Course Overview

Computer Graphics

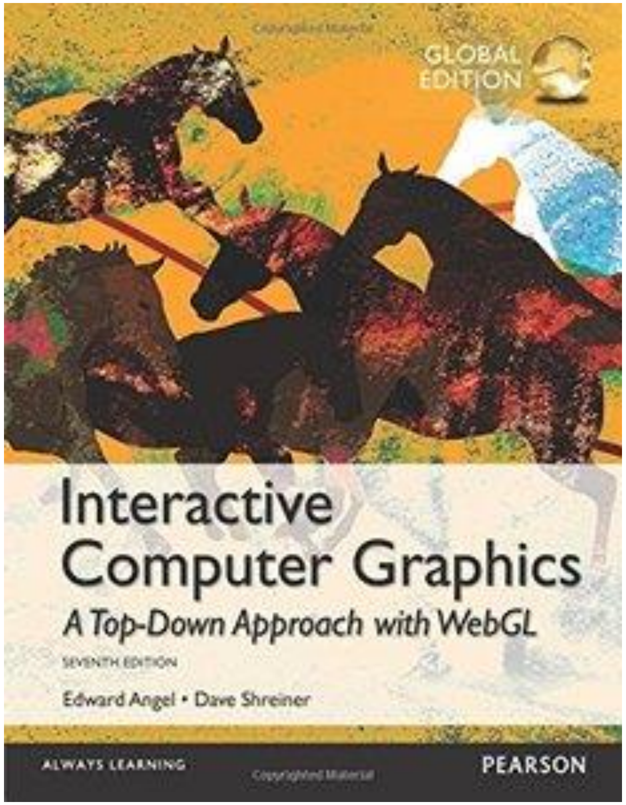
Yu-Ting Wu

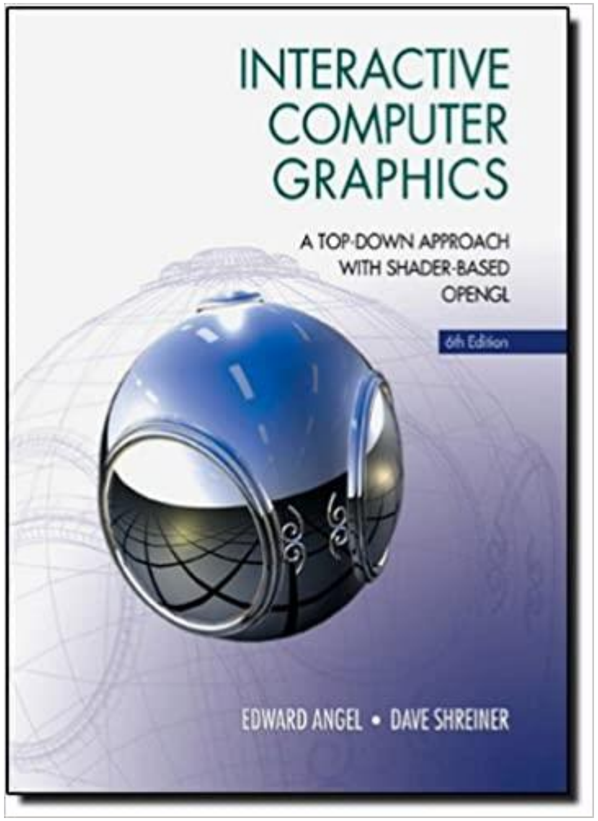
Course Information

- **Meeting time:** 09:10 - 12:00, Monday
- **Classroom:** 電2F-03
- **Instructor:** 吳昱霆 (Yu-Ting Wu)
- **Teaching assistants:** 王紘毅
- **Course webpage:**
  - *https://kevincosner.github.io/courses/CG2024/*
- **Grading:**
  - Assignments: 45% (3 HWs, 18%+18%+9%)
  - Midterm 25%
  - Final exam: 25%
  - Rendering competition: 5%

Textbook (Optional)

- **Interactive Computer Graphics: A Top-Down Approach with WebGL (7th) / Shader-based OpenGL (6th)**


GLOBAL EDITION
Interactive Computer Graphics
A Top-Down Approach with WebGL
SEVENTH EDITION
Edward Angel • Dave Shreiner
ALWAYS LEARNING
PEARSON


INTERACTIVE COMPUTER GRAPHICS
A TOP-DOWN APPROACH WITH SHADER-BASED OPENGL
6th Edition
EDWARD ANGEL • DAVE SHREINER

HW Late Policy HW

• One day	90%
• Two days	80%
• Three days	70%
• Four days	60%
• Five days+	50%

- E.g., assume the deadline for the HW is 12/24 23:59 and you submit your HW on 12/25, you will get a 10% penalty

- You are encouraged to discuss HWs with your classmates; however, the code should **NOT** be highly similar
  - **If caught, you will get ZERO**

Class Rules

- You are welcome to ask questions
  - Raise your hands anytime in class
  - Send an email to me anytime out of class
  - **Please be polite and always reply to the mail!**

- DO **NOT CHAT** in the class

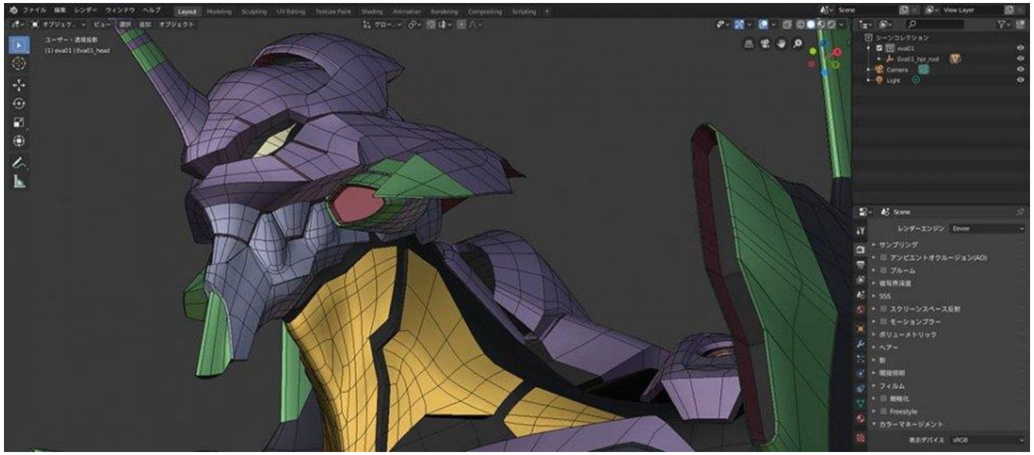
Copyright Statement

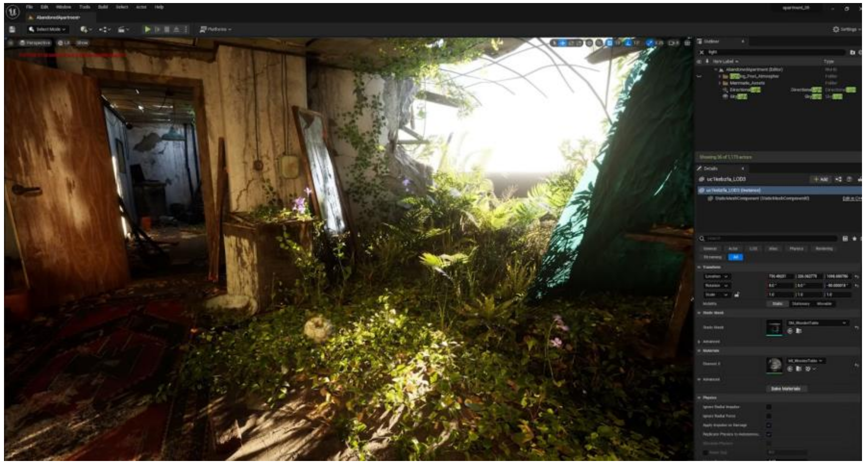
- Some of the materials (mostly images) are borrowed from the Internet (copyright belongs to the creators)
- Thereby, please do **NOT** share the slides out of the class

CAUTION
WET
FLOOR

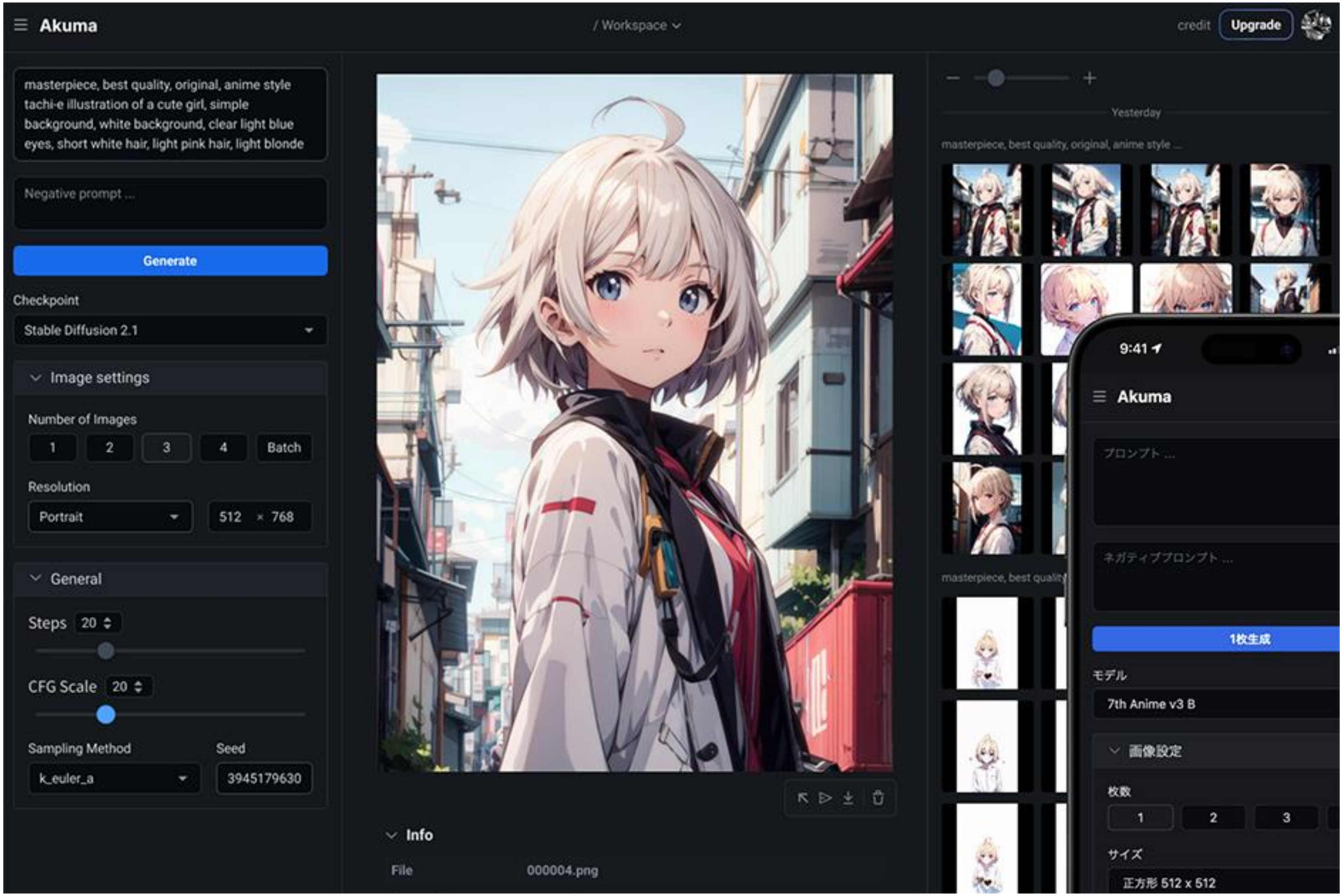
This Course is NOT about using Editors

- Instead, we learn the techniques behind the software!





This Course is NOT about AI



masterpiece, best quality, original, anime style tachi-e illustration of a cute girl, simple background, white background, clear light blue eyes, short white hair, light pink hair, light blonde

Checkpoint: Stable Diffusion 2.1

Number of Images: 1 2 3 4 Batch

Resolution: Portrait 512 × 768

Steps: 20

CFG Scale: 20

Sampling Method: k_euler_a

Seed: 3945179630

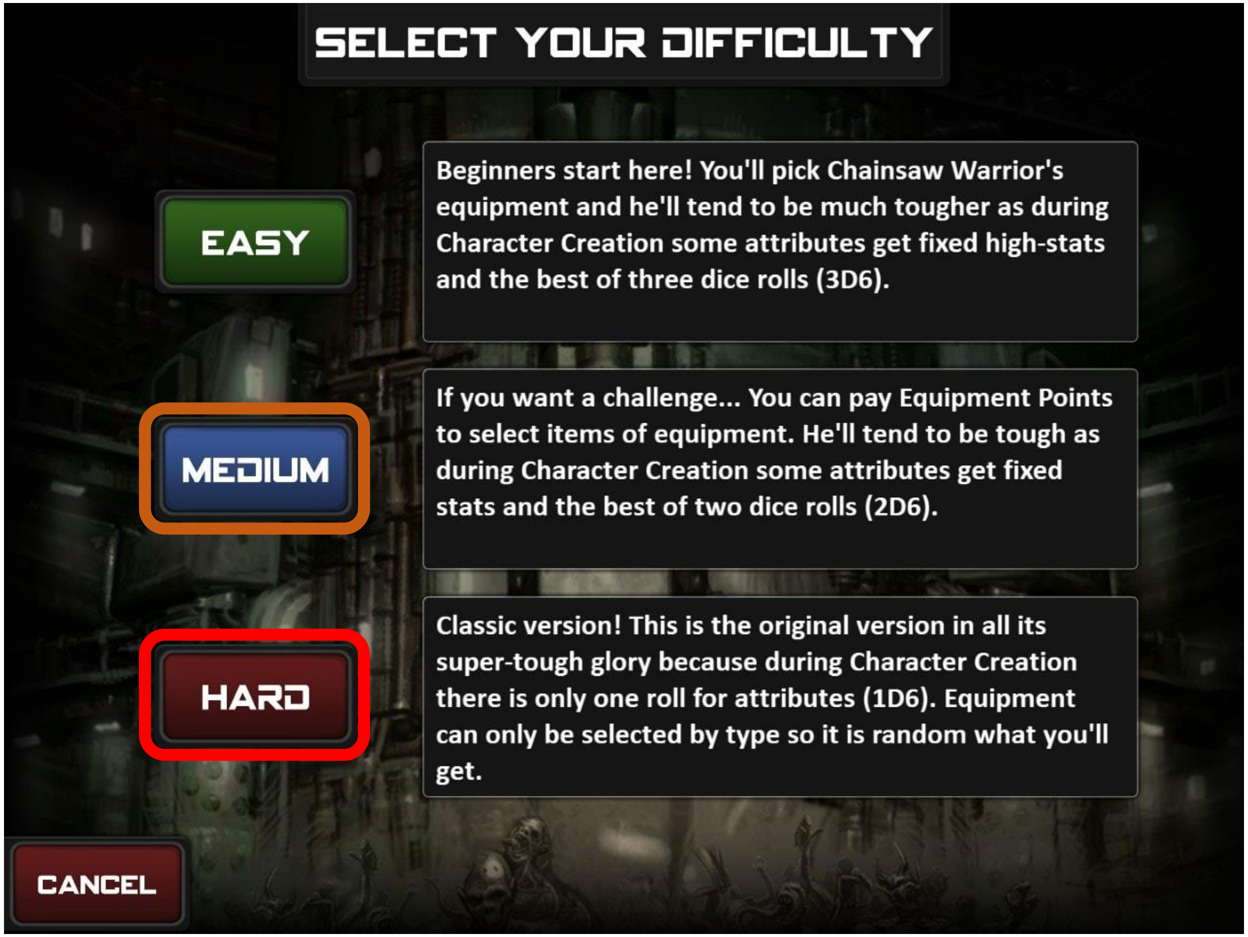
File: 000004.png

モデル: 7th Anime v3 B

枚数: 1 2 3

サイズ: 正方形 512 x 512

This Course is NOT Easy!



Beginners start here! You'll pick Chainsaw Warrior's equipment and he'll tend to be much tougher as during Character Creation some attributes get fixed high-stats and the best of three dice rolls (3D6).

If you want a challenge... You can pay Equipment Points to select items of equipment. He'll tend to be tough as during Character Creation some attributes get fixed stats and the best of two dice rolls (2D6).

Classic version! This is the original version in all its super-tough glory because during Character Creation there is only one roll for attributes (1D6). Equipment can only be selected by type so it is random what you'll get.

We only have Medium and Hard modes

What You Will Learn!

The composition of this course:

- Learn the basic concepts of **3D** computer graphics, especially in **modeling** and **rendering**

50%

- Learn how to program with **graphics API (OpenGL)**

50%

WE ARE GOING TO WRITE C++ CODES!

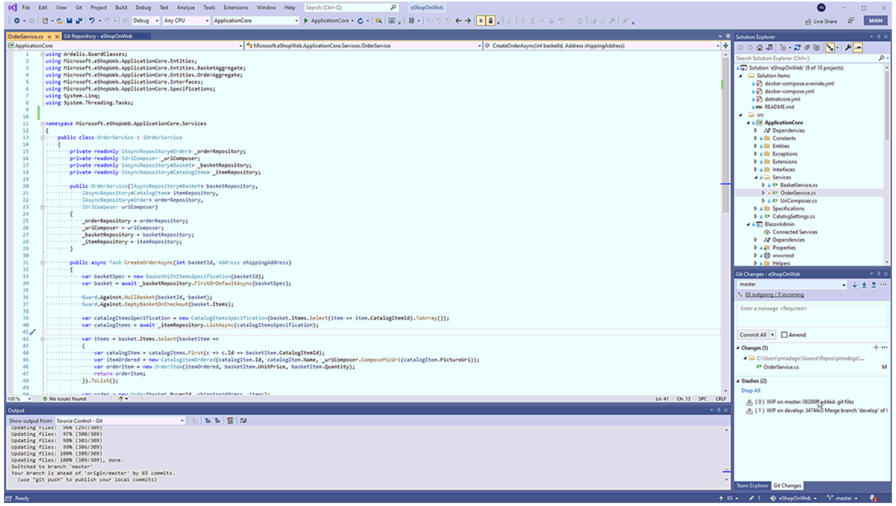
Prerequisites

- **C++ programming experience is required**
- Basic knowledge of **data structure** and **objected-oriented programming** is essential

- It is a **plus** if you
  - Are familiar with **linear algebra**
  - Have taken my course, **multimedia technology and applications**
  - Have experience in **image processing**

Prerequisites (cont.)

- For all HWs, we will provide a skeleton code of the **Visual Studio Community 2022 Project** on **Windows**
  - Download the free IDE from https://visualstudio.microsoft.com/zh-hant/vs/community/



```
using Ardalis.GuardClauses;
using Microsoft.eShopWeb.ApplicationCore.Entities;
using Microsoft.eShopWeb.ApplicationCore.Entities.BasketAggregate;
using Microsoft.eShopWeb.ApplicationCore.Entities.OrderAggregate;
using Microsoft.eShopWeb.ApplicationCore.Interfaces;
using Microsoft.eShopWeb.ApplicationCore.Specifications;
using System.Linq;
using System.Threading.Tasks;


namespace Microsoft.eShopWeb.ApplicationCore.Services
{
    public class OrderService : IOrderService
    {
        private readonly IAsyncRepository<Order> _orderRepository;
        private readonly IUriComposer _uriComposer;
        private readonly IAsyncRepository<Basket> _basketRepository;
        private readonly IAsyncRepository<CatalogItem> _itemRepository;

        public OrderService(IAsyncRepository<Basket> basketRepository,
            IAsyncRepository<CatalogItem> itemRepository,
            IAsyncRepository<Order> orderRepository,
            IUriComposer uriComposer)
        {
            _orderRepository = orderRepository;
            _uriComposer = uriComposer;
            _basketRepository = basketRepository;
            _itemRepository = itemRepository;
        }

        public async Task CreateOrderAsync(int basketId, Address shippingAddress)
        {
            var basketSpec = new BasketWithItemsSpecification(basketId);
            var basket = await _basketRepository.FirstOrDefaultAsync(basketSpec);

            Guard.Against.NullBasket(basketId, basket);
            Guard.Against.EmptyBasketOnCheckout(basket.Items);

            var catalogItemsSpecification = new CatalogItemsSpecification(basket.Items.Select(item => item.CatalogItemId).ToArray());
            var catalogItems = await _itemRepository.ListAsync(catalogItemsSpecification);

            var items = basket.Items.Select(basketItem =>
            {
                var catalogItem = catalogItems.First(c => c.Id == basketItem.CatalogItemId);
                var itemOrdered = new CatalogItemOrdered(catalogItem.Id, catalogItem.Name, _uriComposer.ComposePicUri(catalogItem.PictureUri));
                var orderItem = new OrderItem(itemOrdered, basketItem.UnitPrice, basketItem.Quantity);
                return orderItem;
            }).ToList();

            var order = new Order(basket.BuyerId, shippingAddress, items);
```

```
Updating files:  96% (297/309)
Updating files:  97% (300/309)
Updating files:  98% (303/309)
Updating files:  99% (306/309)
Updating files: 100% (309/309)
Updating files: 100% (309/309), done.
Switched to branch 'master'
Your branch is ahead of 'origin/master' by 65 commits.
  (use "git push" to publish your local commits)
```

END OF PRESENTATION
ANY QUESTIONS?