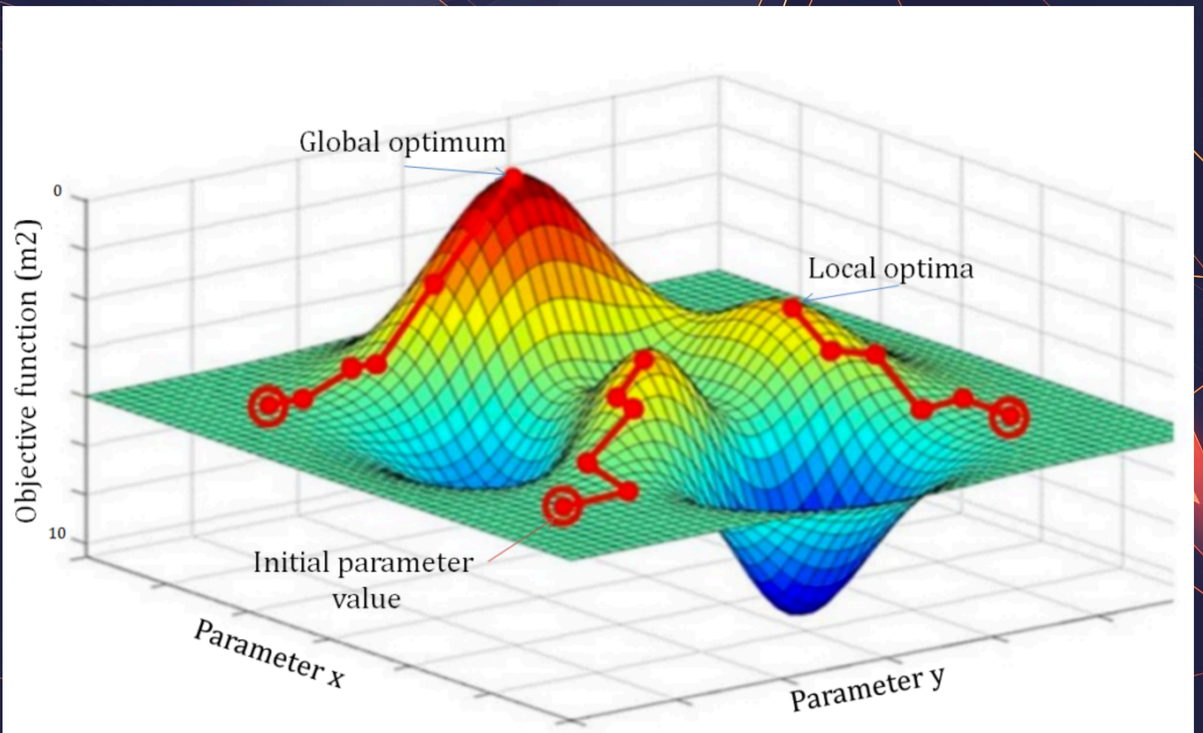

HOW TO REPRESENT A SOLUTION

Prof. Eduardo Pécora

KNAPSACK PROBLEM

Prof. Eduardo Pécora

HOW TO REPRESENT A KNAPSACK SOLUTION

- A vector where each position represents an object to be placed in the knapsack.
- The value of each element is $x_i = \begin{cases} 1, & \text{the object is placed in the knapsack,} \\ 0, & \text{otherwise.} \end{cases}$

i	1	2	3	4	5
x_i	1	0	0	1	0

VEHICLE ROUTING PROBLEM

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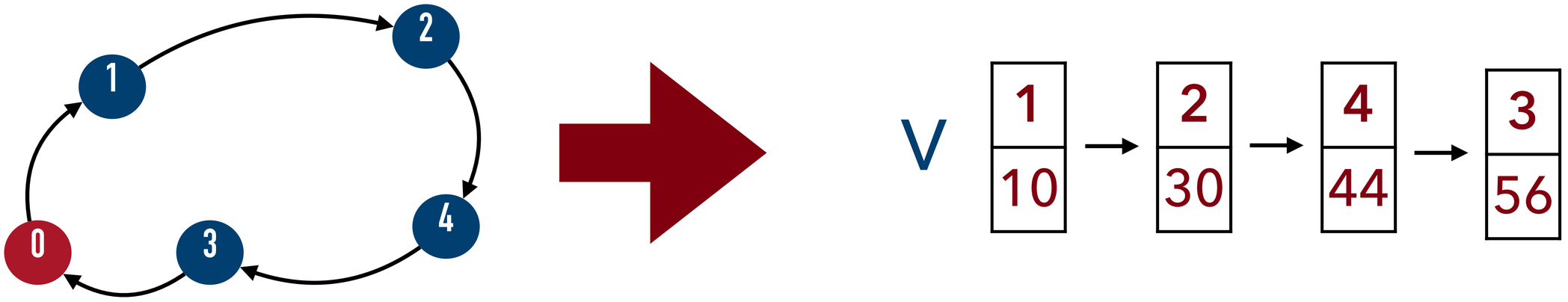
HOW TO REPRESENT A VEHICLE ROUTING SOLUTION

- Establishes a solution structure *location*:
  - *location . index* represents the index of the pace to be visited.
  - *location . instant* represents the instant when the location was visited.

$$instant = \begin{array}{|c|c|} \hline \textbf{\textit{Index}} & 8 \\ \hline \textbf{Instant} & 10 \\ \hline \end{array}$$

HOW TO REPRESENT A VEHICLE ROUTING SOLUTION

- Ensure the problem definition:
  - Each location must be visted
- Example: a problem with 1 vehicle and 4 locations.



- The solution should be represented as a vector of structures *location*, ordered in the sequence visited by the vehicle.

PARALLEL MACHINE PROBLEM

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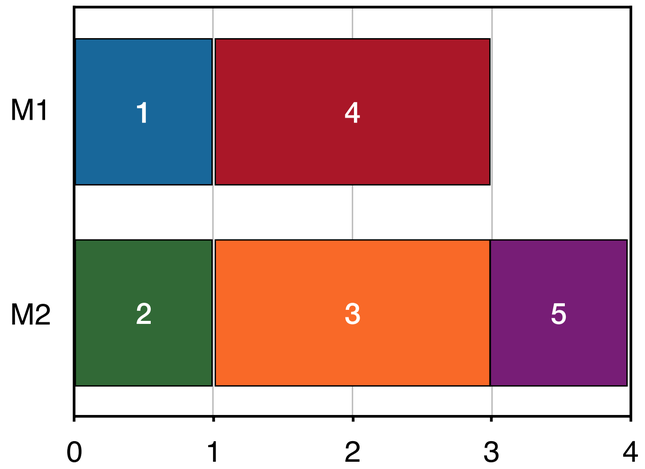
HOW TO REPRESENT A PARALLEL MACHINE SOLUTION

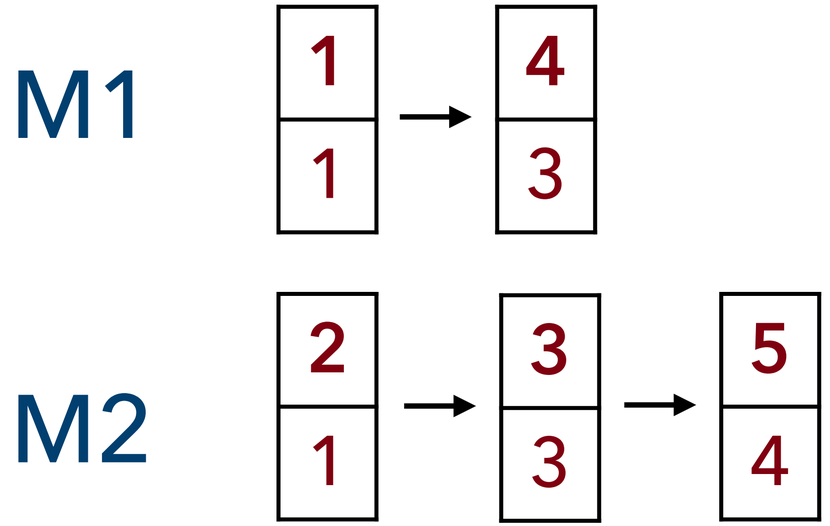
- Establishes a solution structure *job*:
  - *job* . *index* represents the index of the job.
  - *job* . *makespan* represents the makespan of the job.

$$job = \begin{array}{|c|c|} \hline \textit{Index} & 8 \\ \hline \textbf{Makespan} & 10 \\ \hline \end{array}$$

HOW TO REPRESENT A PARALLEL MACHINE SOLUTION

- Ensure the problem definition:
  - Each job must be performed on only one machine
  - Each machine must perform only one job at a time
- Example: a problem with 2 machines and 5 jobs





- For each machine, the solution should be represented as a vector of structures *job*, ordered in the processing sequence.