

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

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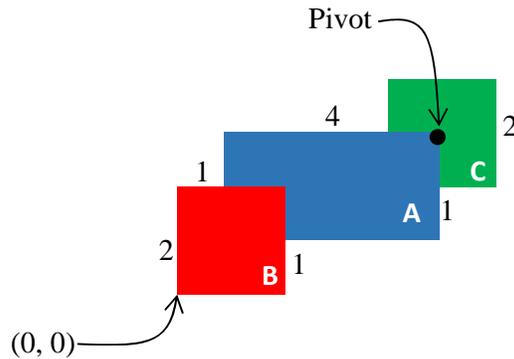
### Instructions:

- 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.

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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?
  - b. Scale=?
2. What is the Transform of Renderable-B
  - a. Translation=?
  - b. Scale=?
3. What is the Transform of Renderable-C
  - a. Translation=?
4. What is the Pivot setting for the SceneNode?
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. 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?
- b. What is the WC Width?
- 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?