

1<sup>st</sup> iteration

cluster 1 :  $A_1, A_3, A_9$

cluster 2 :  $A_4, A_6, A_8$

cluster 3 :  $A_7, A_2, A_5$

compute new centroids:

$$\text{cluster 1 : } x = \frac{3+4+4}{3} = 3.67$$

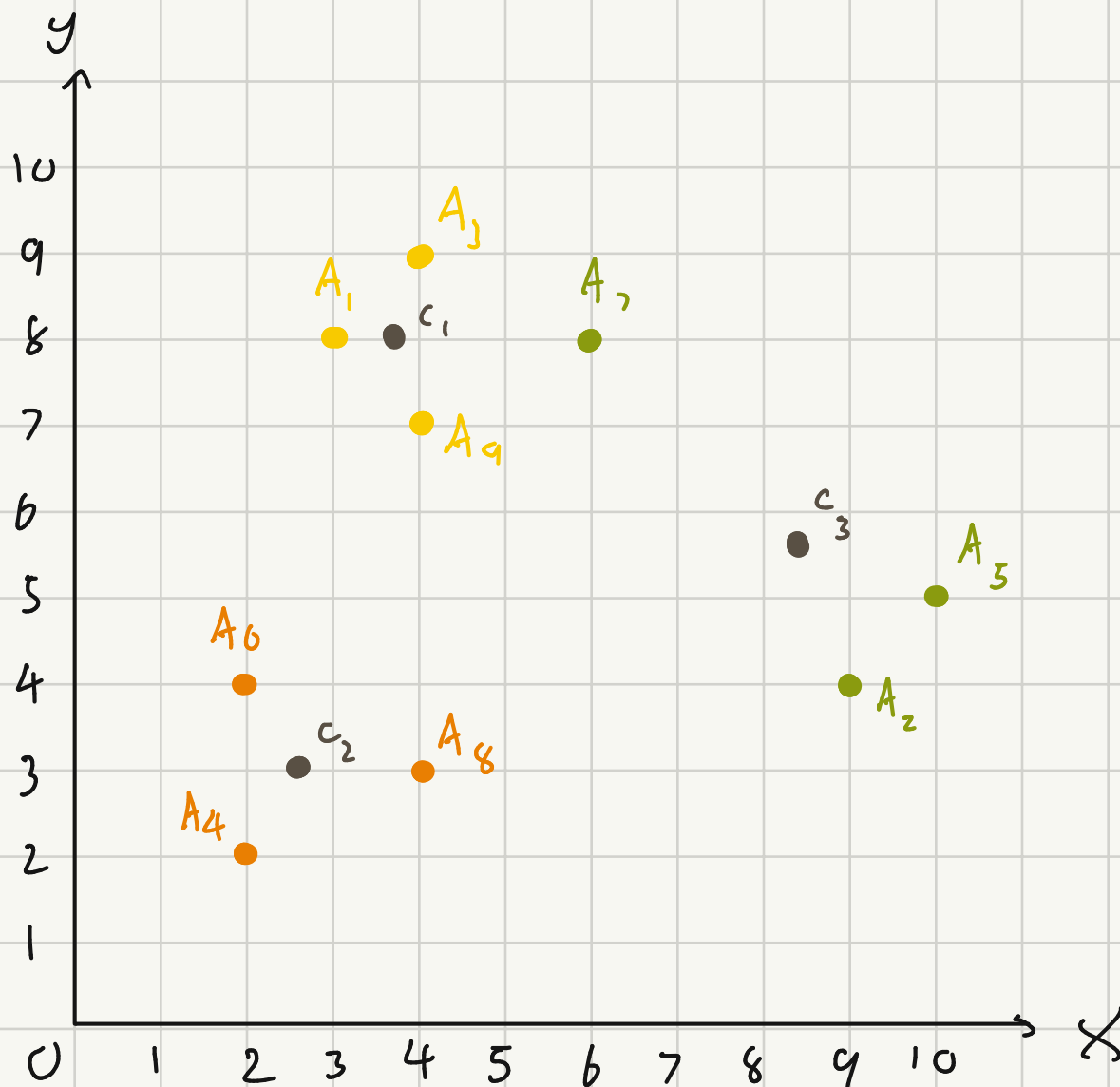
$$y = \frac{8+9+7}{3} = 8$$

$$\text{cluster 2 : } x = \frac{2+2+4}{3} = 2.67$$

$$y = \frac{2+4+3}{3} = 3$$

$$\text{cluster 3 : } x = \frac{6+9+10}{3} = 8.33$$

$$y = \frac{8+4+5}{3} = 5.67$$



2<sup>nd</sup> Iteration

cluster 1 :  $A_1, A_3, A_7, A_9$

cluster 2 :  $A_4, A_6, A_8$

cluster 3 :  $A_2, A_5$

compute new centroid :

$$\text{cluster 1 : } x = \frac{3+4+6+4}{4} = 4.25$$

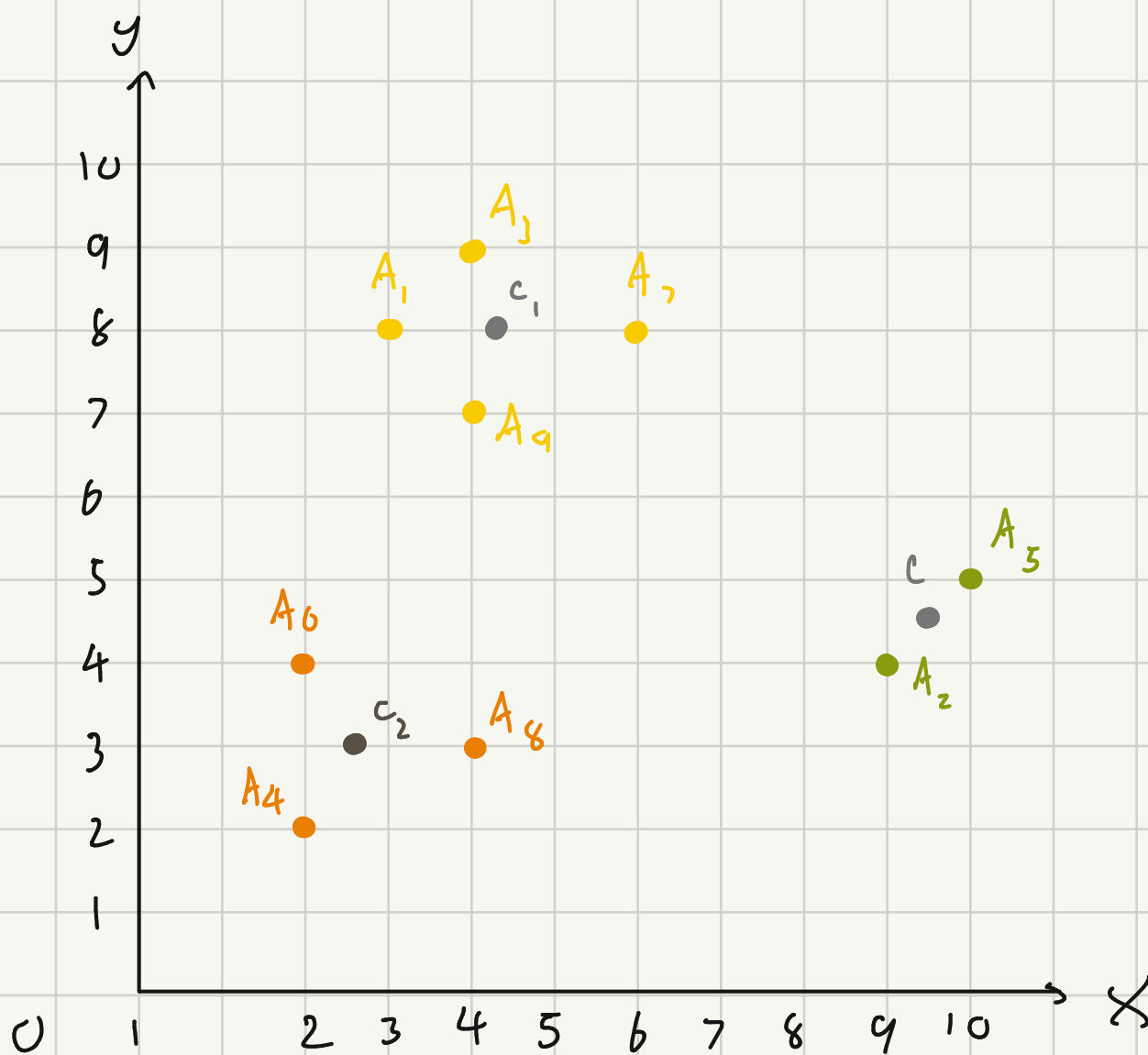
$$y = \frac{8+9+8+7}{4} = 8$$

$$\text{cluster 2 : } x = \frac{2+2+4}{3} = 2.67$$

$$y = \frac{2+4+3}{3} = 3$$

$$\text{cluster 3 : } x = \frac{9+10}{2} = 9.5$$

$$y = \frac{4+5}{2} = 4.5$$



3<sup>rd</sup> Iteration

cluster 1 :  $A_1, A_3, A_7, A_9$

cluster 2 :  $A_4, A_6, A_8$

cluster 3 :  $A_2, A_5$

compute new centroid :

$$\text{cluster 1 : } x = \frac{3+4+6+4}{4} = 4.25$$

$$y = \frac{8+9+8+7}{4} = 8$$

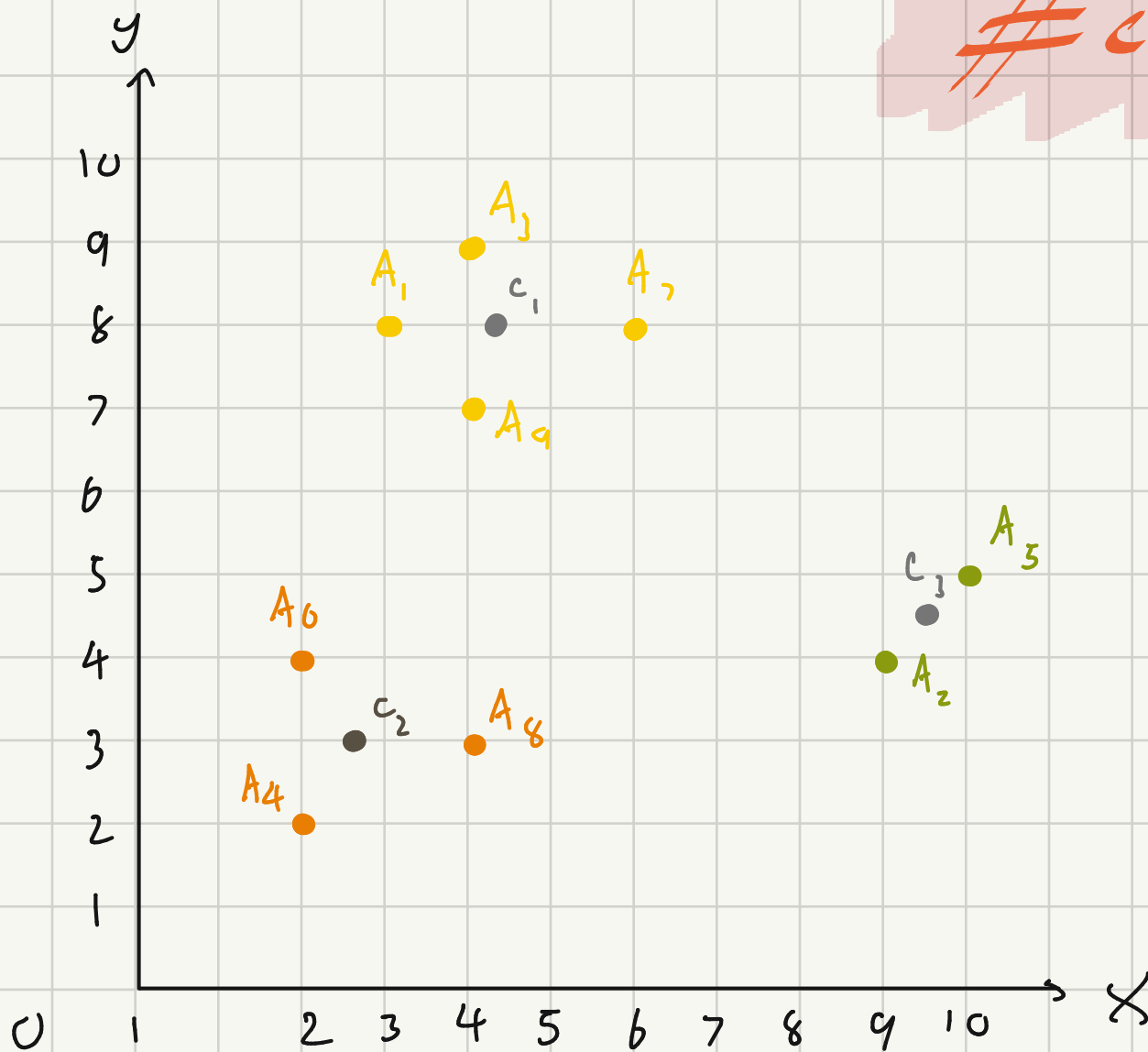
$$\text{cluster 2 : } x = \frac{2+2+4}{3} = 2.67$$

$$y = \frac{2+4+3}{3} = 3$$

$$\text{cluster 3 : } x = \frac{9+10}{2} = 9.5$$

$$y = \frac{4+5}{2} = 4.5$$

~~converge~~



# Ans

3 Iterations have to be run until k-mean converge.

1<sup>st</sup> centroid :  $x = 4.25$        $y = 8$   
member :  $A_1, A_3, A_7, A_9$

2<sup>nd</sup> centroid :  $x = 2.67$        $y = 3$   
member :  $A_4, A_6, A_8$

3<sup>rd</sup> centroid :  $x = 9.5$        $y = 4.5$   
member :  $A_2, A_5$