Sam Assaf 6150748
COMP 476 Assignment 1

Question #1

a) $p_t - p_c = (6,6) - (11,2) = (-5,4)$

$\frac{p_t - p_c}{|p_t - p_c|} = (-0.78, 0.62)$

$v = (-7.8, 6.2)$

$p'_c = (11,2) + (-7.8, 6.2)(0.5) = \boxed{(7.1, 5.1)}$ Update 1

$p_t - p_c = (-1.1, 0.9)$

$\frac{p_t - p_c}{|p_t - p_c|} = (-0.77, 0.63)$

$v = (-7.7, 6.3)$

$p'_c = (7.1, 5.1) + (-7.7, 6.3)(0.5) = \boxed{(3.25, 8.25)}$ Update 2

$p_t - p_c = (2.75, -2.25)$ $\frac{p_t - p_c}{|p_t - p_c|} = (0.77, -0.63)$ $v = (7.7, -6.3)$

$p'_c = (3.25, 8.25) + (7.7, -6.3)(0.5) = \boxed{(7.1, 5.1)}$ Update 3

$p_t - p_c = (-1.1, 0.9)$ $\frac{p_t - p_c}{|p_t - p_c|} = (-0.77, 0.63)$ $v = (-7.7, 6.3)$

$p'_c = (3.25, 8.25)$ Update 4

Based on updates 2 and 3

$p'_c = (7.1, 5.1)$ Update 5

b) $p_c - p_t = (5, -4)$ $\frac{p_c - p_t}{|p_c - p_t|} = (0.78, -0.62)$ $v = (7.8, -6.2)$

$p'_c = (11, 2) + (7.8, -6.2)(0.5) = (15.1, -1.1)$ Update 1

$p_c - p_t = (9.1, -7.1)$ $\frac{p_c - p_t}{|p_c - p_t|} = (0.79, -0.62)$ $v = (7.9, -6.2)$

$p'_c = (15.1, -1.1) + (7.9, -6.2)(0.5) = (19.05, -4.2)$ Update 2

$p_c - p_t = (13.05, -10.2)$ $\frac{p_c - p_t}{|p_c - p_t|} = (0.79, -0.62)$ $v = (7.9, -6.2)$

$p'_c = (23, -7.3)$ Update 3

$p_c - p_t = (17, -13.3)$ $\frac{p_c - p_t}{|p_c - p_t|} = (0.79, -0.62)$ $v = (7.9, -6.2)$

$p'_c = (26.95, -10.4)$ Update 4

$p_c - p_t = (20.95, -16.4)$ $\frac{p_c - p_t}{|p_c - p_t|} = (0.79, -0.62)$ $v = (7.9, -6.2)$

$p'_c = (30.9, -13.5)$ Update 5

c) $p_t - p_c = (-5, 4)$ $\vec{n} = (-0.78, 0.62)$ $a = (-18.72, 14.88)$

$v = (0,4) + (-18.72, 14.88)(0.5) = (-9.36, 11.44)$

$p'_c = (11,2) + (-9.36, 11.44)(0.5) = (6.32, 7.72)$ Update 1

$p_t - p_c = (-0.32, -1.72)$ $\vec{n} = (-0.18, -0.98)$ $a = (-4.32, -23.52)$

$v = (-11.52, -0.32)$

$p'_c = (0.56, 7.56)$ Update 2

$p_t - p_c = (5.44, -1.56)$ $\vec{n} = (0.96, -0.28)$ $a = (23.04, -6.72)$

$v = (0.05, -3.68)$ $p'_c = (0.59, 5.72)$ Update 3

$p_t - p_c = (5.41, 0.28)$ $\vec{n} = (1, 0.05)$ $a = (24, 1.2)$

$v = (12.05, 0.88)$ $p'_c = (6.62, 6.16)$ Update 4

$p_t - p_c = (-0.62, -0.16)$ $\vec{n} = (-0.97, -0.25)$ $a = (-23.28, -6)$

$v = (0.41, -2.12)$ $p'_c = (6.83, 5.1)$ Update 5

d) In Kinematic Seek, the character moves linearly towards the target, however the velocity is too high the character keeps overshooting the target and having to go back. The character overshoots the target yet again and goes back and forth like this forever.

In steering Seek, the character attempts to accelerate towards the target but the acceleration is too high so the character has a tendency to overshoot and the turn back towards the target creating a spiral-like path.

Question #2

a) $p_c = [(21,6) + (5,11) + (28,9)]/3 = (18, 8.67)$

$v_c = [(3,1) + (3,3) + (6,5)]/3 = (4, 3)$

$\boxed{p_{anchor} = (18, 8.67) + (1)(4,3) = (22, 11.67)}$

b) Character 1: $\Delta p_{si} = (22,18) - (18, 8.67) = (4, 9.33)$

$\boxed{p'_{si} = (22, 11.67) + (4, 9.33) = (26, 21)}$

Character 2: $\Delta p_{si} = (-12, 4.33)$

$\boxed{p'_{si} = (10, 16)}$

Character 3: $\Delta p_{si} = (11, 3.33)$

$\boxed{p'_{si} = (33, 15)}$

If killed before a)

c) $p_c = (13, 13.5)$ $v_c = (3, 2)$

$\boxed{p_{anchor} = (16, 15.5)}$

Character 1: $\Delta p_{si} = (-11, 4.5)$

$\boxed{p'_{si} = (5, 20)}$

Character 2: $\Delta p_{si} = (-7, -0.5)$

$\boxed{p'_{si} = (9, 15)}$

In this case the anchor would move to (16, 15.5) and Characters 1 and 2 will take slot positions (5, 20) and (9, 15), respectively.

If Character 3 was killed before b) but after a), then nothing would change since p_{anchor} and p_c were already calculated.