

The following discretization was used to make our MDP

```
X_STEP = 2  
X_DOT_STEP = 0.1  
THETA_STEP = 0.1  
THETA_DOT_STEP = 0.25
```

We decided to use a big “bucket” for position since we believed it did not help much to balance the pole, but instead to simply stay on the track, which was not the biggest factor in failing the pole-balancing

We believed the two biggest factors in pole balancing were the velocity of the cart and the angle of the pole, since the angle of the pole should be close to 0 radians and directly determines success. The velocity of the cart heavily influences the pole’s angular velocity.

Lastly, the angular velocity was fairly important; however, X\_DOT\_STEP also influenced it heavily, and the number of states should not be too large so that the model can use more previously learned states to determine the next move, so we did not use as many buckets