

This session will commence shortly

Note: This session is being recorded !

Remember me ?

I'm Dr Simon Lock

You might remember me from units such as SPE !

Welcome to Computer Graphics
In these "interesting" times

This unit has been extensively
refactored to make it suitable
for online and hybrid delivery



Aim: To Introduce "Computer Graphics" !

This term means different things to different people
Our perspective on the area encompasses:

- Low-level pixel manipulation
- Drawing primitives (Lines and Triangles)
- 2D and 3D geometry
- *Approximating* behaviour of light
- Camera views and navigation

As you might have sensed, it's all very low-level...
This is not a "Graphic Design" unit !

Technology Feeds into a Range of Domains

- Film
- Games
- Data Science (visualisation)
- Product Design ("pre-vis")
- Buildings Architecture
- Projection Mapping
- Immersive technologies
- Generative Graphics

etc.

A Word of Warning !

This unit starts off very gently :o)
(to make sure everyone gets off to a good start)

But it will speed up later on (week 3 onwards)

Watch out you don't get left behind !
Don't take your eye off the ball !!

There were a bunch of fails/resits last year !!!

Weekly Activities

- Online briefing to introduce coming week's topics
Wednesday at 9am (yes, I know !)
- Q&A opportunity (at the end of the briefing)
- Weekly workbook of tasks to complete
More on this in the next slide !
- Practical session to support completing the tasks
Monday at 2pm (that's _before_ the briefing !)
- Asynchronous support via Teams discussion forum

Weekly Workbooks

Each workbook contains a set of tasks to complete
Lead you step-by-step towards a practical end-goal

Key concepts introduced with rich-media materials:

- Written slides and descriptions
- Recorded audio narration
- Graphical video animations
- References to additional materials

Workbooks are made available via GitHub
(For easy upload and download !)

Importance of Weekly Workbooks

It is ESSENTIAL that you keep up with practical tasks

Even if you are taking the exam variant of unit

Workbooks are the main (only !) teaching material

They are an integrated bundle of content & activities

Shared Language ?

Various types of "language" are at our disposal:

- Natural Language
- Mathematical Notation
- Algorithmic Expression
- Graphical Representation

We'll be using ALL of these to discuss key concepts
We need them - some things are tricky to explain !

Implementation

We will be using C++ for implementation
(Fairly standard for low-level graphics)

For drawing to the screen, we will use "SDL2"
Platform independent graphics library, used to:

- Create windows to show on the screen
- Manipulate individual screen pixels
- Allow user interaction via keys and mouse

Everything else will be built on top of this !
(Although we'll use some Maths functions from GLM)

Practical Labs IRL

We aim to provide physical practicals in MVB 2.11
(subject to government and university guidance !)

Some people won't be able to attend
(depending on location and personal situation)

Which is fine - lab space is at a premium !

Online equivalents will run in parallel
(the same kind of thing as last year)

If you can (and wish) to attend physically, then do
Otherwise make use of the online equivalents

Please take all precautions !

If attending the physical lab please be considerate:

- Maintain social distancing
- Wear a good quality, well-fitting mask
- FFP2/N95 or FFP3/N99 - without vents/valves !
- Sanitise hands and desks where possible
- Bring your own laptop if you can

It would be a shame to have to pull the plug !
(which we will do if it doesn't feel safe)

Practical Announcements

There won't be any verbal announcements at the start of the practical labs

It's a bit tricky talking to both online and F2F groups

Aim is to cover everything you need in the weekly Teams briefings

There is an "Announcements" channel on Teams for anything we forgot to tell you !



COMS30020: Computer

General

Announcements

Discussion Forum

Microsoft Stream

There is a Microsoft Stream for this unit

Recordings of weekly briefings will appear there

Async lecture videos aren't on Stream

They're embedded in workbooks
(and so are stored on GitHub)

See BB for links to both...



COMS30020: Computer ...

M365

PRIVATE

Unit Team for Computer Graphics
(Teaching Unit) teaching and
learning

Blackboard

We will use Blackboard as a set of bookmarks
Pointing to other platforms (GitHub, Teams etc.)

Note that there are 3 pages for this unit !
("Teaching" page, Coursework Page, Exam Page)
They generally have identical information on them
(apart from the "Assessments" pages !)

Nature of Coursework

Your task will be to create a short 3D animation

This is NOT like the CGI unit

(Where its all about the modelling and design)

This assignment will be much lower-level...

You will NOT be using an existing application

You will build your OWN rendering engine !

Aim of animation: show off features of YOUR engine

More about the assignment when we get to week 8

Nature of Exam

The exam will be fairly mathematical in nature
Applying principles of Computer Graphics "on paper"

Essential to complete workbooks and practical task
(to gain an understanding of all the techniques)

There won't be a big HTP resource during revision
So don't just leave the workbooks until the end !

Various formats of exam are possible
Ranging from physical co-present to digital online
(depending on the situation during exam period)

Recommended Textbook

The recommended textbook for the unit is:

<https://www.scratchapixel.com/>

It is pretty extensive

(there's more in the book than we cover in the unit)

Although some "advanced topics"
aren't covered fully in the book

Questions ?

Why not teach an existing framework ?

One difficulty is choosing which one to teach !
DirectX, OpenGL, Vulkan or proprietary ?

Better to teach fundamental theoretical concepts
Which makes it easy to pick up any framework

Besides, fundamentals are much more BSc/MEng
We don't like to focus a unit around a single API

Can I use <insert_language>

Soz, no !

C++ is a well established standard in the area

All templates/examples are written in C++

Teaching assistants are all skilled in C++

It's hard to mark an unfamiliar language

Need to maintain a level playing field !

Aim of the first workbook

The aim of the first practical session is simple:

To compile and run the "RedNoise" project
(the base template for all practical exercises)

The deeper purpose is more serious:

Find a "workable" way to compile and run SDL code
(native OS / virtual machine / remote login)

Let's take look at that first workbook...

<https://github.com/drslock/CG2021>

Getting Help During Practicals

Physical and Online Practicals will run in parallel
With HPTs "spreading" themselves between the two

In order to get help during the online sessions...
Create a new ticket in the "Requests for Help" queue
We'll get to you as soon as we can !

Note: We only monitor the queue during lab sessions



General

Posts

Files

Class Notebook

Insights

Requests for Help

In the rest of this practical session...

Try to get SDL2 installed and "RedNoise" running

If you need help, create a ticket on the board

Include the platform you are working on

(Windows / OSX / Linux)

Just so you get the right TA to offer you help !

To Work !