Mathnado

Game Design Document

Paul Killman

Killman Media Productions

11/8/2022

Contents:

[Overview: 4](#_Toc118814834)

[Game Description: 4](#_Toc118814835)

[Game Technical: 4](#_Toc118814836)

[Game Play: 4](#_Toc118814837)

[ Duration 4](#_Toc118814838)

[ Questions 5](#_Toc118814839)

[ Duration-Duration 5](#_Toc118814840)

[ Question-Duration 6](#_Toc118814841)

[ Speed Play. 7](#_Toc118814842)

[ Death. 8](#_Toc118814843)

[Difficulty Table: 9](#_Toc118814844)

[AI Difficulty Percentages: 9](#_Toc118814845)

[Levels: 9](#_Toc118814846)

[High Scores: 9](#_Toc118814847)

[Winning: 10](#_Toc118814848)

[Technical: 10](#_Toc118814849)

[ UI: 10](#_Toc118814850)

[ Events: 11](#_Toc118814851)

[o General 11](#_Toc118814852)

[o Main Menu 11](#_Toc118814853)

[o Gameplay 11](#_Toc118814854)

[ House Placement: 12](#_Toc118814855)

[Screens: 12](#_Toc118814856)

[ Splash – Splash Scene 12](#_Toc118814857)

[ Opening – Opening Scene 12](#_Toc118814858)

[ Main Menu – UI Scene 12](#_Toc118814859)

[ High Scores – UI Scene 12](#_Toc118814860)

[ Custom Game Settings – UI Scene 12](#_Toc118814861)

[ How To Play – UI Scene 12](#_Toc118814862)

[ Game – Game Scene(s) 12](#_Toc118814863)

[ Game Over – UI Scene 12](#_Toc118814864)

[ Winner – UI Scene 12](#_Toc118814865)

[ Loser – UI Scene 12](#_Toc118814866)

# Overview:

## Game Description:

* Genre: Educational.
* Elements: Answering math questions.
* Content: Humor.
* Theme: Fantasy.
* Style: Cartoon.
* Sequence: Increasingly difficult math tests.
* Player: One or Two players.
* Player Immersion: Mental.

## Game Technical:

* From: 2D graphics/animation.
* View: Third Person/Platformer.
* Platform: Unity/C#
* Device: PC, Android, WebGL

## Game Play:

## Duration

* + Duration X minutes
    - Easy – 3 minutes
    - Average – 5 minutes
    - Hard – 10 minutes
    - Insane – 30 minutes
    - Custom
  + Answer as many questions as possible
  + Scoring:
    - While round is being played:
      * The player gets 10 points for each correct answer.
      * If player has gotten 10 number of answers correct in a row, there will be a correct answer multiplier of 2
        + Have some type of animation or SFX to show that the player earned the bonus.
    - After round is finished
      * Calculate number of cottages remaining as a percentage value between 0 and 1. Then add the value to 1 and multiply the score by this value. Example 100% of cottages = 1. 1 + 1 = 2. Multiply the score by 2.
    - Lower limit to upper limit range. When calculating the range, don’t forget to add 1 to the total. (10 – 0 = 10, but the range is 11) Divide this range by 100 and then add it to 1. Example the lower limit is 0 and the upper limit is 10. This gives a range of 11. 11/100 = .11. 1 + .11 = 1.11. Multiply the score by this value.

## Questions

* + Answer a set number of questions
    - Easy – 15 Questions
    - Average – 30 Questions
    - Hard – 50 Questions
    - Insane – 100 Questions
    - Custom
  + Scoring:
    - While round is being played:
      * The player gets 10 points for each correct answer.
      * If player has gotten 10 number of answers correct in a row, there will be a correct answer multiplier of 2
        + Have some type of animation or SFX to show that the player earned the bonus.
    - After round is finished
      * Bonus timer X minutes – *These may be too easy*
        + Easy – 2.5 minutes (10 sec/question)
        + Average – 2.5 minutes (5 sec/question)
        + Hard – 2.5 minutes (3 sec/question)
        + Insane – 2.5 minutes (1.5 sec/question)
        + Multiply the number of seconds remaining by 10. (2.5 minutes = 150 seconds)
      * Calculate number of cottages remaining as a percentage value between 0 and 1. Then add the value to 1 and multiply the score by this value. Example 100% of cottages = 1. 1 + 1 = 2. Multiply the score by 2.
      * Lower limit to upper limit range. When calculating the range, don’t forget to add 1 to the total. (10 – 0 = 10, but the range is 11) Divide this range by 100 and then add it to 1. Example the lower limit is 0 and the upper limit is 10. This gives a range of 11. 11/100 = .11. 1 + .11 = 1.11. Multiply the score by this value.

## Duration-Duration

* + Duration X minutes
    - Easy – 3 minutes
    - Average – 5 minutes
    - Hard – 10 minutes
    - Insane – 30 minutes
    - Custom
  + Answer each question in X seconds
    - Easy – 10 seconds/question
    - Average – 5 seconds/question
    - Hard – 3 seconds/question
    - Insane – 1.5 seconds/question
    - Custom
  + Scoring:
    - While round is being played:
      * The player gets 10 points for each correct answer.
      * If player has gotten 10 number of answers correct in a row, there will be a correct answer multiplier of 2
        + Have some type of animation or SFX to show that the player earned the bonus.
    - After round is finished
      * Calculate number of cottages remaining as a percentage value between 0 and 1. Then add the value to 1 and multiply the score by this value. Example 100% of cottages = 1. 1 + 1 = 2. Multiply the score by 2.
      * Lower limit to upper limit range. When calculating the range, don’t forget to add 1 to the total. (10 – 0 = 10, but the range is 11) Divide this range by 100 and then add it to 1. Example the lower limit is 0 and the upper limit is 10. This gives a range of 11. 11/100 = .11. 1 + .11 = 1.11. Multiply the score by this value.

## Question-Duration

* + Answer a set number of questions
    - Easy – 15 Questions
    - Average – 30 Questions
    - Hard – 50 Questions
    - Insane – 100 Questions
    - Custom
  + Answer each question in X seconds
    - Easy – 10 seconds/question
    - Average – 5 seconds/question
    - Hard – 3 seconds/question
    - Insane – 1.5 seconds/question
    - Custom
  + Scoring:
    - While round is being played:
      * The player gets 10 points for each correct answer.
      * If player has gotten 10 number of answers correct in a row, there will be a correct answer multiplier of 2
        + Have some type of animation or SFX to show that the player earned the bonus.
    - After round is finished
      * Calculate number of cottages remaining as a percentage value between 0 and 1. Then add the value to 1 and multiply the score by this value. Example 100% of cottages = 1. 1 + 1 = 2. Multiply the score by 2.
      * Lower limit to upper limit range. When calculating the range, don’t forget to add 1 to the total. (10 – 0 = 10, but the range is 11) Divide this range by 100 and then add it to 1. Example the lower limit is 0 and the upper limit is 10. This gives a range of 11. 11/100 = .11. 1 + .11 = 1.11. Multiply the score by this value.

## Speed Play.

* + Each player has a duration timer. Duration X minutes
    - Easy – 3 minutes
    - Average – 5 minutes
    - Hard – 10 minutes
    - Insane - 30 minutes
    - Custom – Each player can set their own amount of time. This will allow a player to be handicapped.
  + When one player answers question, their timer stops, and other players timer activates. If one player is out of time, the other player continues to play until they’re out of time as well.
  + Scoring:
    - While round is being played:
      * The player gets 10 points for each correct answer.
      * If player has gotten 10 number of answers correct in a row, there will be a correct answer multiplier of 2
        + Have some type of animation or SFX to show that the player earned the bonus.
    - After round is finished
      * Calculate number of cottages remaining as a percentage value between 0 and 1. Then add the value to 1 and multiply the score by this value. Example 100% of cottages = 1. 1 + 1 = 2. Multiply the score by 2.
      * Lower limit to upper limit range. When calculating the range, don’t forget to add 1 to the total. (10 – 0 = 10, but the range is 11) Divide this range by 100 and then add it to 1. Example the lower limit is 0 and the upper limit is 10. This gives a range of 11. 11/100 = .11. 1 + .11 = 1.11. Multiply the score by this value.
      * Subtract .1 point for every second initially set on the duration timer. Round to the nearest 1.

## Death.

* + Game continues until one player loses all houses
  + Scoring:
    - While round is being played:
      * The player gets 10 points for each correct answer.
      * If player has gotten 10 number of answers correct in a row, there will be a correct answer multiplier of 2
        + Have some type of animation or SFX to show that the player earned the bonus.
    - After round is finished
      * Calculate number of cottages remaining as a percentage value between 0 and 1. Then add the value to 1 and multiply the score by this value. Example 100% of cottages = 1. 1 + 1 = 2. Multiply the score by 2.
      * Lower limit to upper limit range. When calculating the range, don’t forget to add 1 to the total. (10 – 0 = 10, but the range is 11) Divide this range by 100 and then add it to 1. Example the lower limit is 0 and the upper limit is 10. This gives a range of 11. 11/100 = .11. 1 + .11 = 1.11. Multiply the score by this value.
      * Subtract .1 point for every second initially set on the duration timer. Round to the nearest 1.

## Difficulty Table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Easy | Average | Hard | Insane |
| Number of Lives (1 - 5) | 5 | 3 | 2 | 1 |
| Duration (1 - 30) | 3 | 5 | 10 | 30 |
| Timer (1 - 20) | 10 | 5 | 3 | 2 |
| Number of Question (1 - 100) | 10 | 30 | 50 | 100 |
| AI Intelligence (1 - 10) | 3 | 5 | 8 | 10 |
| Lower Limit (0 - 99) | 0 | 0 | 0 | 0 |
| Upper Limit (1 - 100) | 10 | 10 | 50 | 100 |

## AI Difficulty Percentages:

|  |  |  |  |
| --- | --- | --- | --- |
| Level | % Correct | Level | % Correct |
| 1 | 82% | 6 | 92% |
| 2 | 84% | 7 | 94% |
| 3 | 86% | 8 | 96% |
| 4 | 88% | 9 | 98% |
| 5 | 90% | 10 | 99% |

The computer does a % check against the table above. If the result is higher or equal to the % Correct figure, the computer picks an incorrect answer.

## Levels:

* Default
  + Five cottages on each side
* Wizard of Oz
  + Old lady on bicycle
  + Witch on broomstick
* Farm
  + Fields/Crops
  + Farm Animals – especially cows
* Ground War
  + Each side has troops attacking the other side. Mathnado will destroy troops as they pass by on wrong answer.
* Air War
  + Each side has a flight of fighter planes. Mathnado will destroy planes as they pass by on wrong answer.

## High Scores:

* Only show top ten in each location? Should the website have more information or possibly be sorted by location and then game type? Break world into regions? Have an Overall Global High Scores?
* Local:
  + This is saved only on the local device
* Global:
  + This is saved on the website
* Game Type:
  + Winner Name
  + Winner Score
  + Difficulty

## Winning:

* Printable certificate?
* Coloring pages based on the level chosen.
* Post to High Scores on website?

# Technical:

## UI:

* + Colors:
    - Mathnado (This includes cloud swirl, debris & debris cloud)
      * Mellow – 44, 195, 185, 255
      * Angry – 39, 7, 7, 255
    - Sky
      * Mellow – 139, 220, 229, 255
      * Angry – 32, 51, 58, 255
  + Buttons
    - Sprites change when highlighted or selected.
      * Black background – unselected
      * White background – selected
  + Tool tips
    - Each control should have a tool tip
  + Volume Controls
    - Music Volume
    - SFX Volume
  + Custom Settings

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Duration (0) | Questions (1) | Duration/Timer (2) | Question/Timer (3) | Speed (4) | Death (5) |
| Number of Lives (1-5) | X | X | X | X | X | X |
| Duration (1-30) | X |  | X |  | X |  |
| Number of Questions (1-100) |  | X |  | X |  |  |
| Timer (1-20) |  |  | X | X |  |  |
| AI Intelligence (1-10) | X | X | X | X | X | X |
| Lower Limit (0-99) | X | X | X | X | X | X |
| Upper Limit (1-100) | X | X | X | X | X | X |

## Events:

## General

* + - Load Next Scene
    - Load Previous Scene
    - Load Specific Scene

## Main Menu

* + - Change custom difficulty settings – this affects the Custom Settings script.
    - Change game type – this affects the Custom Settings script.

## Gameplay

* + - Question timer complete
      * Active player loses house
      * Active player reset run for 10 in a row
    - Wrong answer
      * Active player loses house
      * Active player reset run for 10 in a row
    - Correct answer
      * Active player increases score
      * Check for 10 in a row
    - Round timer complete
      * Calculate final score
    - Number of questions complete
      * Calculate final score
    - Last house destroyed
      * Calculate final score
    - Both duration timers complete.
      * Calculate final score

## House Placement:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| House Placement | | | | | | | | | | | | | | |
| **1** |  |  |  | H |  |  |  |  |  |  | H |  |  |  |
| **2** |  |  | H |  | H |  |  |  |  | H |  | H |  |  |
| **3** |  | H |  | H |  | H |  |  | H |  | H |  | H |  |
| **4** |  | H | H | H | H |  |  |  |  | H | H | H | H |  |
| **5** |  | H | H | H | H | H |  |  | H | H | H | H | H |  |
|  | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** |

# Screens:

## Splash – Splash Scene

## Opening – Opening Scene

## Main Menu – UI Scene

## High Scores – UI Scene

## Custom Game Settings – UI Scene

## How To Play – UI Scene

## Game – Game Scene(s)

## Game Over – UI Scene

## Winner – UI Scene

## Loser – UI Scene