Kanae Engine Virtue Documentation

Overview

Kanae Engine Virtue is a modern game engine built using C# and OpenGL through OpenTK. It provides a robust foundation for game development with an intuitive user interface powered by ImGui.NET.

System Requirements

Minimum Requirements

- Operating System: Windows 10/11 (recommended) or macOS 12+

- .NET SDK 9.0 or later

- Graphics: OpenGL 4.1 compatible GPU

- RAM: 4GB minimum

- Storage: 100MB for engine installation

Recommended Requirements

- Operating System: Windows 10/11

- .NET SDK 9.0 or later

- Graphics: Dedicated GPU with OpenGL 4.1+ support

- RAM: 8GB or more

- Storage: 1GB or more for engine and projects

Engine Architecture

Core Components

Transform System

- Position, rotation, and scale manipulation

- Parent-child hierarchy support

- World and local space transformations

GameObject System

- Component-based architecture

- Dynamic object creation and destruction

- Material and mesh handling

Scene Management

- Scene loading and saving

- Primitive object creation (cube, sphere, plane)

- Scene hierarchy management

Graphics Pipeline

Rendering System

- OpenGL 4.1 based rendering

- Forward rendering pipeline

- Material system with shader support

- Basic lighting system

Shader System

- GLSL shader support

- Vertex and fragment shader compilation

- Uniform management

- Built-in shader library

User Interface

Launcher Window

- Project creation and management

- Resolution settings (800x600 and up to 3840x2160)

- Project name configuration

- Quick launch functionality

Editor Interface

- ImGui-based UI system

- Scene hierarchy window

- Properties window with transform controls

- 3D viewport with camera controls

- Main menu system

Controls

Camera Controls

- WASD: Camera movement

- Mouse: Camera rotation

- Mouse Wheel: Zoom in/out

Interface Controls

- Left Click: Select objects

- Right Click: Context menus

- Drag & Drop: Hierarchy management

Project Structure

Directory Layout
```
Kanae/
├── Core/
│   ├── Engine/
│   └── Components/
├── Engine/
│   ├── UI/
│   ├── Shader/
│   └── Components/
└── Resources/
```

Key Files

- `Program.cs`: Engine entry point

- `KanaeCore.cs`: Core engine functionality

- `LauncherWindow.cs`: Project launcher interface

- `ImGuiController.cs`: UI system integration

Platform-Specific Considerations

Windows

- Full OpenGL support

- Native graphics driver integration

- Optimal performance

macOS

- Metal-based OpenGL implementation

- Some performance limitations

- Requires specific OpenGL context configuration

Best Practices

Project Organization

1. Use meaningful project names

2. Organize assets in appropriate folders

3. Follow the component-based architecture

4. Maintain clean scene hierarchies

Performance Optimization

1. Minimize draw calls

2. Use appropriate primitive types

3. Implement proper object pooling

4. Manage memory efficiently

Development Workflow

1. Create new project through launcher

2. Set up scene hierarchy

3. Add and configure game objects

4. Implement game logic through components

5. Test and iterate

Troubleshooting

Common Issues

Rendering Issues

- Ensure graphics drivers are up to date

- Verify OpenGL version compatibility

- Check shader compilation errors

- Validate texture formats and sizes

Performance Problems

- Monitor draw call count

- Check object hierarchy complexity

- Verify memory usage

- Profile CPU and GPU usage

Project Loading Issues

- Verify project file integrity

- Check file permissions

- Validate asset references

- Ensure correct project structure

Error Messages

- Shader compilation errors: Check GLSL version and syntax

- OpenGL context errors: Verify graphics driver compatibility

- Memory allocation errors: Monitor resource usage

- File access errors: Check permissions and paths

Support and Contact

Technical Support

For technical issues and bug reports, please contact:

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License Information

Kanae Engine Virtue

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Version History

Current Version

- Version: 1.0.0 dev Chaos

- Release Date: June 2, 2025, pre alpha version

- Platform: Windows, macOS

Key Features

- Modern OpenGL rendering

- ImGui-based user interface

- Scene management system

- Component-based architecture

- Cross-platform support

This documentation is subject to updates and changes as the engine evolves. For the latest information, please check the official documentation or contact Kyon Soft support.