Bournemouth University

National Centre for Computer Animation

MSc in Computer Animation and Visual Effects

evulkan

A Vulkan Library

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Abstract

Vulkan is a graphics API which aims to provide users with faster draw speeds. The user is expected to explicitly provide the details previously given by the driver, as in the case of OpenGL. The resulting extra code can be difficult to understand and write at first, leading to the need for a wrapper library.

Acknowledgements

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Mum, Dad, Rory, Aisling, Aoife, Ellie.
Neil.

Dedication

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Chapter 1

Introduction

Vulkan is a cross-platform graphics and compute API, developed by the Khronos Group. It aims to provide higher-efficiency than other current cross-platform APIs, by using the full performance available in today's largely-multithreaded machines. Vulkan achieves this by allowing tasks to be generated and submitted to the GPU in parallel (multi-threaded programming). In addition, the API itself is written at a lower-level than other graphics APIs, meaning that the developer is required to provide many of the details previously generated by the driver at run-time.

This project aims to alleviate this cost by providing a wrapper library for Vulkan, which allows a developer to use some of the more common features of Vulkan with much less effort than writing an application from scratch. This library is written in C++, using modern C++ features, adheres to both the official C++ Core Guidelines and Google C++ Style Guide and is fully unit tested. The library is available for download from GitHub and can be built using CMake.

The library is specifically written with beginners and casual users of Vulkan in mind. The examples included in the repository provide a demonstration of how to use the library for different purposes, including drawing a triangle, loading an OBJ with a texture and using multiple passes to render simple objects with deferred shading.

Testing123. Attiya et al. (1995). Another. Beyer et al. (2016)

Karlsson (2018) Gregory (2014)

Chapter 2

Previous Work

Chapter 3

Technical Background

3.1 Limitations of OpenGL

OpenGL, the current cross-platform industry standard, was first released in 1992.

Chapter 4

The evulkan Library

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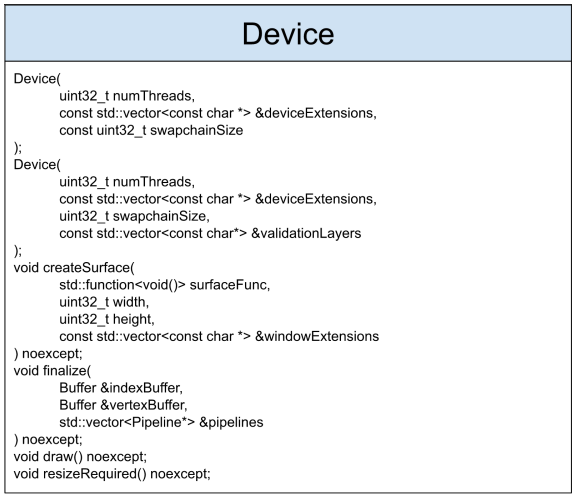

Figure 4.1: Device class diagram.

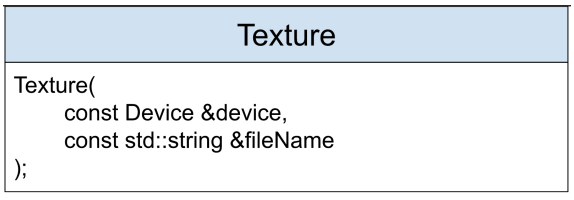

Figure 4.2: Texture class diagram.

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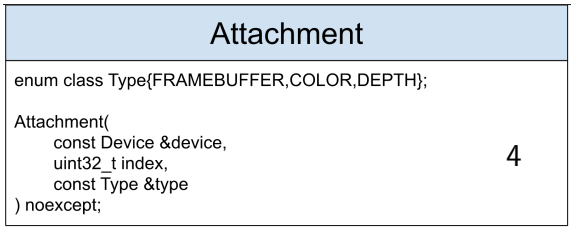

Figure 4.3: Attachment class diagram.

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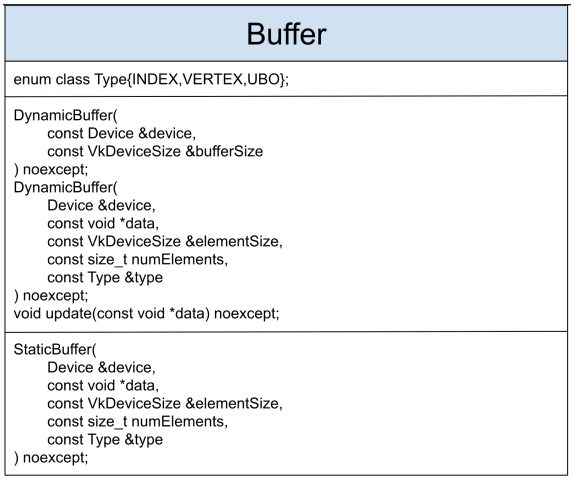

Figure 4.4: Buffer class diagram.

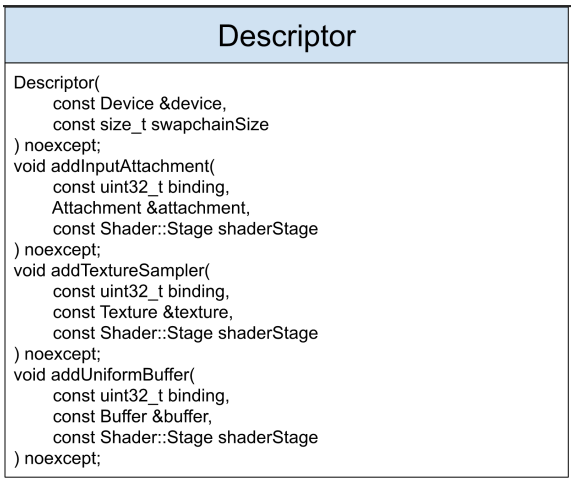

Figure 4.5: Descriptor class diagram.

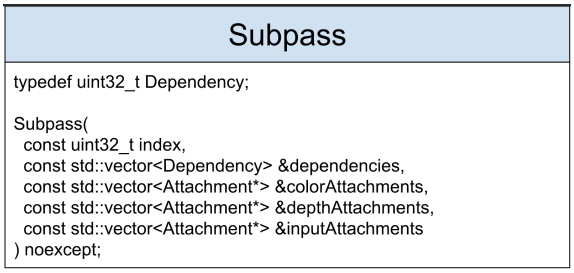

Figure 4.6: Subpass class diagram.

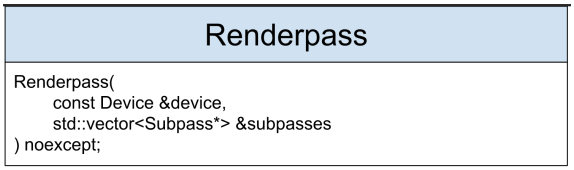

Figure 4.7: Renderpass class diagram.

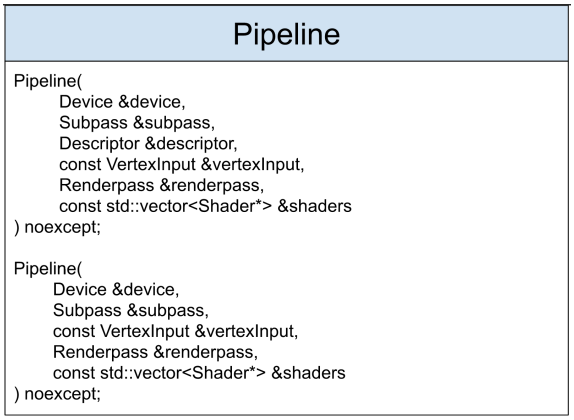

Figure 4.8: Pipeline class diagram.

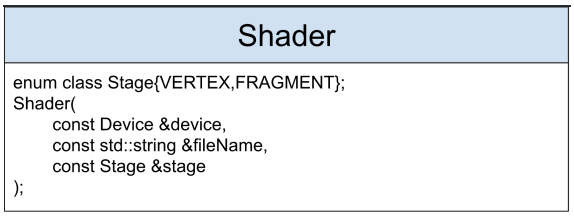

Figure 4.9: Shader class diagram.

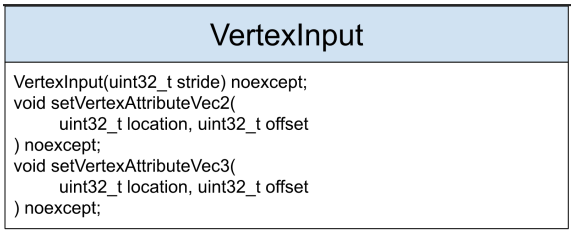

Figure 4.10: VertexInput class diagram.

Chapter 5

Conclusion

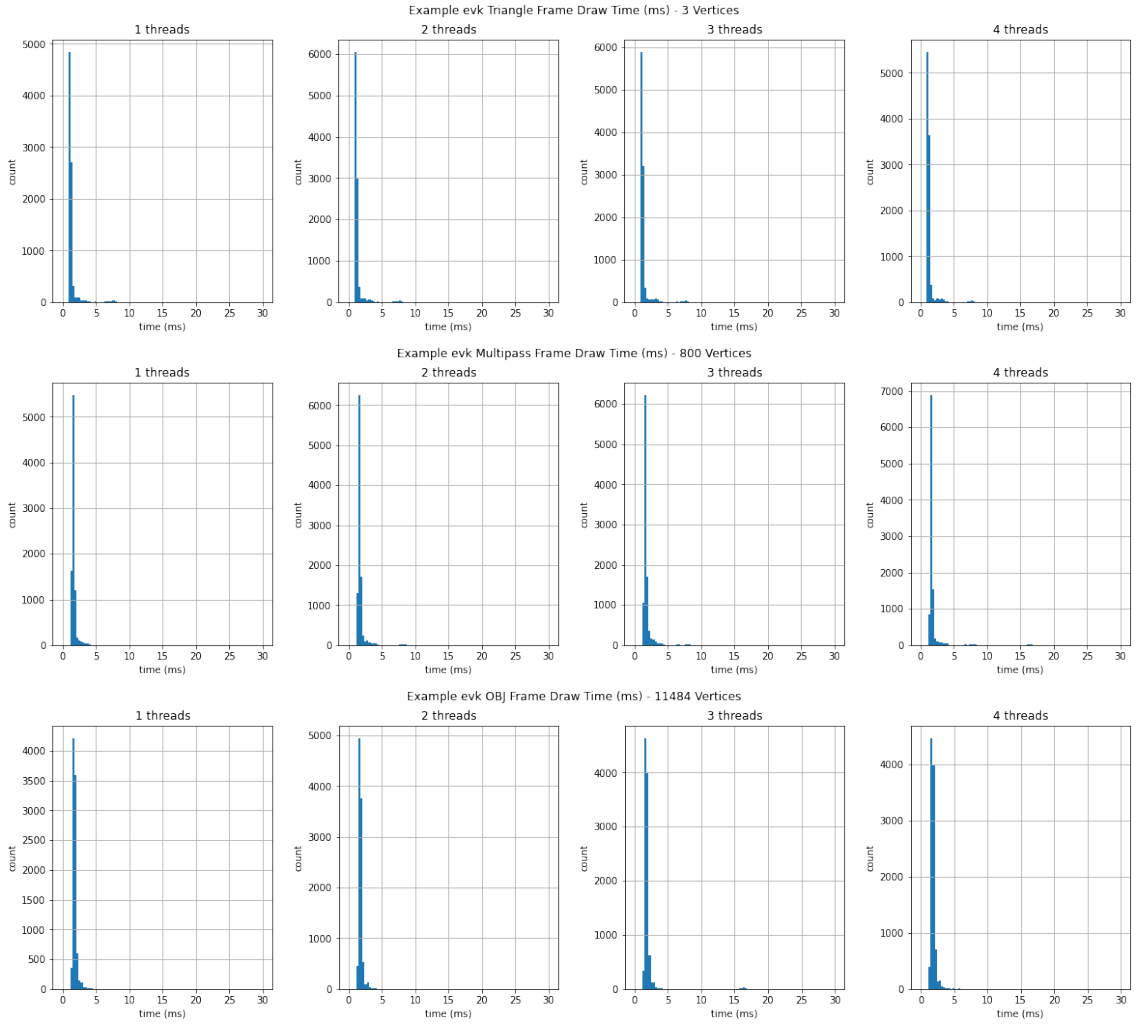

Figure 5.1: Draw time for different examples over multiple threads.

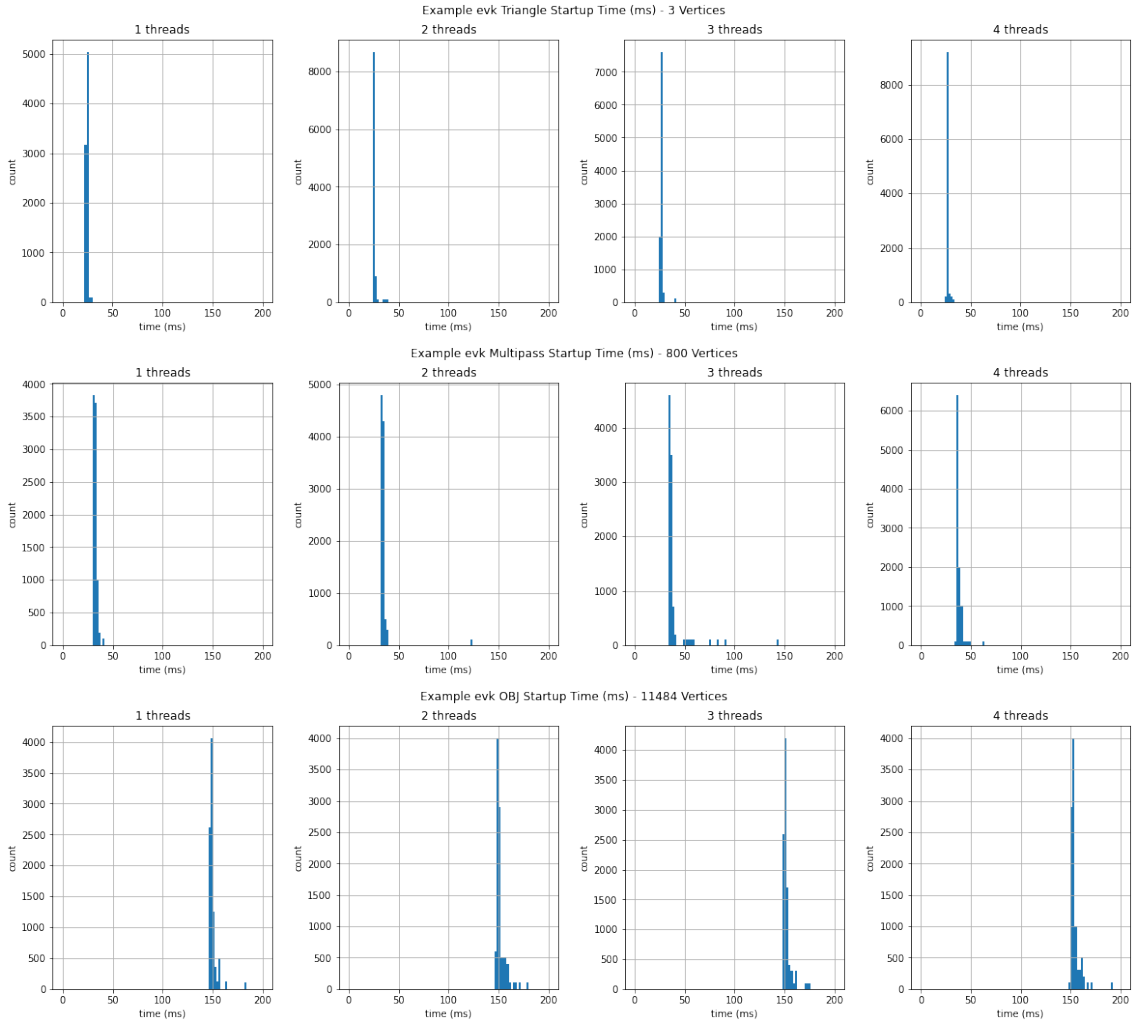

Figure 5.2: Setup time for different examples over multiple threads.

Bibliography

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Appendices