Graphics Programming with WebGPU

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Declaration

I hereby declare and confirm that this thesis is entirely the result of my own original work. Where other sources of information have been used, they have been indicated as such and properly acknowledged. I further declare that this or similar work has not been submitted for credit elsewhere. This printed copy is identical to the submitted electronic version.

Hagenberg, January 30, 2023

Shehata Abd El Rahaman

Contents

Preface

Abstract

This should be a 1-page (maximum) summary of your work in English.

Kurzfassung

An dieser Stelle steht eine Zusammenfassung der Arbeit, Umfang max. 1 Seite. ...

Chapter 1

Introduction

1.1 Motivation

Computer Graphics is one of the widest areas of computer science because
Applications:

- Video games
- Medical imaging
- Scientific Visualization
- Design, Planning
- Film Industry
    - VFX
    - Animated Movies
- VR/AR

1.2 Challenges

1.3 Goals

The goal of the thesis is to provide some insight on the internals of WebGPU, and it's API but also to show how it compares to other APIs. The following questions will be the focus and will hopefully be answered throughout the work.

Chapter 2

Related Work

2.1 WebGPU

2.2 WGSL

2.3 Rust

2.4 wgpu

2.5 Graphic APIs

Chapter 3

Concept

3.1 Shaders

3.2 Graphics Pipeline

3.3 3D Object Projection

3.4 Light Solutions

3.5 Controls

3.6 Textures

3.7 Materials

Chapter 4

Implementation

4.1 Programming Languages and Target Platforms

4.2 Libraries

Chapter 5

Results

5.1 Performance

5.2 Portability

Chapter 6

Discussion

6.1 What are the benefits?

6.2 What shortcomings does WebGPU have?

Chapter 7

Conlusion

7.1 Summary

7.2 Future Work

Chapter 8

Writing a Thesis

Chapter 9

Working with LaTeX

Chapter 10

Figures, Tables, Source Code

Chapter 11

Mathematical Elements, Equations and Algorithms

Chapter 12

Using Literature and other Resources

[1]

Chapter 13

Printing the Manuscript

Chapter 14

Closing Remarks

Appendix A

Technical Details

Appendix B

Supplementary Materials

List of supplementary data submitted to the degree-granting institution for archival storage (in ZIP format).

B.1 PDF Files

Path: /

thesis.pdf . . . . . Master/Bachelor thesis (complete document)

B.2 Media Files

Path: /media

*.ai, *.pdf . . . . . Adobe Illustrator files
*.jpg, *.png . . . . . raster images
*.mp3 . . . . . audio files
*.mp4 . . . . . video files

B.3 Online Sources (PDF Captures)

Path: /online-sources

Reliquienschrein-Wikipedia.pdf

Appendix C

Questionnaire

Appendix D

LaTeX Source Code

References

Literature

[1] Hubert M. Drake, Milton D. McLaughlin, and Harold R. Goodman. *Results obtained during accelerated transonic tests of the Bell XS-1 airplane in flights to a MACH number of 0.92*. Tech. rep. NACA-RM-L8A05A. Edwards, CA: NASA Dryden Flight Research Center, Jan. 1948. URL: https://www.nasa.gov/centers/dryden/pdf/87528main_RM-L8A05A.pdf (cit. on p. 12).

Online sources

[2] *Reliquienschrein*. Oct. 20, 2020. URL: https://de.wikipedia.org/wiki/Reliquienschrein (visited on 05/12/2021).

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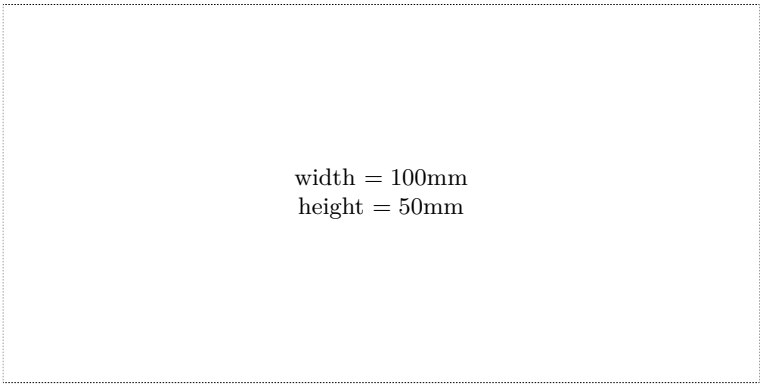

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