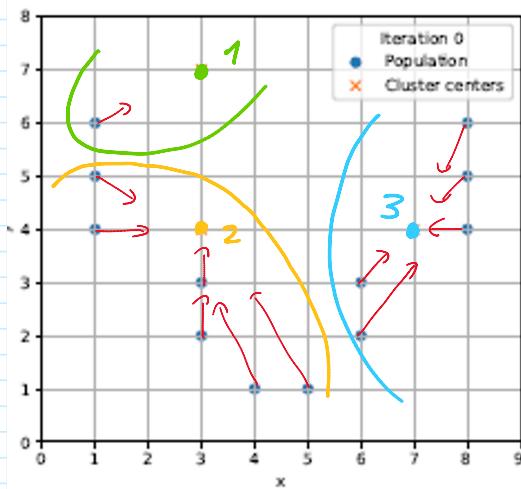
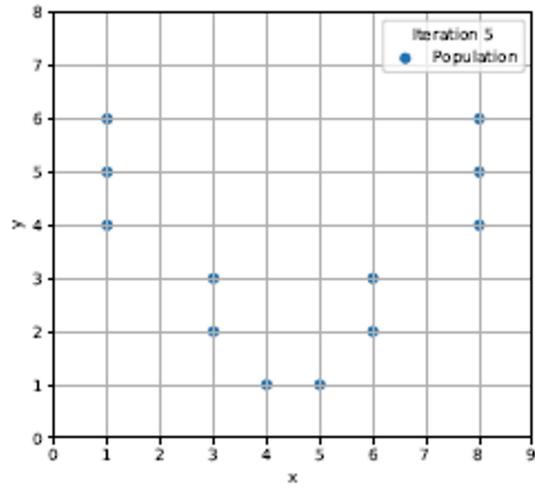
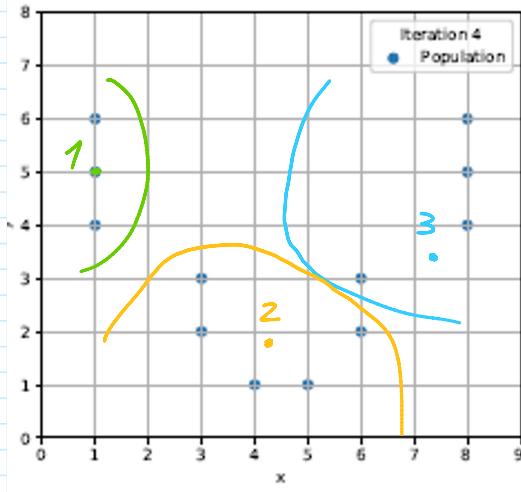
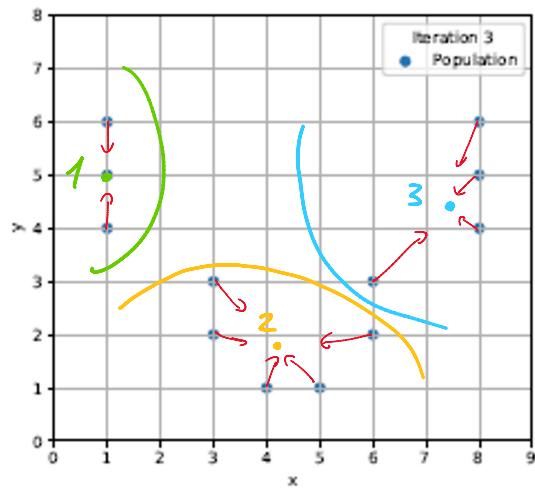
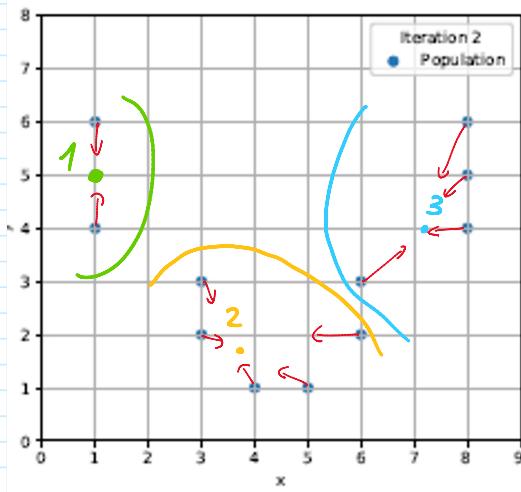
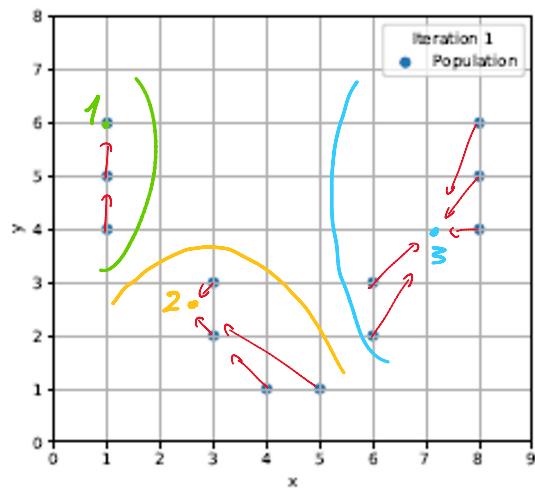


ex 21

Samstag, 25. Juni 2022 15:55



calculation seen below



k-means algorithm

- ① $k = 0$: completely done by hand (all obvious)

$$\textcircled{2} \quad k=1 : \textcolor{red}{1} \quad \mu_1 = (1, 6)$$

$$\textcolor{blue}{2} \quad \mu_2 = (2.83, 2.67)$$

$$\textcolor{red}{3} \quad \mu_3 = (7.2, 4)$$

calculation for unclear points:

$$(1, 4) : |(\frac{6}{2}) - \mu_1| = 2, |(\frac{6}{2}) - \mu_2| = 2,26$$

$$\textcircled{3} \quad k=2 : \textcolor{red}{1} : (1, 5)$$

$$\textcolor{blue}{2} : (3.75, 1.75)$$

$$\textcolor{red}{3} : (7.2, 4)$$

calculation for uncertain points:

$$(6, 2) : |(\frac{6}{2}) - \mu_1| = 2,26, |(\frac{6}{2}) - \mu_3| = 2,33$$

$$\textcircled{4} \quad k=3 : \textcolor{red}{1} : (1, 5)$$

$$\textcolor{blue}{2} : (4.2, 1.8)$$

$$\textcolor{red}{3} : (7.5, 4.5)$$

$$(6, 3) : |(\frac{6}{3}) - \mu_1| = 2.16, |(\frac{6}{3}) - \mu_2| = 2.12$$

$$\textcircled{5} \quad k=4 : \textcolor{red}{1} : (1, 5) \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{same centers,} \\ \textcolor{blue}{2} : (4.2, 1.8) \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{since no points} \\ \textcolor{red}{3} : (7.5, 4.5) \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{have changed}$$

→ algorithm converged

c) The algorithm converged after 4 iterations, it doesn't match our expectations. The point $(6, 3)$ should belong to center $\textcolor{blue}{2}$.

⇒ A reason for this probably are the given centers as initial values.