



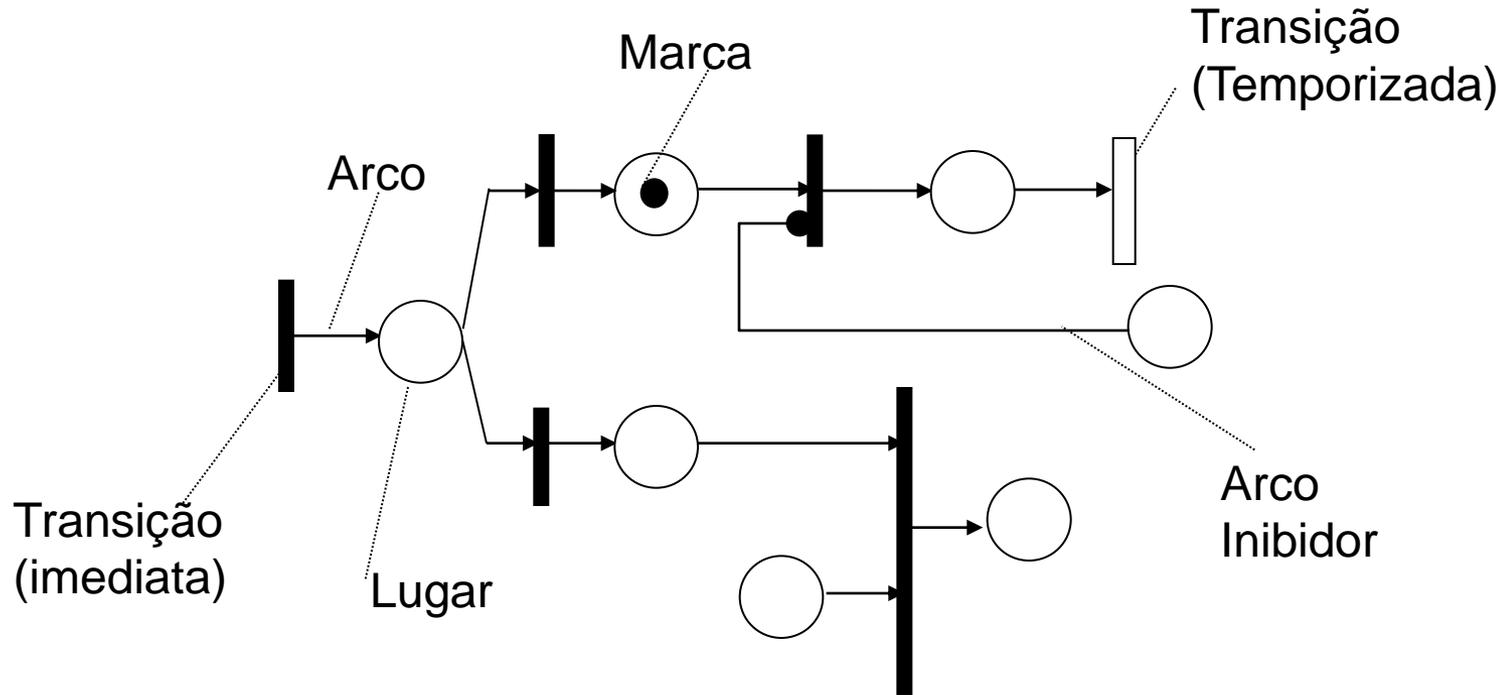
MECATRÔNICA

Simulação Usando Redes de Petri

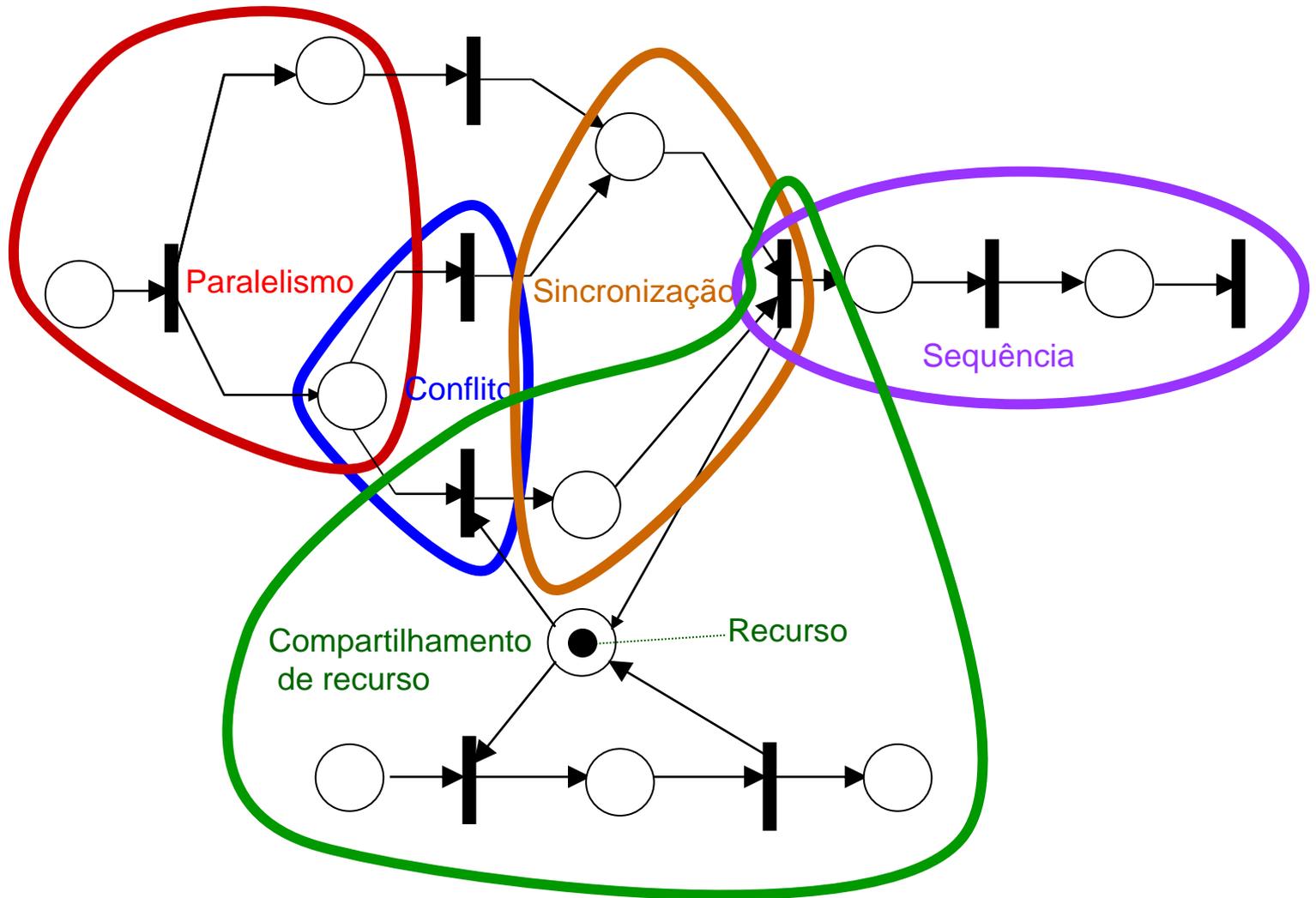
Software PIPE2



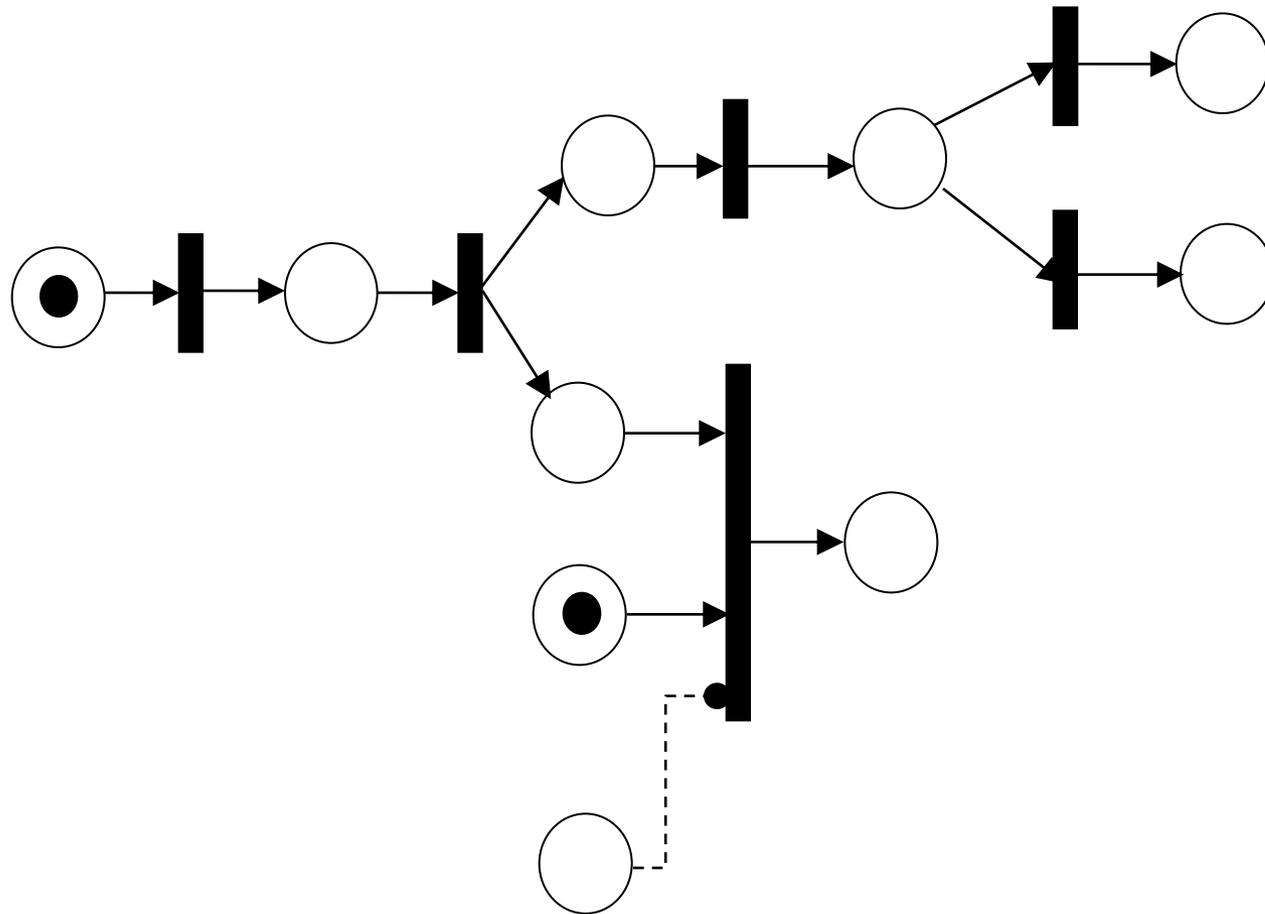
Elementos da Rede de Petri



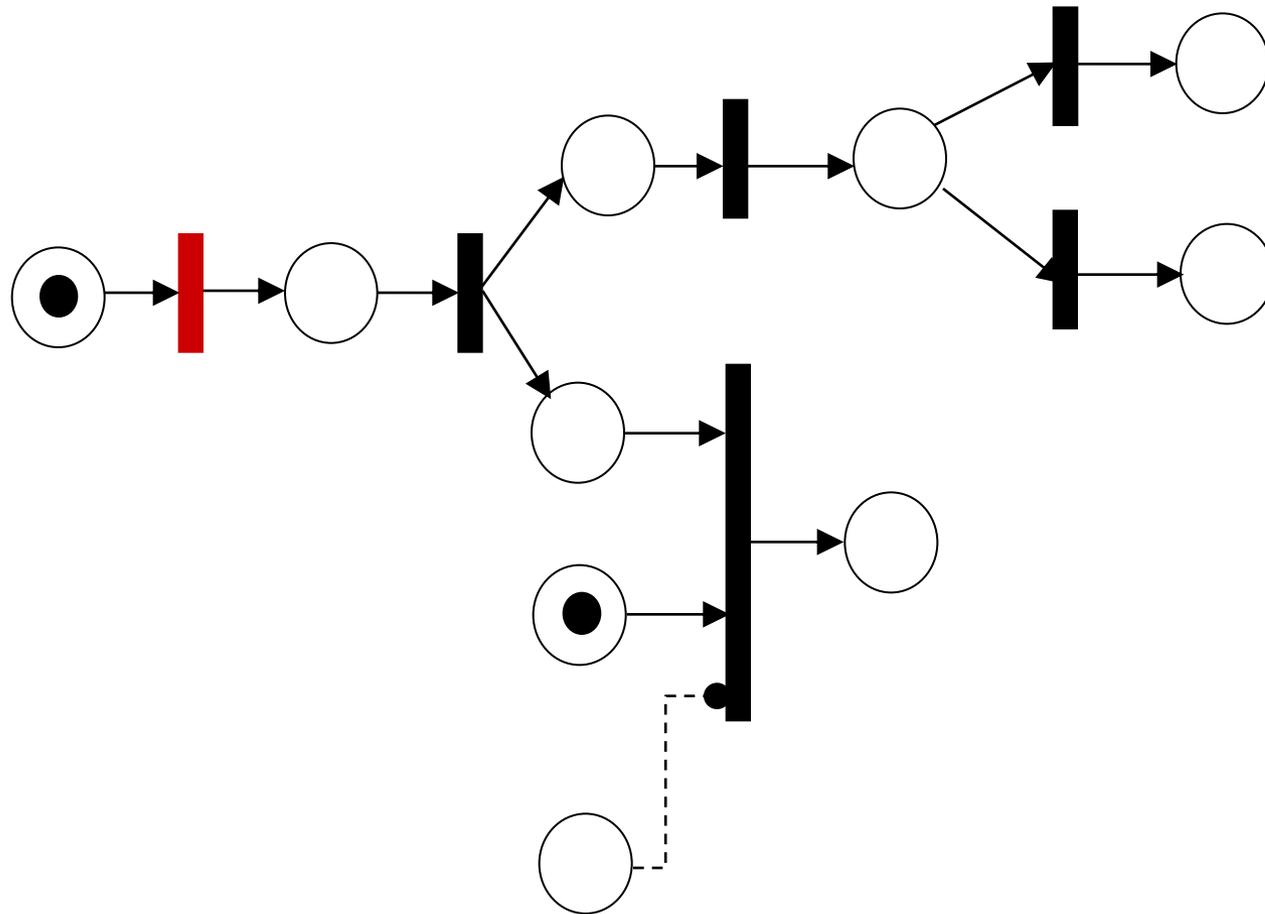
Rede de Petri e as características dos SEDs



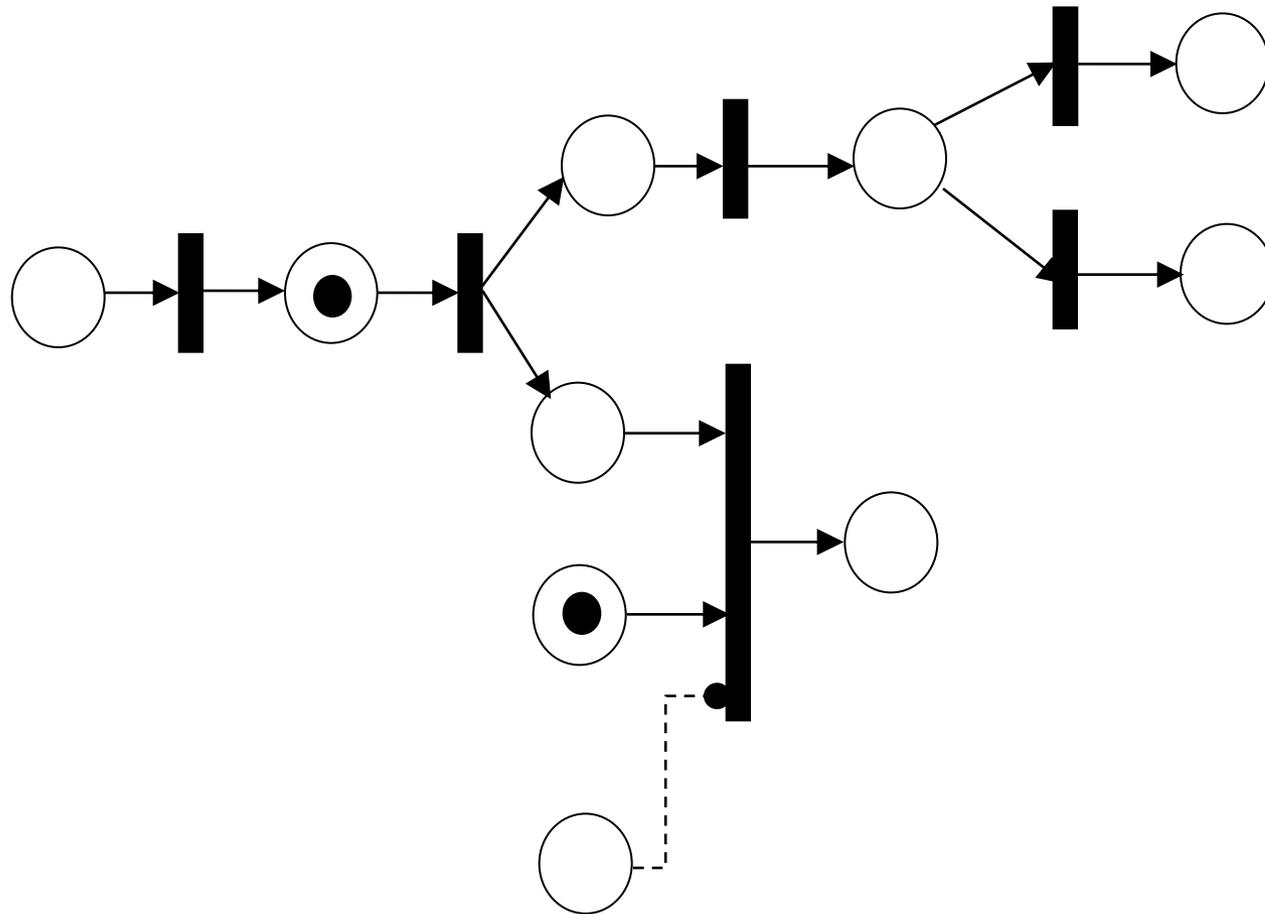
Dinâmica da Rede de Petri



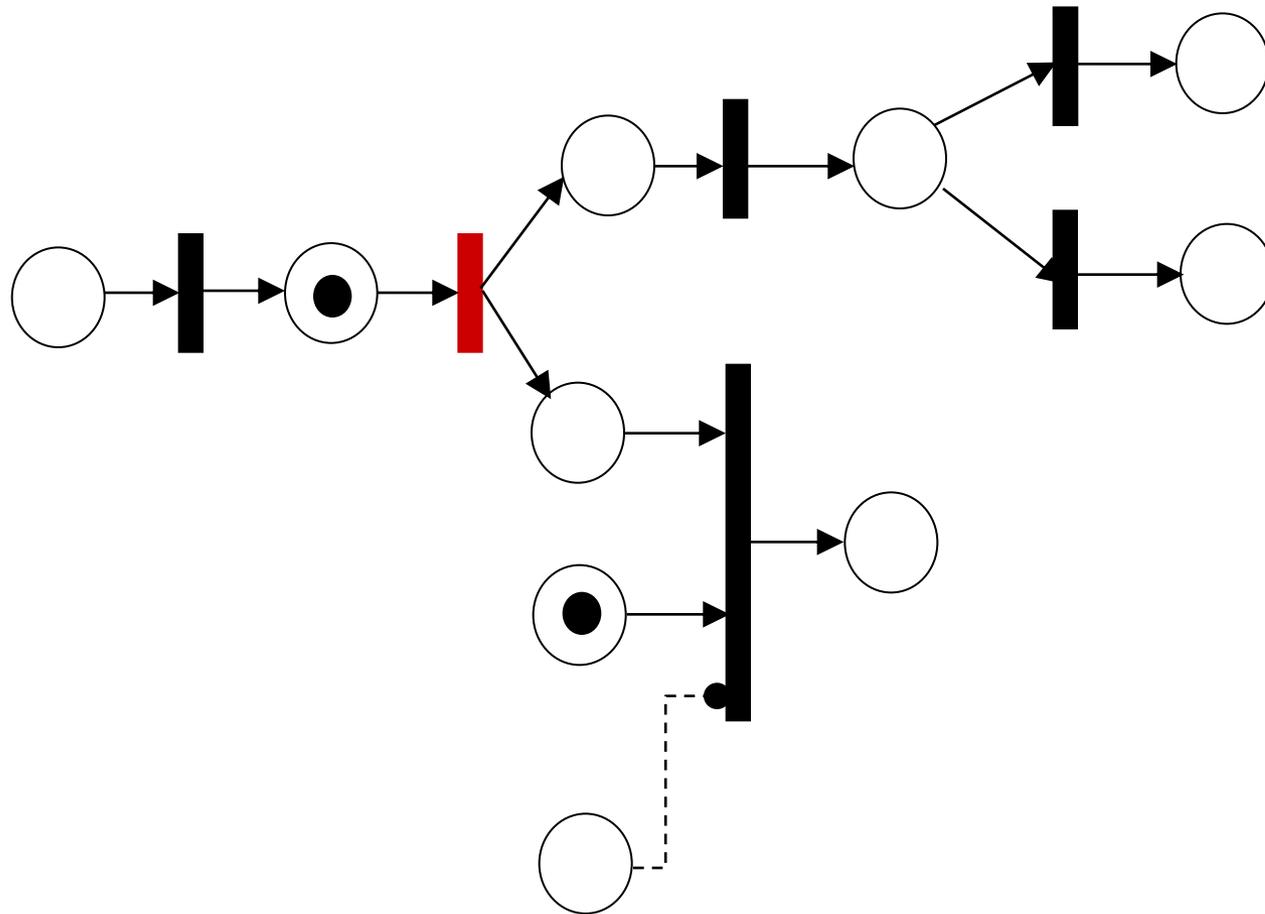
Dinâmica da Rede de Petri



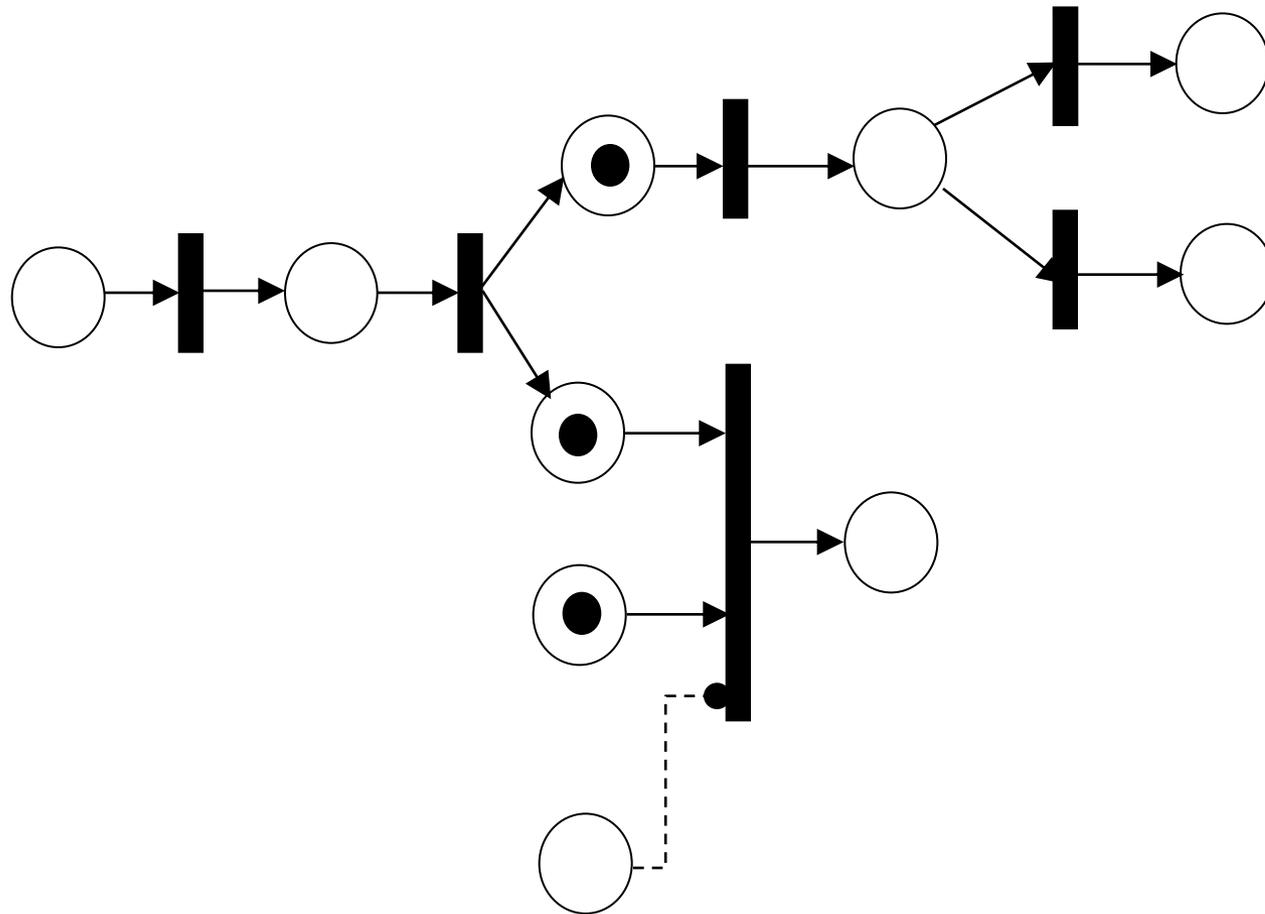
Dinâmica da Rede de Petri



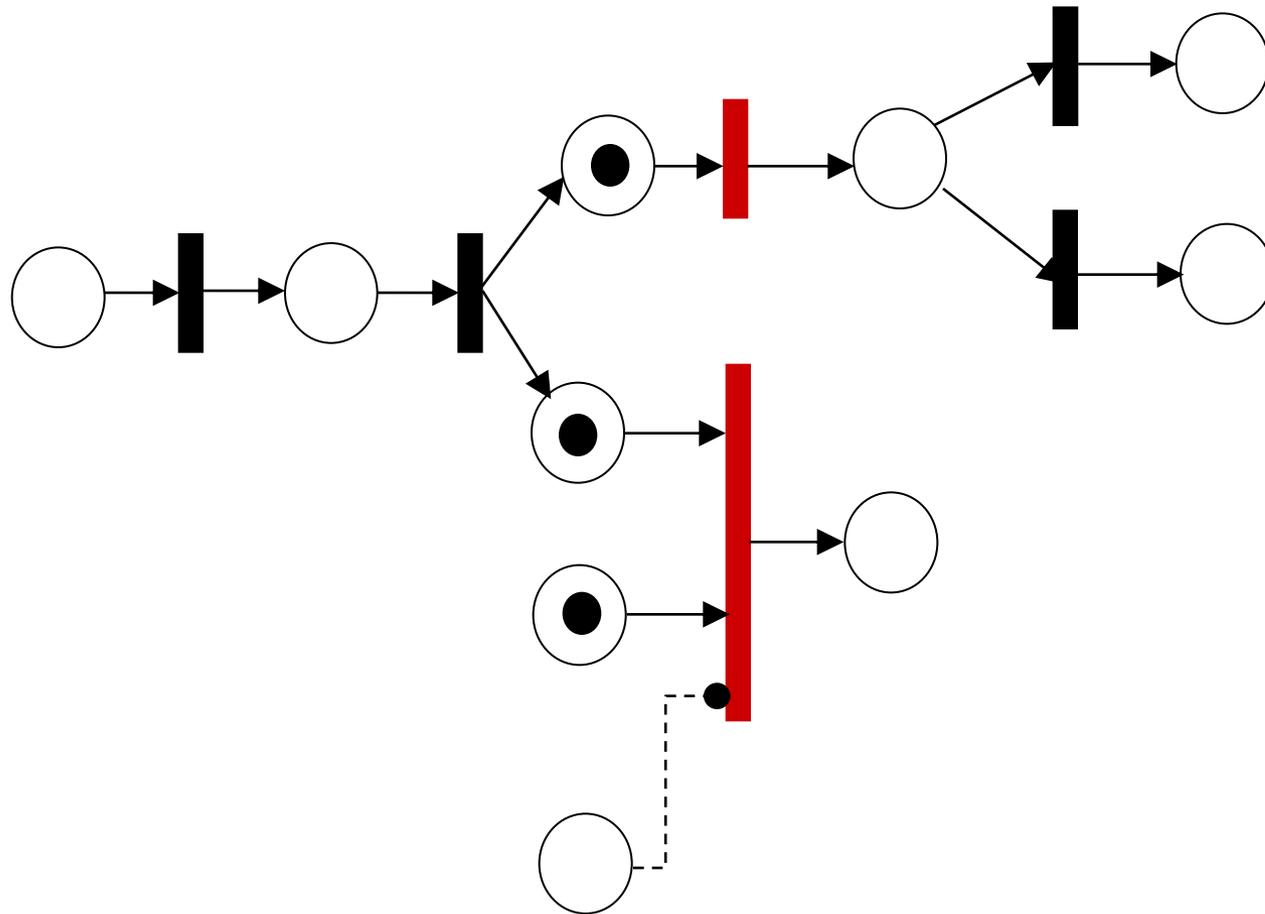
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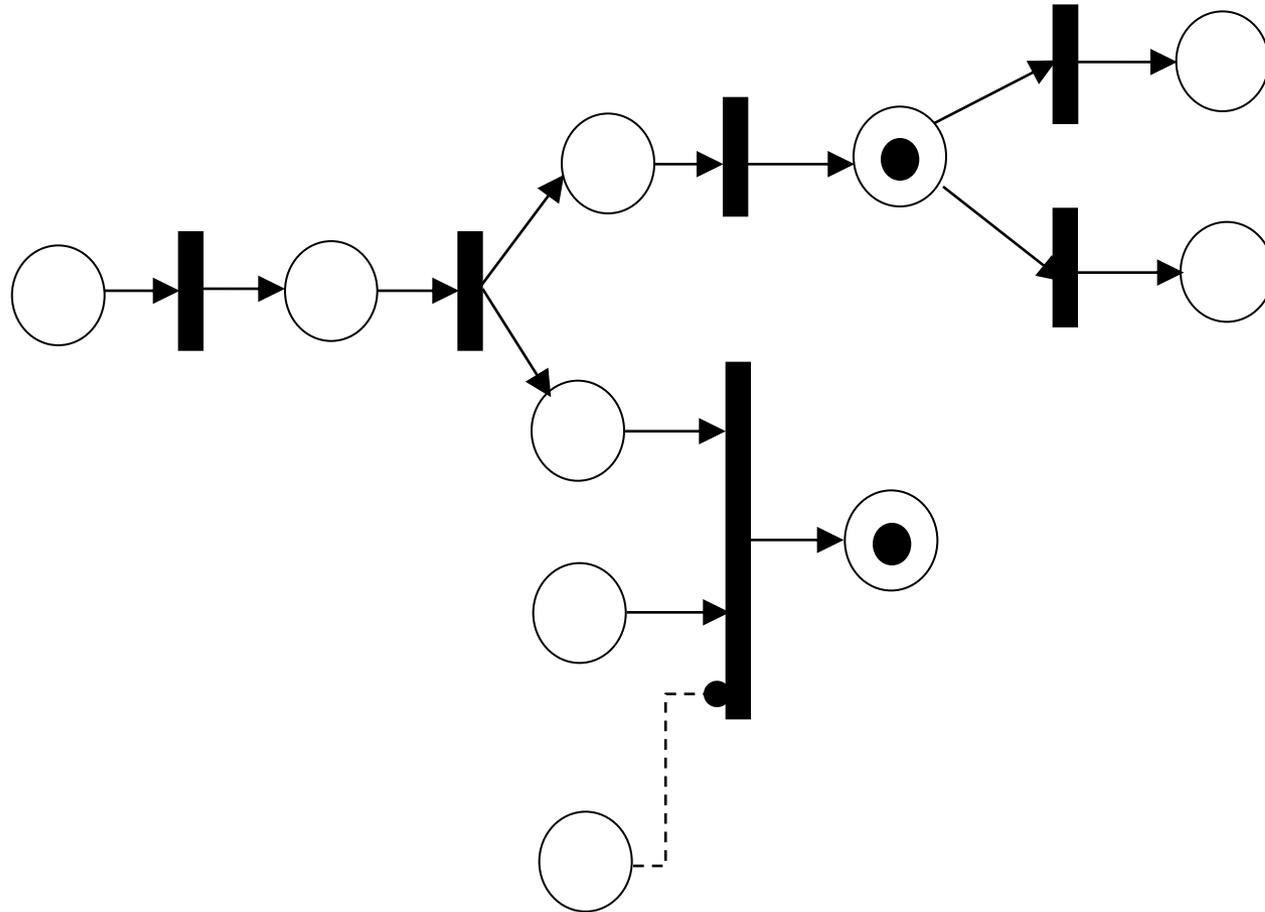
Dinâmica da Rede de Petri



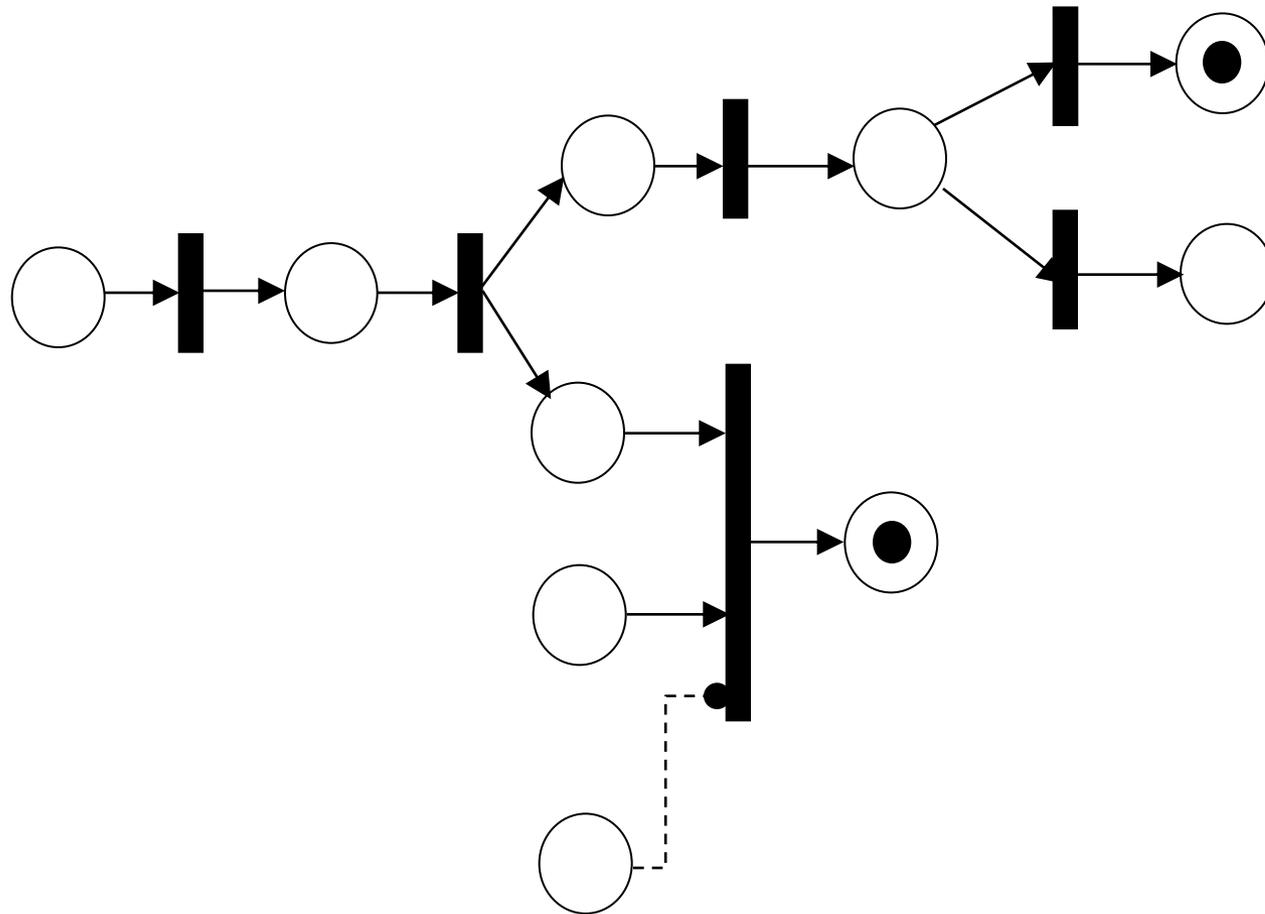
Dinâmica da Rede de Petri



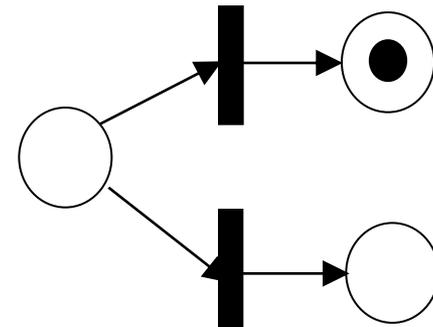
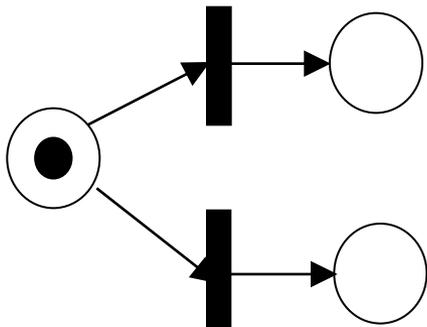
Dinâmica da Rede de Petri



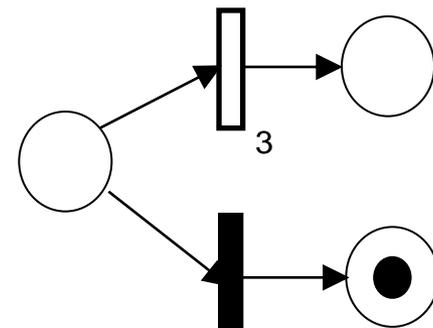
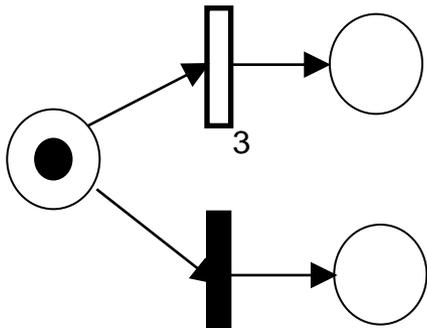
Dinâmica da Rede de Petri



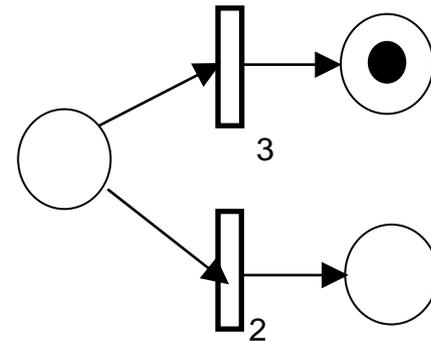
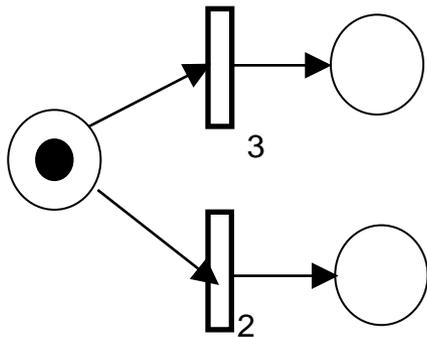
Dinâmica da Rede de Petri Temporizada



Dinâmica da Rede de Petri Temporizada

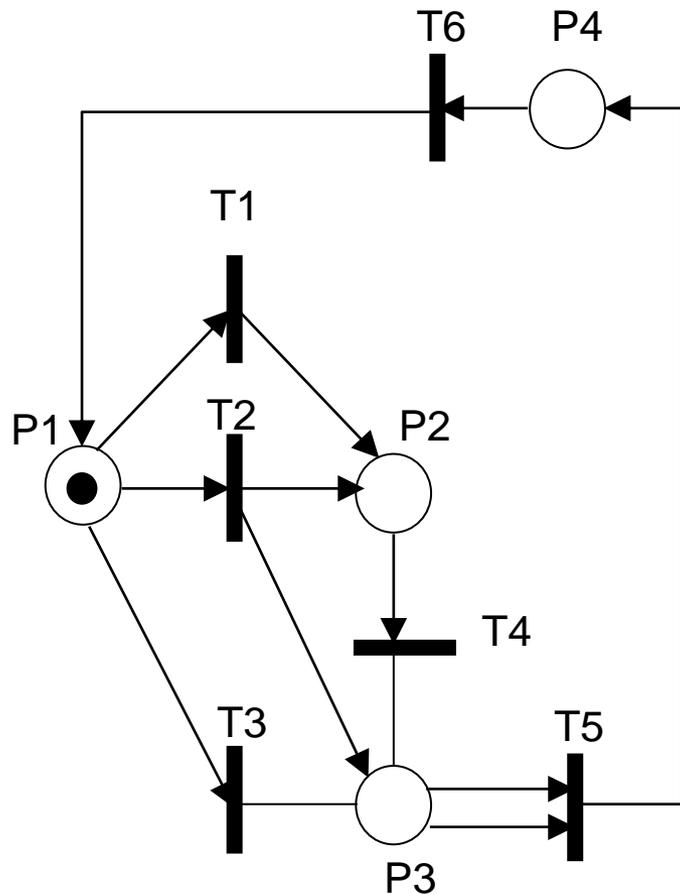


Dinâmica da Rede de Petri Temporizada



Formalização Matemática

Representação Matricial



$$M = M_0 + C * s$$

$$M_0 = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \end{bmatrix} \begin{matrix} P1 \\ P2 \\ P3 \\ P4 \end{matrix} \left. \vphantom{\begin{matrix} 1 \\ 0 \\ 0 \\ 0 \end{matrix}} \right\} \text{Lugares}$$

Marcação inicial

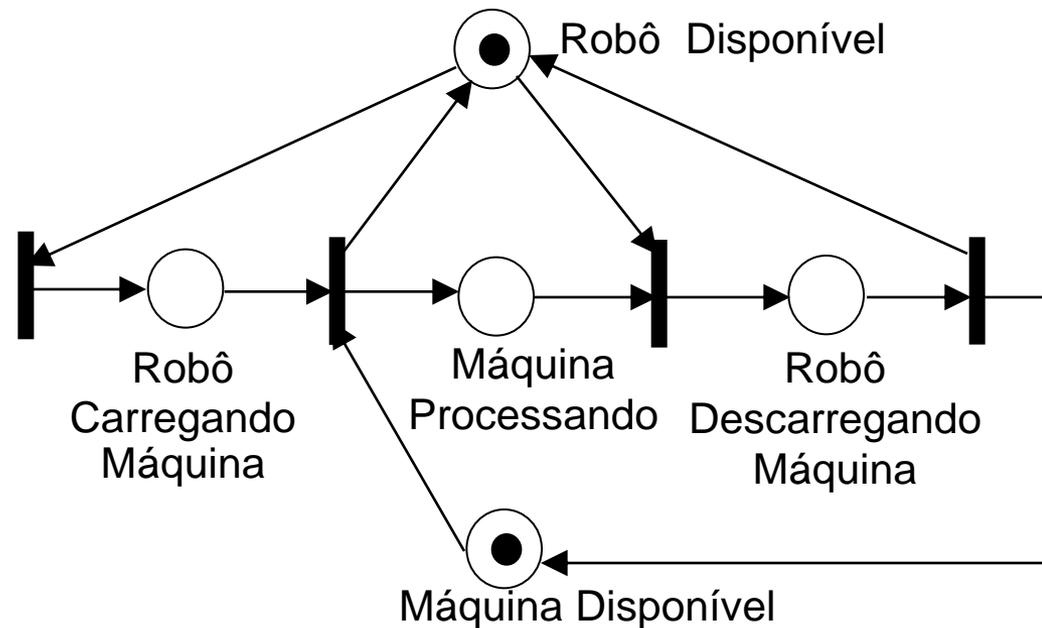
$$s = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} \begin{matrix} T1 \\ T2 \\ T3 \\ T4 \\ T5 \\ T6 \end{matrix} \left. \vphantom{\begin{matrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{matrix}} \right\} \text{Trans.}$$

Vetor de disparo

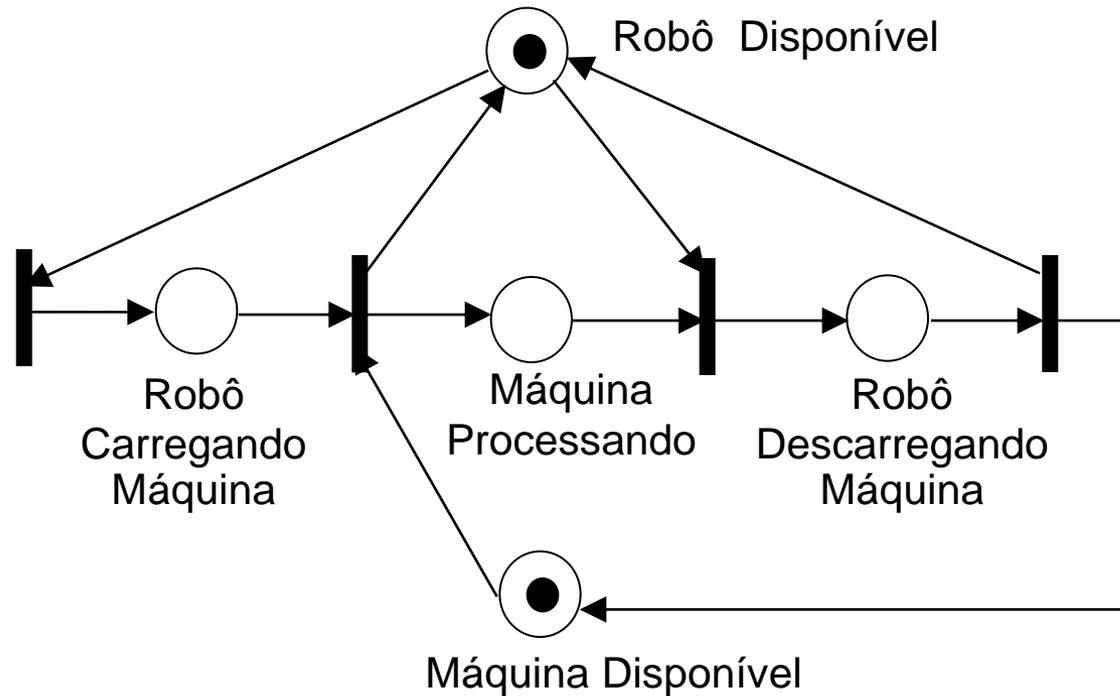
$$C = \begin{matrix} & \underbrace{\begin{matrix} T1 & T2 & T3 & T4 & T5 & T6 \end{matrix}}_{\text{Transições}} \\ \begin{bmatrix} -1 & -1 & -1 & 0 & 0 & +1 \\ +1 & +1 & 0 & -1 & 0 & 0 \\ 0 & +1 & +1 & +1 & -2 & 0 \\ 0 & 0 & 0 & 0 & +1 & -1 \end{bmatrix} & \begin{matrix} P1 \\ P2 \\ P3 \\ P4 \end{matrix} \end{matrix} \left. \vphantom{\begin{matrix} -1 & -1 & -1 & 0 & 0 & +1 \\ +1 & +1 & 0 & -1 & 0 & 0 \\ 0 & +1 & +1 & +1 & -2 & 0 \\ 0 & 0 & 0 & 0 & +1 & -1 \end{matrix}} \right\} \text{Lugares}$$

Matriz de Incidência

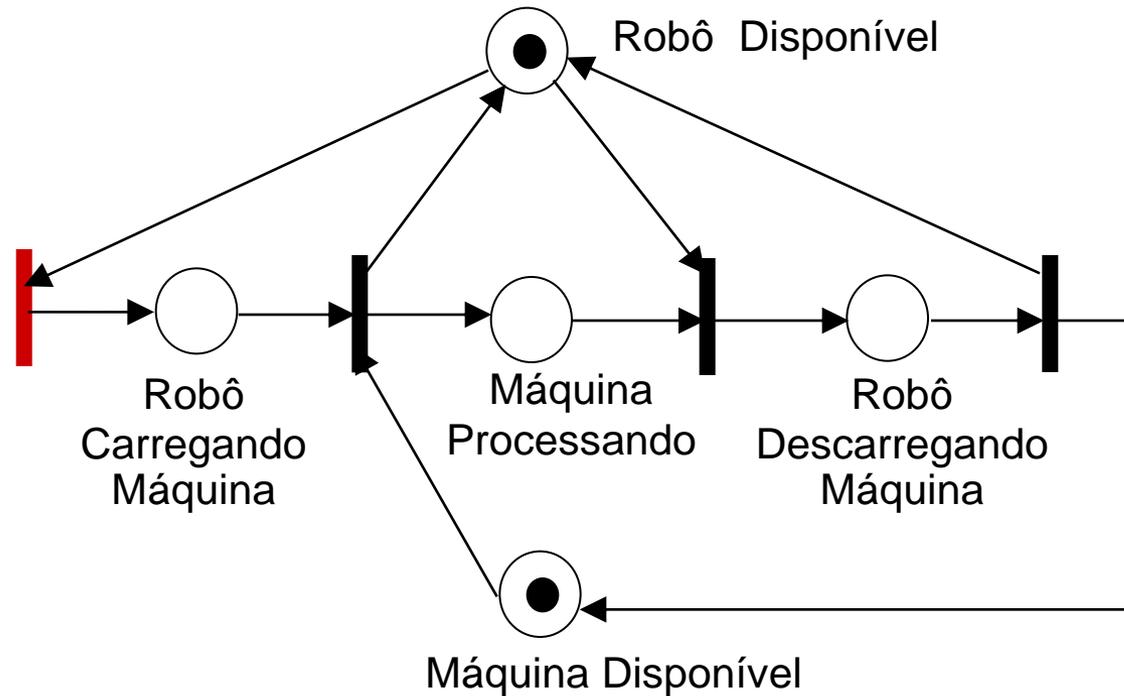
Aplicação: Sistema Máquina-Ferramenta e Robô



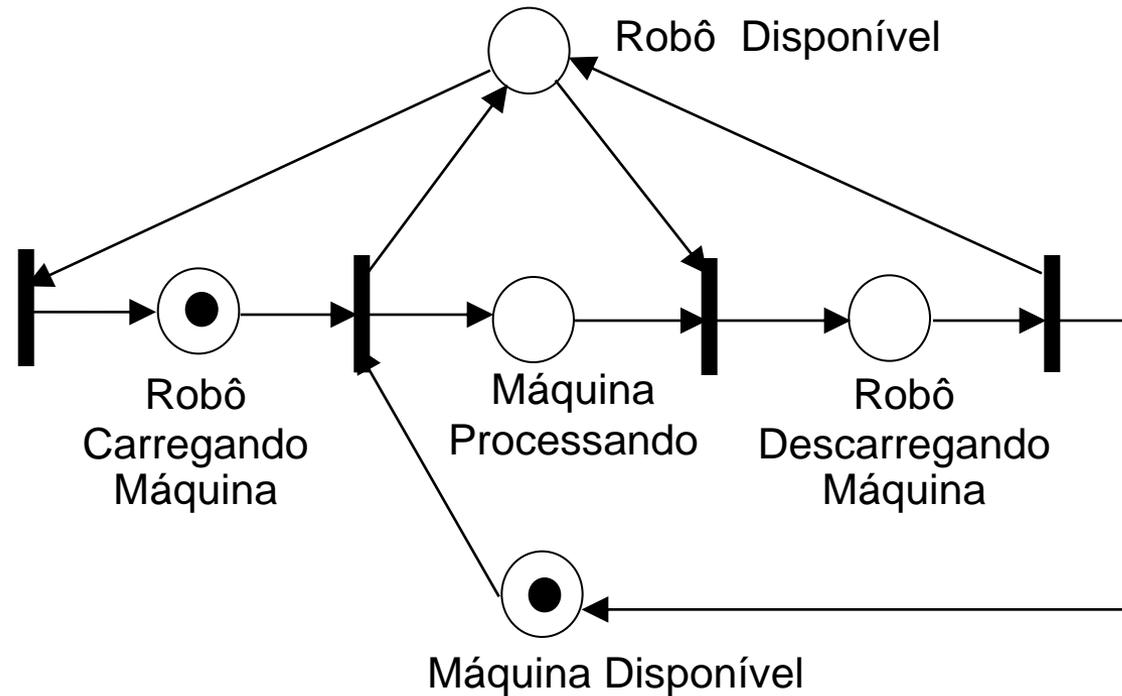
Aplicação: Sistema Máquina-Ferramenta e Robô



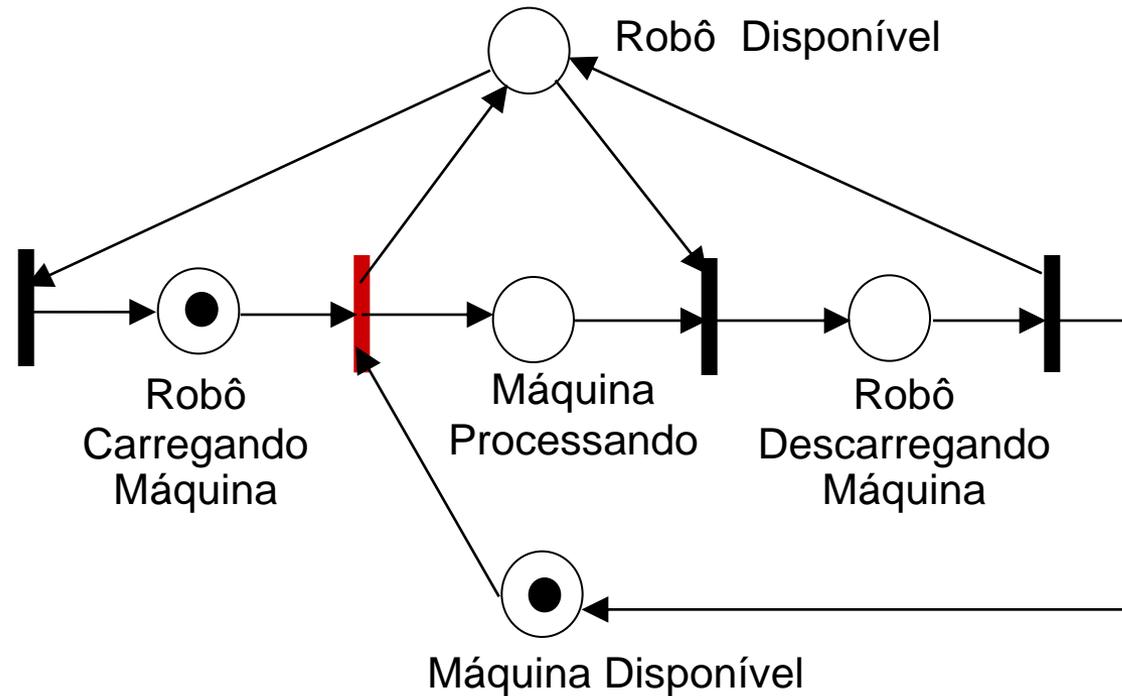
Aplicação: Sistema Máquina-Ferramenta e Robô



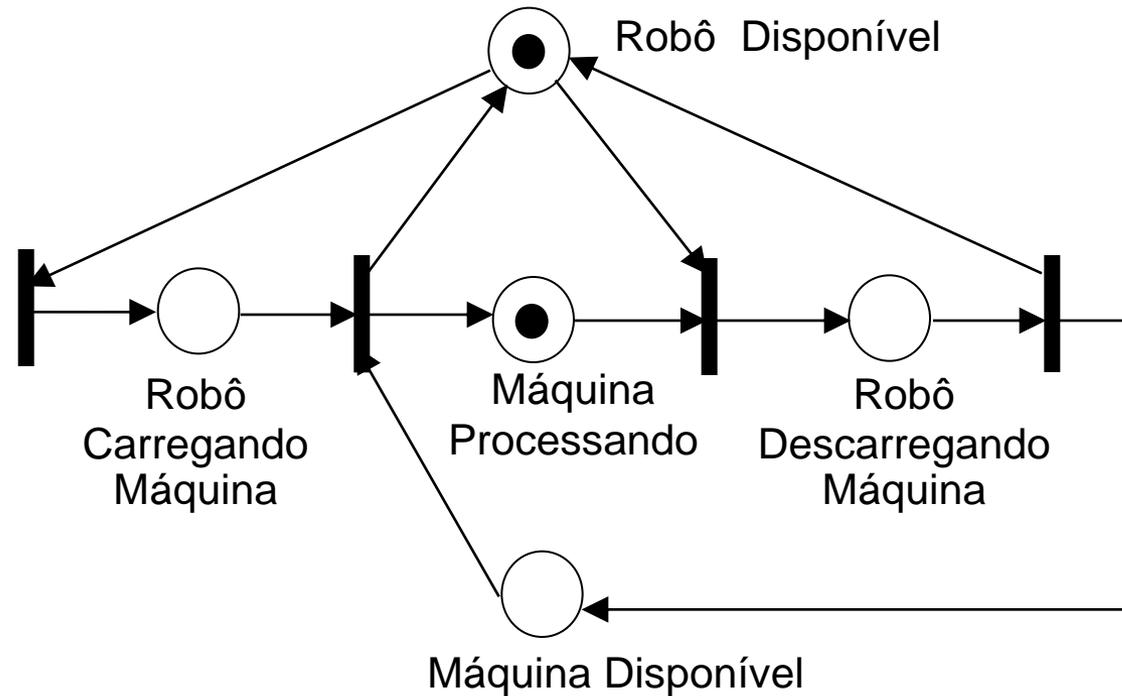
Aplicação: Sistema Máquina-Ferramenta e Robô



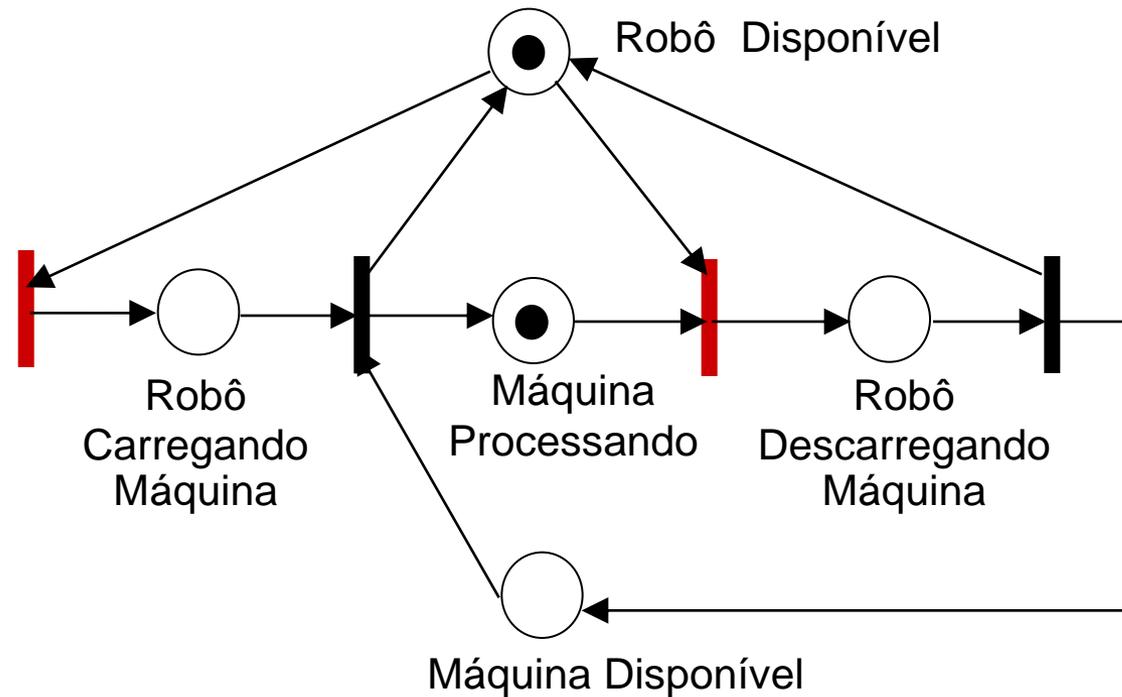
Aplicação: Sistema Máquina-Ferramenta e Robô



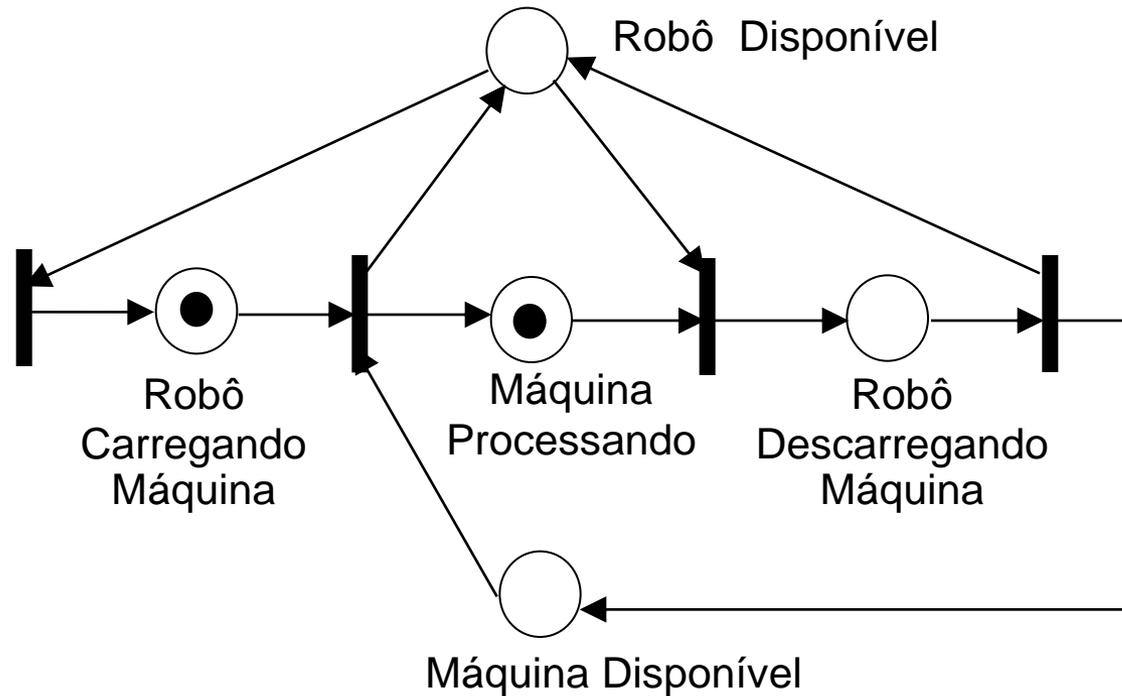
Aplicação: Sistema Máquina-Ferramenta e Robô



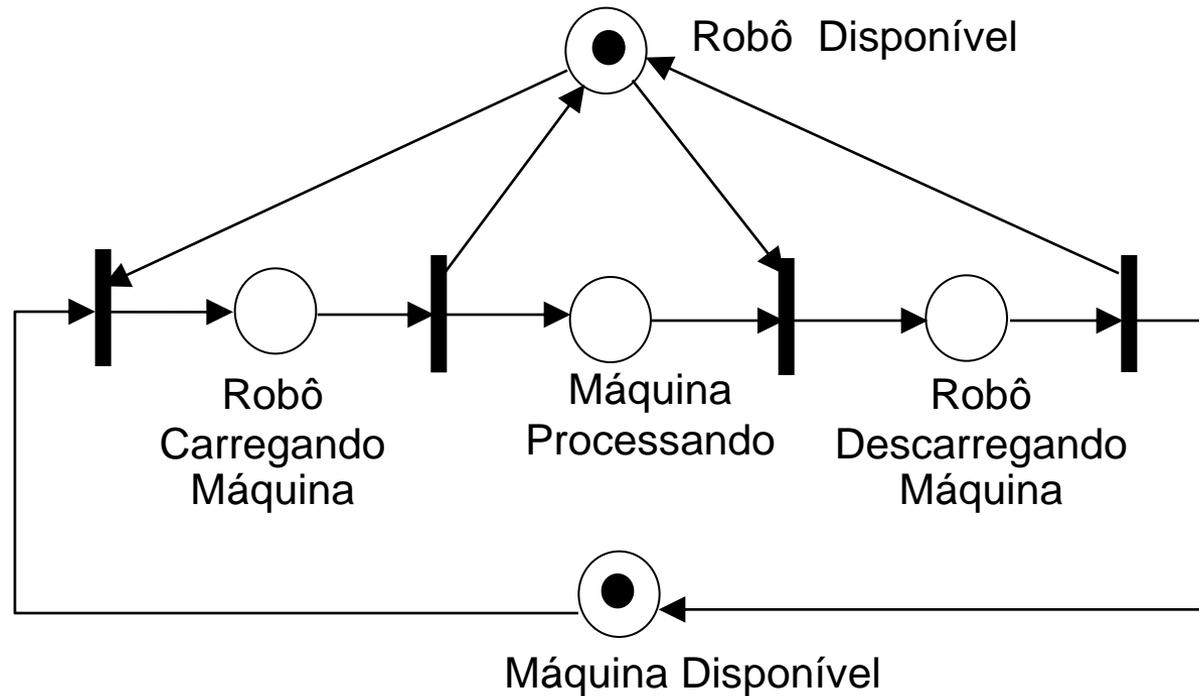
Aplicação: Sistema Máquina-Ferramenta e Robô



Aplicação: Sistema Máquina-Ferramenta e Robô



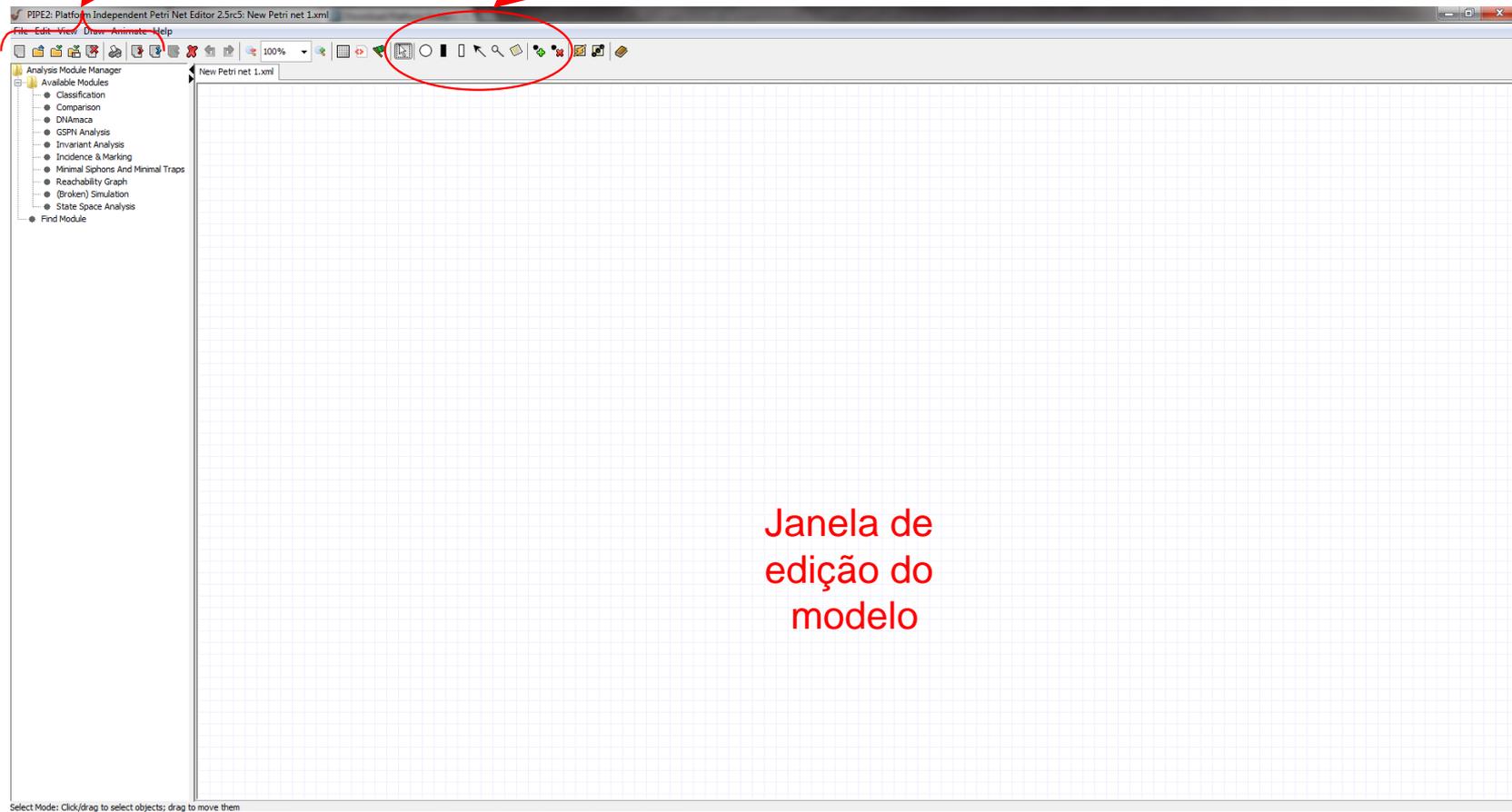
Aplicação: Sistema Máquina-Ferramenta e Robô



PIPE2: Software de Simulação de Redes de Petri

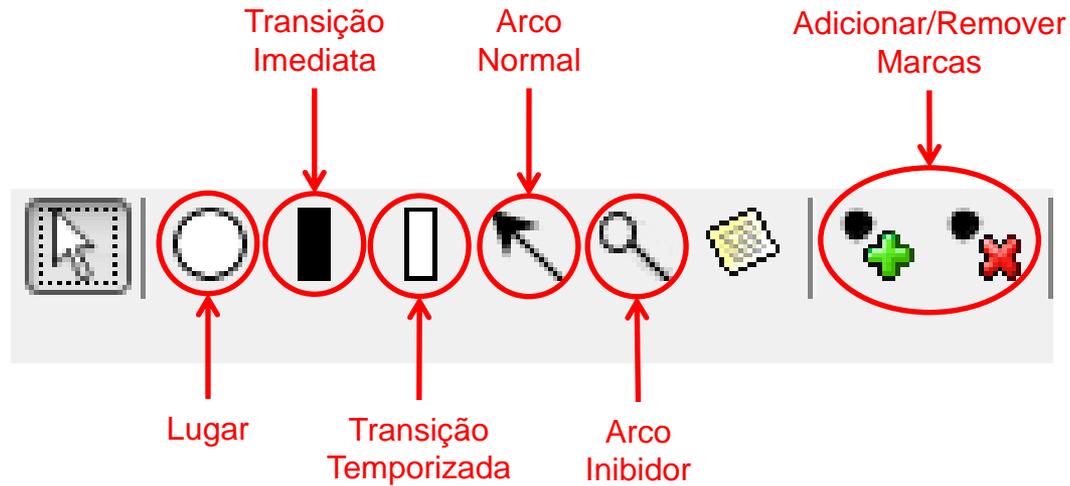
Barra principal

Barra de edição

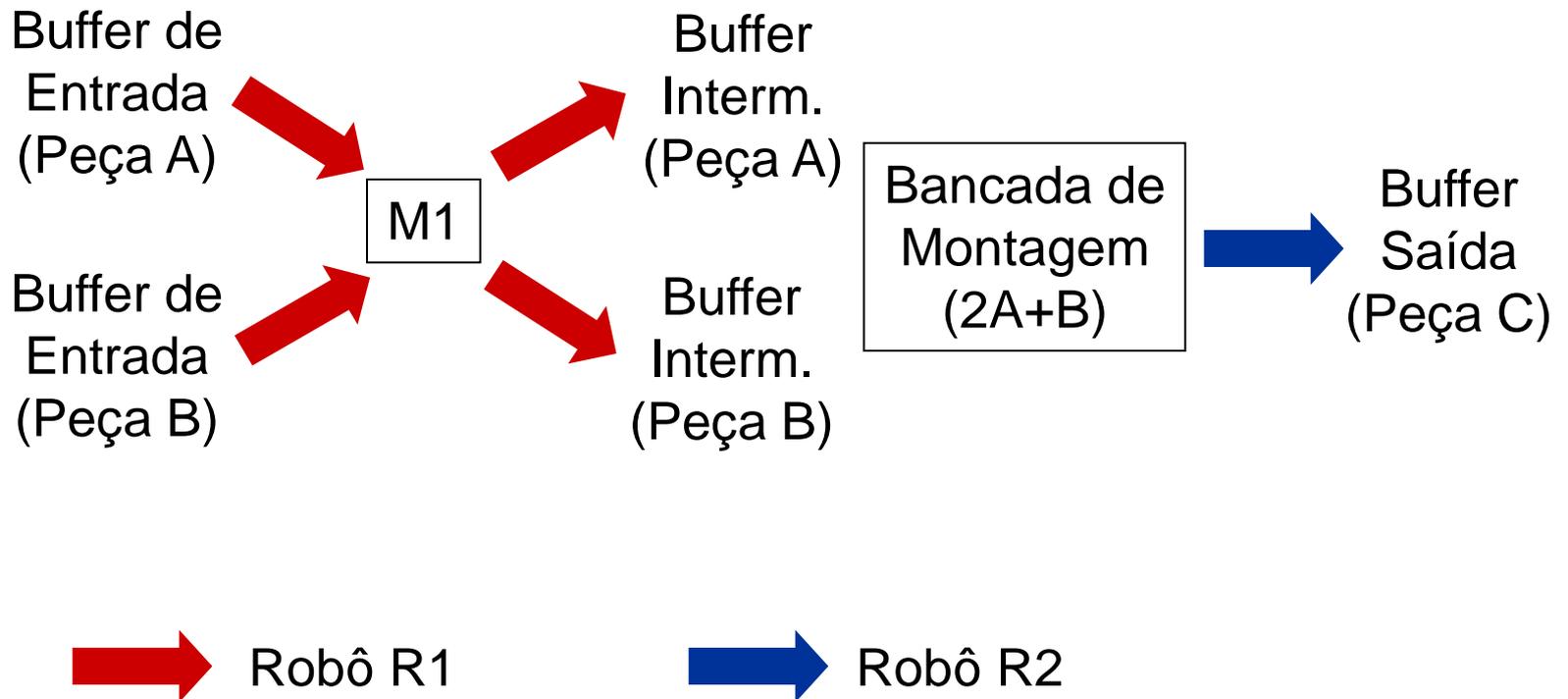


Janela de
edição do
modelo

PIPE2: Software de Simulação de Redes de Petri

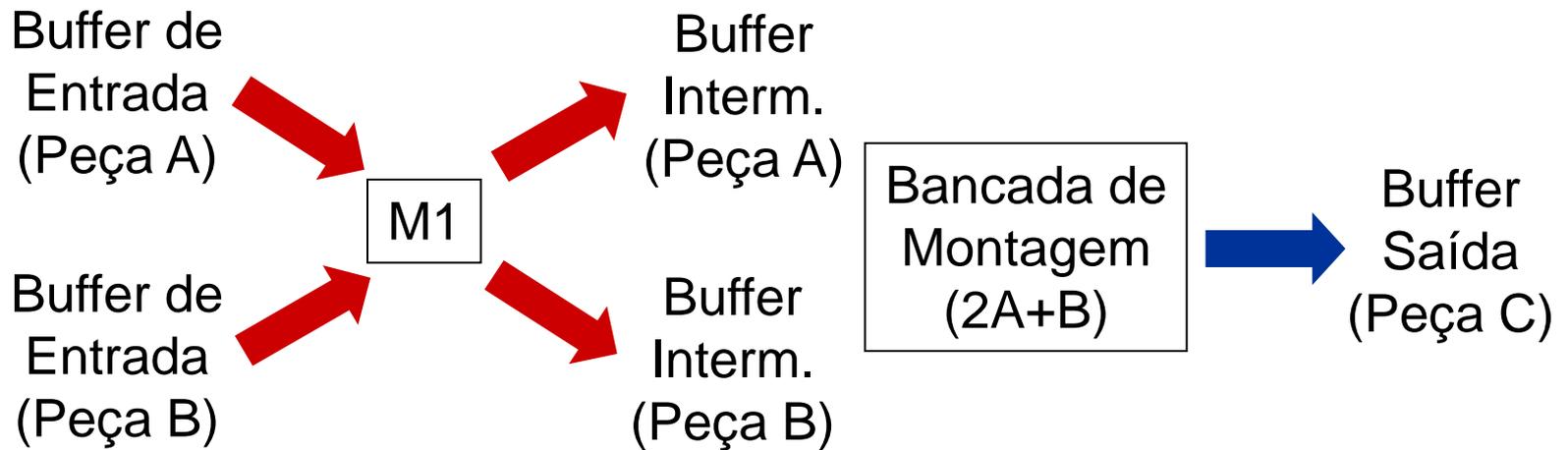


Metodologia



Metodologia

Buffers viram lugares com capacidade elevada

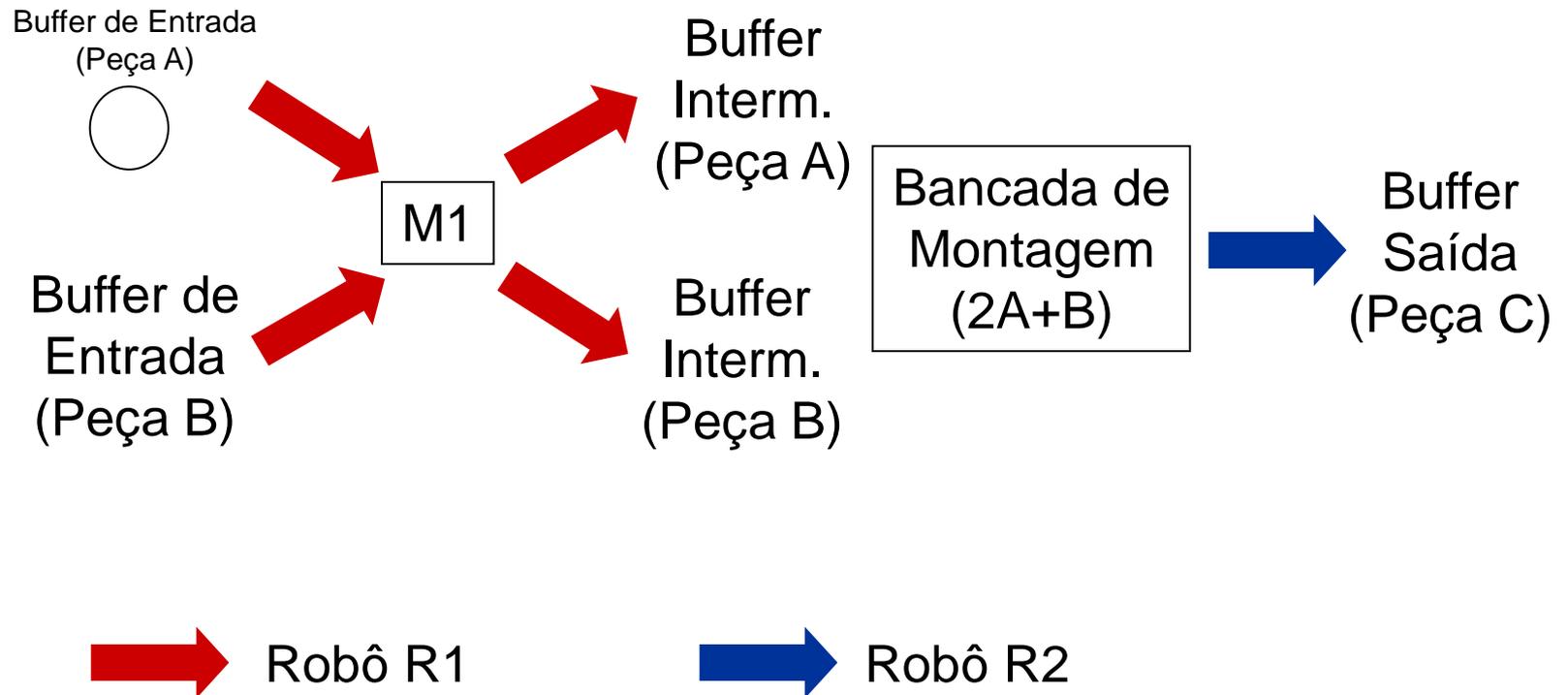


 Robô R1

 Robô R2

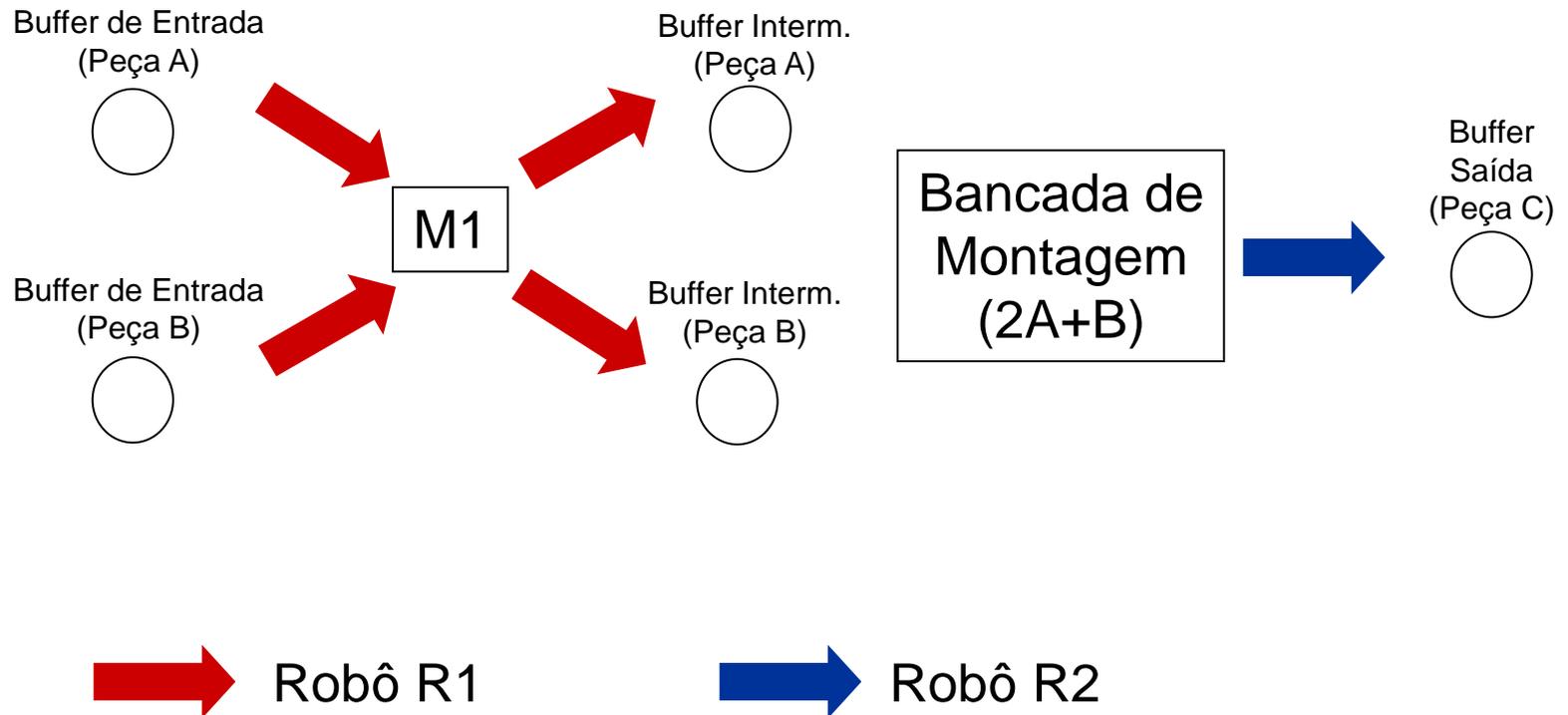
Metodologia

Buffers viram lugares com capacidade elevada



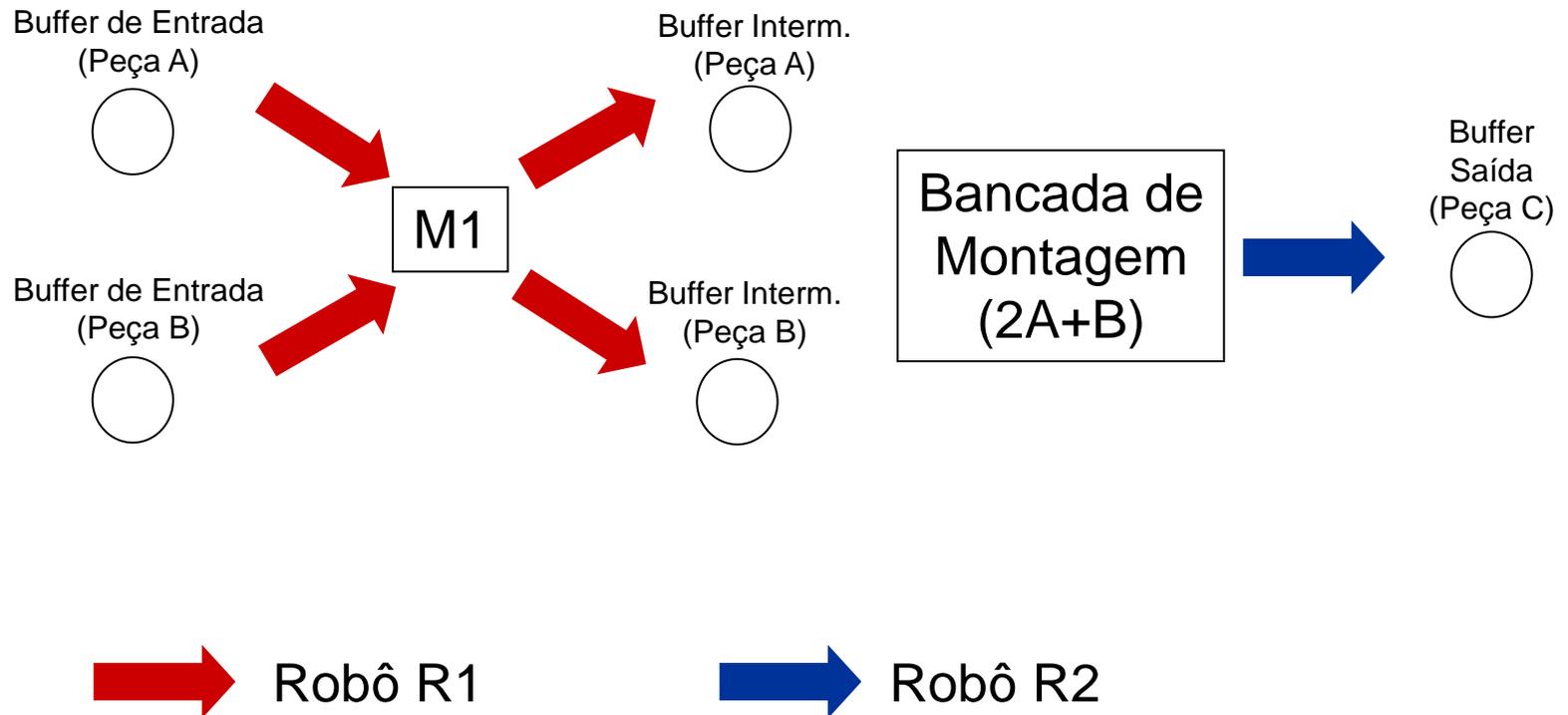
Metodologia

Buffers viram lugares com capacidade elevada



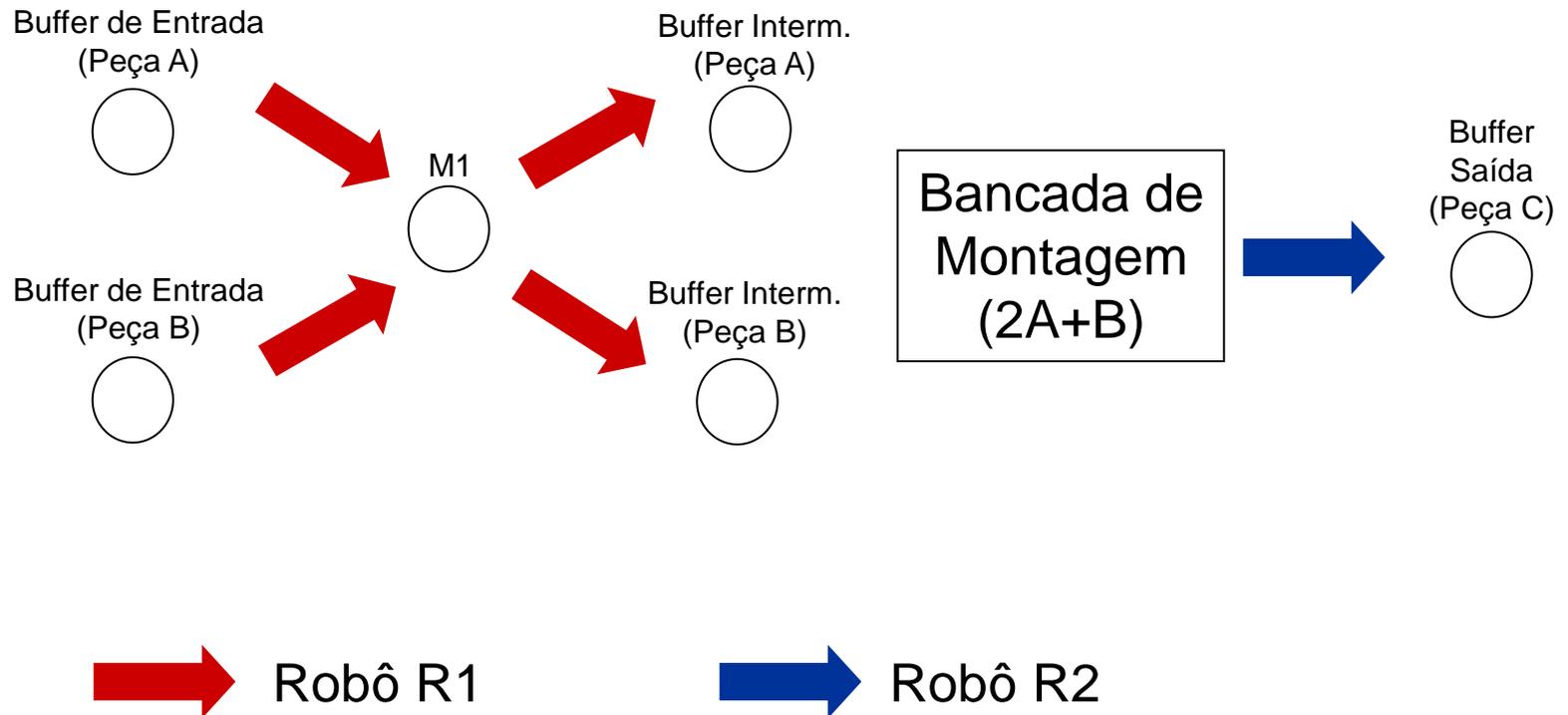
Metodologia

Operações viram lugares com capacidade simples



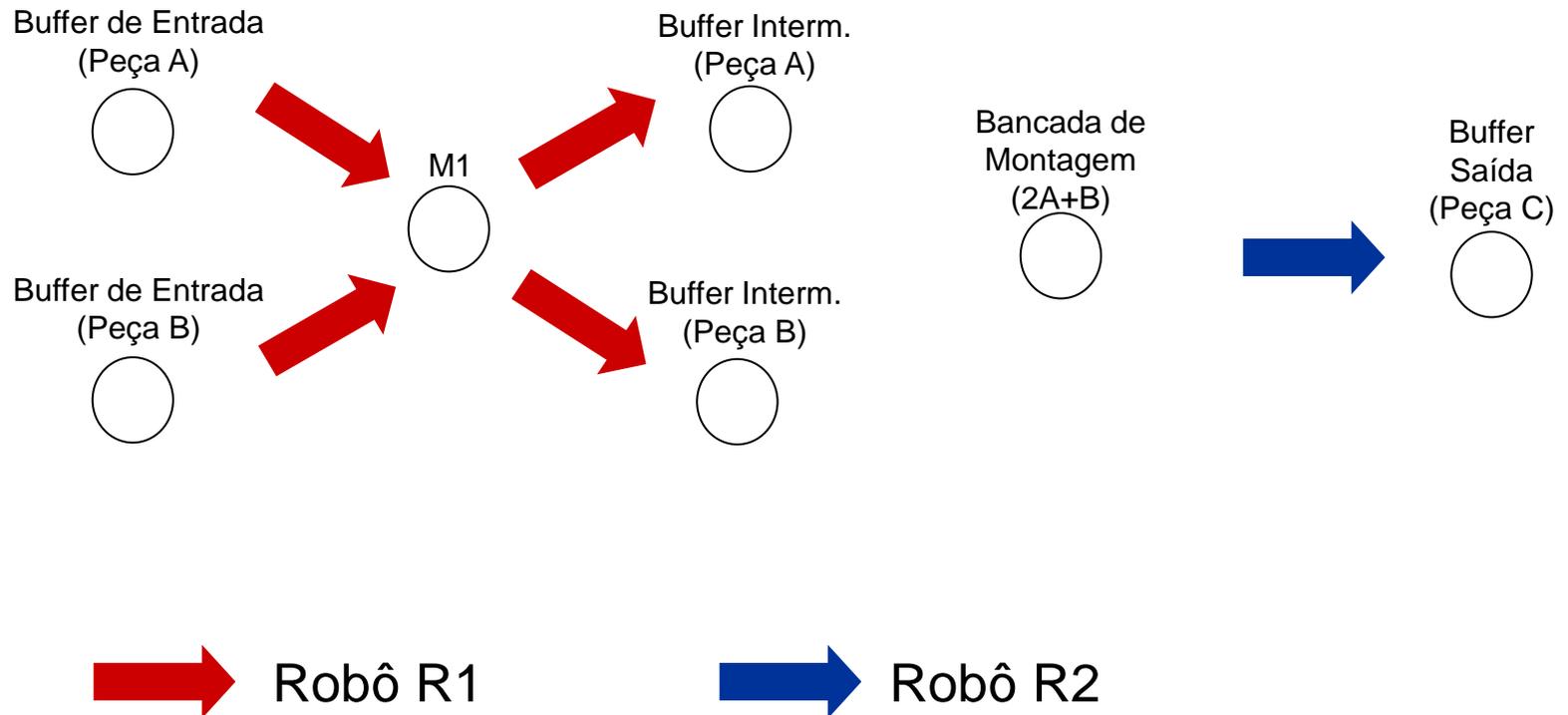
Metodologia

Operações viram lugares com capacidade simples



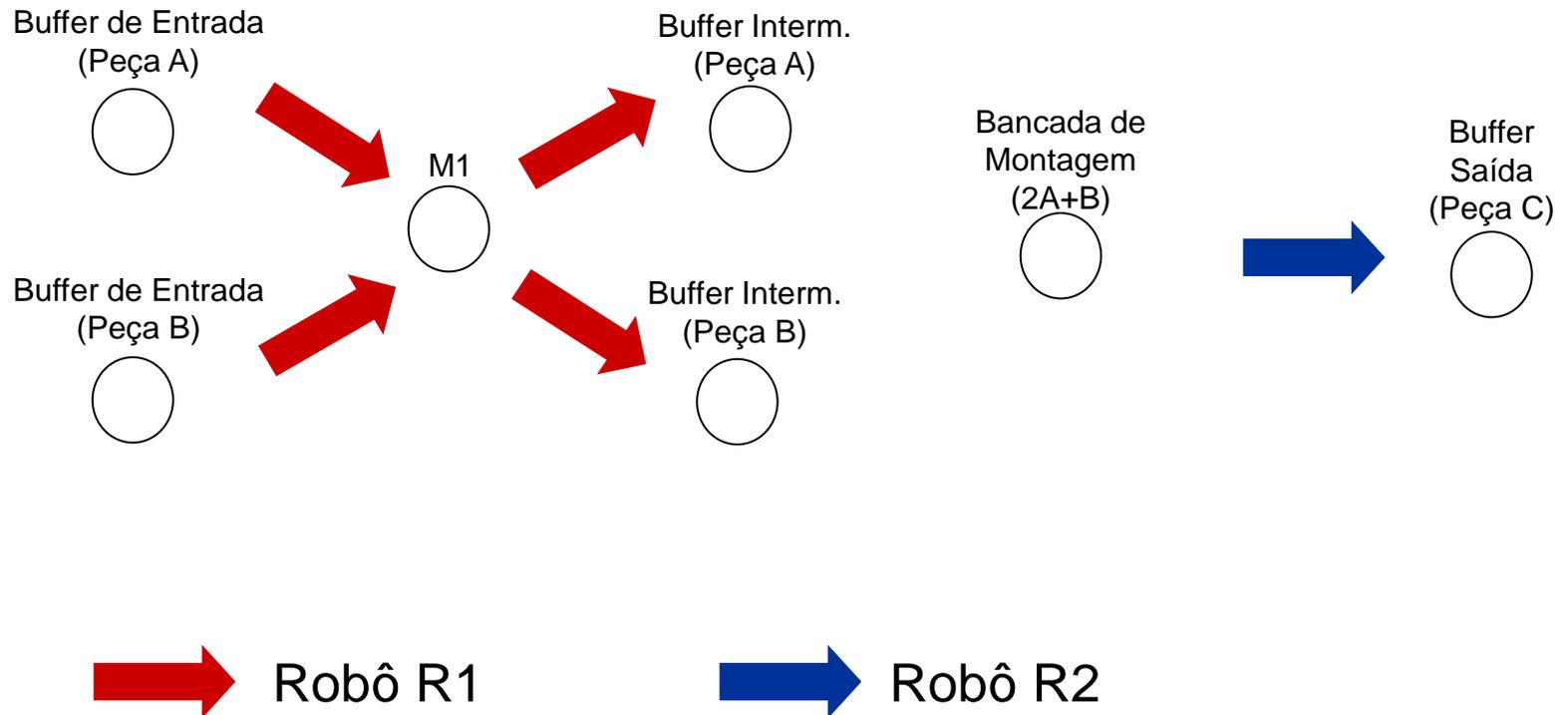
Metodologia

Operações viram lugares com capacidade simples



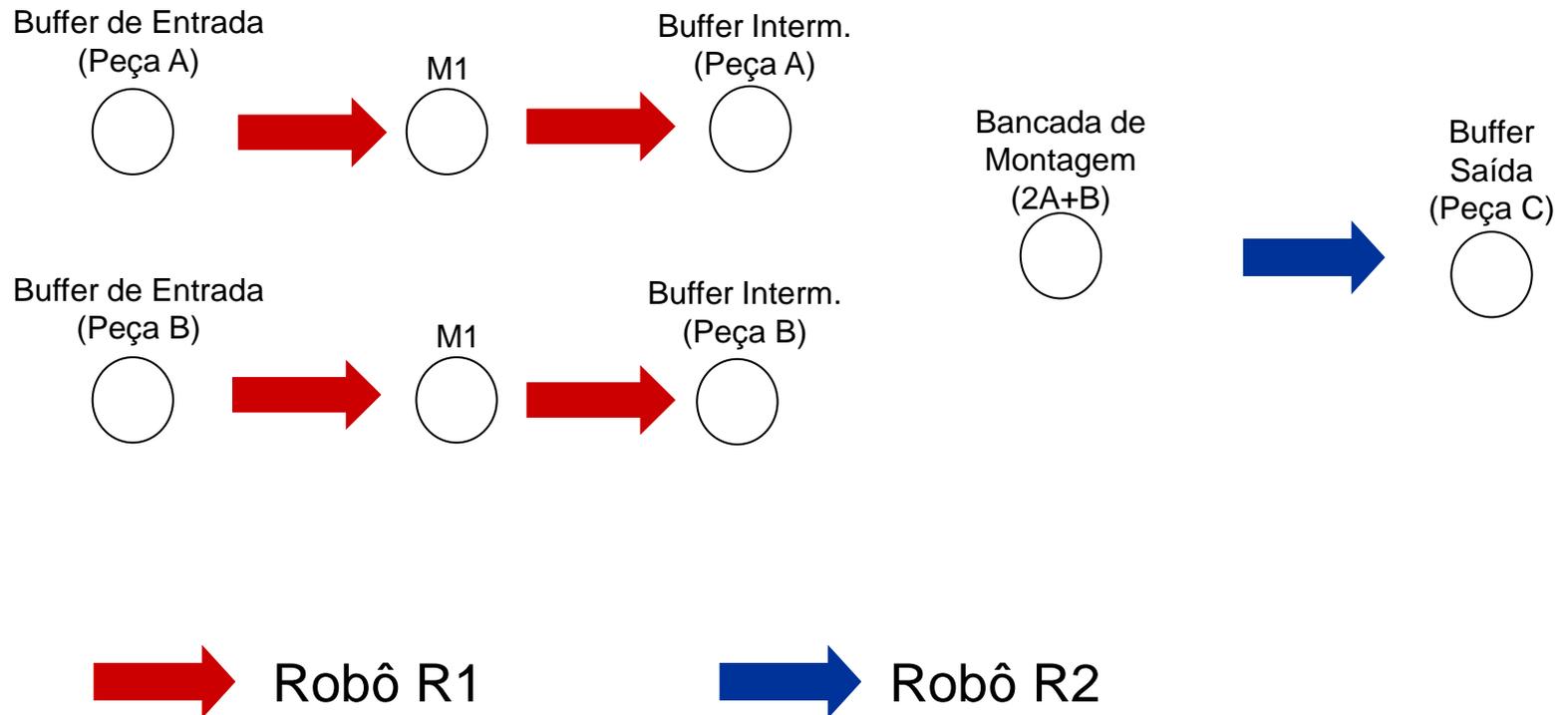
Metodologia

Processos de linhas diferentes se dividem para cada linha



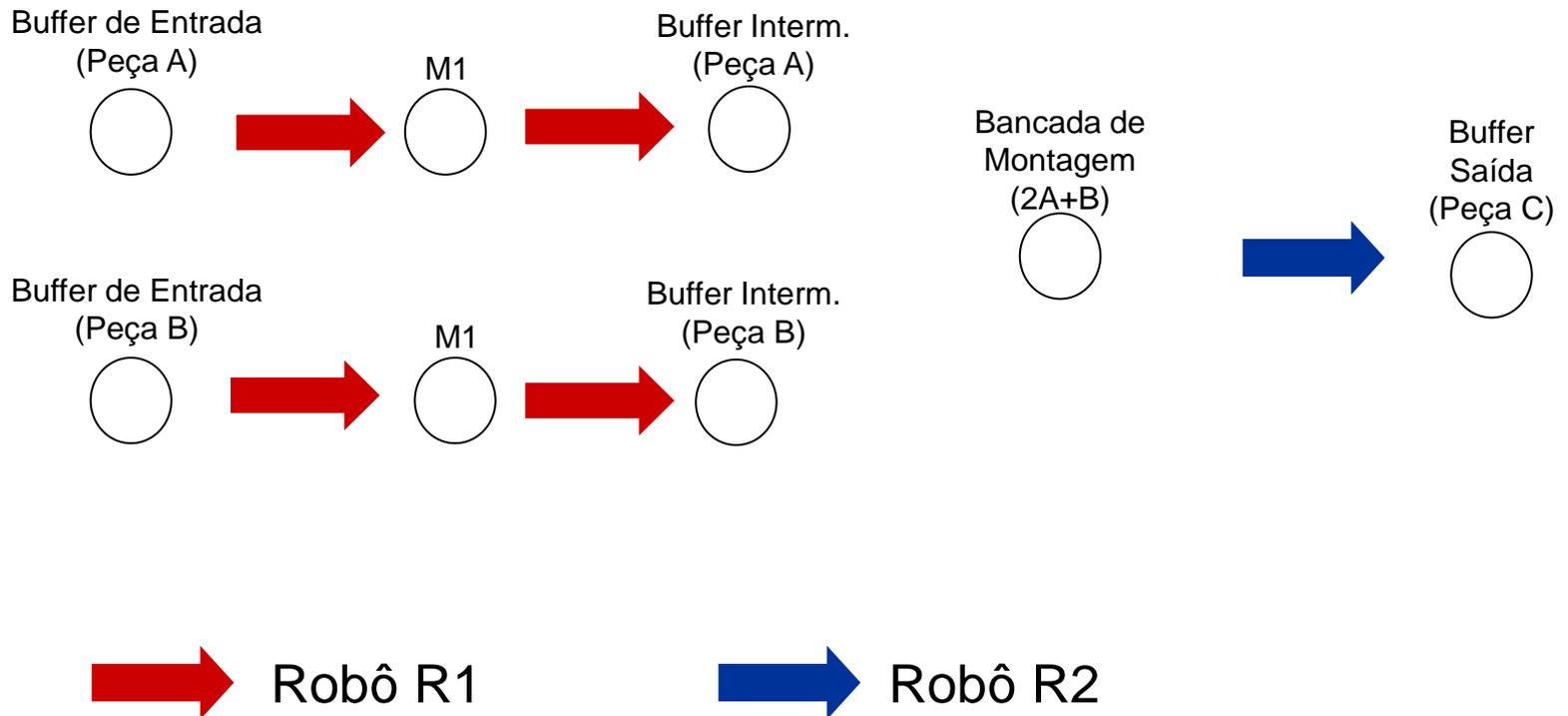
Metodologia

Processos de linhas diferentes se dividem para cada linha



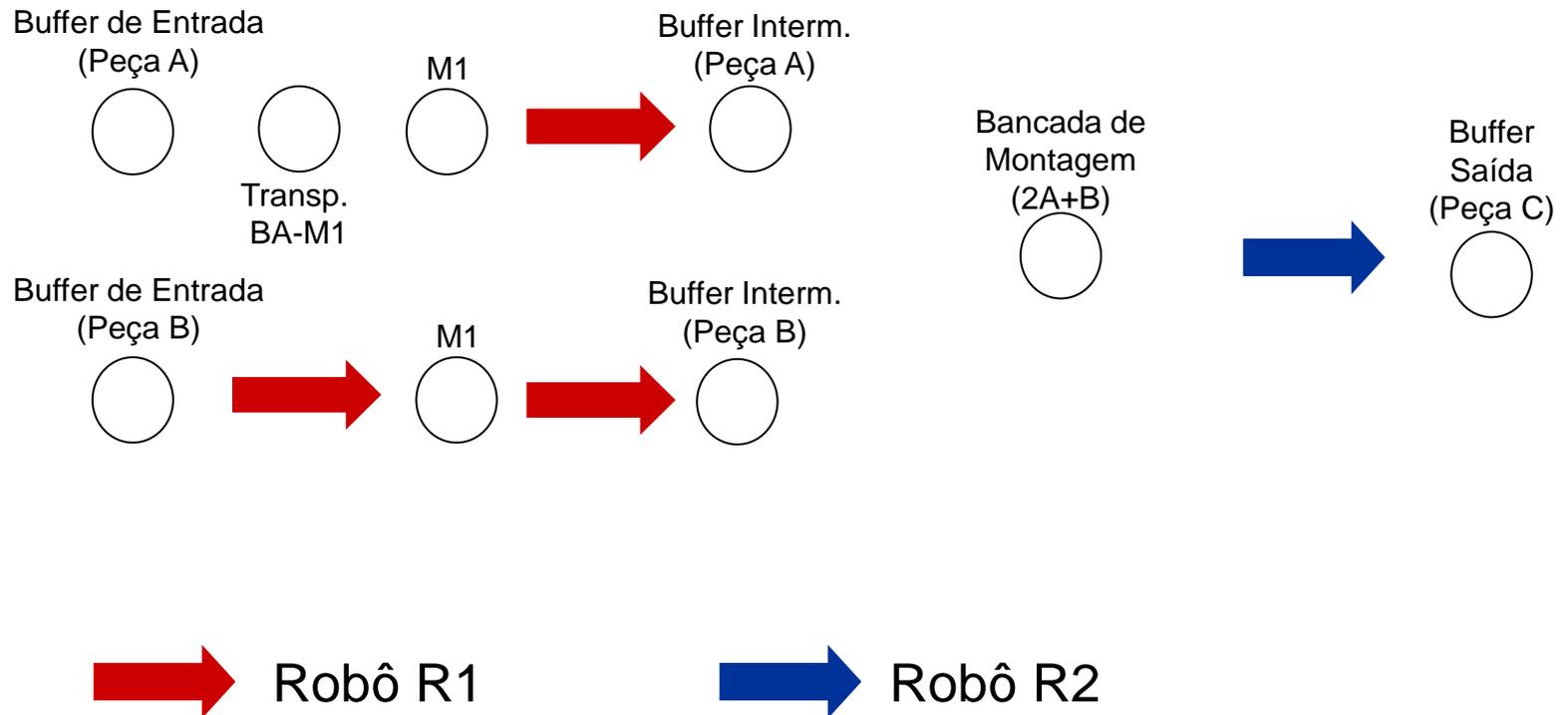
Metodologia

Transportes viram por lugares com capacidade simples



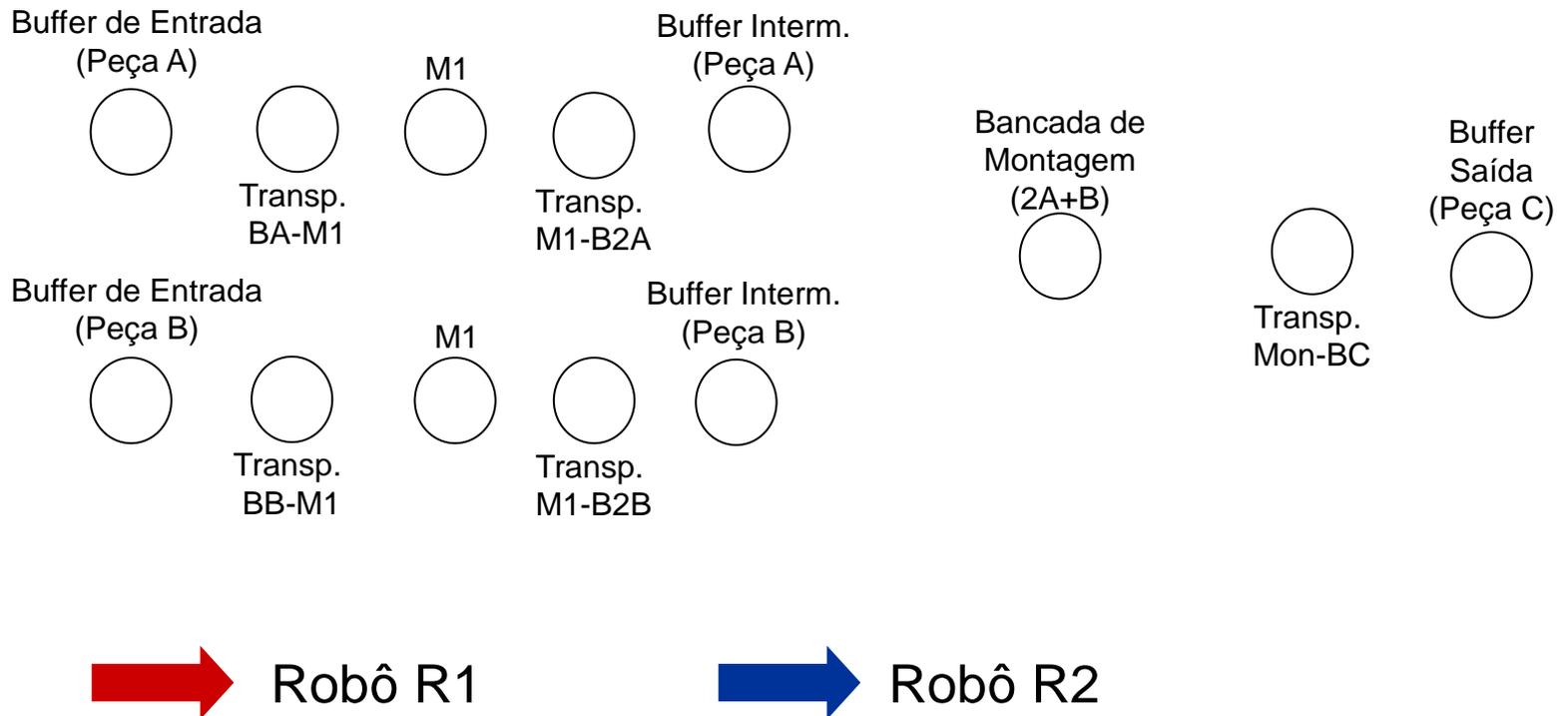
Metodologia

Transportes viram por lugares com capacidade simples



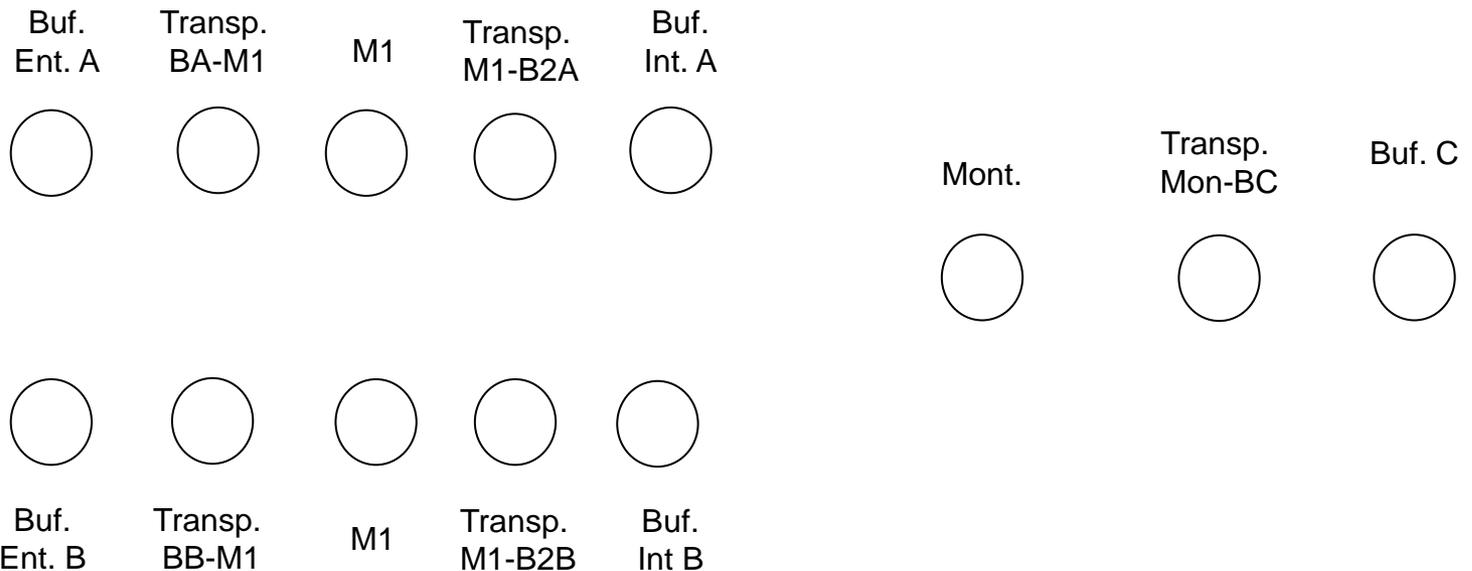
Metodologia

Transportes viram por lugares com capacidade simples



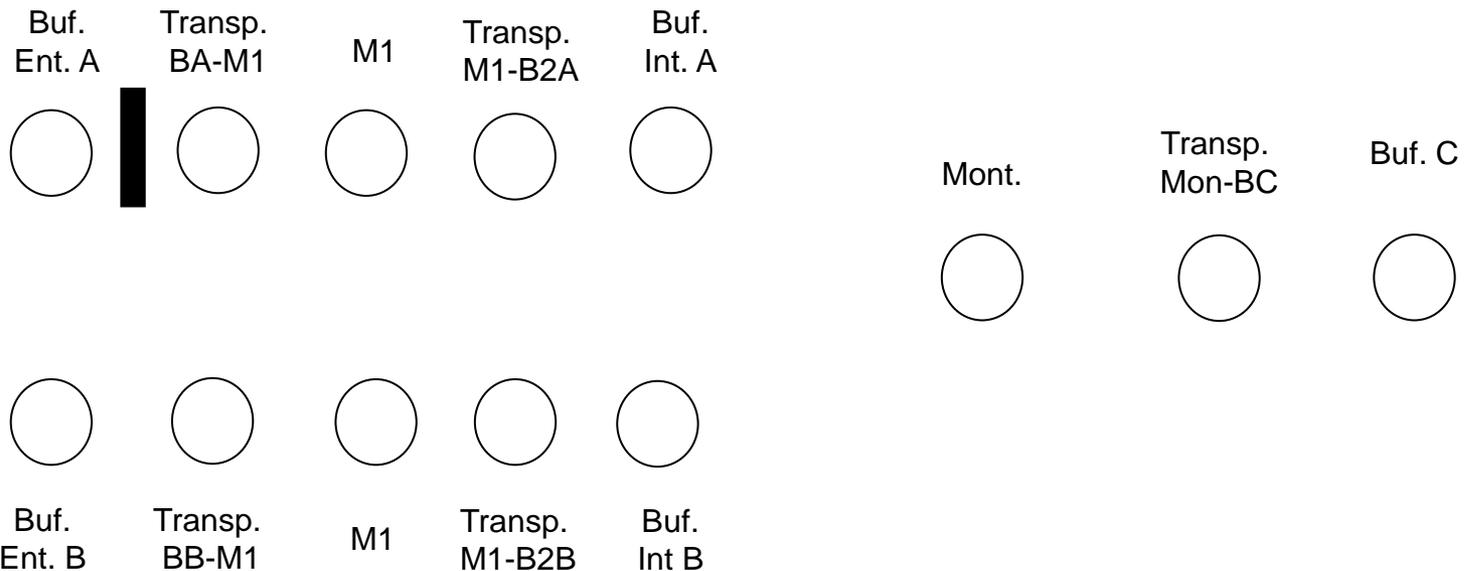
Metodologia

Coloca-se as transições entre os lugares da rede garantindo as características dos SEDs



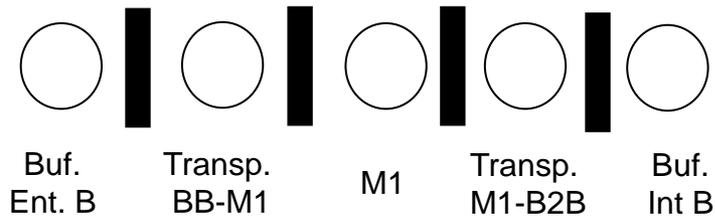
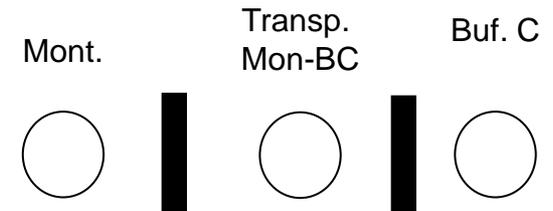
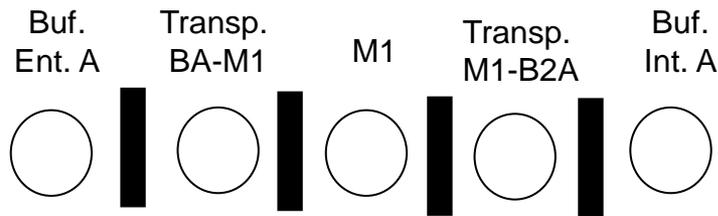
Metodologia

Coloca-se as transições entre os lugares da rede garantindo as características dos SEDs



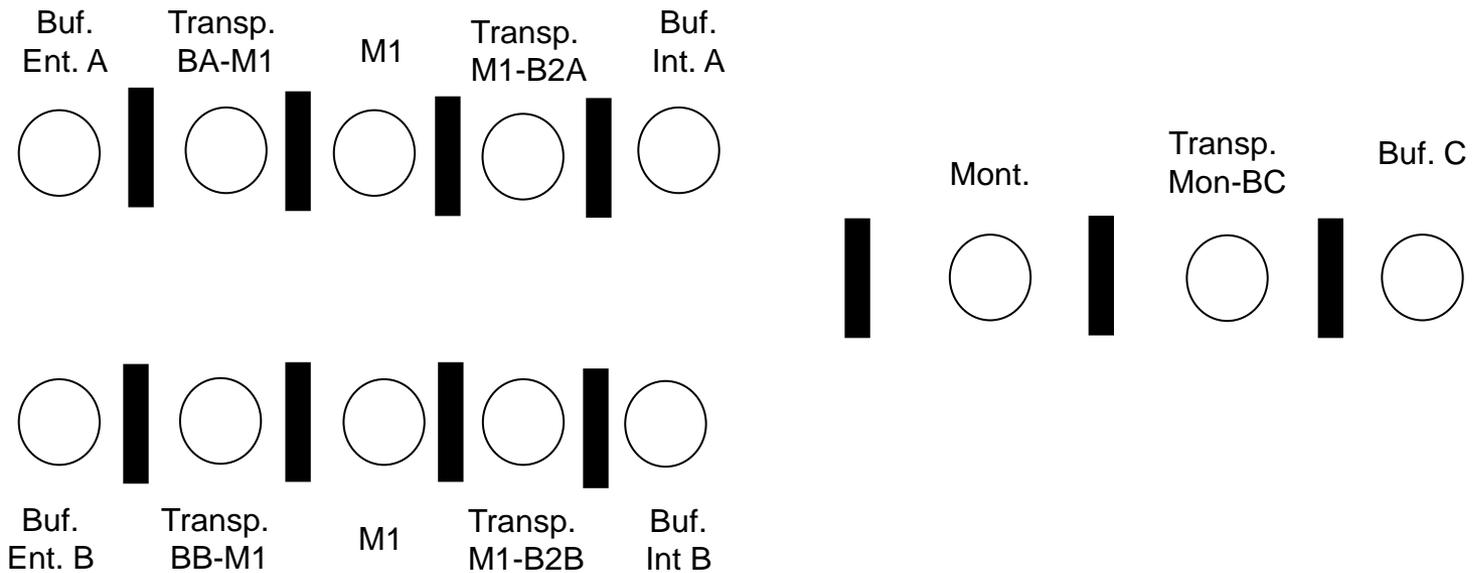
Metodologia

Coloca-se as transições entre os lugares da rede garantindo as características dos SEDs



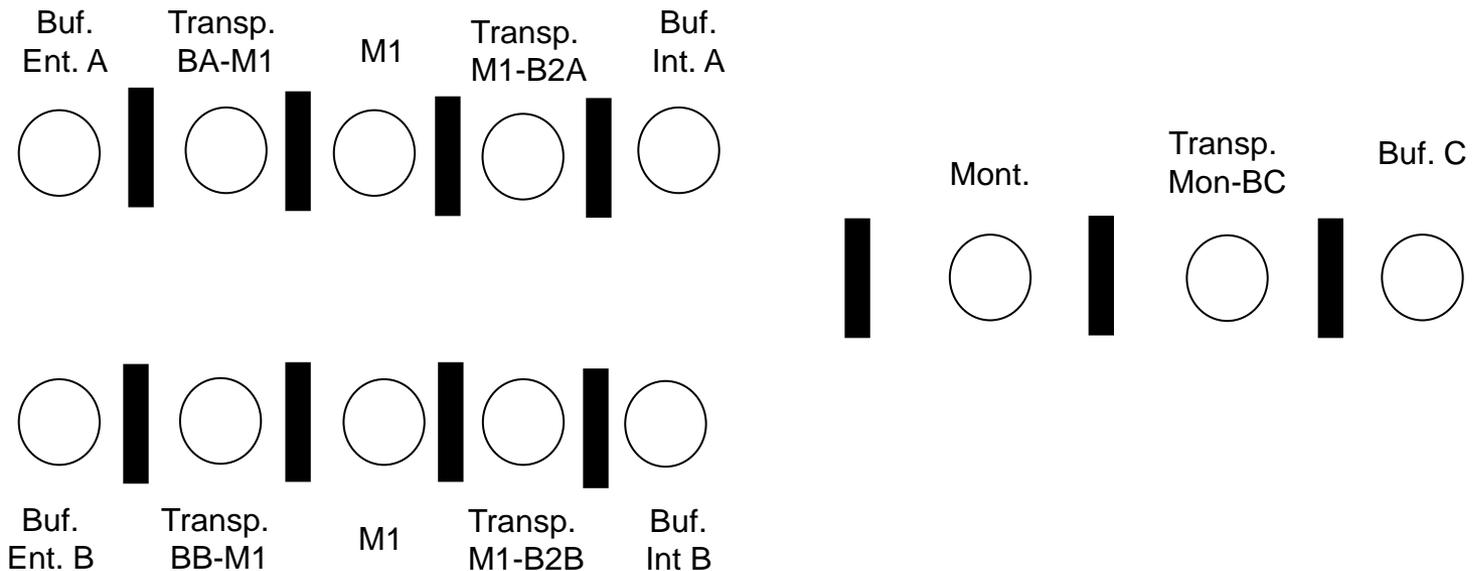
Metodologia

Coloca-se as transições entre os lugares da rede garantindo as características dos SEDs



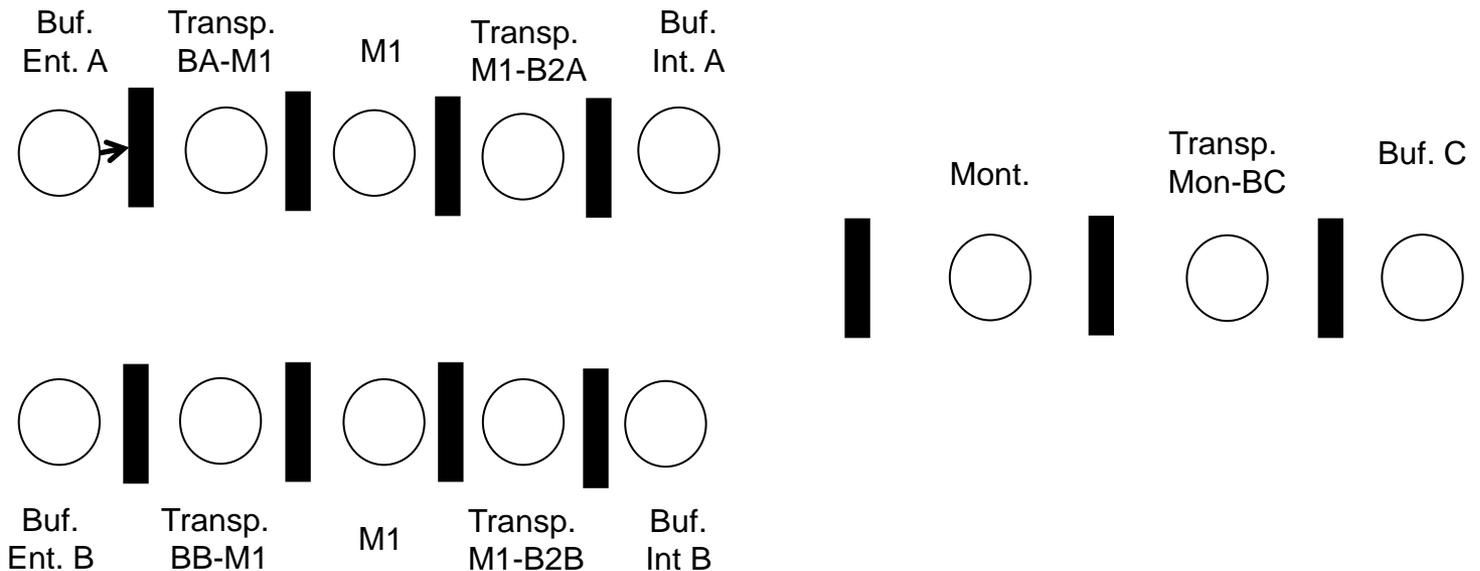
Metodologia

Liga-se os arcos dos lugares para as transições e das transições para os lugares e coloca-se os pesos



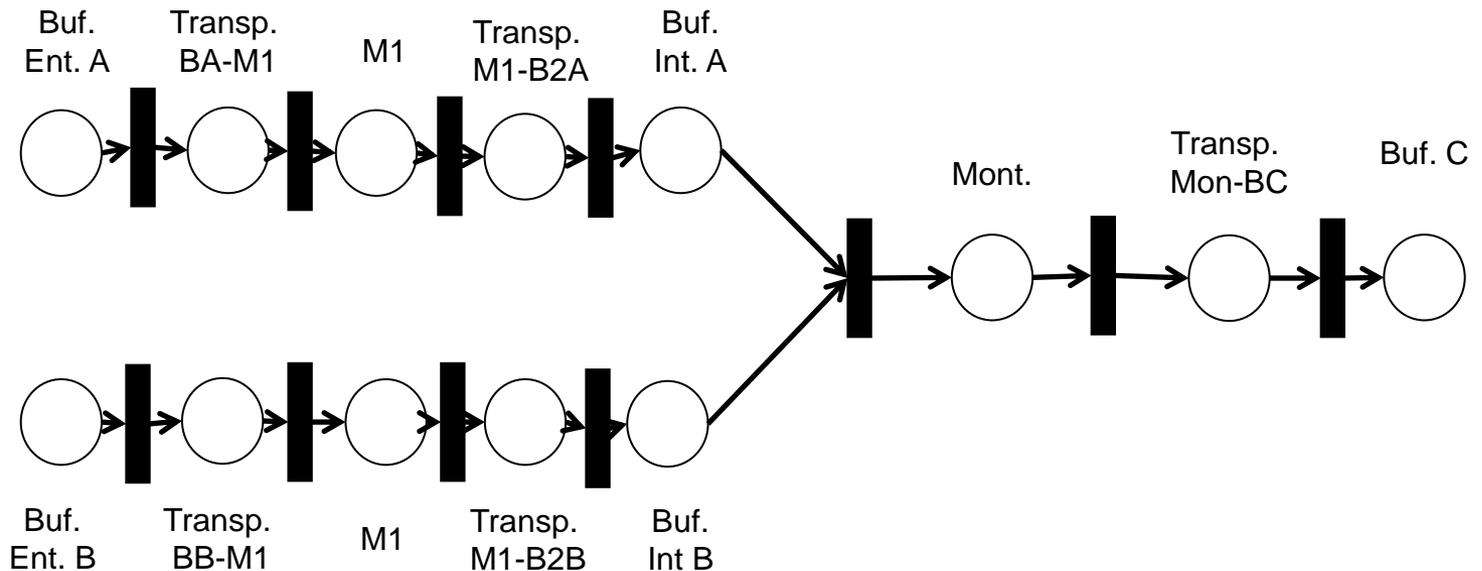
Metodologia

Liga-se os arcos dos lugares para as transições e das transições para os lugares e coloca-se os pesos



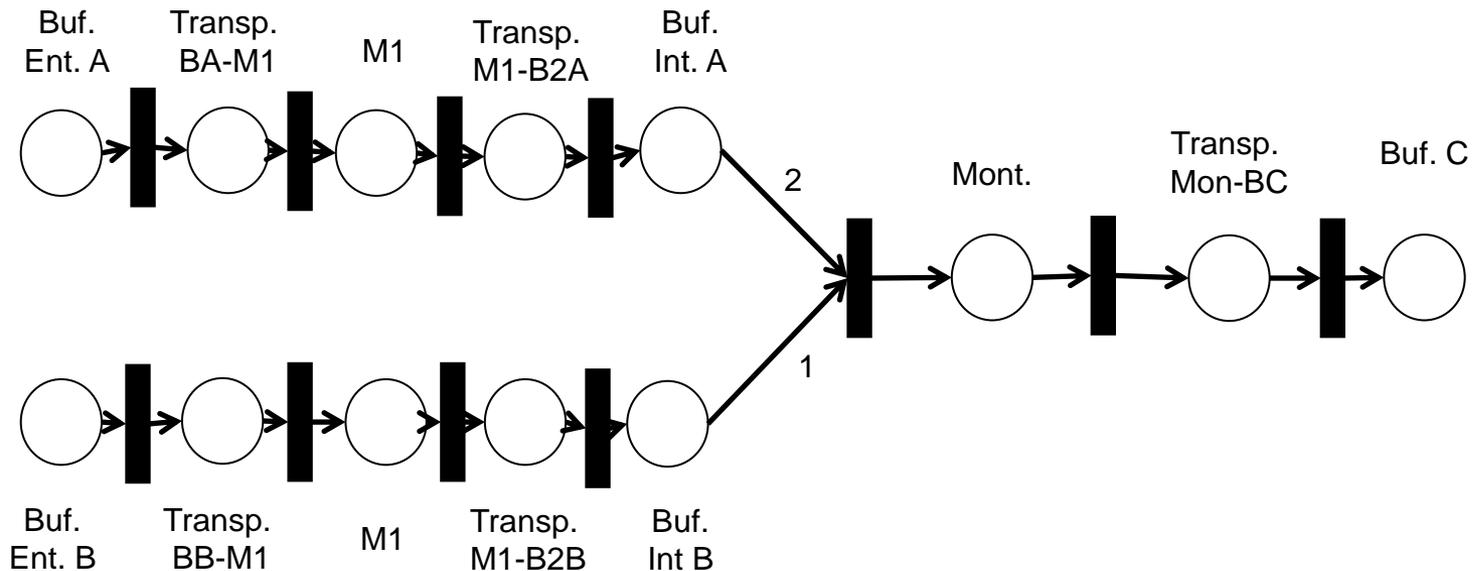
Metodologia

Liga-se os arcos dos lugares para as transições e das transições para os lugares e coloca-se os pesos



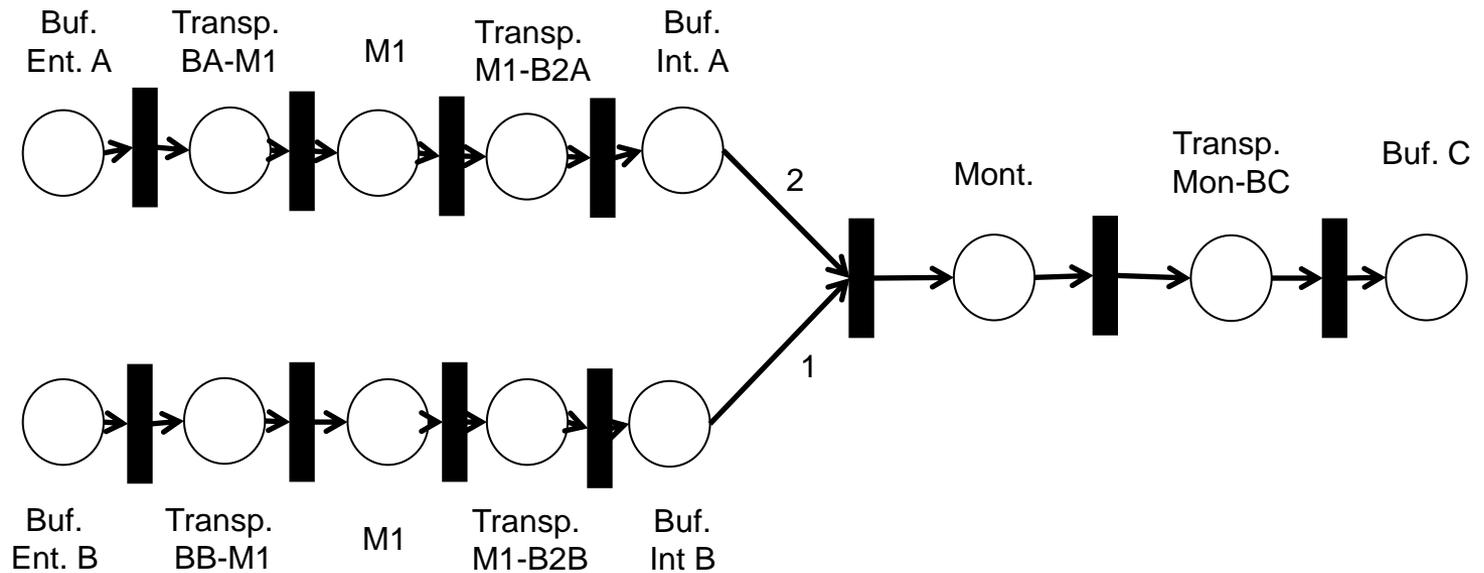
Metodologia

Liga-se os arcos dos lugares para as transições e das transições para os lugares e coloca-se os pesos



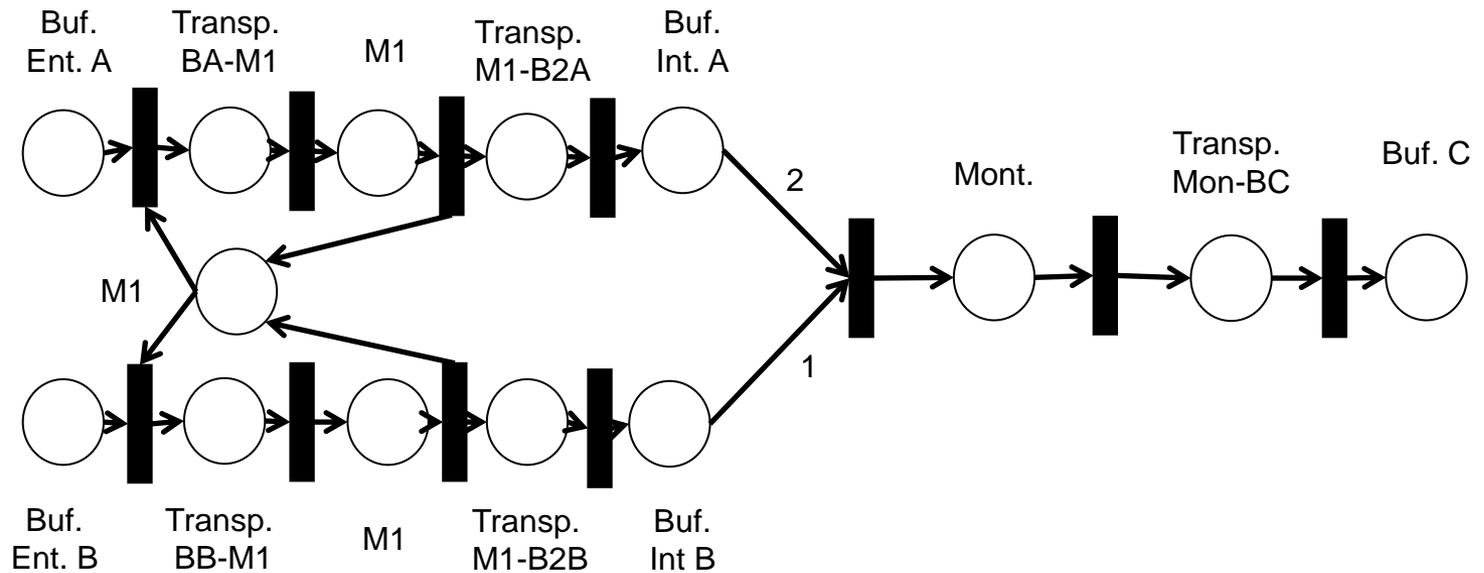
Metodologia

Aloca-se os recursos



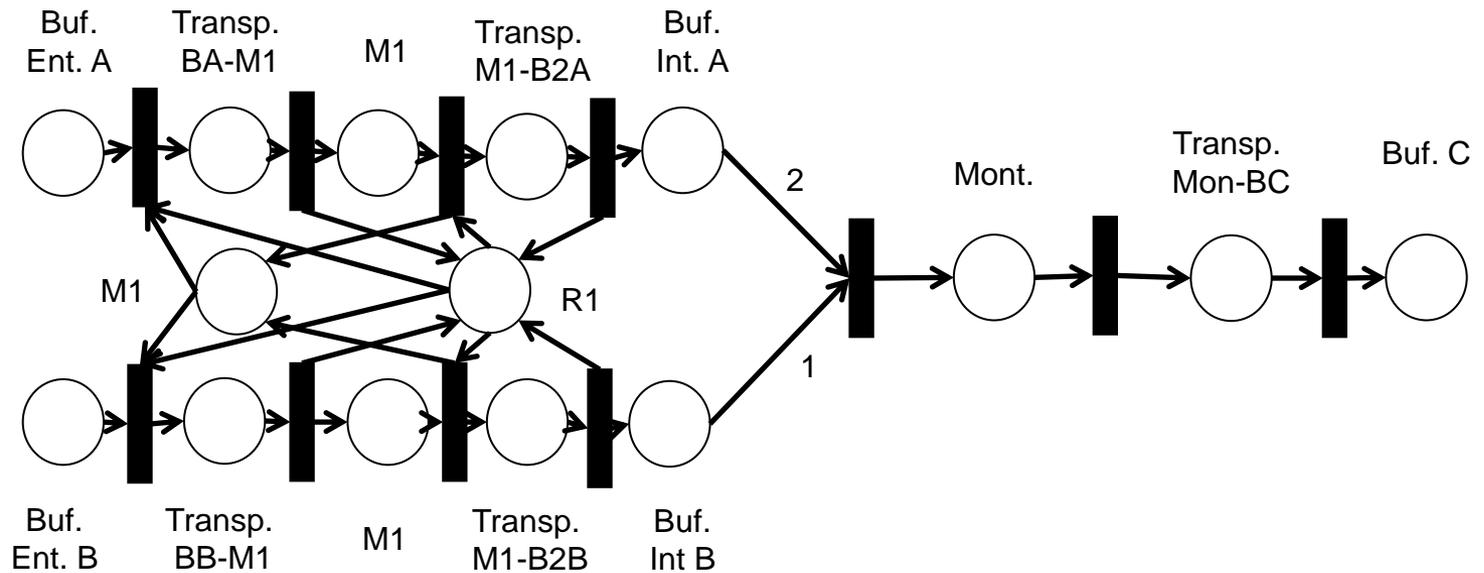
Metodologia

Aloca-se os recursos



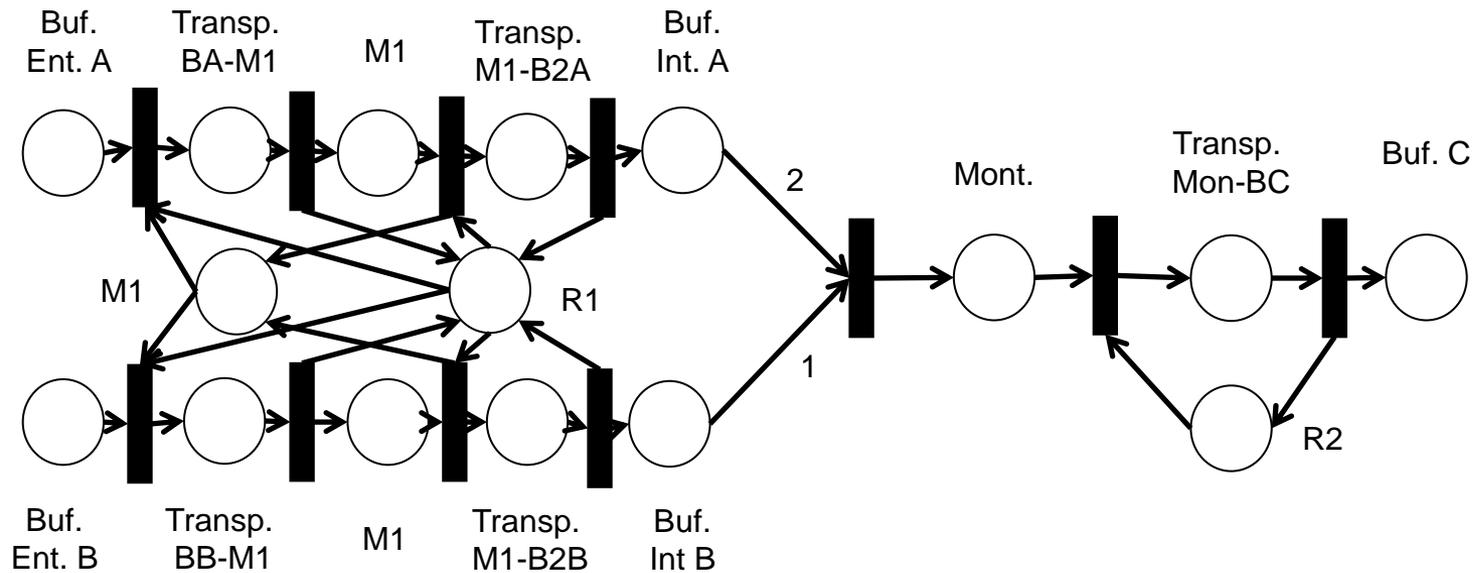
Metodologia

Aloca-se os recursos



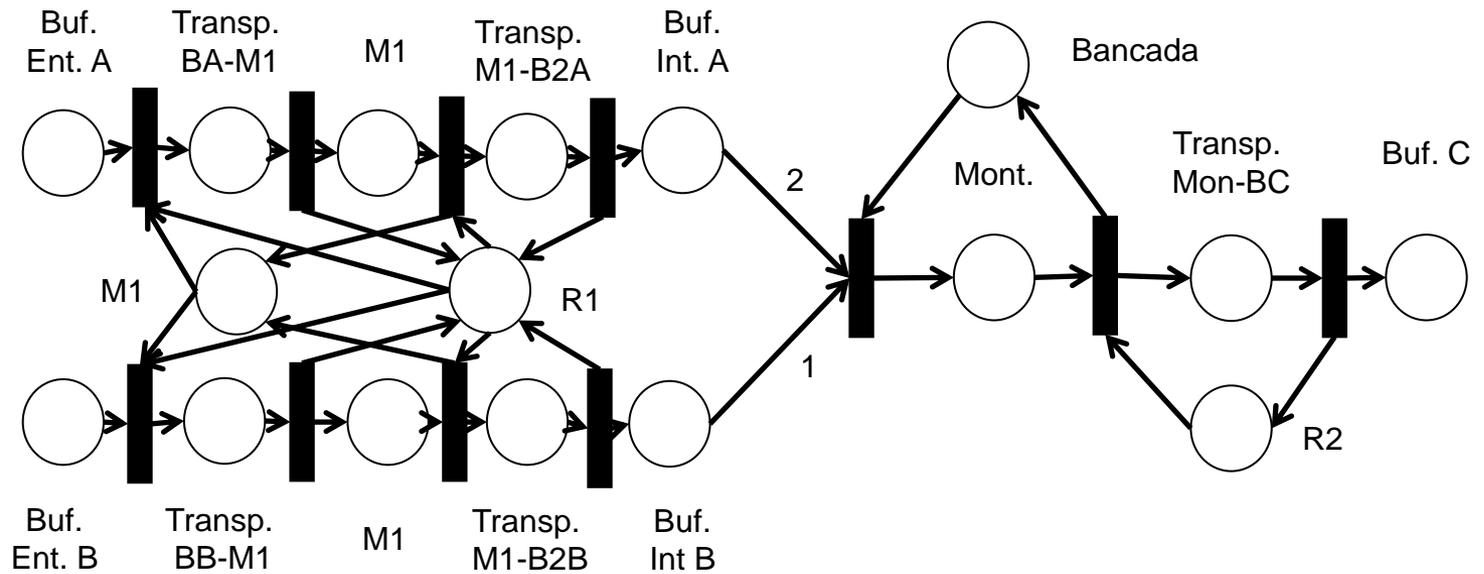
Metodologia

Aloca-se os recursos



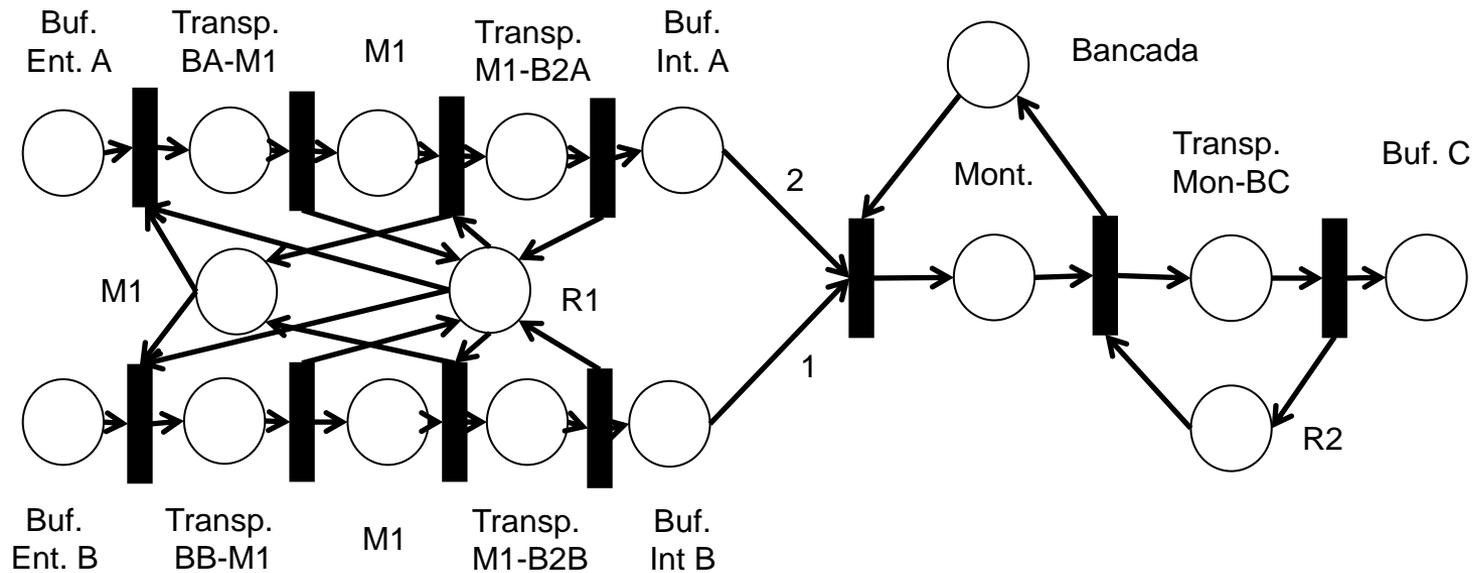
Metodologia

Aloca-se os recursos



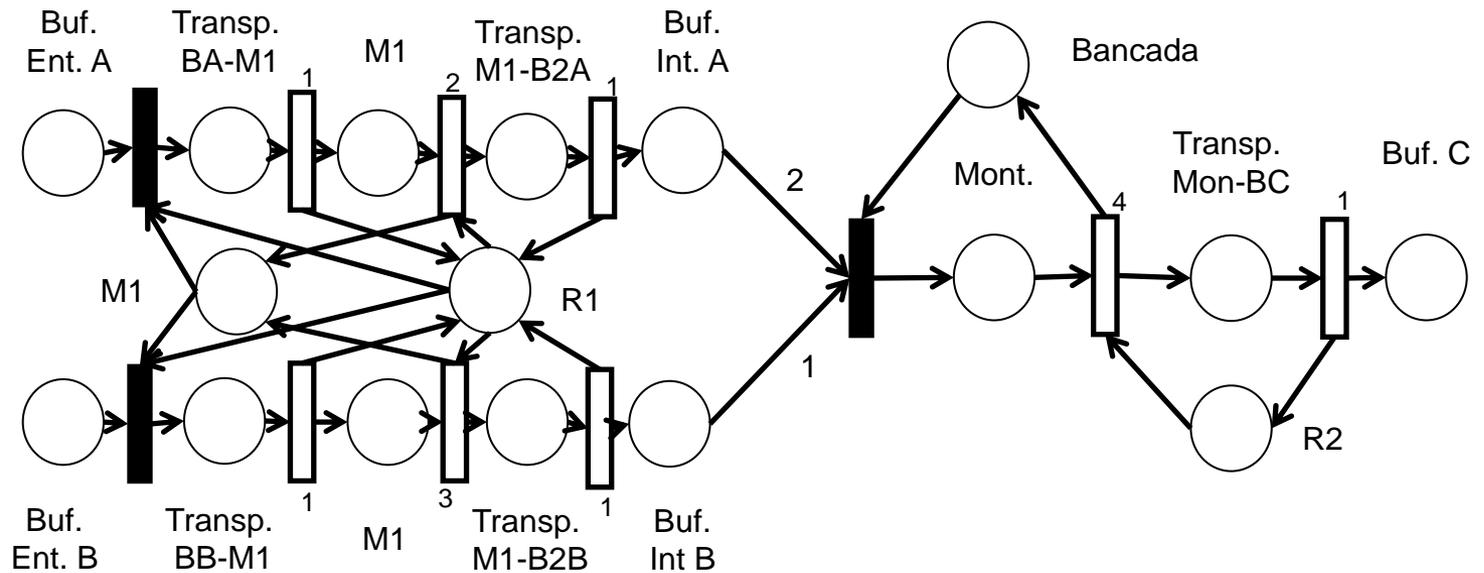
Metodologia

Configura os tempos das transições e as condições iniciais dos lugares



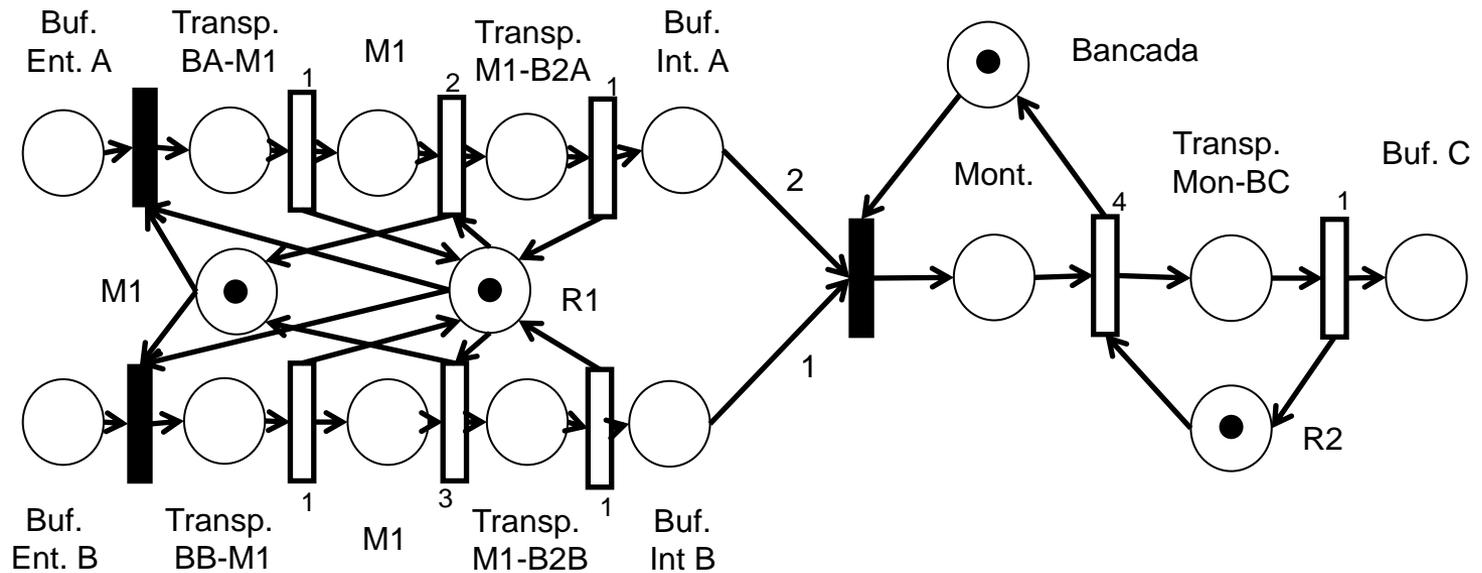
Metodologia

Configura os tempos das transições e as condições iniciais dos lugares



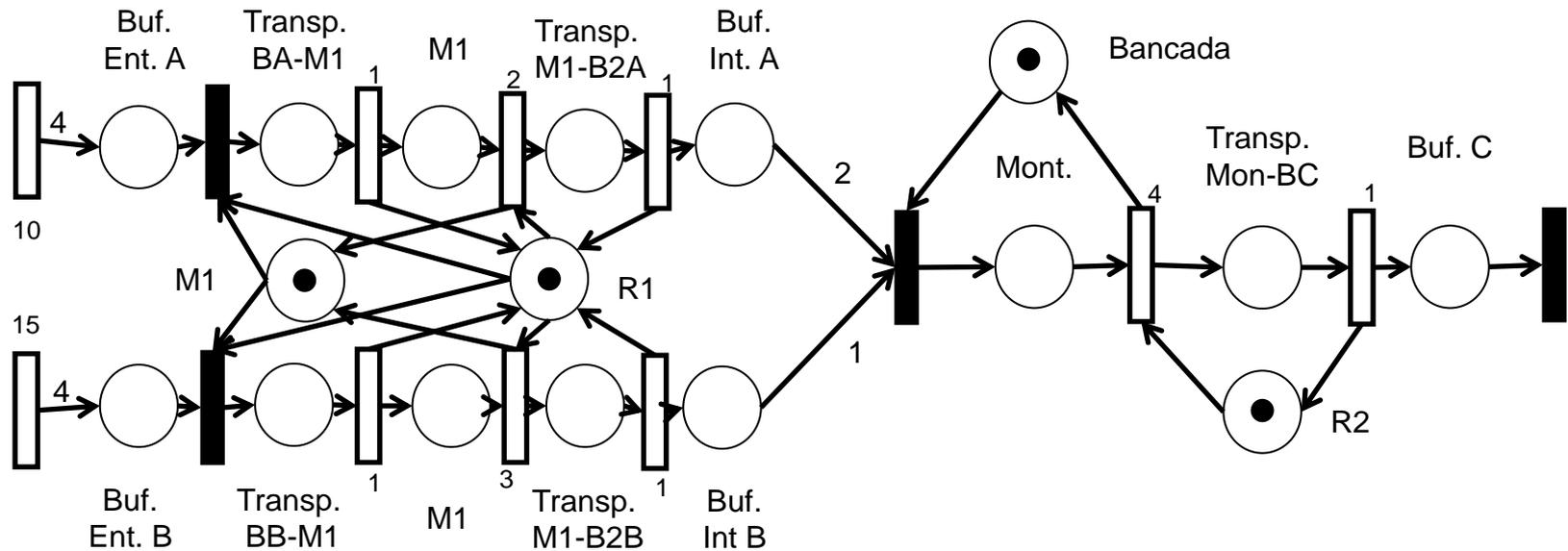
Metodologia

Configura os tempos das transições e as condições iniciais dos lugares



Metodologia

Configura os tempos das transições e as condições iniciais dos lugares



Metodologia

Simular

