Flying Panther Games

Game Concept for:

Maths Burst

**The Latest Single Person Adventure Maths Game**

**Maths To survive!!!**

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Version # 1.0

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# Design History

Design History is used to track modifications made to the document, including the version number, modifiers name, and date of modification.

## Version 1.0

Name: Justin Pettit & Daniel Manganaro

Date: 7th April 2015

Modification: Initial design.

# Introduction

Maths Burst is an educational first person Adventure game designed to help gamers practice their maths skills. Players must navigate through the 3D world and find the question numbers then answer a maths question that will unlock the path to the final goal and complete the game. The included maths problems are designed to accommodate an age range of 8 – 9 years of age.

# Game Overview

## Philosophy

### Philosophical Point #1

Maths Burst is an educational game that attempts to provide an exciting and enjoyable gaming experience for the player, whilst also helping them improve their maths skills. The game is not based on any known games, however it is acknowledged that the concept of an educational maths game is not original.

### Philosophical Point #2

The game is aimed at children aged 8 to 9 years of age based on the current question list provided.

### Philosophical Point #3

The game is designed to run on Windows XP/ Vista/7 or higher. The reason for this is that most schools use the Windows operating system, as well as many general home users, so this platform will provide the greatest potential for exposure.

## Common Questions

### What is the game?

Maths Burst is an educational maths game targeted at school children aged 8 to 9 years of age. The game is a first person Adventure game set in a 3D outdoor environment. The player must successfully navigate through the world to find the numbers that are displayed, whilst avoiding the persistent monster. The user must find each number in the world then successfully answer the randomly generated maths question before they can proceed to the next question. The path to the final goal is unlocked after all ten questions are answered. If the monster makes contact with the player then the players health is diminished until eventually the player is killed and the game is lost. The player then has the option to restart the game or exit. Because the questions are randomly generated then there is minimal possibility of repeated questions.

### Why create the game?

Basic skills such as maths are essential in the modern world, but they are not always the most entertaining skills to learn. On the other hand, computer games can be very entertaining and are now common place in many households and regularly played by children under the age of 12. Combining maths questions into a computer game provides the opportunity, if done properly, to develop the maths skills of children whilst keeping them engaged in an entertaining and interactive computer game.

### Where does the game take place?

Maths Burst is set in a 3 dimensional world. The player starts in a forest and must answer the questions to make their way back to their home village.

### What do I control?

The player controls the on screen character, navigating through the world in a first person point of view. When a number is located the player must approach the number to activate a maths question. The player will then be responsible for answering the maths question.

### What is the main focus?

The aim of Maths Burst is to navigate through the world, find the numbers and correctly answering the maths problems posed.

### What’s different?

Unlike some other maths games available, Maths Burst provides an interactive, entertaining and engaging game play first, then the maths problems have been adapted to fit into the game. This ensures younger players remain engaged in playing the game instead of being overloaded with maths problems and losing interest.

### What is the genre of the game?

Maths Burst is a first person Educational Adventure game. The primary genre is Education however; to deliver a successful educational game capable of keeping the target audience engaged it is necessary to add some entertaining and interesting characteristics to the game play thus the Adventure genre is also included when describing Maths Burst.

# Feature Set

## General Features

* Large 3D game world with realistic terrain and models
* 3D Graphics
* 32-bit colour
* Simple keyboard and mouse navigation
* Collision Detection for realism
* Realistic monster AI
* Realistic sound effects and modern background music

## Multiplayer Features

* Nil. Maths Burst is not designed as a multiplayer game.

## Gameplay

* Basic storyline applied as the player navigates to each number, answers questions and deals the monster in hot pursuit.
* Level objectives – find each number in sequence and answer questions. If question is answered incorrectly the question is displayed for the player until the question is answered correctly
* Number Locations placed in random locations
* Hidden areas unlocked after a certain number of questions have been answered.

# The Game World

## Overview

The game world for Maths Burst is a 3D environment set in a forest and an outdoor small village. The weather is fine with clear blue skies and general midday lighting.

## The Physical World

### Overview

The game world is built on a realistic 3D terrain, with models and sky box added for realism.

### Key Locations

* Starting point in the woods
* Home Village in the fields
* Hidden areas unlocked when correct number of questions answered

### Travel

The player navigates through the world using the keyboard. Keys ‘W’, ‘S’, ‘A’ and ‘D’ are used to navigate through the world and the mouse is used to move the eye focus of the player.

### Scale

An experimental scale of 10:1 will be setup to see how the game plays and aligns with the terrain and models and adjusted accordingly.

### Objects

The following objects will be employed the development of the 3D game world:

* 3D terrain
* Trees
* House/shack models
* Monster
* Numbers

### Weather

The weather will be day time, fine and sunny. This will be static throughout the game.

### Time

There will be no direct correlation between real time and time in the game. However, at the start of the search for each question a 5 minute head start will be provided to the player over the monster, to find the number, before they actively start seeking them.

# Rendering

### Overview

The game will be rendered in 3D using OpenGL.

# Camera

### Overview

The camera will be set in a first person perspective, allowing the player to navigate through the world as if they were actually there.

The operation of the camera will be fairly basic, using the glut ‘glLookAt’ for camera location and indicate what the player is looking at.

# Game Engine

### Overview

The game engine will create realistic 3D terrain and render both the terrain and models. It will also provide a first person camera point of view, collision detection for the camera, and basic Artificial Intelligence through a state machine.

### Collision Detection

Collision detection in the game is achieved by using bounding boxes. This ensures the player is not able to ‘walk through walls’ or any similar unrealistic feats.

# Lighting

### Overview

The Slope Lighting technique will be used to create realistic lighting effects in the 3D world.

### Lighting Model Detail

A separate class for ‘Slope Lighting’ will be created to handle the creation of slope lighting data for the 3D world. A static light source will be used to ensure that the light map is only created once. This technique also allows an effective technique to light static object in the world.

# The World Layout

### Overview

The world will be generated from a height map so that certain aspect of the terrain can be controlled. This will allow correct placement of models on the terrain to ensure a realistic 3D world.

### World Layout Detail

A height map will be created with the placement of the forest and the village in mind. This will ensure that house models are correctly placed in realistic areas, not hanging off the side of a cliff. The height map will also enable the development of paths etc as required for guidance of the player through the world as required, and also the creation of hidden worlds as necessary.

# Game Characters

### Overview

The only 2 characters in the game will be the player and the monster. Because the player will be represented from a first person point of view there will be no physical character displayed for them.

### Main Character

The main character will only be displayed through a first person point of view. They will have a health bar displayed in the main game screen that shows their current health status. Each time the monster makes contact with the player the health bar will be reduced until finally the player is killed and the game ends.

### Enemies and Monsters

The monster will be based on a typical 8 – 10 year old perception of a monster so as not to provide a terrifying visual for the target audience. The monster will not be able to be killed, instead only presents a looming threat to the player, with the ability to terminate the game if they contact the player.

# User Interface

### Overview

The game will consist of 3 main screens, or user interfaces, namely a Title Screen, the main Game Screen and a High Scores Screen.

### Title Screen

The title screen will consist of the game name and 3 options; Play Game, High Scores and Quit.

### Main Game Screen

The main Game screen will have a basic Head-Up-Display which shows vital statistics for the player such as health, the current question they’re on etc.

### High Score Screen

Displays the top 10 high scores of the game.

# Music and Sound effects

### Overview

Suitable music and sound effects will be implemented where appropriate to provide realism to the game. The music and sound effects will be selected to suit the target audience. Sound effects will be implemented to indicate when the player has taken damage, correctly or incorrectly answered questions and passed the level.