

Lab 9 Report

Javier Ramirez Moyano

Perception & Multimedia Computing

Write-up Questions

Part A

3.- Does your code handle the situation where velocity is $(-0.3, -0.4)$? If not, why? How could you fix it?

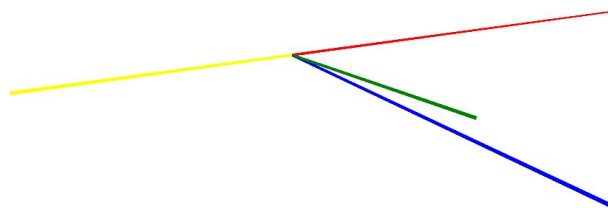
Using the *angleBetween()* function, my code does not handle the situation where velocity is $(-0.3, -0.4)$ properly, as the arrow points in the wrong direction. This is because the *angleBetween()* function always returns the smallest angle between the vectors given, so it will never return a value larger than 180 degrees or π radians. Therefore, if the velocity vector's x value is negative, the result of *angleBetween()* will not be accurate. In order to fix this, I've implemented the following code within the *draw()* function:

```
if(velocity.x > 0){
    rotate(dir.angleBetween(velocity), position);
} else {
    rotate((2*Math.PI)-dir.angleBetween(velocity), position);
}
```

Part B

2.- What's the difference between *b.cross(a)* and *a.cross(b)*?

The difference between *b.cross(a)* and *a.cross(b)*, or in my case *vector1.cross(vector2)* and *vector2.cross(vector1)*, is the direction of the resulting vectors. In the image below we can see the original vectors, *vector1* and *vector2*, in blue and green, respectively, and the resulting cross products, *cross1* and *cross2*, in red and yellow.



As we can see, the resulting vectors point in opposite direction directions.

Part C

5.- What do you see when you observe each of the lights separately? (Switch off the other two lights by editing the code) What effects can you create by editing the materials, or the light colors?

With only the ambient light, I'm able to see the spheres and their colors perfectly from all angles, but the animation feels very artificial because the light doesn't seem to be coming from a specific point in space as it does in real life. Turning the rest of the lights off except for the directional lights gives the animation a more natural feel, and it makes both spheres reflect the same color (blue). With this light, only a part of the spheres is lit up, and depending on the angle of the camera we can see more or less of the spheres. The point light has a similar effect on the animation than the directional lights, only the point light has a different color (orange) and we are able to change the angle that it hits the spheres from using the mouse.

By changing the parameters on the light and material functions, we are able to change many aspects of the animations, like the color and opacity of spheres, or the color, strength, and position of the lights. Playing around with these parameters we are also able to create some interesting effects, such as changing appearance of the spheres' texture.