COMS30020 - Computer Graphics

Week 8 - Coursework Briefing

Dr Simon Lock

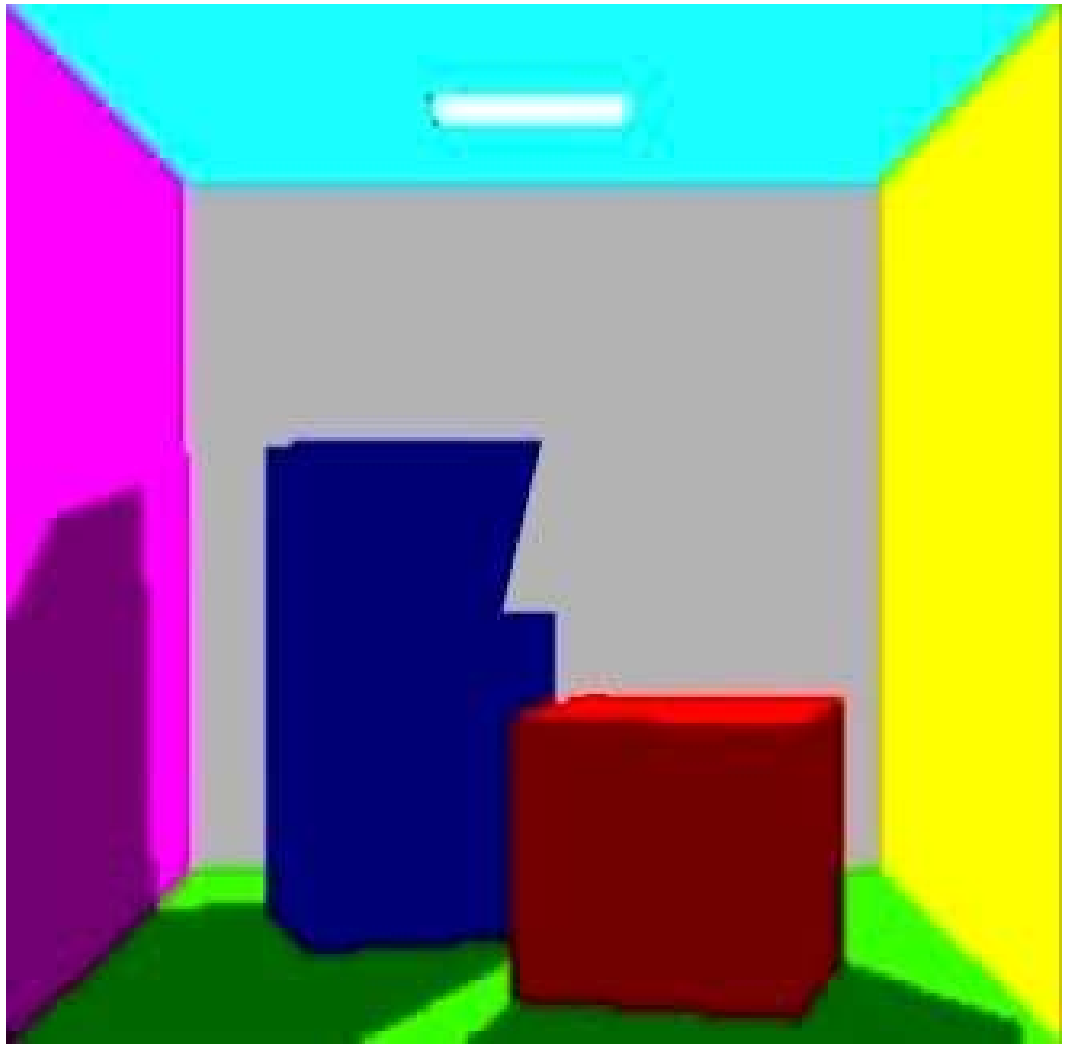
Overview of Session

We have now covered all CORE theoretical content
So we will spend this session talking about the CW

Before we begin however, a few debugging tips !

We are going to unleashed you to work on your own
A good idea to give you the tools to help yourselves !

"What's wrong with my Raytracer ?"



Debug Challenge

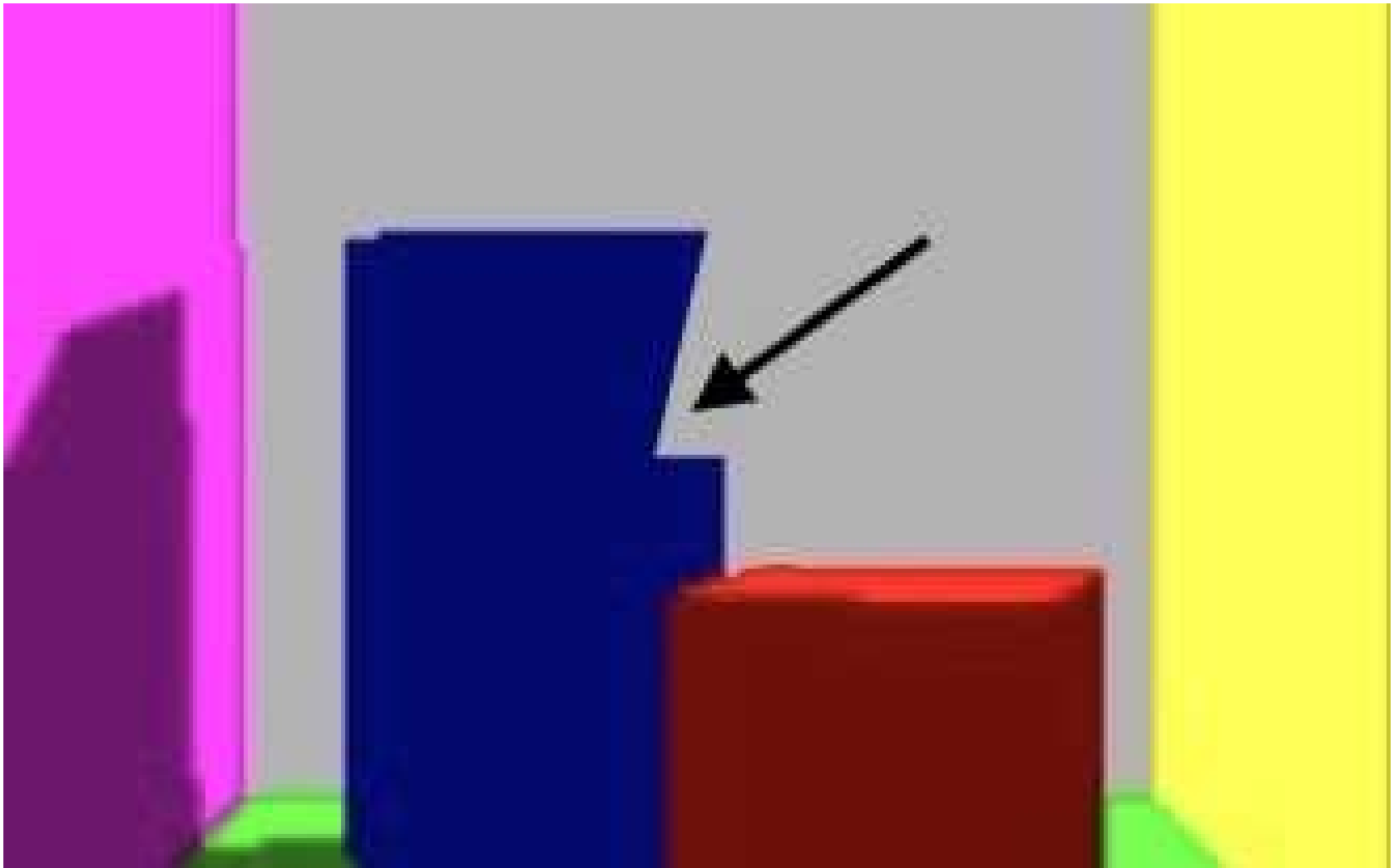
It is *probably* an error calculating intersections
Problem is, it is impractical to print ALL variables

320 x 240 = 77k pixels

Even with careful structuring or labelling of output
The volume of printed data will be hard to manage

So what can we do ?

Useful strategy: Pick just 1 pixel to render



How do we know which pixel that is ?

Could do a screengrab, then open image in an editor

or

Just add code to renderer to print out click location...

```
if(event.type == SDL_MOUSEBUTTONDOWN) {
    int mouseX, mouseY;
    SDL_GetMouseState(&mouseX,&mouseY);
    std::cout << mouseX << "," << mouseY << std::endl;
}
```

Use this position to constrain rendering loop

```
void draw()
{
    window.clearPixels();
    for(int x=0; x<WIDTH ;x++) {
        for(int y=0; y<HEIGHT ;y++) {
```

```
void draw()
{
    window.clearPixels();
    for(int x=200; x<201 ;x++) {
        for(int y=160; y<161 ;y++) {
```

"Interrogate" value of key variables

All "possible solution" intersections that are found (including the colour of each intersected triangle)
3D position of all intersection points
Distance from camera to each intersection point
The intersection that was identified as "closest"
Distance from intersection point to light source
Shadow ray intersection (surface that casts shadow)
Brightness from Proximity, AoI, Specular for point
etc.

Want to talk about the coursework ?

Coursework

CW assignment will go live on Blackboard at 1pm
This will take the form of a written assignment brief
This describes in detail all aspects of assignment
Will appear in "Assessment, Submission & Feedback"

We can however provide an overview of CW now
The focus of the assignment will be of no surprise...
Workbooks stepped through building a 3D renderer
CW assignment is a demonstration of that renderer

Assignment Task

- Render a short (ballpark ~15 second) "ident video"

idents

- Use the MVB hackspace as a "client" (if it helps !)

- Aim is to show off features of your rendering engine
- The focus is NOT on the creation of complex models
- Use any OBJ files you like (if you can parse them ;o)

- Appealing visual aesthetics ARE part of assignment
- BUT focus is on rendering light/shade/texture etc.

Specific Marking Criteria

- Implementing different rendering "modes" (wireframe, rasterised, raytraced)
- Implementing various lighting effects (shadows, ambient, proximity, AoI, specular)
- Implementing intelligent shading (Phong, Gouraud)
- Animating camera position and orientation
- Implementing various renderer extensions...

Renderer Extensions

- Rather than being a totally open-ended assignment
- We provide list of *prescribed* renderer extensions
- Think: "Fancy Features" you might like to implement
- Select whichever extensions you are interested in
- No credit will be awarded for alternative extensions
- Made available as an additional workbook on GitHub:

https://github.com/COMS30020/CG2024

Note: These are HARD topics

- Slides/Narrations/Animations only "introduce" topics
- Unlike previous workbooks, no step-by-step guides
- Don't expect to be able to do them all in one week !

- Emphasis is on YOU devising suitable algorithms
- You may need additional research to find out more !
- Which is why you get credit for implementing them

MAJOR versus MINOR

The MINOR variant of this unit is worth 10 CP
The MAJOR variant of this unit is worth 20 CP

Workbook 8 "Advanced Topics" is the difference !
Coursework students ARE expected to engage with it
Exam students are NOT (and won't be assessed on it)

Having said that...
Exam students may like to take a look "for interest"
(there are some nice animations in there ;o)

Indicative Marking Guide

On Blackboard there is an "indicative marking guide"

Aim is to provide transparency into marking process

Features you must implement to get particular marks

```
To get a pass mark of 40, you must implement...
To get a mark in the 40s band you must implement...
To get a mark in the 50s band you must ALSO implement...
To get a mark in the 60s band you must ALSO implement...
To get a mark in the low 70s you must ALSO implement...
To get a mark of 75 and above you must ALSO implement...
```

No more practical sessions !

Tuesday slots will be used for online (Teams) Q&A

Optional, drop-in, responsive Q&A sessions

I won't be presenting any pre-defined material

Just answering ad-hoc questions from individuals

This is for high-level "strategy" type questions

It isn't intended to be a "debugging service"

Online discussion forum is there for technical help

What kinds of questions can I ask ?

Does this render look right ?

Is my understanding of the approach correct ?

Is this good enough to get the marks ?

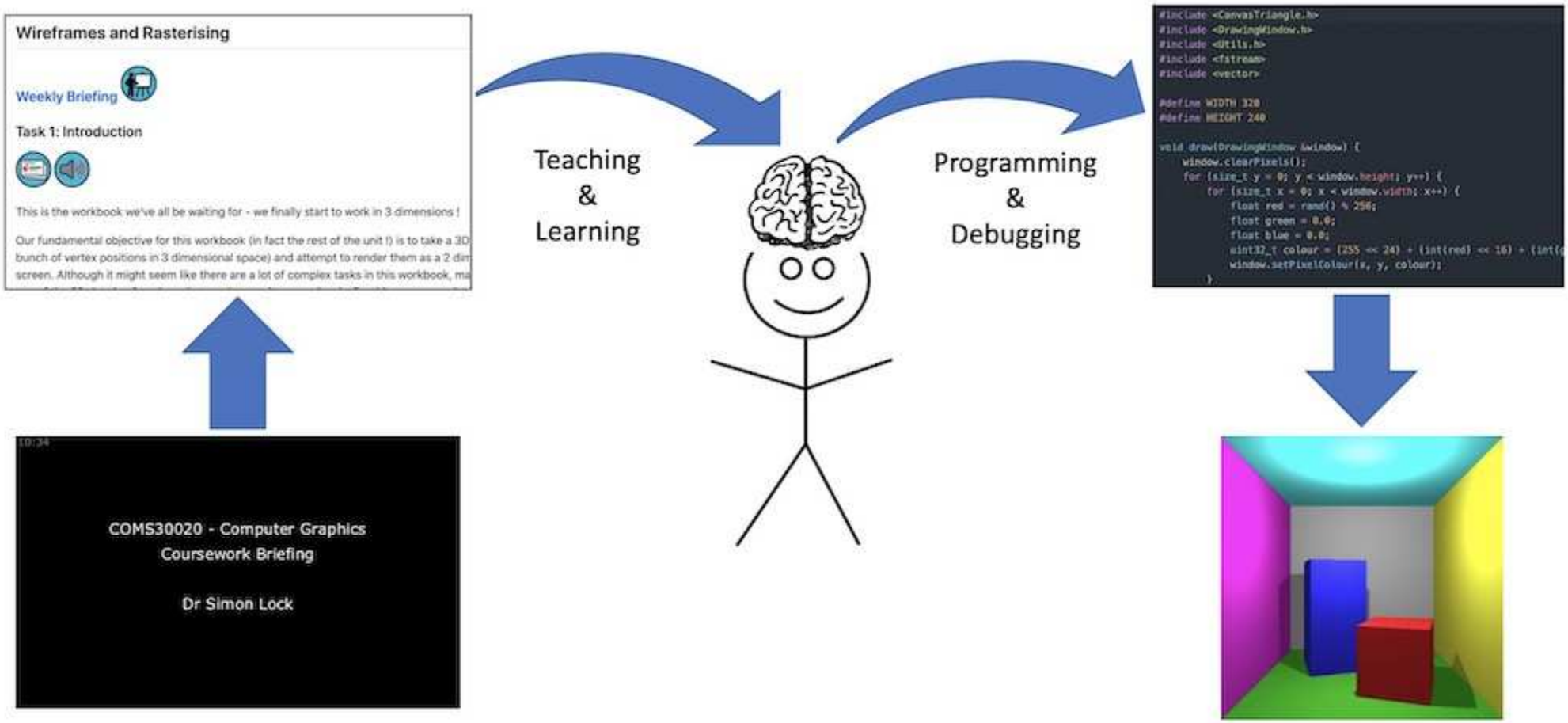
Which approach will get me more marks ?

Any idea why I get this strange shadow ?

(the answer might be "no idea, sorry !")

But don't be asking us to debug your code !

Learning Boundaries and Responsibilities



A little insight into being a Lecturer

(It is NOT ALWAYS like this)

(and when it is, it is usually NOT AS BAD)

(but this is SOMETIMES what if FEELS like)

It won't run - help me fix it !

Can't you fix it ? You are the Lecturer !!!

Build and Run on Lab machines

Need to be able to build & run code on lab machines
(that is where it is going to be tested and marked)

Check your project can still be built using either...
`make` or `cmake` FROM THE COMMAND LINE

It's fine (essential ?) to submit updated makefiles
(Just make sure they work on the lab machines)

Probably best to check this sooner, rather than later
Don't leave it until just before the deadline !

Reminder about "Derived" Code

You may include "derived" code in your solution
(i.e. code you found online or generated by AI tools)

You will be asked declare the extent of "derived" code
Code similarity tools will be used to confirm this

Will be taken into account during marking process !

Remember: you'll only get credit for code YOU write

Details of Exam ?

Majority of you will now be focused on 3 week CWs
Don't want to distract people by talking about exam

Once CW period is over, we'll do an exam briefing
12 noon 3rd December (should be in your timetable)

Will give an overview of style and coverage of exam
Also make available suitable past paper questions

Questions ?