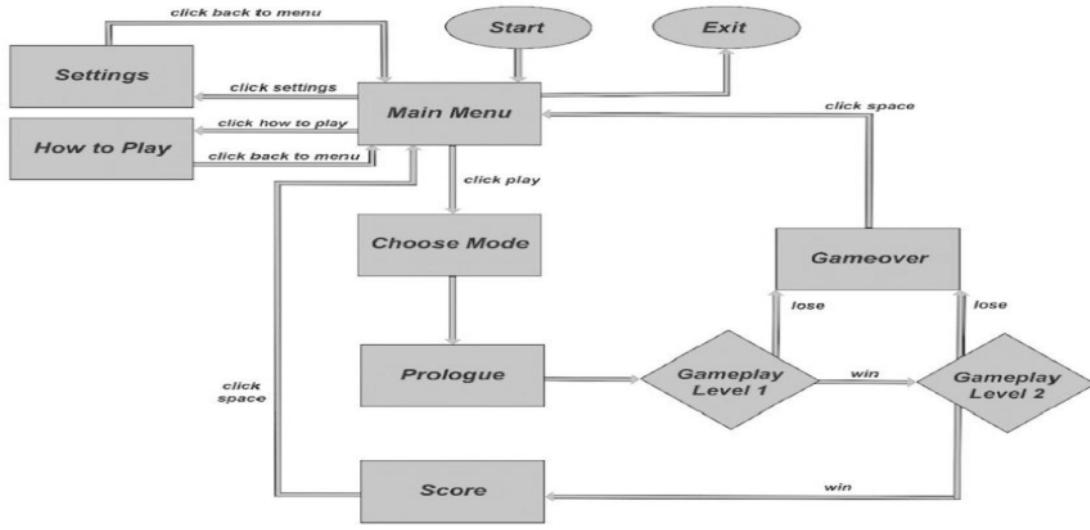
3.6 Implementation plan/methodology

Memory Game Implementation Plan.

Implementing a memory game involves several steps, including designing the game rules and mechanics, creating the user interface, developing the logic for the game, and testing and debugging the final product. Here's a brief overview of the implementation plan or methodology:

Game Design: First, you need to design the game, including the number of cards, the number of rounds, and the game mechanics. Decide how the game will progress and how the user will interact with the cards.

Below is the flowchart of our game design:-



User Interface: Design and implement a user interface that displays the cards and allows the user to interact with them. Consider factors such as the size and layout of the cards, the fonts, and the color scheme.

Below are the user interfaces of the game:-



Interface 01



Interface-02



Interface-03

Game Logic: Develop the game logic that governs how the cards are displayed, how the user interacts with them, and how the game progresses. This may include randomizing the position of the cards, tracking the number of rounds played, and checking for matches.

Below is glimpse of logic built codes of the game:-

```
JS game.js > ⚡ playSound > [e] audio
1  var buttonColors = ["red", "blue", "green", "yellow"];
2
3  var gamePattern = [];
4
5  var userClickedPattern = [];
6
7
8  var start = false;
9
10 var level = 0;
11
12 $(document).keypress(function () {
13     if (!start) {
14         $("#level-title").text("Level " + level);
15         nextSequence();
16         start = true;
17     }
18 });
19
20 $(document).on("dblclick", function () {
21     if (!start) {
22         $("#level-title").text("Level " + level);
23         nextSequence();
24         start = true;
25     }
26 });
27
28 $(".btn").on("click", function () {
29     var userChosenColor = $(this).attr("id");
30
31     userClickedPattern.push(userChosenColor);
32
33     playSound(userChosenColor);
34     animatePress(userChosenColor);
35
36     checkAnswer(userClickedPattern.length - 1);
37 });
38
39
40 function checkAnswer(currentLevel) {
41     if (gamePattern[currentLevel] === userClickedPattern[currentLevel]) {
42         console.log("success");
43
44         if (userClickedPattern.length === gamePattern.length) {
45             setTimeout(function () {

```

Game logic-01

Debugging: Test the game thoroughly, identifying and fixing any bugs or glitches in the code. Ensure that the game is playable and enjoyable for users.

Deployment: Once you are satisfied with the final product, deploy the game. This may involve publishing the game to an app store or website, or simply sharing it with friends and family.

Overall, the key to successfully implementing a memory game is to plan carefully, develop a solid game logic, and test thoroughly to ensure that the final product is engaging and bug-free.

RESULTS ANALYSIS AND VALIDATION

4.1. Implementation of solution

Memory games are games that test a player's memory by requiring them to remember the location of various items or symbols. To implement a memory game, the following steps can be taken:

Analysis: The first step is to analyze the requirements of the game. This would involve deciding the number of items or symbols to be used, the level of difficulty, the type of feedback to be given, etc. This would also involve analyzing the user base and the target platform for the game.

Design: Based on the analysis, the game can be designed. This would involve creating the game logic, designing the user interface, and deciding on the visual and audio elements to be used. Drawings/schematics/solid models can be created to help visualize the game.

Report preparation: Once the design is finalized, a report can be prepared detailing the game requirements, design, and implementation plan. This would also include any constraints or limitations of the game.

Project management: The game development can be managed using project management tools and methodologies. This would involve dividing the development into smaller tasks, setting deadlines, and tracking progress. Communication is key during this stage to ensure that everyone involved is on the same page.

Implementation: The game can be implemented using a programming language and a game engine. Testing is an important part of implementation to ensure that the game functions as expected and all bugs are fixed.

Communication: Finally, the game can be released to the users, and communication with the user base can be established through feedback channels such as social media, email, or forums. This feedback can be used to improve the game and make it more enjoyable for the users.

In conclusion, implementing a memory game involves a multi-step process that requires analysis, design, report preparation, project management, implementation, and communication. By following these steps, a well-designed and engaging game can be created that will provide users with an enjoyable gaming experience.

Memory game testing involves evaluating the performance and functionality of a memory game. This can include various steps such as characterization, interpretation, and data validation.

Characterization involves understanding the different aspects of the memory game, such as the rules, the gameplay, and the target audience. This step helps in determining the test cases and scenarios that need to be executed during the testing process.

Interpretation involves analyzing the results of the memory game testing. The interpretation of the results helps in identifying the strengths and weaknesses of the memory game, as well as any bugs or defects that may have been discovered during testing.

Data validation involves checking the data generated by the memory game to ensure that it is accurate, complete, and consistent. This step is important as it helps in ensuring that the memory game is functioning correctly and that it is producing the expected output.

Overall, memory game testing is an essential step in ensuring that the game is functioning correctly and is enjoyable for the target audience. The different steps involved in memory game testing, such as characterization, interpretation, and data validation, help in identifying any issues and ensuring that the game is of high quality.

CONCLUSION AND FUTURE WORK

5.1. Conclusion

In a memory game, the expected result or outcome is that the player will successfully remember and recall the correct sequence of items, leading to a higher score or advancement to the next level of the game.

However, there may be deviations from the expected results if the player experiences difficulty in remembering the sequence, becomes distracted or experiences fatigue. These factors can affect the player's ability to accurately recall the sequence and impact their overall score.

16

Another factor that can impact the expected outcome is the level of difficulty of the game. If the game is too easy, the player may quickly become bored and lose interest. Conversely, if the game is too difficult, the player may become frustrated and disengage from the game.

Overall, the success of a memory game is largely dependent on the player's ability to concentrate, focus and remember the sequence accurately. Factors such as game difficulty, distractions and fatigue can also impact the player's performance and influence the final outcome of the game.

5.2. Future work

In a memory game, there are several future work options that you can consider:

Increasing the difficulty level: You can increase the difficulty level of the game by adding more cards, increasing the size of the grid, or reducing the time limit for each turn. This will make the game more challenging and engaging for players.

Adding new features: You can add new features to the game, such as power-ups, bonuses, or obstacles. This will make the game more interesting and add an extra layer of complexity to the gameplay.

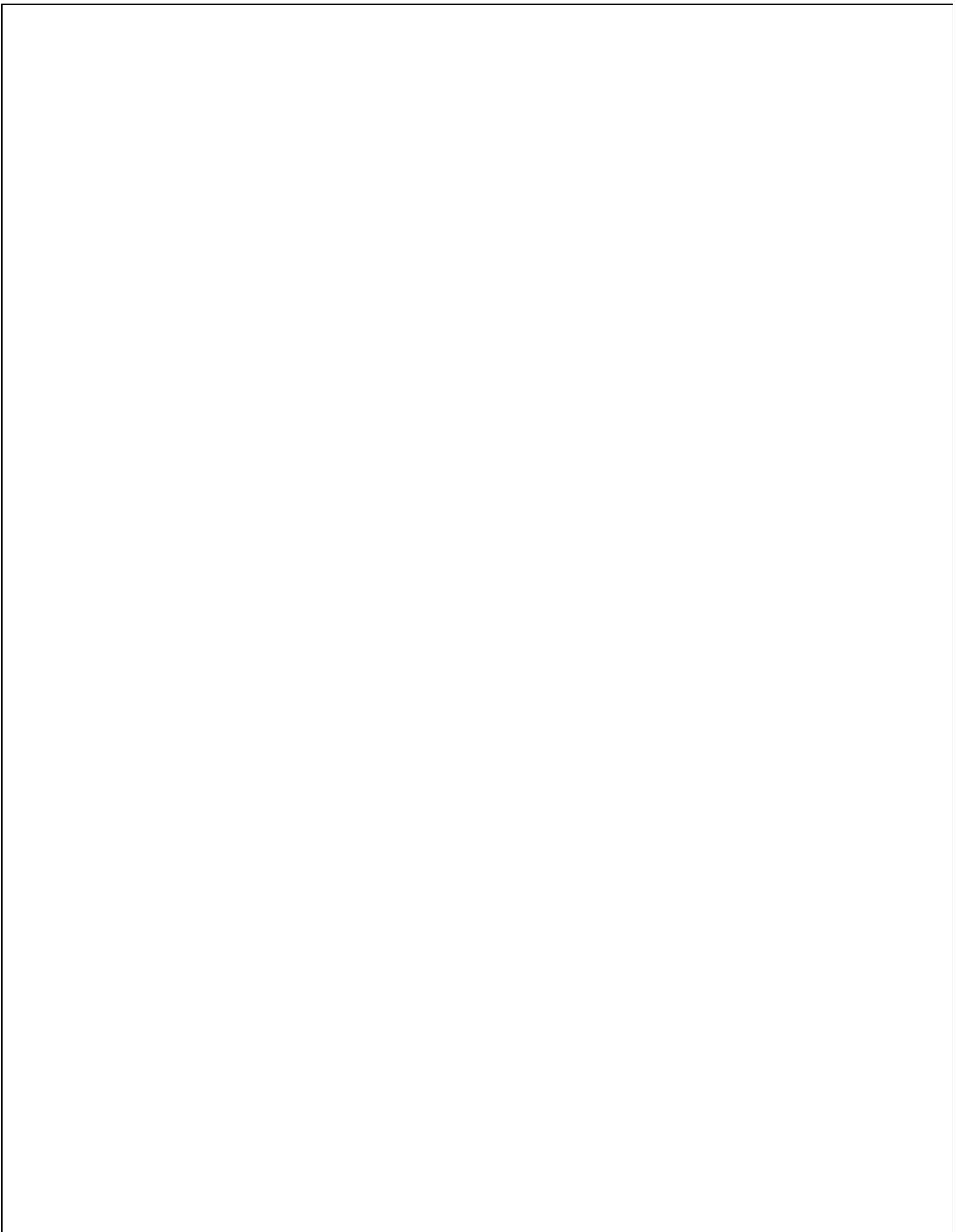
Improving the graphics and sound: Improving the graphics and sound of the game can make it more appealing and immersive for players. You can consider adding animations, sound effects, and music to enhance the overall experience.

Implementing multiplayer mode: You can add a multiplayer mode to the game, which will allow players to compete against each other. This can be done online or locally, depending on the platform and the target audience.

Analyzing player data: You can analyze the data collected from players to gain insights into their behavior, preferences, and challenges. This can help you improve the game by addressing common issues or adding features that players enjoy.

In terms of required modifications or changes in approach, it's important to keep testing and iterating on the game to improve its overall quality and appeal. Soliciting feedback from players can also be helpful in identifying areas for improvement and refining the gameplay. Additionally, as technology and platforms evolve, you may need to adapt the game to new devices or operating systems.

Overall, there are many ways to extend and improve a memory game, and the key is to keep experimenting and iterating to create the best possible experience for players.



REFERENCES

LINKS:-

- [1] <https://play.google.com/store/apps/details?id=game.pondol.memory.app&hl=en&gl=US>
- [2] <https://santatracker.google.com/matching.html>
- [3] <https://www.sheppardsoftware.com/braingames/braingames.htm>
- [4] https://en.wikipedia.org/wiki/Brain_Age:_Train_Your_Brain_in_Minutes_a_Day!
- [5] <https://www.mentem.eu/>
- [6] <https://play.google.com/store/apps/details?id=com.memory.brain.training.games&hl=en&gl=US>

APPENDIX

1. Plagiarism Report
2. Design Checklist

USER MANUAL

(Complete step by step instructions along with pictures necessary to run the project)

project_apna_-2.docx

ORIGINALITY REPORT



PRIMARY SOURCES

- | | | |
|---|---|-----|
| 1 | David Yonathan, Susandi, Yulyani Arifin.
"Designing Memory Game for Learning Healthy Life", Procedia Computer Science, 2021
Publication | 3% |
| 2 | Submitted to Chandigarh University
Student Paper | 2% |
| 3 | Submitted to Asia Pacific University College of Technology and Innovation (UCTI)
Student Paper | 1 % |
| 4 | Submitted to International School Haarlem
Student Paper | 1 % |
| 5 | Submitted to University of St Mark and St John
Student Paper | 1 % |
| 6 | Submitted to American Heritage School
Student Paper | 1 % |
| 7 | Submitted to University of East London
Student Paper | 1 % |

8	Internet Source	1 %
9	Submitted to GNA University Student Paper	<1 %
10	Submitted to Leicester College Student Paper	<1 %
11	Submitted to The Mico University College Student Paper	<1 %
12	Submitted to CSU, San Jose State University Student Paper	<1 %
13	Alan Dinevan. "Human computer interactive system for fast recovery based stroke rehabilitation", 2011 11th International Conference on Hybrid Intelligent Systems (HIS), 12/2011 Publication	<1 %
14	www.curiousworld.com Internet Source	<1 %
15	Submitted to University of Queensland Student Paper	<1 %
16	J.W. Bur. "Augmented Reality Games for Upper-Limb Stroke Rehabilitation", 2010 Second International Conference on Games and Virtual Worlds for Serious Applications, 03/2010 Publication	<1 %

17	Submitted to Universidad Europea de Madrid Student Paper	<1 %
18	Submitted to City College Brighton and Hove Student Paper	<1 %
19	Submitted to Higher Education Commission Pakistan Student Paper	<1 %
20	Submitted to Stourbridge College Student Paper	<1 %
21	Submitted to Charles Sturt University Student Paper	<1 %
22	Submitted to Free University of Bolzano Student Paper	<1 %
23	Submitted to Galen College Student Paper	<1 %

Exclude quotes On
Exclude bibliography On

Exclude matches < 10 words