

Sample Questions from Previous Computer Graphics Exams

Relevant to In-Class Test

Question 1: Colour Representation

You are using a drawing library that requires pixels colours to be packed into 32 bit integers. This library is slightly unusual in that it requires colour channels to be ordered: Green, Red, Alpha, Blue (GRAB) (i.e. the Green value should occupy the most significant bits, followed by the Red, Alpha and then Blue). You wish to draw pixels using the following colour combination (numbers in range 0-255):

- Red: 158
- Green: 77
- Blue: 141
- Alpha: 255

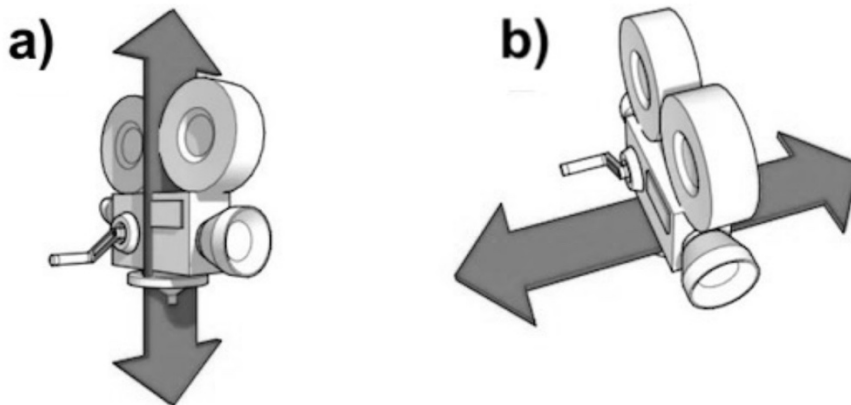
Providing your answer as a single unsigned integer (for example: 1234567890), what is the GRAB value required to draw the specified colour ?

[1 mark]

[ANSWER]: 1302265741

Question 2: Camera Movement

What are the names of the two types of camera movement illustrated in (a) and (b) below:



[2 marks]

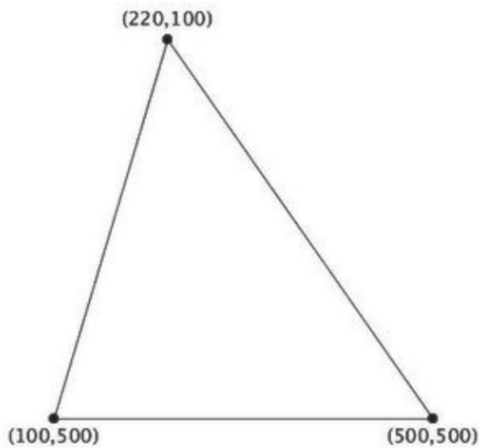
c) What name is given the action of moving a camera forwards, whilst at the same time changing the focal length?

[1 mark]

[ANSWER]: A: Pedestal; B: Truck; C: Dolly Zoom

Question 3: Rasterising

Consider the triangle illustrated below:



When filling this triangle by rasterisation:

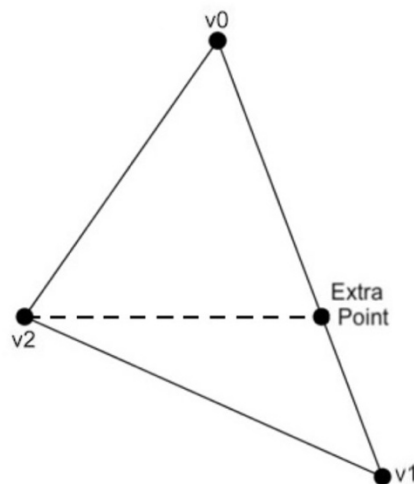
- a) Calculate the x coordinate (rounded to the *nearest* whole number) of the *left-most* filled pixel of the row at y position 363 [1 mark]
- b) Calculate the x coordinate (rounded to the *nearest* whole number) of the *right-most* filled pixel of the row at y position 363 [1 mark]

[ANSWER]: 141 and 404

Question 4: Texture Mapping

The 2D triangle shown in the diagram below has vertices:

$v_0 = [289, 50]$ $v_1 = [506, 585]$ $v_2 = [45, 419]$



- a) The filled rendering of this triangle can be achieved by first splitting it into a flat bottom and flat top triangle by the addition of an "Extra Point", as illustrated in the diagram. Giving your answer to the nearest whole number, what are the coordinates of this extra point ? [1 mark]

- b) The vertices of the triangle map to points on a 2D texture map as follows:

$v_0 \rightarrow [319, 50]$ $v_1 \rightarrow [487, 618]$ $v_2 \rightarrow [68, 418]$

Giving your answer to the nearest whole numbers, what are the texture map coordinates for the point on the triangle at position $[280, 351]$?

[3 marks]

[ANSWER]: (a) 439,419; (b) 291,362

Question 5: Camera View

A camera has the position of $[-83, -34, 18]$ relative to the scene/world origin.

Making sure you normalise your vectors where appropriate and rounding all numbers in your solution to the nearest two decimal places, what is the *forward* vector required for the camera to point directly towards

$[-2, -96, 13]$?

[1 mark]

[ANSWER]: $[-0.79 \ 0.61 \ 0.05]$