

▼ Create random data

**Create random data**

nr\_ingredients := 51      total number of ingredients

nr\_flavors := 25      total number of flavors

**Creation of the "names" of the ingredients and the flavors**

i := 0 .. nr\_ingredients - 1      Ingredients<sub>i</sub> := concat("Ingr\_", substr(S ← format("0{0}", i + 1), strlen(S) - 2, 2))

f := 0 .. nr\_flavors - 1      Flavors<sub>f</sub> := concat("Flav\_", substr(S ← format("0{0}", f + 1), strlen(S) - 2, 2))

**Create the table of ingredients per flavor by random**

min\_ingredients := 7      max\_ingredients := 15

```
Data :=
  D
  nr_ingredients-1, nr_flavors-1 ← 0
  for c ∈ 0 .. nr_flavors - 1
    |
    | ings ← min_ingredients + trunc(rnd(max_ingredients - min_ingredients + 1))
    | for i ∈ 1 .. ings
    | |
    | | r ← trunc(rnd(nr_ingredients))
    | | while Dr,c = 1
    | | |
    | | | r ← trunc(rnd(nr_ingredients))
    | | | Dr,c ← 1
    | |
    |
  D
```

**Add row and column headers**

Data := augment(stack("Ing.\Fl.", Ingredients), stack(Flavors<sup>T</sup>, Data))

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Data =

	0	1	2	3	4	5	6	7	8	9
0	"Ing.\Fl."	"Flav_01"	"Flav_02"	"Flav_03"	"Flav_04"	"Flav_05"	"Flav_06"	"Flav_07"	"Flav_08"	"Flav_09"
1	"Ingr_01"	0	1	1	1	0	0	0	0	0
2	"Ingr_02"	1	0	0	0	0	0	0	0	0
3	"Ingr_03"	0	0	0	0	0	1	0	1	1
4	"Ingr_04"	0	0	0	0	0	0	0	1	0
5	"Ingr_05"	0	0	0	1	0	0	0	0	0
6	"Ingr_06"	0	0	0	0	0	1	1	0	1
7	"Ingr_07"	1	0	1	0	0	0	0	0	0
8	"Ingr_08"	0	0	0	0	0	1	0	0	0
9	"Ingr_09"	0	1	0	0	0	0	0	1	...

$\text{distr} := (8 \ 15)^T$       Distribution of the flavors to three extruders (the first 8 to extr. A, the next 15 to extr. B)

$\text{distr}_2 := \begin{cases} \text{error}(\text{"wrong distribution values"}) & \text{if } \sum \text{distr} > \text{nr\_flavors} \\ \text{nr\_flavors} - \sum \text{distr} \end{cases}$       Remaining flavors to extr. C

$\text{distr}^T = (8 \ 15 \ 2)$

$\text{function}(f1, f2, f3) := \begin{cases} m \leftarrow (\text{match}(f1, \text{Data})_0)_1 \\ S \leftarrow \text{submatrix}(\text{Data}, 1, \text{rows}(\text{Data}) - 1, m, m) \\ m \leftarrow (\text{match}(f2, \text{Data})_0)_1 \\ S \leftarrow S + \text{submatrix}(\text{Data}, 1, \text{rows}(\text{Data}) - 1, m, m) \\ m \leftarrow (\text{match}(f3, \text{Data})_0)_1 \\ S \leftarrow S + \text{submatrix}(\text{Data}, 1, \text{rows}(\text{Data}) - 1, m, m) \\ \text{return } \sum \overrightarrow{(S > 0)} \end{cases}$

$\text{function\_descr} := \text{"sum ingreds."}$

$\text{Table}(\text{data}, \text{dist}, f, f\_descr) := \begin{cases} T \leftarrow 0 \\ \text{for } a \in 1 \dots \text{dist}_0 \\ \quad \text{for } b \in \text{dist}_0 + 1 \dots \text{dist}_0 + \text{dist}_1 \\ \quad \quad \text{for } c \in \text{dist}_0 + \text{dist}_1 + 1 \dots \text{nr\_flavors} \\ \quad \quad \quad T^{\langle \text{cols}(T) \rangle} \leftarrow (\text{data}_{0,a} \ \text{data}_{0,b} \ \text{data}_{0,c} \ f(\text{data}_{0,a}, \text{data}_{0,b}, \text{data}_{0,c}))^T \\ T \leftarrow \text{augment}[(\text{"Extr. A"} \ \text{"Extr. B"} \ \text{"Extr. B"} \ f\_descr)^T, T] \\ \text{return } T^T \end{cases}$

$\text{Tbl} := \text{Table}(\text{Data}, \text{distr}, \text{function}, \text{function\_descr})$

Tbl =

"Extr. A"	"Extr. B"	"Extr. B"	"sum ingreds."
"Flav_01"	"Flav_09"	"Flav_24"	22
"Flav_01"	"Flav_09"	"Flav_25"	22
"Flav_01"	"Flav_10"	"Flav_24"	21
"Flav_01"	"Flav_10"	"Flav_25"	21
"Flav_01"	"Flav_11"	"Flav_24"	24
"Flav_01"	"Flav_11"	"Flav_25"	24
"Flav_01"	"Flav_12"	"Flav_24"	27
"Flav_01"	"Flav_12"	"Flav_25"	27
"Flav_01"	"Flav_13"	"Flav_24"	22
"Flav_01"	"Flav_13"	"Flav_25"	22
"Flav_01"	"Flav_14"	"Flav_24"	25
"Flav_01"	"Flav_14"	"Flav_25"	25
"Flav_01"	"Flav_15"	"Flav_24"	23
"Flav_01"	"Flav_15"	"Flav_25"	23
"Flav_01"	"Flav_16"	"Flav_24"	23
"Flav_01"	"Flav_16"	"Flav_25"	23
"Flav_01"	"Flav_17"	"Flav_24"	24
"Flav_01"	"Flav_17"	"Flav_25"	24
"Flav_01"	"Flav_18"	"Flav_24"	23
"Flav_01"	"Flav_18"	"Flav_25"	23
"Flav_01"	"Flav_19"	"Flav_24"	24
"Flav_01"	"Flav_19"	"Flav_25"	24
"Flav_01"	"Flav_20"	"Flav_24"	...

IDX := match(MIN, submatrix(Tbl, 1, rows(Tbl) - 1, 3, 3)) =

90
91
108
109
120
121
136
137
180
181
192
193

Minima := 
$$\left| \begin{array}{l} T \leftarrow \text{Tbl}^T \\ R \leftarrow 0 \\ \text{for } i \in 0 \dots \text{last}(\text{IDX}) \\ R^{\langle \text{cols}(R) \rangle} \leftarrow T^{\langle (\text{IDX}_i+1) \rangle} \\ R^T \end{array} \right.$$

Minima =

"Flav_04"	"Flav_09"	"Flav_24"	15
"Flav_04"	"Flav_09"	"Flav_25"	15
"Flav_04"	"Flav_18"	"Flav_24"	15
"Flav_04"	"Flav_18"	"Flav_25"	15
"Flav_05"	"Flav_09"	"Flav_24"	15
"Flav_05"	"Flav_09"	"Flav_25"	15
"Flav_05"	"Flav_17"	"Flav_24"	15
"Flav_05"	"Flav_17"	"Flav_25"	15
"Flav_07"	"Flav_09"	"Flav_24"	15
"Flav_07"	"Flav_09"	"Flav_25"	15
"Flav_07"	"Flav_15"	"Flav_24"	15
"Flav_07"	"Flav_15"	"Flav_25"	15

Press Ctrl-F9 to create new random data