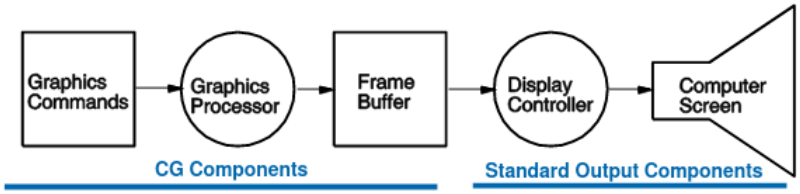
Introduction

Study methods for digitally synthesizing and manipulating visual content and the generation of 2D images for display

Although it often refers to 3D computer graphics, it also studies 2D computer graphics and certain image processing.

1 Modern Graphics hardware setting



- Typically, the CPU runs graphics applications, e.g. a computer game and continuously generates graphics commands
- These commands are buffered and executed by the graphics processor one at a time

2 Graphics processor

A graphics processor accepts graphics commands from the CPU and executes them
Graphics commands may include:

- Draw point
- Draw polygon
- Draw text
- Clear frame buffer
- Change drawing colour

It draws the rendered results into the frame buffer

3 Types of graphics commands

A graphics processor handles two types of drawing commands
2D graphics commands:

- Based on 2D coordinates
- When objects overlap each other in x and y, the current object being drawn will obscure objects drawn previously
- Frame buffer operations, such as copy/move/clear contents

3D Graphics commands:

- Based on 3D coordinates
- When objects overlap each other in x and y, the z values of the object determine their visibility

4 Frame Buffer

Definition: Frame buffer

A memory space that stores a grid
Each grid cell stores an intensity or colour value and is mapped to a pixel on the screen

Definition: Double Buffering

To support interactive graphics applications, more than one frame buffer is required. While an image in the frame buffer is being displayed, the next image can be rendered into the other frame buffer

5 Stereoscopic vision

Definition: Stereopsis

The impression of depth that is perceived when a scene is viewed with both eyes