Game Development Report

Game Title: Road Rush
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Subject: Game Programming with Data Structures - Section: 1 - PROG2370
Date: Sunday, December 8th

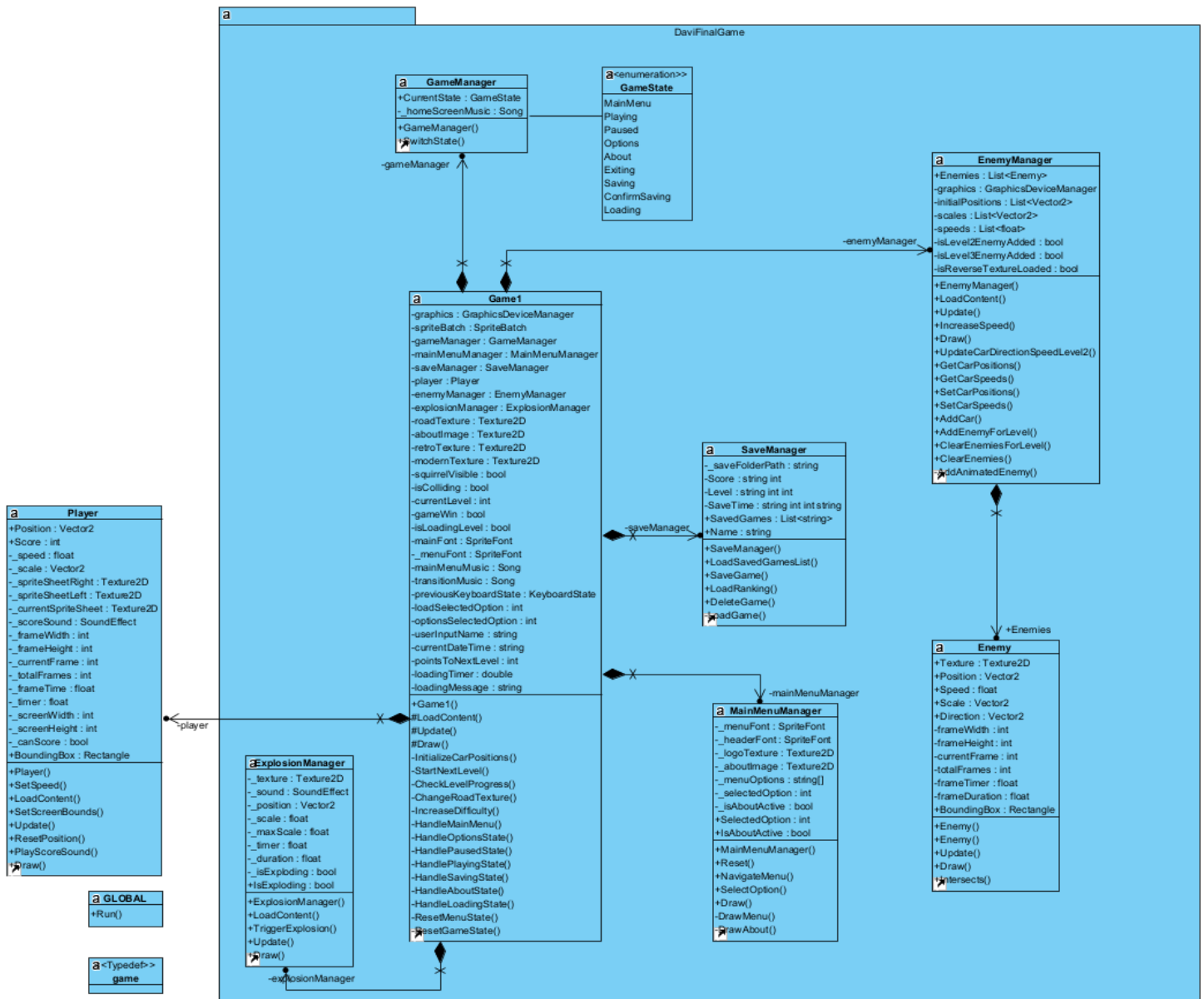## 1. Game Description and Features

Game Description

Road Rush is an engaging 2D arcade-style game where players navigate a fast-paced road while controlling a squirrel attempting to avoid obstacles and score points. The game features diverse environments, including retro and modern visual themes, offering a challenging and immersive gameplay experience.

Game Features

- **Dynamic Gameplay:** Player control a smoothly animated squirrel character, crossing roads while avoiding speeding cars.

- **Level Progression:** The game offers three levels with increasing difficulty, introducing unique challenges and new enemies in Levels 2 and 3.

- **Save and Load System:** Players can save their progress and continue later. The game saves ranking by scores, from highest to lowest (including date and time).

- **Audio and Visuals:** Includes background music, sound effects, and polished art with animated sprites.

- **Customization Options:** Players can toggle between retro and modern themes for visuals.

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2. Class Diagram

A comprehensive class diagram representing the main game classes and their relationships is included. The diagram illustrates core components such as GameManager, EnemyManager, Player, SaveManager, and Enemy, along with their attributes and methods. In the image below, the project diagram in Visual Paradigm format:

DaviFinalGame

a

GameManager
+CurrentState : GameState
-_homeScreenMusic : Song
+GameManager()
+SwitchState()

a <<enumeration>>
GameState
MainMenu
Playing
Paused
Options
About
Exiting
Saving
ConfirmSaving
Loading

-gameManager

a **EnemyManager**
+Enemies : List<Enemy>
-graphics : GraphicsDeviceManager
-initialPositions : List<Vector2>
-scales : List<Vector2>
-speeds : List<float>
-isLevel2EnemyAdded : bool
-isLevel3EnemyAdded : bool
-isReverseTextureLoaded : bool
+EnemyManager()
+LoadContent()
+Update()
+IncreaseSpeed()
+Draw()
+UpdateCarDirectionSpeedLevel2()
+GetCarPositions()
+GetCarSpeeds()
+SetCarPositions()
+SetCarSpeeds()
+AddCar()
+AddEnemyForLevel()
+ClearEnemiesForLevel()
+ClearEnemies()
+AddAnimatedEnemy()

-enemyManager

a **Game1**
-graphics : GraphicsDeviceManager
-spriteBatch : SpriteBatch
-gameManager : GameManager
-mainMenuManager : MainMenuManager
-saveManager : SaveManager
-player : Player
-enemyManager : EnemyManager
-explosionManager : ExplosionManager
-roadTexture : Texture2D
-aboutImage : Texture2D
-retroTexture : Texture2D
-modernTexture : Texture2D
-squirrelVisible : bool
-isColliding : bool
-currentLevel : int
-gameWin : bool
-isLoadingLevel : bool
-mainFont : SpriteFont
-_menuFont : SpriteFont
-mainMenuMusic : Song
-transitionMusic : Song
-previousKeyboardState : KeyboardState
-loadSelectedOption : int
-optionsSelectedOption : int
-userInputName : string
-currentDateTime : string
-pointsToNextLevel : int
-loadingTimer : double
-loadingMessage : string
+Game1()
#LoadContent()
#Update()
#Draw()
-InitializeCarPositions()
-StartNextLevel()
-CheckLevelProgress()
-ChangeRoadTexture()
-IncreaseDifficulty()
-HandleMainMenu()
-HandleOptionsState()
-HandlePausedState()
-HandlePlayingState()
-HandleSavingState()
-HandleAboutState()
-HandleLoadingState()
-ResetMenuState()
-ResetGameState()

a **SaveManager**
-_saveFolderPath : string
-Score : string int
-Level : string int int
-SaveTime : string int int string
+SavedGames : List<string>
+Name : string
+SaveManager()
+LoadSavedGamesList()
+SaveGame()
+LoadRanking()
+DeleteGame()
+LoadGame()

-saveManager

a **Player**
+Position : Vector2
+Score : int
-_speed : float
-_scale : Vector2
-_spriteSheetRight : Texture2D
-_spriteSheetLeft : Texture2D
-_currentSpriteSheet : Texture2D
-_scoreSound : SoundEffect
-_frameWidth : int
-_frameHeight : int
-_currentFrame : int
-_totalFrames : int
-_frameTime : float
-_timer : float
-_screenWidth : int
-_screenHeight : int
-_canScore : bool
+BoundingBox : Rectangle
+Player()
+SetSpeed()
+LoadContent()
+SetScreenBounds()
+Update()
+ResetPosition()
+PlayScoreSound()
+Draw()

-player

a **ExplosionManager**
-_texture : Texture2D
-_sound : SoundEffect
-_position : Vector2
-_scale : float
-_maxScale : float
-_timer : float
-_duration : float
-_isExploding : bool
+IsExploding : bool
+ExplosionManager()
+LoadContent()
+TriggerExplosion()
+Update()
+Draw()

-explosionManager

a **MainMenuManager**
-_menuFont : SpriteFont
-_headerFont : SpriteFont
-_logoTexture : Texture2D
-_aboutImage : Texture2D
-_menuOptions : string[]
-_selectedOption : int
-_isAboutActive : bool
+SelectedOption : int
+IsAboutActive : bool
+MainMenuManager()
+Reset()
+NavigateMenu()
+SelectOption()
+Draw()
-DrawMenu()
-DrawAbout()

-mainMenuManager

a **Enemy**
+Texture : Texture2D
+Position : Vector2
+Speed : float
+Scale : Vector2
+Direction : Vector2
-frameWidth : int
-frameHeight : int
-currentFrame : int
-totalFrames : int
-frameTimer : float
-frameDuration : float
+BoundingBox : Rectangle
+Enemy()
+Enemy()
+Update()
+Draw()
+Intersects()

+Enemies

a **GLOBAL**
+Run()

a <<Typedef>>
game

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3. References

Assets

- **Images:**

  - Squirrel sprite: Pinterest

  - Road textures: Google Images

  - Explosion animation: Pixabay

- **Sounds:**

  - Background music: [Pixabay](#)

  - Sound effects (score, explosion): [Pixabay](#)

Tools Used

- **Development Tools:**

  - MonoGame Framework for game development.

  - Visual Studio for coding and debugging.

- **Design Tools:**

  - Paint Brush for editing and cropping images.

  - [Online-Convert.com](#) for converting .jpg to .ico files.

- **Learning Resources:**

  - eConestoga platform for learning installer creation.

  - Notepad for brainstorming and notes.

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4. Acknowledgements

AI Assistance

- "I used Copilot's AI to brainstorm ideas for game design, fix bugs, and debug the enemy management logic."

- "Copilot was instrumental in implementing the save/load system efficiently."

- "AI assistance helped clarify and correct syntax I was unfamiliar with, saving valuable development time."