Contents:

Game Design Document:

The 3 Game Ideas:

- **Story**

Synopsis:

Several different, popular, children short stories, will be selected. These stories will be displayed on screen with parts of it or some of the characters of the story hidden. The player, will then, exit the text screen to an adventure based, playable level where the player has to identify the missing components from the story and bring them back in to the text screen. This helps the player to identify characters, letters and words, provide a better understanding of stories.

Genre: Puzzle, Adventure

Target Audience: An audience of over 6 years can play this game. The stories selected will be suitable to their age.

Art Style: 2D

Platform: Android

- **Word-Darts:**

Synopsis:

Various animals, domestic, wild and so on., will be displayed on a dart board and a single one among them will be asked to be targeted. The player must swipe on the screen to hit the animal, while the dart board keeps spinning at different speeds. The speed increases as the game progresses.

Genre: Puzzle, Casual

Target Audience: This game is suitable for an audience of 5 years and above.

Platform: Android

- **Math Homework:**

  Synopsis:

  A kid is solving his math problems in his notebook, but he keeps getting bored, looking at the blank colorless pages in his book. So, he begins playing a game in his head while solving his math problems.

  Genre: Puzzle, Learning

  Target Audience: Since, its just math, anyone who wants to improve their existing math skill may play this game, but it is mainly focused on children of age 5 and above.

Critical Analysis:

All the ideas listed above are easy to implement and help in different learning outcomes while still maintaining the fun in them. But "Math Homework" is more difficult, interesting and can actually increase an individual's interest in the subject if executed right. Large amounts of research have been done and app stores checked to see if a game of this kind and target has ever been made. There are some of them with similar ideas but could not live up to expectations. It region of the market is still unexplored.

Introduction to "Math Homework":

A mathematics notebook, at least in elementary school, consists of white pages with blue vertical and horizontal lines forming a grid. This grid serves the purpose of helping the student stay within bounds. It's a good procedure but makes the work boring. "Math Homework" takes place in a child's mind, while he is trying to solve actual problems in his notebook. In the child's head, his math problems are colored gems that he is trying to count, in a given time frame.

Gameplay:

The player has to from the question, i.e., form an equation for the final answer that is provided, by collecting the numbers and signs. Finally, when the correct answer is reached, the player has to collect the equal to (=) sign to finish the sum. If the question is too hard, there is a reset button that can be collected, to provide a new question, with a 5 second time penalty. The final score is determined by the total number of questions solved.

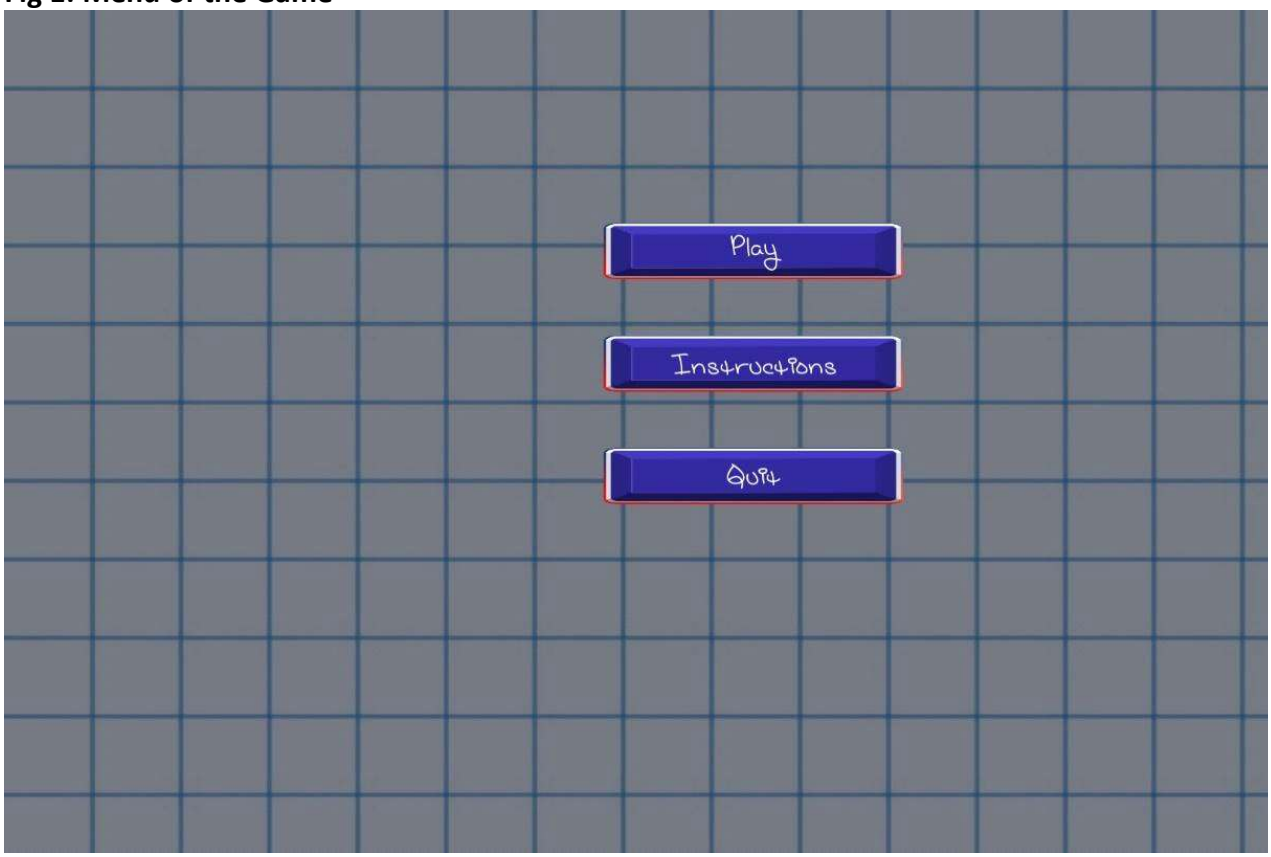
Game Mechanics:

The player-controlled object is a red colored gem, which can be dragged across the screen to collect the numbers and signs. The numbers and signs will only be acknowledged after a collision with the red colored gem. Two numbers can be collected consecutively to give form double digit numbers and three numbers can be collected consecutively to give triple digit numbers and so on. No two signs can be collected consecutively. Each equation solved will increase the timer by 10 additional seconds and increase the score by 10. Each time the reset button is collected, the time is reduced by 5 seconds. Wrong answer leads to negative scoring by 5.

Menu and UI:

The menu background is a notebook, because it holds a significant importance and also because the child is solving the problems in the notebook. The buttons were designed in Adobe Photoshop and a font was used for text.

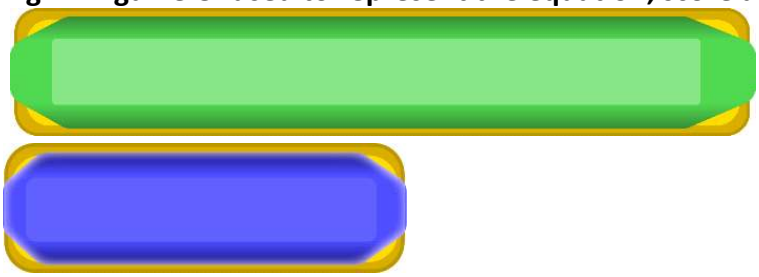
Fig 1: Menu of the Game



All the three buttons perform the necessary functions. The “Play” button takes the

player to the game, “Instructions” will display the instructions on how to play the game, and “Quit” exits the game.

Fig 2: In game UI used to represent the equation, score and timer



The score is displayed in the top left corner, the equation in the center and the timer in the top right corner.

Fig 3: Score, Timer and Equation

Asset Design:

The Assets were designed after the prototype of the game had been made. Except for the Menu Scene buttons all the other buttons were designed in Adobe Illustrator. The assets don’t have any animations.

Fig 4: Player Controlled Asset:

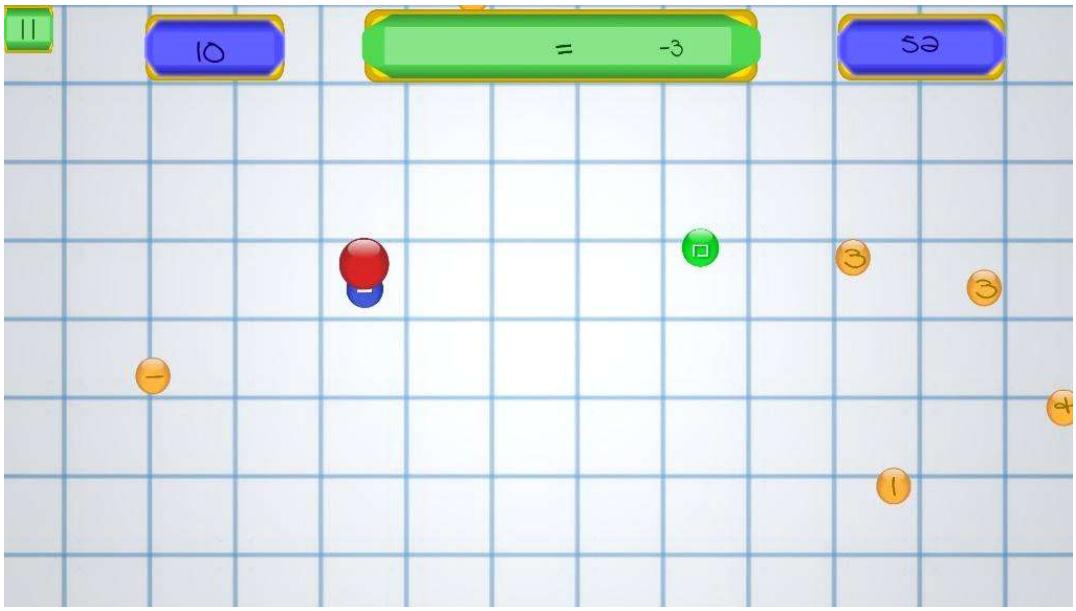
Fig 5: Collectable Assets:

Collectable assets are of two types, namely the numbers and the signs.

Level Design:

The visual theme of the game is to represent a reimagined notebook in the mind of a child to improve his/her interest in math by making it fun. The game contains two modes, easy and hard mode. The easy mode contains addition and subtraction of single digit numbers and the hard mode contains addition and subtraction of double digit numbers, with reduced time amount and increased reward.

Fig 6: Easy Mode of the game



Software Utilized:

Adobe Illustrator and photoshop were used to create the assets.

Photoshop:

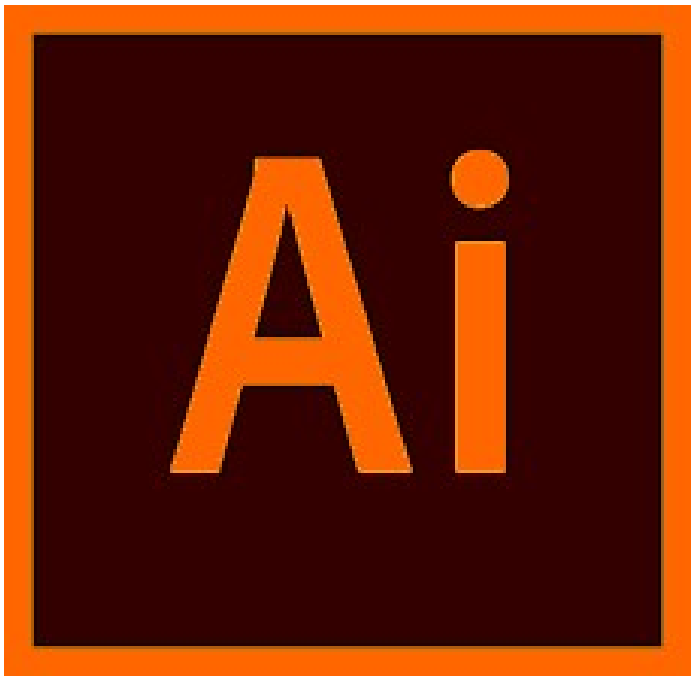
Adobe Photoshop is a software developed and maintained by Adobe Systems. It is mostly used to edit photographs and for digital painting. It has a lot of functionality built into it over the years, drastically improving it. It was initially released on 19th February 1990. It targets both Windows and Mac systems for both 32-bit and 64-bit architecture. The very first versions of Photoshop were numbered with each successive release getting a higher number. With the introduction of Creative Suite (CS), each version was prefixed with CS and a number, like CS2, CS3, etc., Till the version CS6, consumer could buy the product and own it for lifetime (as long as the hardware or future software supports it.) After CS versions were done with, Adobe came up with Creative Cloud (CC), where consumers had to subscribe to the product monthly or annually.

Fig 7: Photoshop CC

Adobe Illustrator:

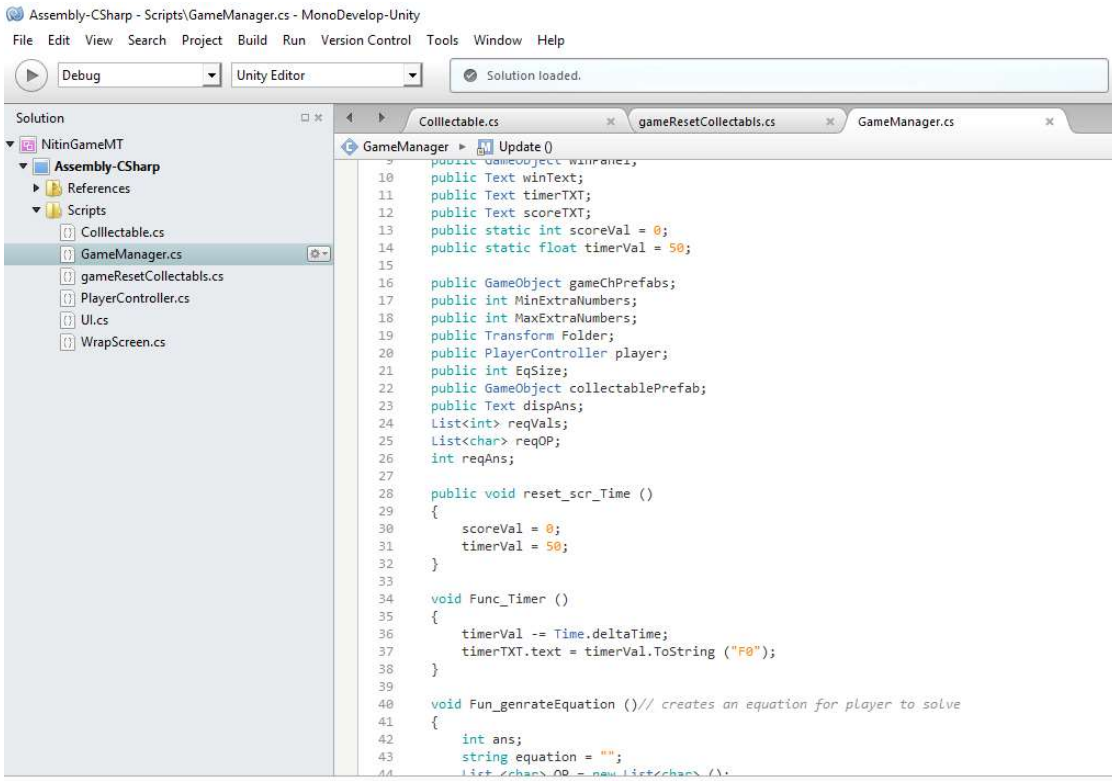
Adobe Illustrator is a proprietary software developed and maintained by Adobe Systems. It uses scalable vector graphics, instead of raster graphics, which enables unlimited scaling of the image i.e., no quality loss upon scaling.

Fig 7: Adobe Illustrator

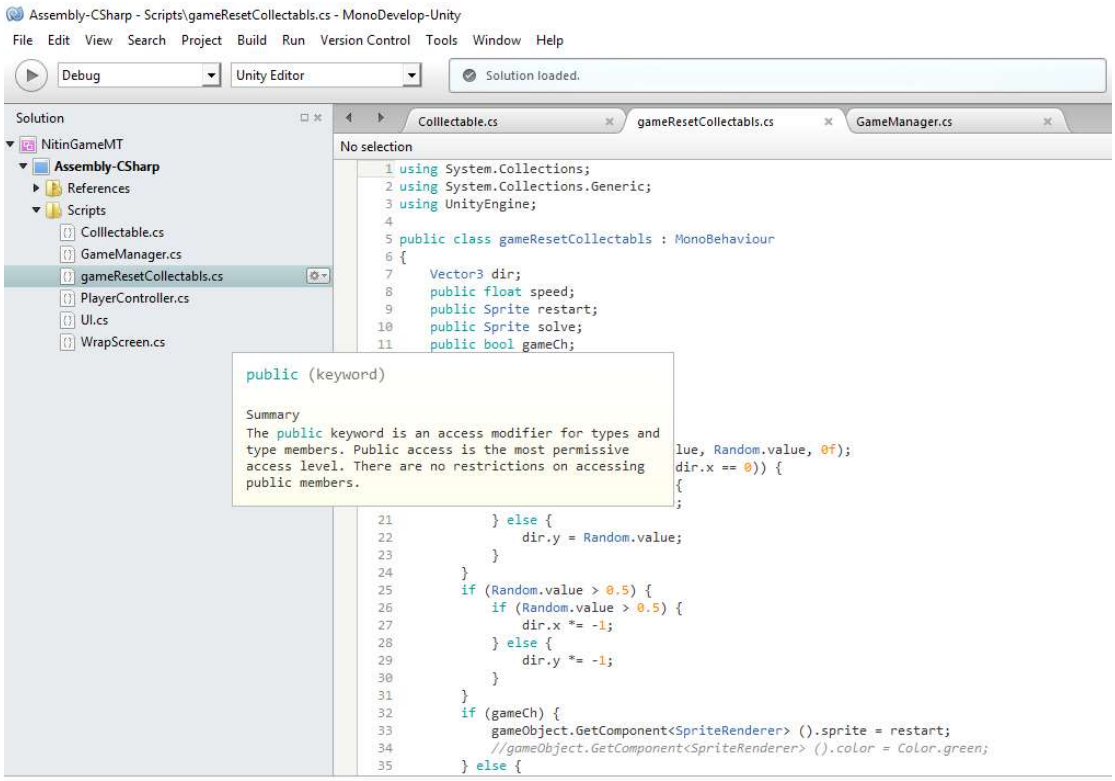


Code Snippets:

Game Manager Script:



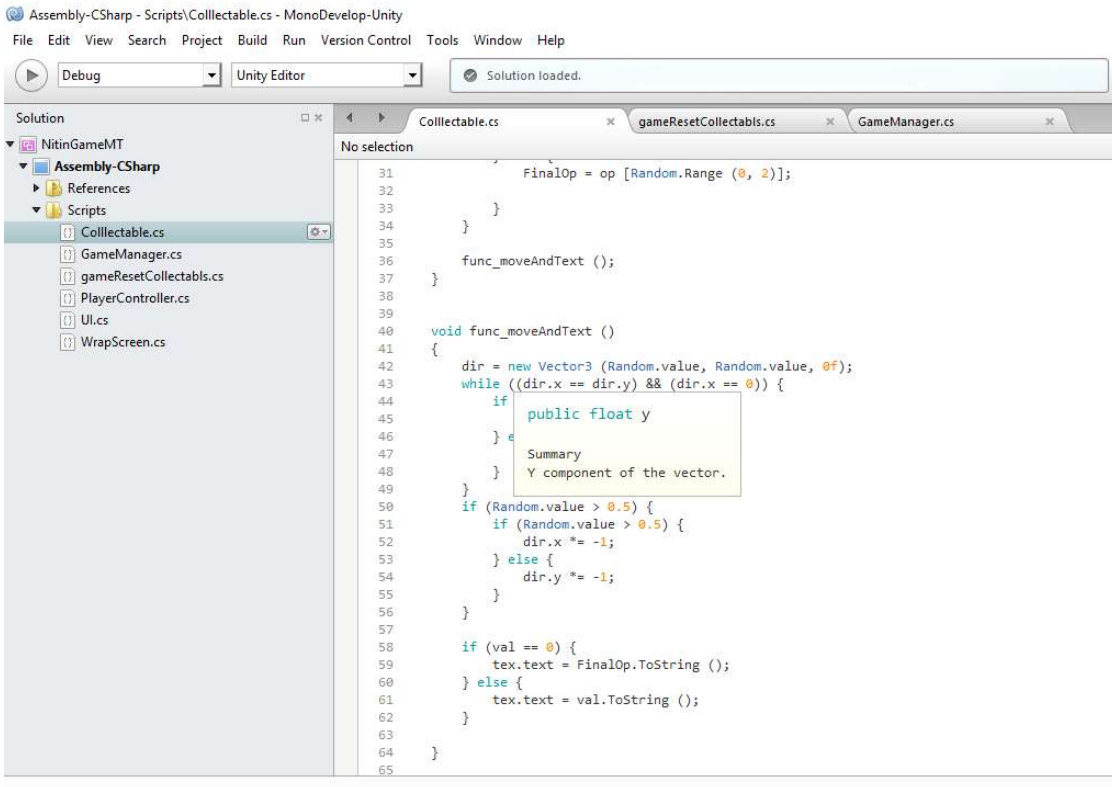
Reset Collectable Script:




```
1  using System.Collections;
2  using System.Collections.Generic;
3  using UnityEngine;
4
5  public class gameResetCollectabls : MonoBehaviour
6  {
7      Vector3 dir;
8      public float speed;
9      public Sprite restart;
10     public Sprite solve;
11     public bool gameCh;
```

```
lue, Random.value, 0f);
dir.x == 0)) {
{
;
21             } else {
22                 dir.y = Random.value;
23             }
24         }
25         if (Random.value > 0.5) {
26             if (Random.value > 0.5) {
27                 dir.x *= -1;
28             } else {
29                 dir.y *= -1;
30             }
31         }
32         if (gameCh) {
33             gameObject.GetComponent<SpriteRenderer> ().sprite = restart;
34             //gameObject.GetComponent<SpriteRenderer> ().color = Color.green;
35         } else {
```

Collectable Script



Credits:

Fonts used in the game:

Catholicschoolgirls by Nate Piekos

References:

- Knoll, T., Knoll, J., Narayanan, S. and Williams, R. (2012). *Adobe Photoshop*. Adobe Systems.
- Webdesigner Depot. (2010). *20 Years of Adobe Photoshop | Webdesigner Depot*. [online] Available at: https://www.webdesignerdepot.com/2010/02/20-years-of-adobe-photoshop/ [Accessed 24 Apr. 2018].