

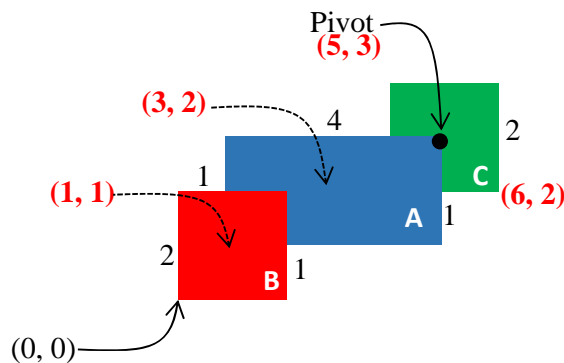
CSS450: Assignment 6 Question Sheet [This assignment carries twice the weight]

Instructions:

- In questions where you are asked to explain, please be concise.
- Show your work when necessary, be neat, precise, and brief!
- To help us grade your assignments and return this to you in a timely fashion please:
 - Put your name and answers in the answer sheet only (separate link provided). Anything you write outside of the answer sheet **will not** be graded.
 - Provide your answers in the order of the problems.
 - Please use only one side of 8.5x11 paper.
 - Please make sure you bring a hardcopy print out **of the answer sheet (!!only!!)** to submit at the beginning of class. Please do not print out the problems.

Your assignment may not be graded if any of the above is violated, you have been warned.

Based on the SceneNode idea as introduced in [Example 5-6](#), I want to create the following group object with three SquareRenderables:



Here are the details:

- Renderable-A (in Blue): size is 4x2
- Renderable-B (in Red): size is 2x2
- Renderable-C (in Green): size is 2x2

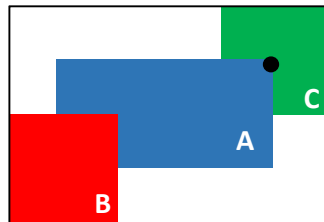
As illustrated in the above figure, Renderable-A's lower-left corner is located at the exact center of Renderable-B, and its top-right corner is located at the exact center of Renderable-C. In other words, the overlap in both cases are 1x1. In this case, we want to defined the object such that the origin of the object is located at the lower-left corner of Renderable-B, while the pivot for the object is located at the top-right corner of Renderable-A.

Keep in mind that the SceneNode transform is meant for the control of the user, in-order words, for the SceneNode,

- Translation should be left as (0,0)
- Scale should be set as (1,1), and
- Rotation should be left 0

Now, answer the following questions:

1. What is the Transform of Renderable-A
 - a. Translation? **(3, 2)**
 - b. Scale=? **(4, 2)**
2. What is the Transform of Renderable-B
 - a. Translation=? **(1, 1)**
 - b. Scale=? **(2, 2)**
3. What is the Transform of Renderable-C
 - a. Translation=? **(5, 3)**
4. What is the Pivot setting for the SceneNode? **(5, 3)**
5. Our user has scaled the SceneNode by S(2,2), and now she wants to move the pivot to the bottom-right corner of Renderable-C, what should be the new Pivot setting? **(6, 2)**
6. With SceneNode Transform set as, T(2,2), S(1,1), and R(0), I want to define a camera to just bound and see the entire object:



- a. What should be the WC-center be set to?

Lower left corner is now (2,2)

Width is 6, so center-X is 3 units from the left: $3+2 = 5$

Height is 4, so center-Y is 2 units from the bottom: $2+2=4$

WC-center=(5, 4)

- b. What is the WC Width? **6, Aspect Ratio must be 6x4**

- c. If you are told that the user wants to display the WC to the entire width of the Canvas of 800 pixels, what should she set the Canvas height to?

Aspect ratio: $W/H = 6/4 = 800/H \rightarrow$

Height= $1600/3$: say 533, 534, or $1600/3$ is all ok.