

The background features a dark blue-to-purple gradient with faint, light-colored concentric circles and degree markings (40, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260) on the left side, suggesting a technical or scientific theme.

# 多媒體系統

# MULTIMEDIA SYSTEM

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The background is a gradient from deep red at the top to dark blue at the bottom, speckled with white dots resembling stars. Overlaid on the left side are several concentric circular patterns. Some are solid white lines, while others are dashed. Some circles have small white arrows indicating a clockwise direction. One large circle on the left has a scale with numbers from 140 to 260 in increments of 10, arranged along its circumference.

# 分群 CLUSTERING

# 概念

- 把許多事物按照某種標準歸為數個類別，其中較為相近/類似的聚為一類，反之較不相近的則聚為不同類。目的是企圖從一大堆雜亂無章的原始資料中，找出少數幾個較小的群體，使得群體內的分子在某些變項的測量值均很類似，而群體與群體間的分子在該測量值上差異較大。
- 同一組樣本會因不同目的、資料輸入方式、所選擇分群特徵或資料屬性，形成不同的分群結果

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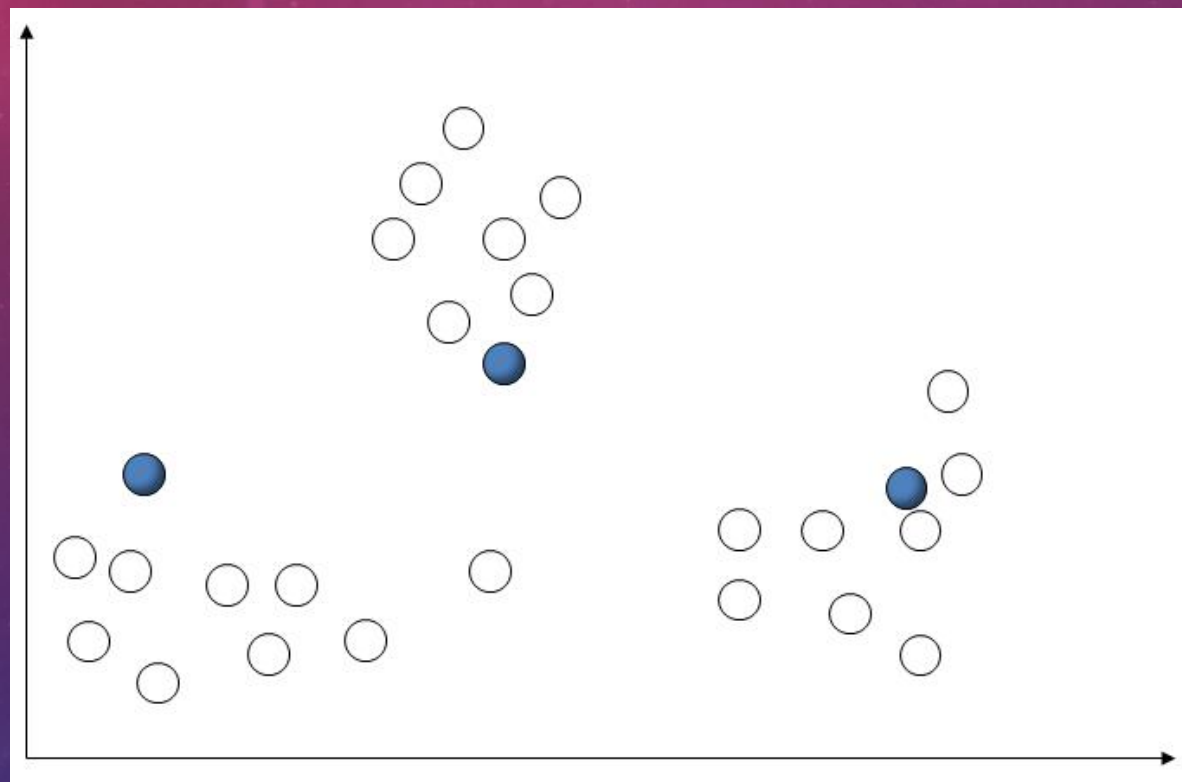
# K-MEANS



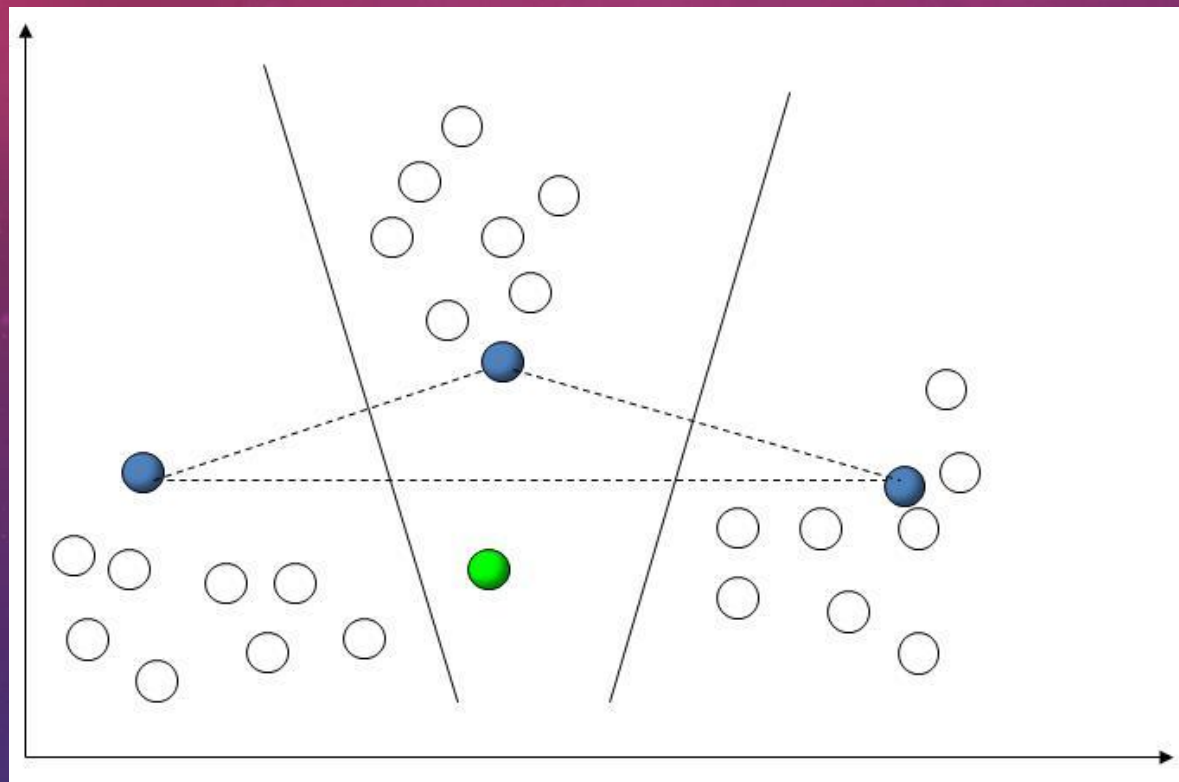
# 概念

- 隨機選取  $k$  個樣本作為起始中心點，將其餘樣本歸入相似度最高中心點所在的群；再計算目前群內樣本座標的平均值為新的中心點，依次循環反覆運算，直到所有樣本所屬的群不再變動。

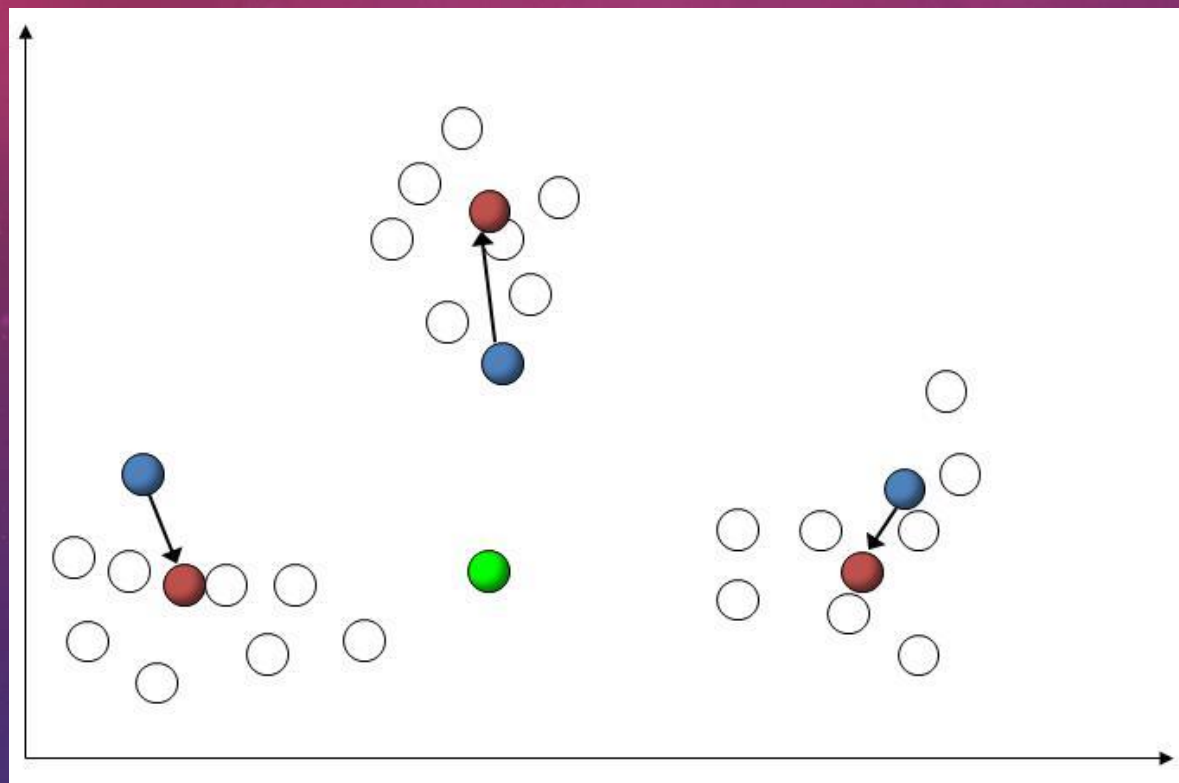
# STEP 1. 隨機指派群集中心



## STEP 2. 產生初始群集

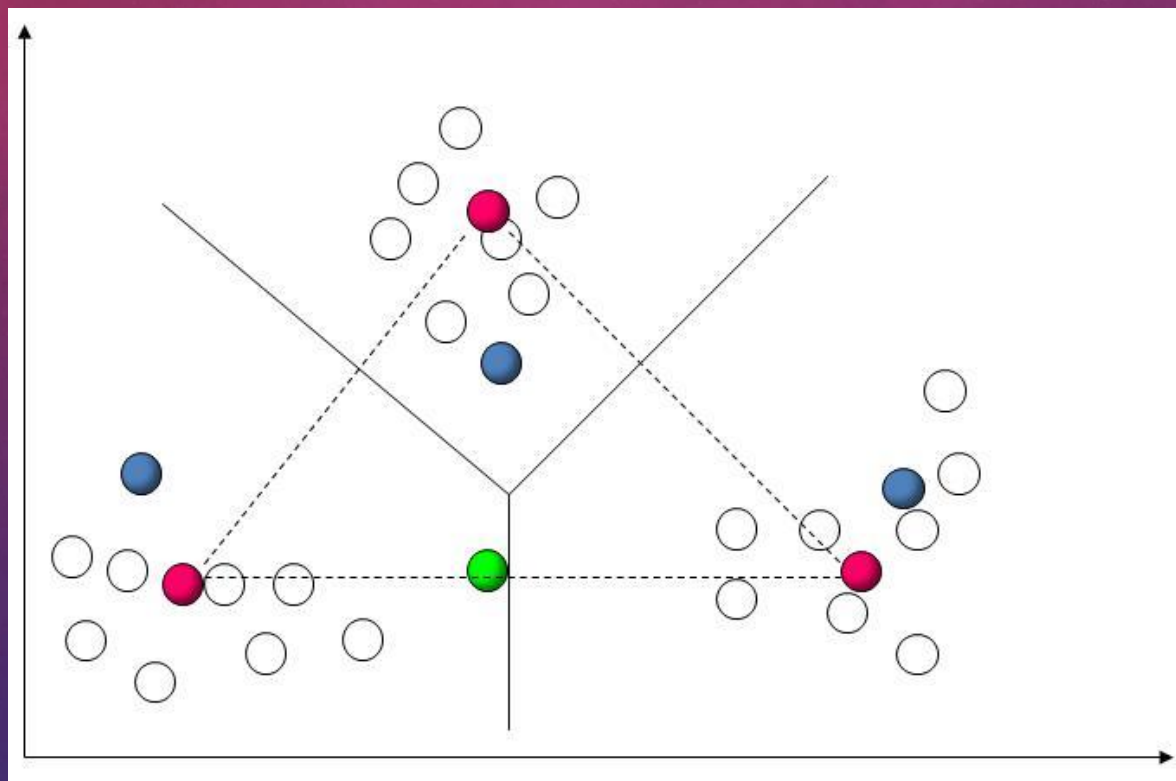


## STEP 3. 產生新的質量中心

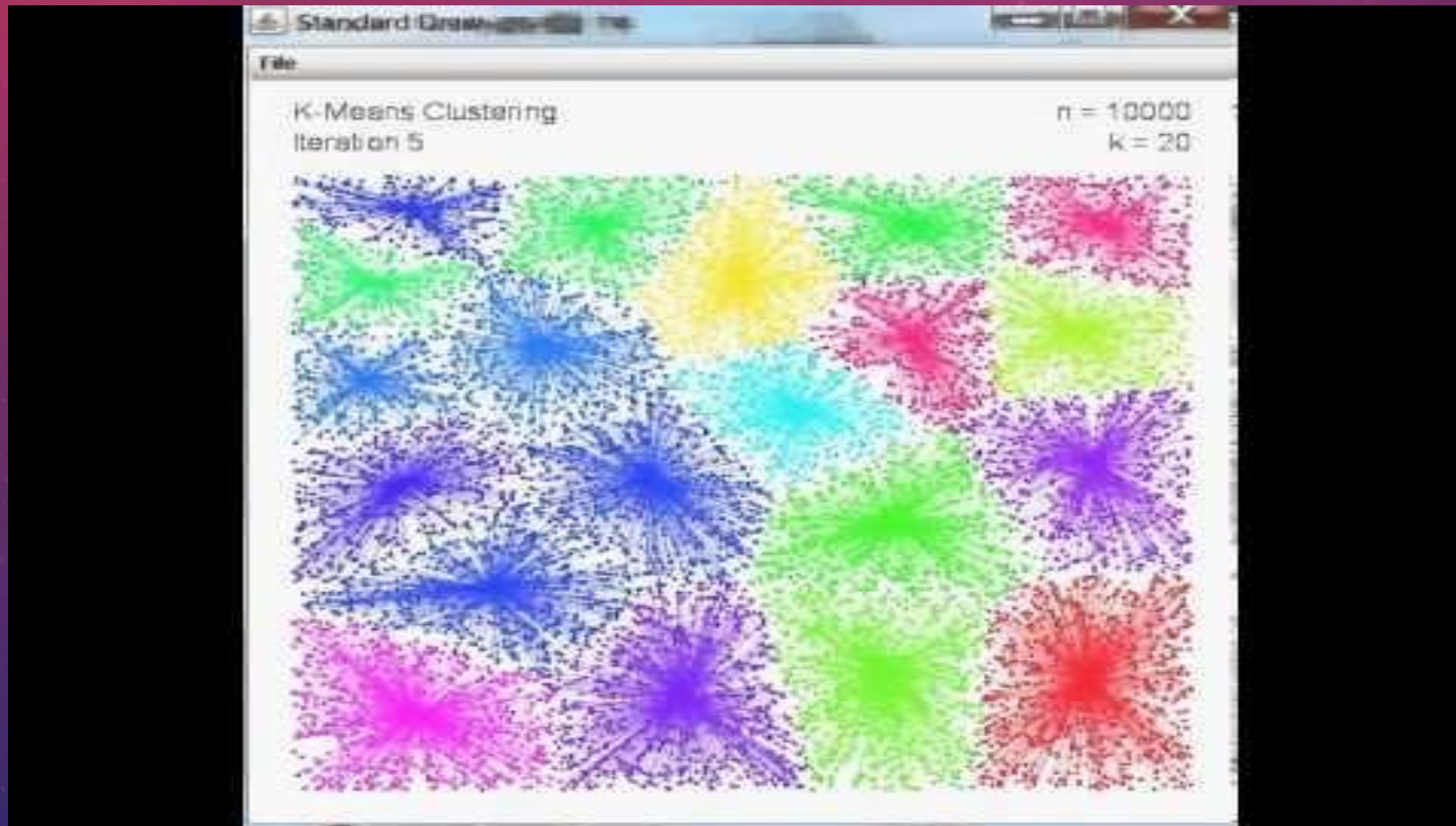




## STEP 4. 變動群集邊界



# EXAMPLE



# 參考來源

1. <https://rpubs.com/skydome20/R-Note9-Clustering>
2. <https://jgpan.gitbooks.io/the-study-of-r/content/clustering.html>
3. [K-Means Clustering Example](#)
4. <http://ccckmit.wikidot.com/ai:kmeans>



The background is a gradient from red at the top to blue at the bottom, with a starry texture. On the left side, there are several concentric circles and a large circular scale with degree markings from 140 to 260. Some circles have arrows indicating a clockwise direction.

# THINKING

## 重點？



# 重點

1.  $K$  如何決定？
2. 相似度的方法

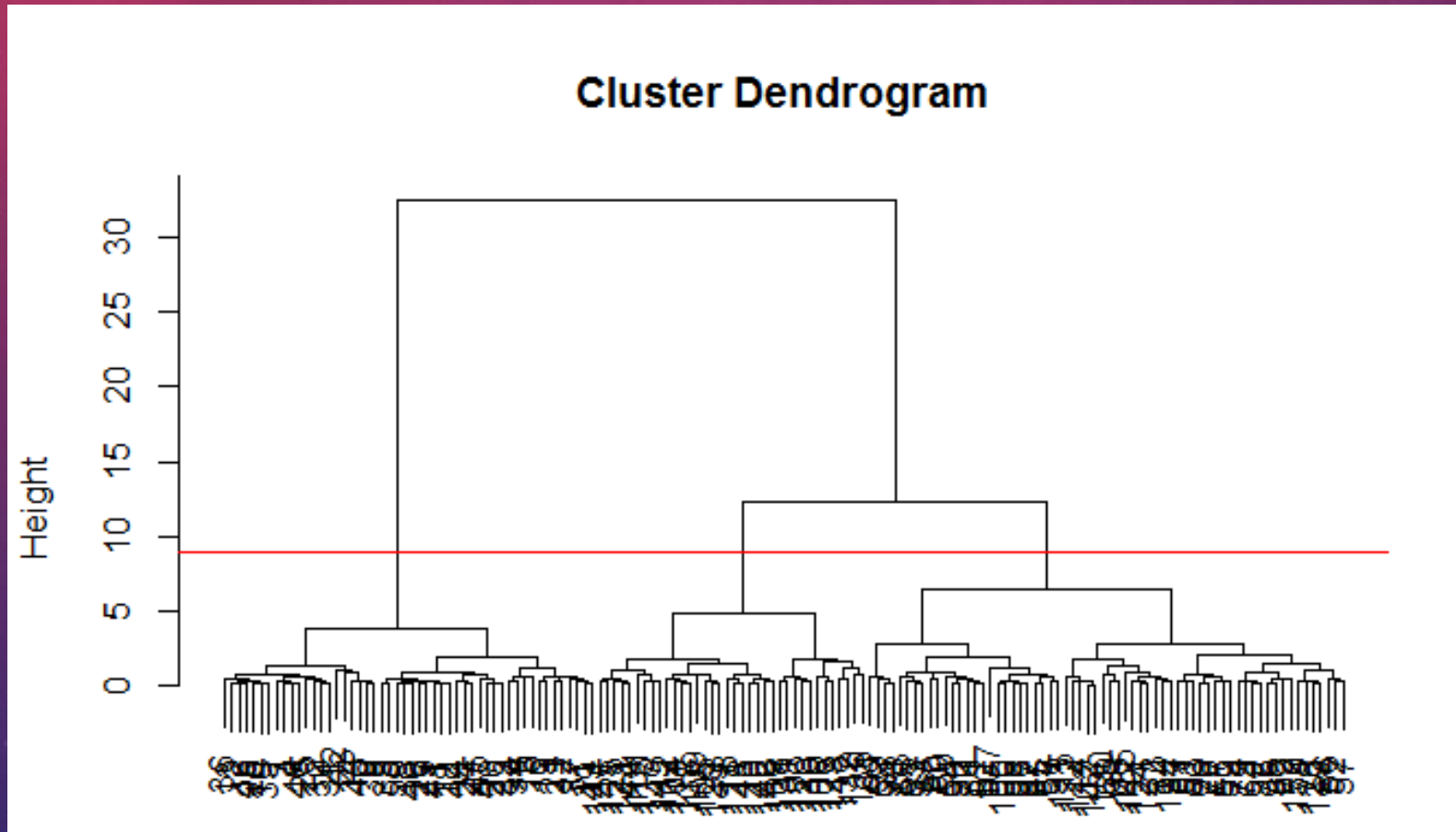
The background is a gradient from dark red at the top to dark blue at the bottom, speckled with small white dots. On the left side, there are several concentric circles and a large circular scale with degree markings from 40 to 260. Some circles have arrows indicating a clockwise direction.

# 階層式分群法 HIERARCHICAL CLUSTERING

# 概念

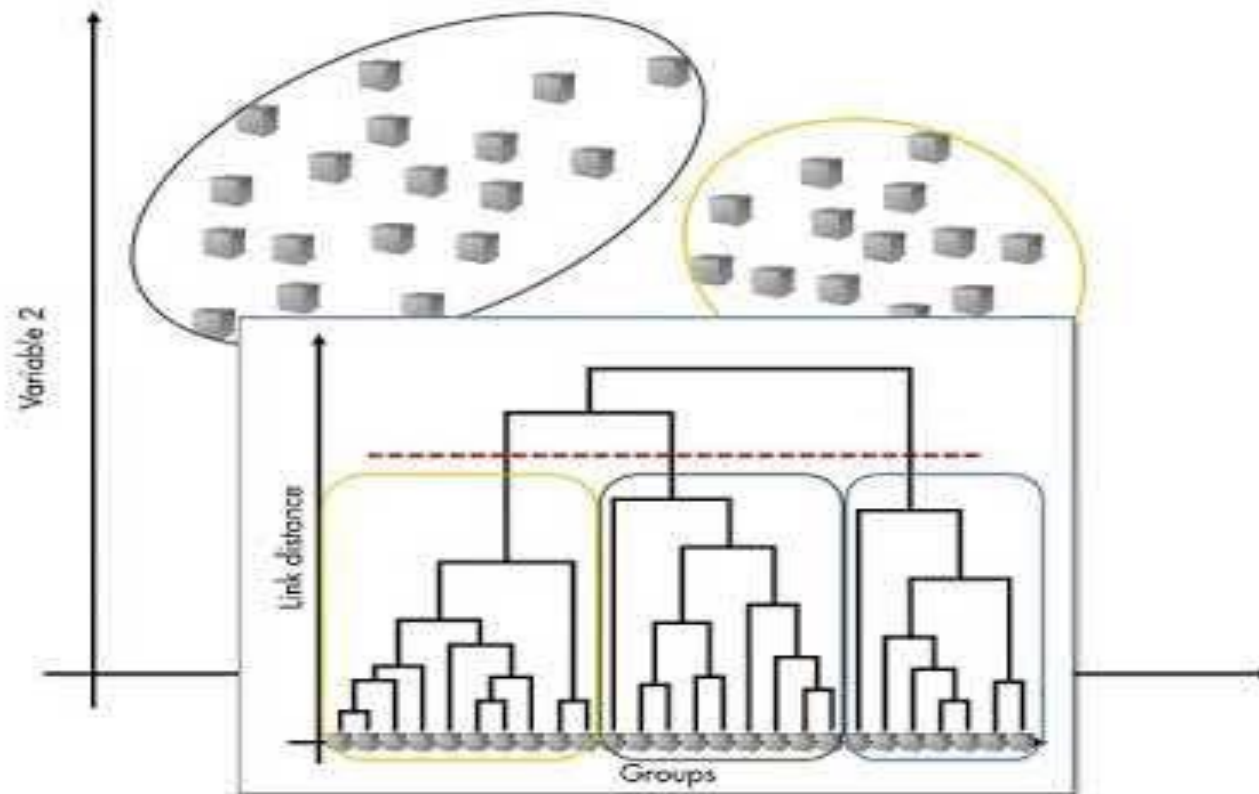
- 不須事先設定群數  $k$ ，每次反覆運算過程僅將距離最近的兩個樣本/群聚為一類，直到符合設定的群集數條件
  - 由下往上聚合: 從樹狀結構底部開始，將資料或各分群逐次合併，一開始將每個資料都視為一個獨立的分群，然後依據分群間相似度計算公式，不斷合併兩個最相似的資料/分群，直到所有資料/分群都合併成一個大的群集或達到所訂定的停止條件（設定的數量）為止。

# PROCESSES





# EXAMPLE



# 參考來源

1. <https://rpubs.com/skydome20/R-Note9-Clustering>
2. <https://jgpan.gitbooks.io/the-study-of-r/content/clustering.html>
3. [MATLAB skills, machine learning, sect 5: Hierarchical Clustering](#)

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# THINKING

## 重點？

# 重點

1. 由上往下分裂？
2. 與 K means 的差異？





THANK YOU