Cube and Spring
David Ng
30009245

Justification

For the second assignment, I decided to create a model of a Rubik's cube, as I thought that it would be interesting to animate the motions of its faces turning. The Rubik's cube is articulated in the sense that it has 6 revolute (rotary) joints for each face. I had planned to rig the faces, but learned from online tutorials that it was not advantageous to do so as the pieces of the cube had to be able to swap with each other in order to simulate a real Rubik's cube. Thus, the rotations seen in the video are done individually by grouping the blocks of a face and rotating as required. I felt that it was difficult to tell a story with just one object, so I also decided to introduce a spring as well, with a ball joint that allowed a limited range of smooth movement in all direction. I was then able to simulate its motion by rigging it, so that it can bend in the ways that a normal spring can. The spring was also useful for demonstrating squashing and stretching, as its motion appears realistic when such principles of animation are applied. I also felt that it contrasted and complimented the Rubik's cube, as a circle does a square.

I have put a lot of effort into this assignment, and hope that it exceeds your expectations. I hope that you enjoy the animation. Thank you.

Script and Expressed Emotions

The scene starts by introducing the viewer to the Rubik's cube, which rolls around and jumps up and down. Evidence of squash and stretch can be seen. We then see that the cube is merrily making its way to the right, while the spring happily hops towards the left (once again squashing and stretching). Both are oblivious to the other, and end up crashing into one another. After hitting each other, the cube spins backwards from the impact, demonstrating follow through as it recoils from the blow. The spring also bounces and rotates in dizziness. After feeling initial surprise at each other's presence, they both become curious at the situation before them. Although the spring is initially cautious of the cube, the cube seems friendly and waves for the spring to come closer. Since they have both been without friends, they soon welcome each other's company after having accepted each other. Their joy is evidenced in their jovial motion when they jump around and play with each other. Their subsequent laughter and wacky motions indicate that they are feeling happiness from their companionship.

Suddenly however, the cube finds itself having jumped too far and without control. The spring is underneath the cube, so they prepare for impact. The cube ends up squishing the spring beneath it. Shocked, the cube jumps back as quick as possible, hoping that the spring is okay. The cube inches closer slowly, feeling scared that it has injured its friend. It nudges the compressed spring, hoping that it is still alive and well, demonstrating its concern. Unfortunately, the spring does not react. Feeling sad and remorseful, the cube shakes its head and slowly rotates and turns away. The cube starts sliding away from the spring, looking back every once in a while. While the cube is turned away and ready to leave, the spring "springs" back to life, jumping in front of the cube. Happy that no one is seriously injured, they both rejoice and continue to frolic.

Elements of Motion included in Animation

Evidence of squash and stretch is seen in nearly all of the bounces and jumps made by the cube and the spring. Staging is used when the camera changes its focus and direction in relation to the objects. This is used to provide close ups, wide angle shots, and present the story in a more interesting and cohesive way than if the entire animation was just one cut. From the animation, the audience can anticipate the collision of the two objects, as they are both moving towards each other, seemingly without notice of the other. Follow through is used after the collisions, and when the cube and spring suddenly stop. This helps to give the impression that he objects follow the principle of inertia, and cannot just immediately stop on demand. Arcs are used when cube and spring hop from one location to the next, providing motion that seems natural to the human eye. Timing is used to convey the emotions that the objects feel, such as when they slowly approach each other in caution, when the sadly drag themselves away, or when they quickly jump up in surprise. It was somewhat difficult for me to incorporate secondary action, since these objects are very basic. I did attempt to implement it in the Rubik's cube, when it swings its faces around, even though they are not contributing to the main direction of motion that the cube intends to head. Exaggeration is attempted during the collision (in which I have attempted to make them collide in slow-mo, before recoiling at normal speed), and when the Rubik's cube stays in the air in shock that the spring is okay before landing. I have also attempted to make the character interactions appealing through their individual antics and quirks.