

P3 B Documentation

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CS 3451

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Summary

The purpose Project 3 Part B was to take what was implemented in part A and convert everything into a three-dimensional coordinate system. Part A consisted of an animation of a pair of two-dimensional legs that demonstrated four stages of tango: transfer, collect, rotate, and aim in a forward step. Part A also included a top view of a path the dancer will take. This demonstrates proper rotation of the dancer's hips. Part B is a combination of the top view of the dancer as well as the side view of the dancer.

Solution

Similarly to P3A module 1, The legs will be animated in this order: transfer, collect, rotate, and aim starting from the left leg as the support foot, which is shown as a green leg. Unlike module 1, P3B is shown in the three-dimensional coordinate system.

Therefore, an extra stage, rotate, is added to this animation. However everything else will remain the same. The first step transfer will still change the left leg to be the free foot and the red leg (right leg), which was originally the free foot, to be the support foot.

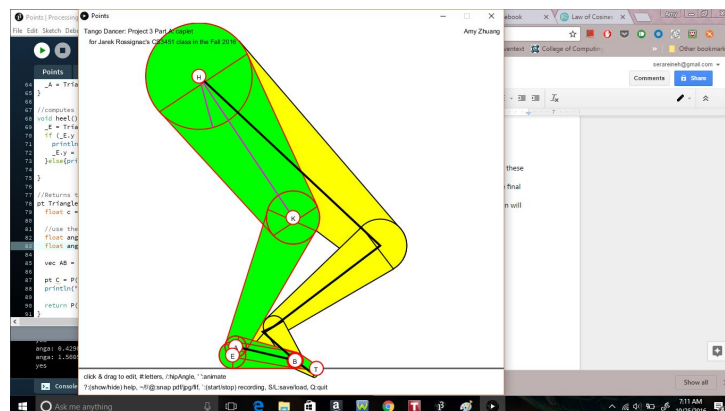
The next step would still be collect, where the free foot collects to the support foot's position. Rotate is when the dancer's hip will rotate at an angle so that its forward direction is in alignment to the next step C. This is the only step that is different from module 1 of part A. Lastly, aim will show the free foot moving past the support foot and into position. The above steps are repeated to form a walking motion.

Here is a breakdown of what needs to be done:

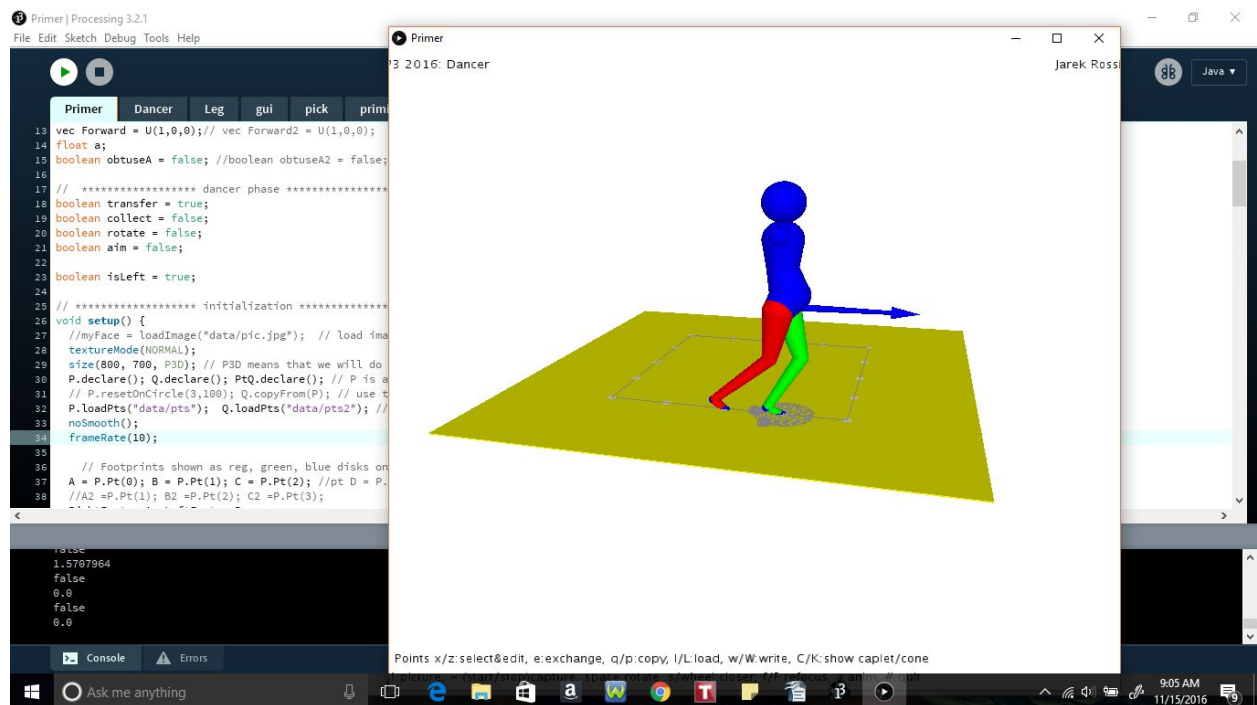
- On transfer, Lerp the center of the dancer, also known as the hip, from the support foot to the new support foot.
- On collect, Lerp the free foot to the support foot.
- On rotate, rotate dancer in the current forward direction by an angle so that the forward vector is aligned with the point the free foot will aim to.
- On aim, Lerp the free foot to the next point in the polyloop.
- Repeat process.

Another addition to this part of the project is the creation of the upper body of the dancer. A leg class was created to better construct the dancer. It includes functions that calculate the points of where the hips, legs, feet, torso, and head are. When creating the object, the position of the left and right leg are passed in along with the forward direction vector. Using these instance variables, the rest of the body can be calculated.

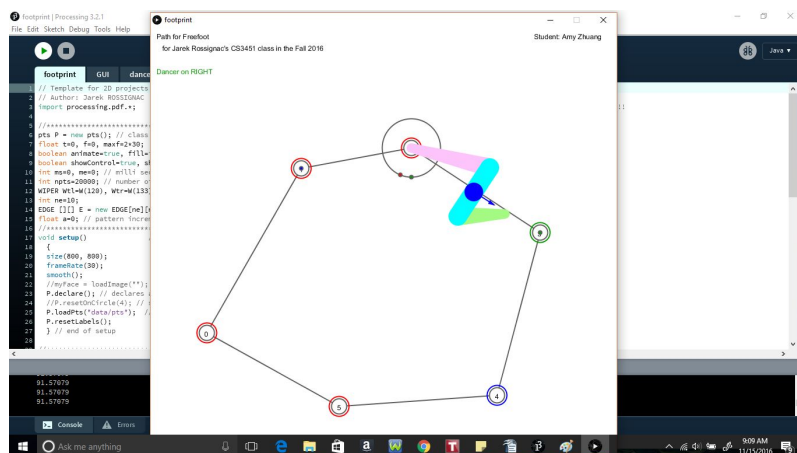
Here are a couple of images to compare and contrast the differences in part A and part B:



Here is a two-dimensional representation of the pair of legs. In contrast, here is the three dimensional representation of them, also with the added upper body.



Here is the two-dimensional representation of the dancer in top view:



In contrast, here is the three-dimensional representation of the dancer in top view:

