Workshop 2
System Design of a Graphics Engine

Computer Graphics

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Introduction

We will use *the C4 model for visualizing software architecture* (https://c4model.com/)

Context, **C**ontainers, **C**omponents, and **C**ode

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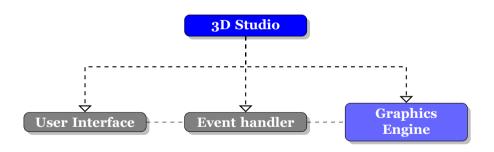
Context, **C**ontainers, **C**omponents, and **C**ode

► Work in groups of 2–3 students

Context

An example of a *System Context Diagram* for 3D Studio

Containers and Components

> We will focus on Containers and Components

Examples

- ► Scene/World
- ► 3D Model
    - − Mesh
    - − Texture
    - − Material
    - − Transform
- ► Camera
- ► Light

- ► Renderer
- ► Shader program
- ► Object Loader
- ► ...

Task 1 - Containers

> Identify the **containers** or layers of the context Graphics Engine and draw a container diagram for them

For example, a container can be

- ▶ A graphical container
- ▶ A system dependent container

A container can interact with other containers

Task 2 - Components

For each container, identify which **components** it consists of
Draw a container diagram for each container

If needed, iterate from Task 1

For example, a component can be

- A graphical or virtual entity
- An element that is shared within a container

A component can interact with other components within the same container
or other containers

Task 3 - Component responsibilities

Continue to assign responsibilities/tasks for each component

> ▶ Add new components if you find tasks that does not belong to any existing component

Data-Oriented Design/Programming

Another way of thinking and structure your code

- ► The first principle: Data is not the problem domain
- ► The second principle: Data is the type, frequency, quantity, shape, and probability

- ► Data-oriented Design (2018), Richard Fabian
  https://www.dataorienteddesign.com/site.php
- ► Revolutionize Your Code: The Magic of Data-oriented Design (DOD) Programming (2023), Tan Dang
  https://www.orientsoftware.com/blog/dod-programming/