2. Food Manufacture II

# Sets

* *Oils*: Types of raw oils used in the refinery process
  + *V*: Types of vegetable oils, V Oils
  + *N*: Types of non-vegetable oils, N Oils
* : Months in which raw oils can be bought

# Parameters

* : Cost of purchasing oil in
* : Price of the final product
* : Production capacity per month of the types of raw oils
* : Storage capacity of raw oils per month
* Cost of storing per unit of raw oil per month
* Final product hardness upper bound
* Final product hardness lower bound
* : Hardness of the raw oil
* Initial inventory of each type of raw oil
* Desired final inventory of each type of raw oil

# Variables

* Tons of to be refined in
* Tons of to be bought in
* Inventory of at the end of
* 1, if the oil is refined in month

# Objective

Maximize profit according to selling, buying and storing policies of final product

# Constraints

1. The inventory at the end of a month depends of the tons of raw oils refined and bought in that month
   1. Initial inventory
   2. Final inventory
2. There are maximum refining capacities for each type of raw oil each month
3. The maximum storage capacity cannot be surpassed
4. There are hardness bounds for the final product linearly dependent of the individual hardness of each raw oil used
5. Associating binary variables to refine variables
6. The food may be never made up of more than three oils in any month
7. If an oil is used in any month, at least 20 tons must be used
8. If either VEG 1 or VEG 2 are used in a month then OIL 3 must also be used
9. Variable type constraints