Computer Graphics HW#3 (Fall 2021)		
Course	Name, ID, Section: Computer Graphics CMPS 373 Instructor Name: Dr Osama Halabi	
HW Info	Due: **Nov. 8, 2021 (Mon)** **(end of the day)** Grade: 100 marks	_____ 100
Student	Student Name: Student ID:	

SUBMISSION INSTRUCTION

 # You must submit the whole homework solution/project folder in one zip file.

**# Name your file as [your name]-[student ID]-HW3**

Before creating the zip file for your solution go to Build -> Clean Solution to remove linking files.

All programming projects should follow the same file organization used in the lectures. Therefore, all the following items are expected to be included:

1. all C++ source (.cpp) files (in \src)

2. all C++ executable (.exe) files (in \bin)

3. all shader source (GLSL) files (in \shaders)

4. all necessary supporting files such as models, textures, cube maps, normal/height maps

5. a "readme" file describing your program, including the items listed below:

    a. a screen capture of your running program.
    b. a list of required items that you were not able to complete.
    c. citation and copyright permission information for all elements used by your program.

6. you **must set the title of the window to the homework number and your name. For example, "CG HW1 Osama Halabi".**

7. This is an **individual work** and the submitted work must represent your **own thinking and efforts**. Copying the work of others will not be tolerated. Similarity will be investigated and zero grade for all parties involved will be assigned.

8. Submit before the due date.

Question 1 .... [50 Marks]

Draw 5x5 cubes with each cube have different color and arrange on the screen 5 horizontal cubes and 5 vertical cubes. Add animation to each cube on x and y direction so that each face will the gradually rotate to simulate the color propagating from left to right and form top to bottom. Also, the size of the cubes will get large in 0.3%.
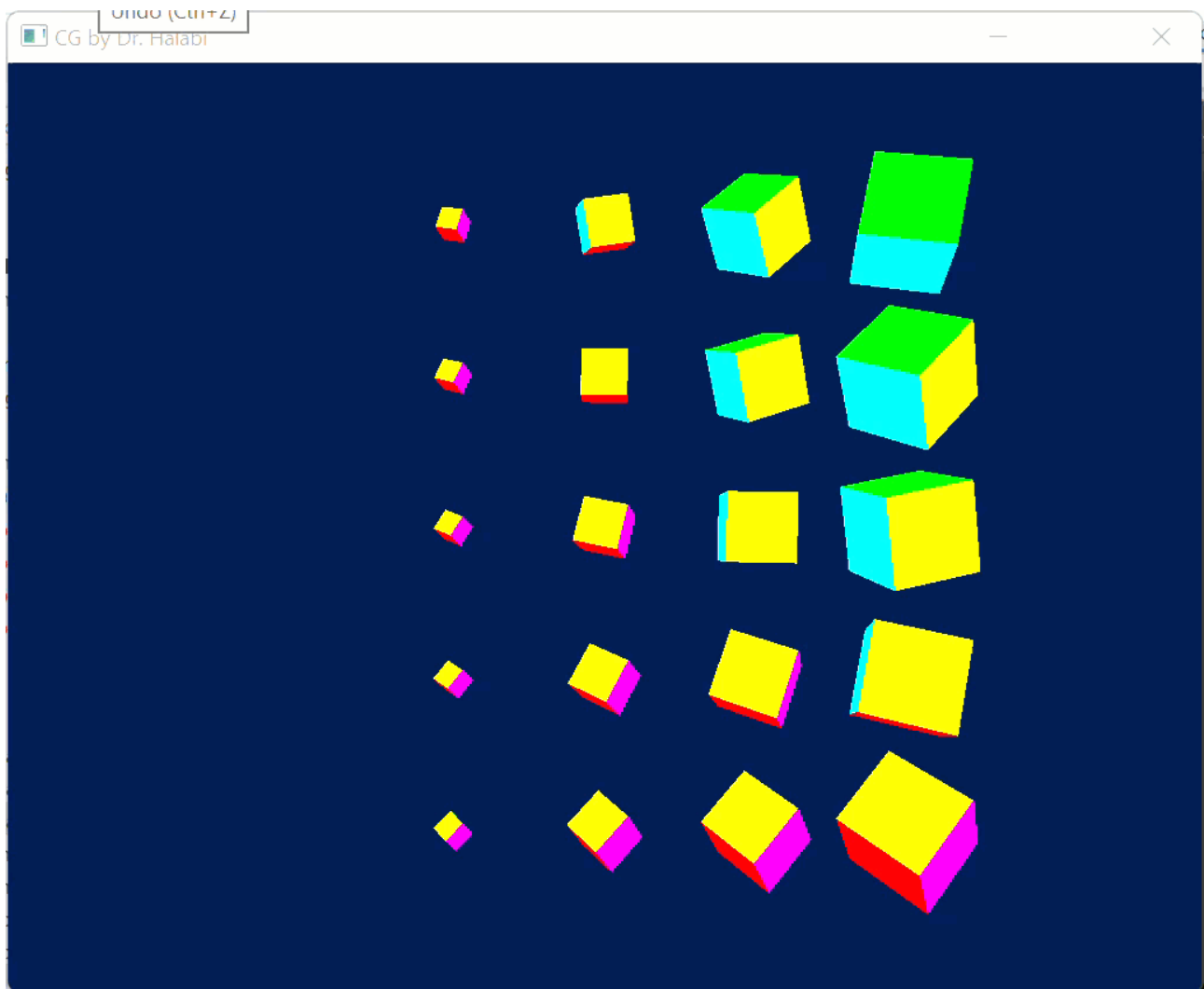
Question 2 .... [30 Marks]

Find the instance transformation which places a half-size copy of the square A(0, 0), B(2 0), C(2, 2), D(0, 2), see fig(a) into a master picture coordinate system so that the center of the square is at (-1, -1) as in fig (b).

Fig. a   Fig. b
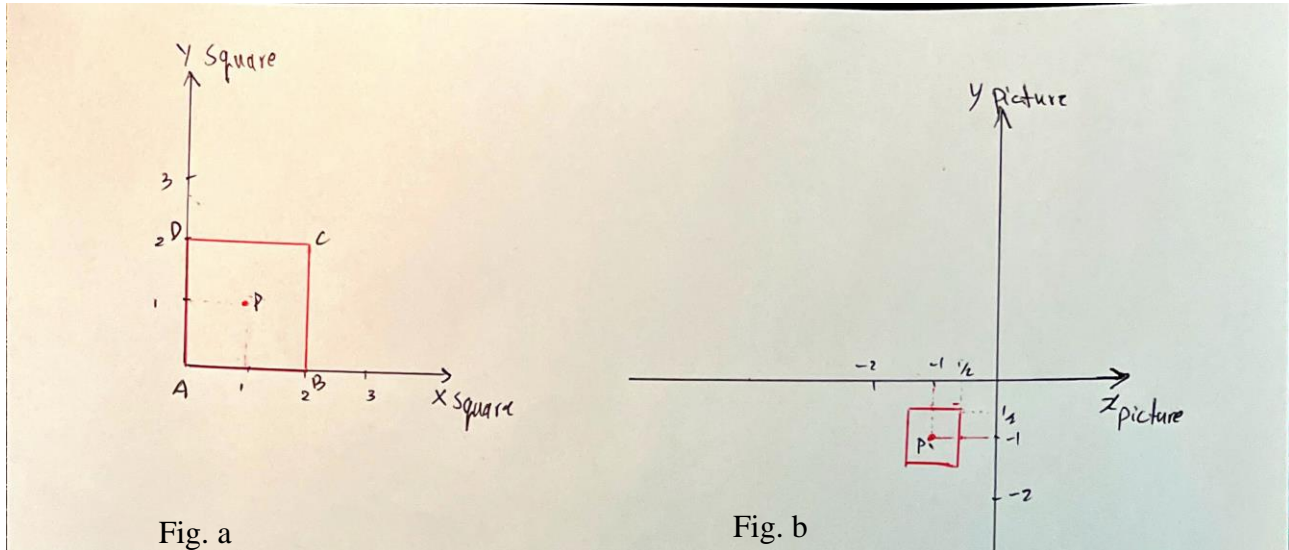
Question 3 .... [20 Marks]

In perspective projection, if center of projection (COP) is (0, 2, 1) and projection plane passes through the origin and is perpendicular to the vector (0, 2, 1) then what (4x4) matrix should we use to compute the projection of a given point (x, y, z)?

Note that you don't need to compute the exact form of M. It is sufficient as long as all the component matrices of M are listed.