

RANK ORDER CLUSTERING (ROC) METHOD

The **Rank Order Clustering (ROC) Method**, developed by **King (1980)**, is a heuristic technique used in **cellular manufacturing** and **group technology (GT)** to form **machine-part families** based on binary incidence matrices. It is widely applied in **Computer Integrated Manufacturing (CIM)** to identify logical groupings of machines and parts for efficient production.

Steps in the Rank Order Clustering Method

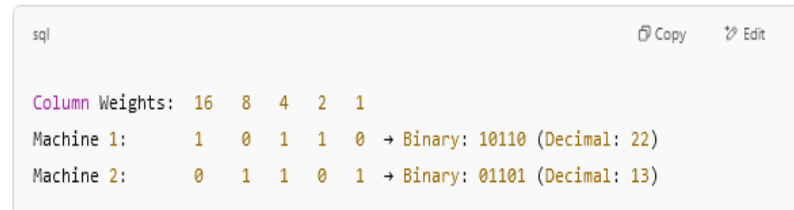
1. Construct a Machine-Part Matrix

- Create a binary matrix where **rows** represent machines and **columns** represent parts.
- A **"1"** in a cell indicates that a machine is required to process a part, while a **"0"** means no interaction.

2. Assign Binary Weights

- Convert each row of the matrix into a **binary number**, where the leftmost column has the highest value.
- Example of binary weighting:

- Example of binary weighting:



The screenshot shows a code editor with the following content:

```
sql                                                                    Copy Edit

Column Weights: 16  8  4  2  1
Machine 1:      1  0  1  1  0 → Binary: 10110 (Decimal: 22)
Machine 2:      0  1  1  0  1 → Binary: 01101 (Decimal: 13)
```

○

3. Sort Rows in Descending Order

- Arrange rows in descending order based on their binary values.

4. Convert Columns to Binary and Sort

- Convert columns into binary values by considering each column as a binary number.
- Rearrange columns in **descending order** based on their binary value.

5. Repeat Until No Change Occurs

- Continue reordering **rows** and **columns** until no further changes occur in the sequence.