USArrests

↳ use the Ascending method to determine if there exists some group.

⇒ hclust

k-means

↳ we should know the number of groups (k)

aim: to determine the composition of the k groups

Step 1: you choose k points of $\mathbb{R}^p$.

$\Rightarrow c_1^{(0)}, \dots, c_k^{(0)}$

for each observation, we compute the distance with $c_1^{(0)}, c_2^{(0)}, \dots, c_k^{(0)}$

2) we find $r \in [1, k]$ which is associated to smallest distance.

at the end of the first step

we have k groups

Step 2 we compute the mean point of each created group

$\rightarrow c_1^{(1)}, \dots, c_k^{(1)}$

we do the same

We repeat Step 2 until the moment when the groups do not change.

Property: The stopping rule is always satisfied!