

# **PLANEJAMENTO E CONTROLE DA PRODUÇÃO II**

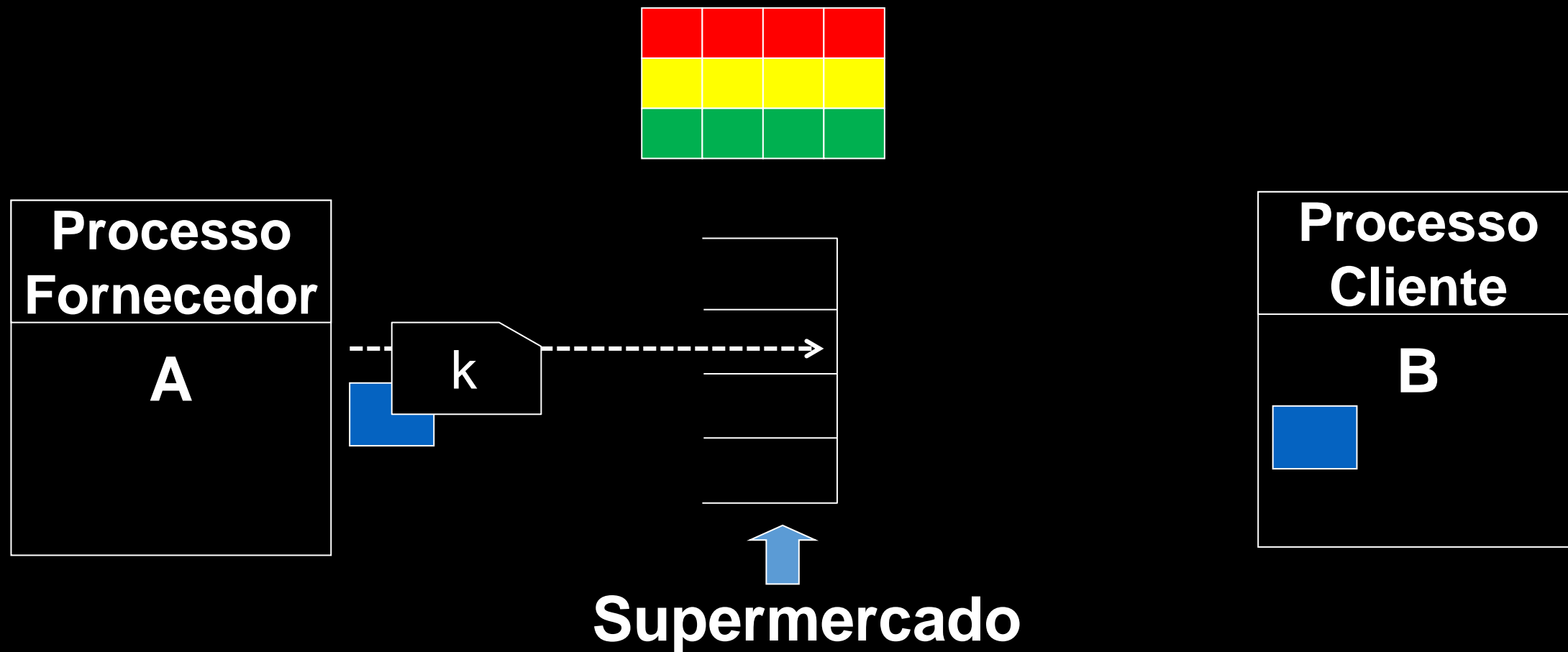
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**Simulando o Kanban**  
**Anibal Tavares de Azevedo**

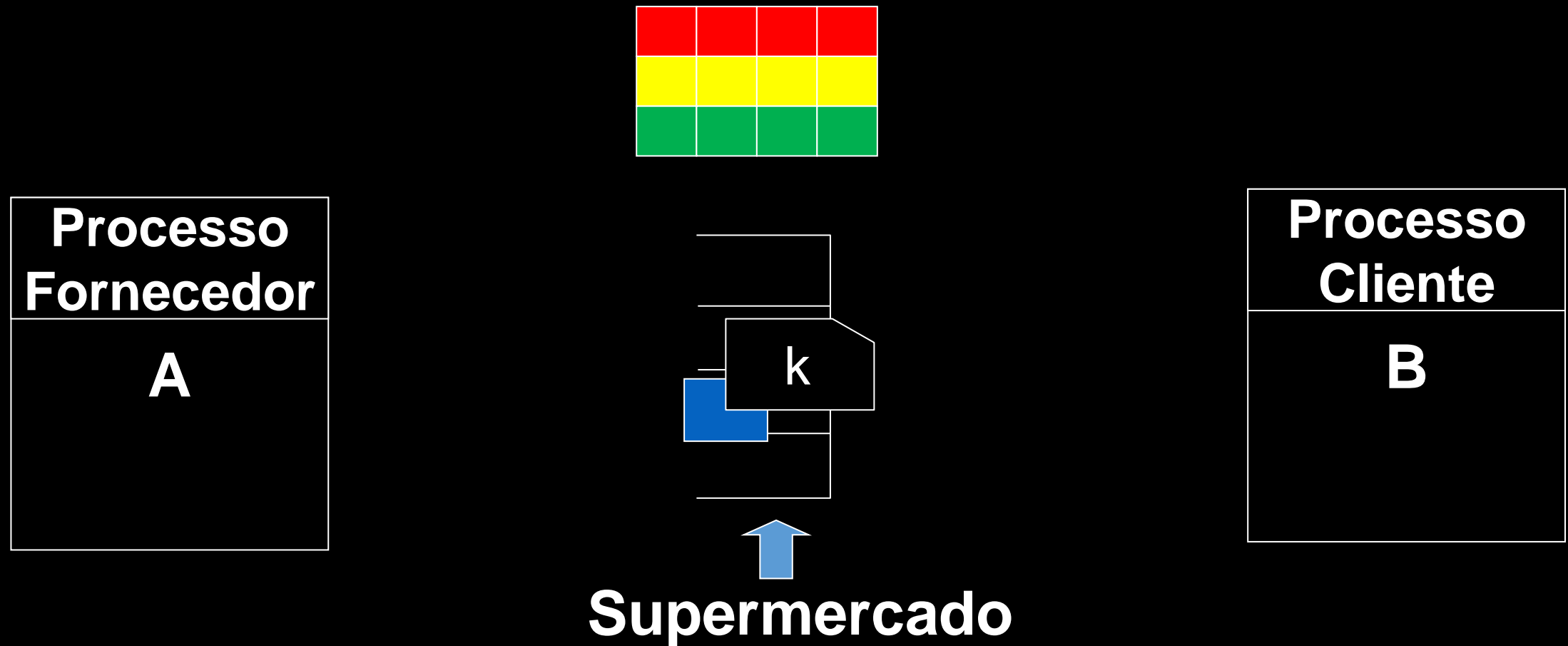
# Sistema kanban de 1 cartão

Processo		Centro de trabalho		
N. de item		N. prateleira estocagem		
Nome do item				
Materiais essenciais		Capacidade do contenedor	N. de emissão	Tipo de contenedor
Código	Locação			
				
<i>Cartão kanban de produção</i>				

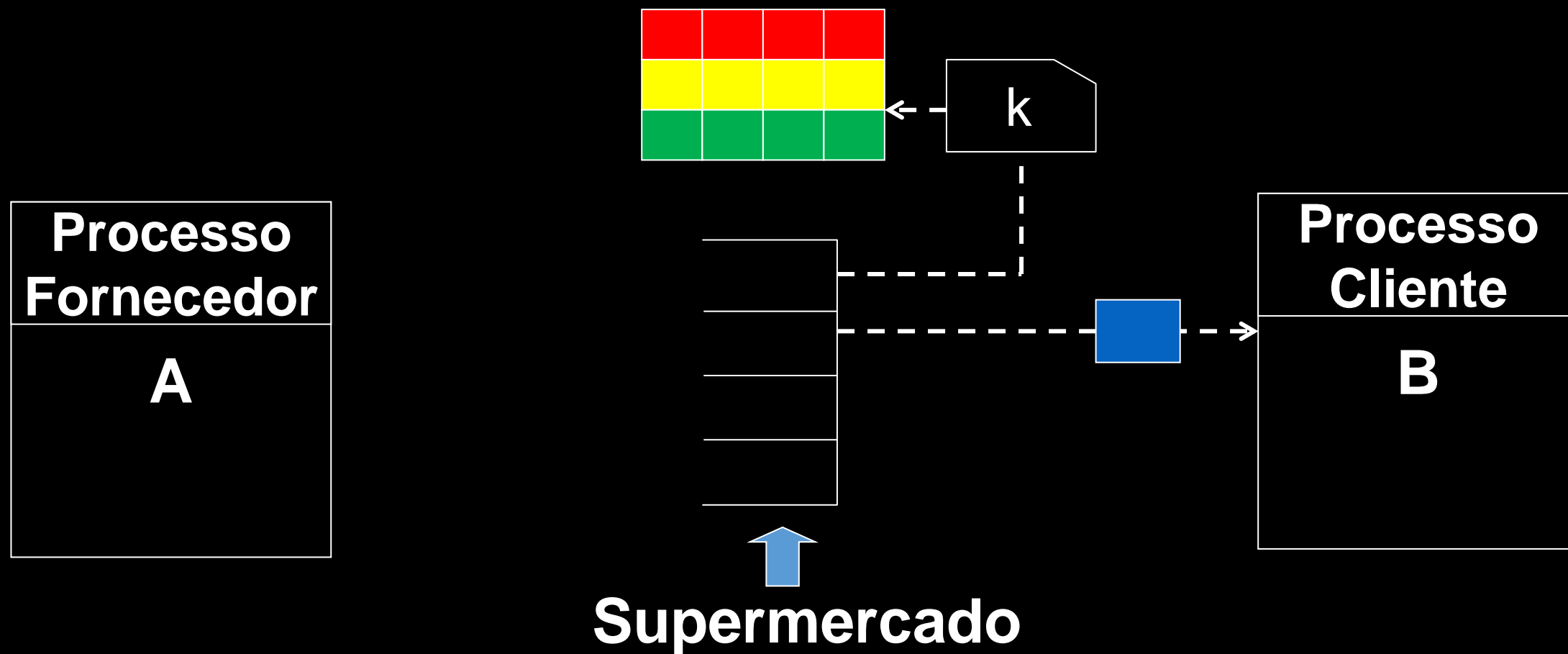
# Kanban de Produção (Sistema 1 kanban)



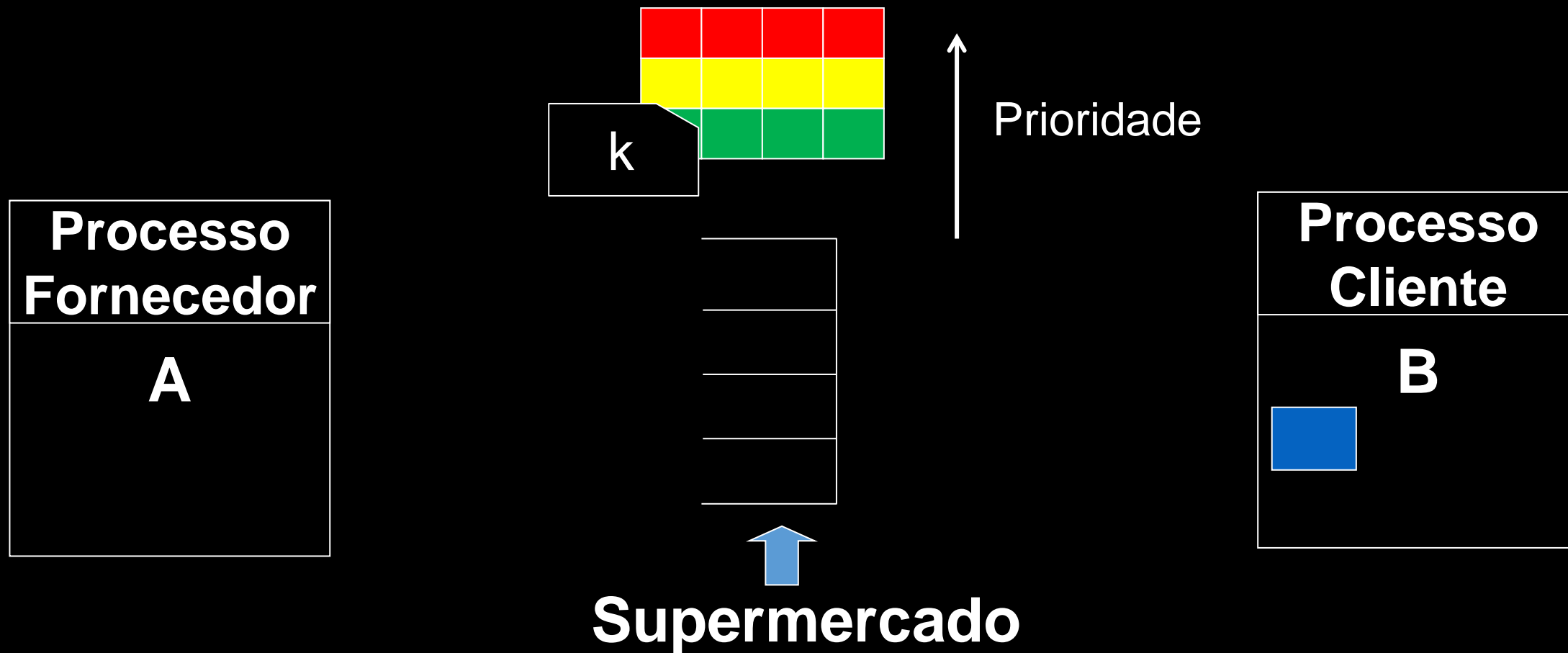
# Kanban de Produção (Sistema 1 kanban)



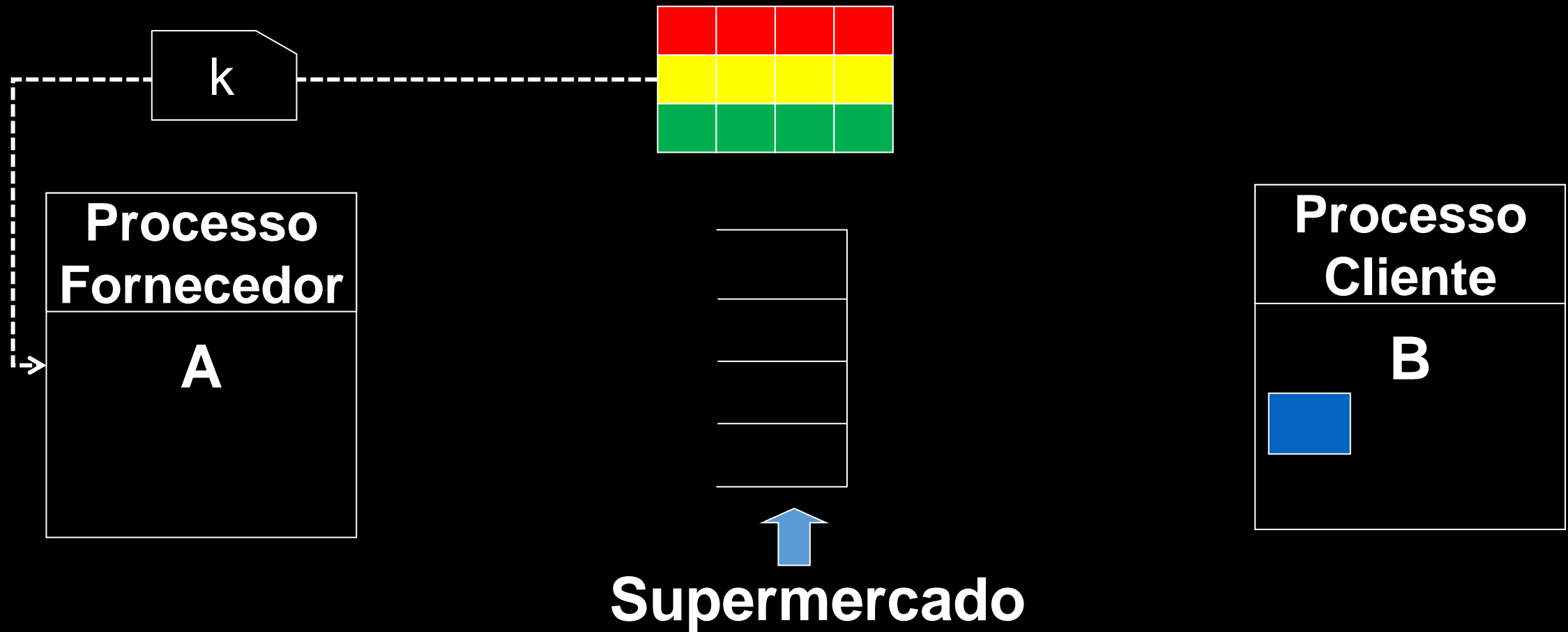
# Kanban de Produção (Sistema 1 kanban)



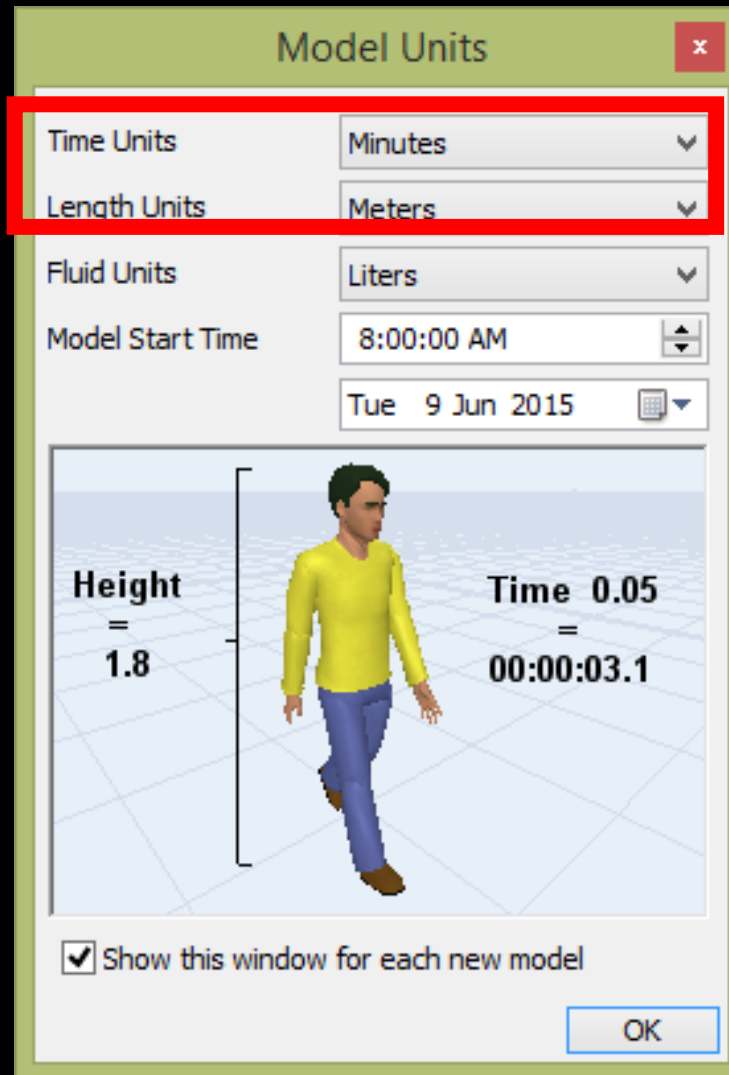
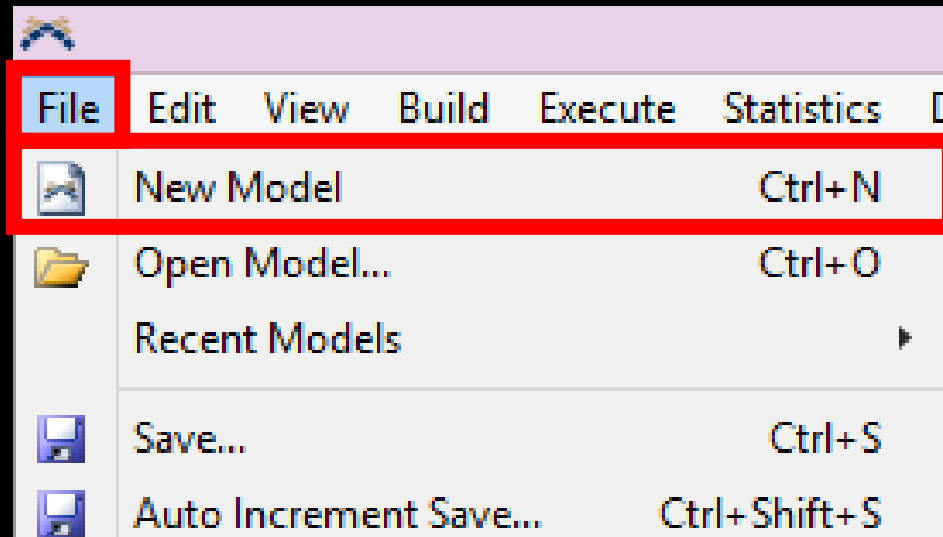
# Kanban de Produção (Sistema 1 kanban)



# Kanban de Produção (Sistema 1 kanban)



# Modelo no FlexSim

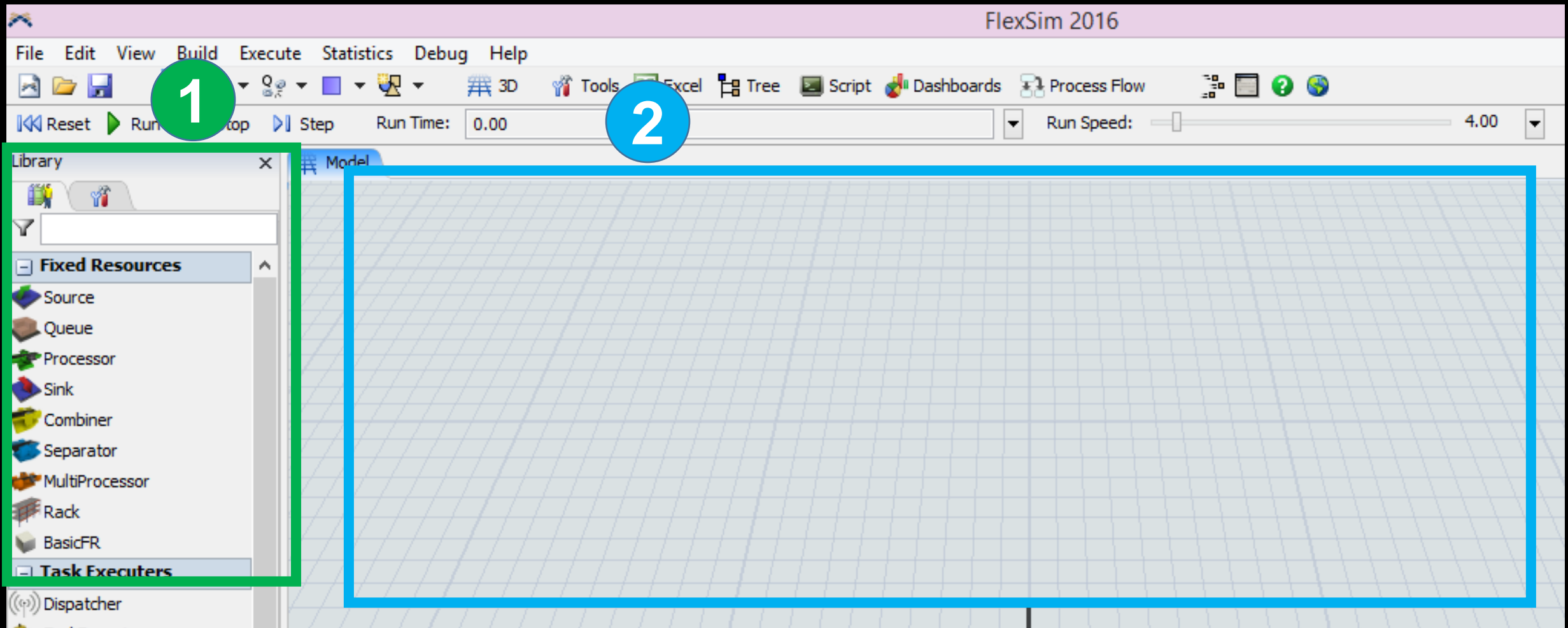


Definir unidades  
do Modelo

Deixe em  
**metros e  
minutos** as  
unidades de  
distância e  
tempo.



# Criando o modelo



# Passo 1

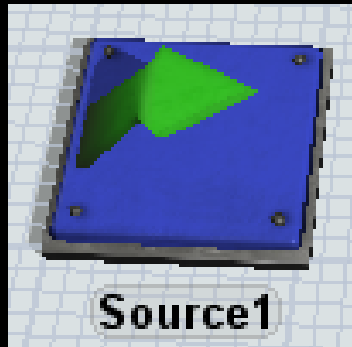
Arrastar os objetos para a superfície de simulação e posicione-os conforme layout abaixo



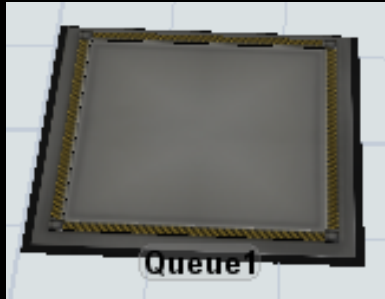
# Criando os locais



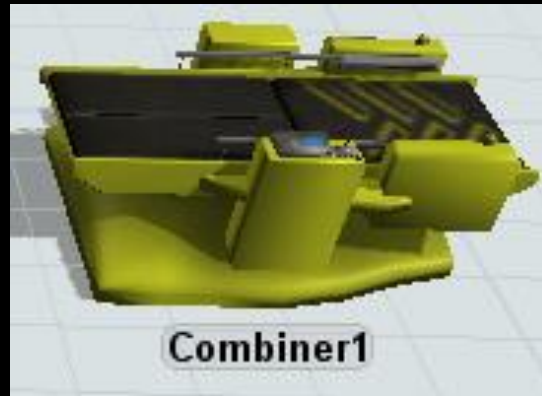
# Criando os locais



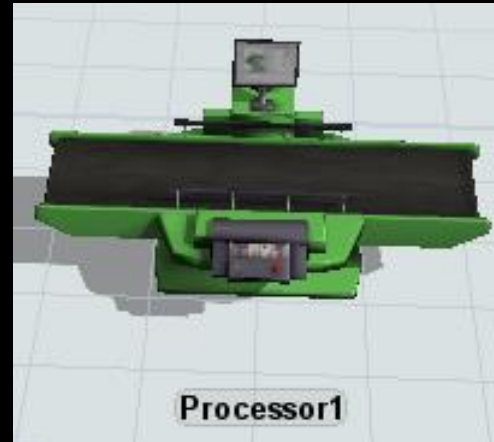
# Criando os locais



# Criando os locais



# Criando os locais

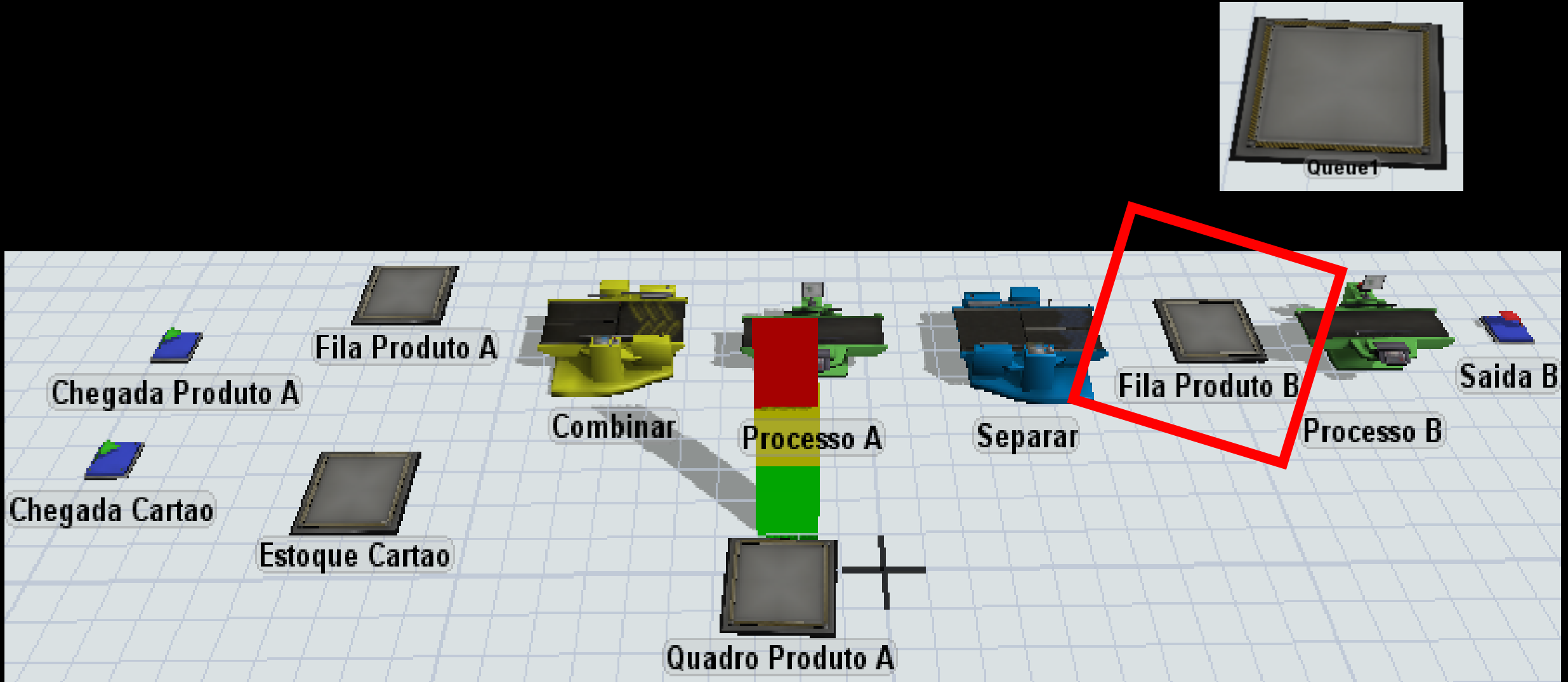


# Criando os locais

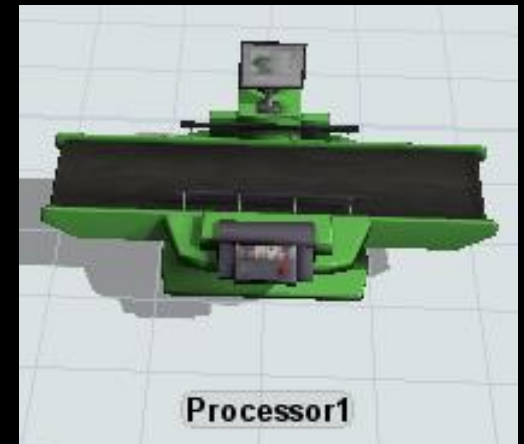




# Criando os locais



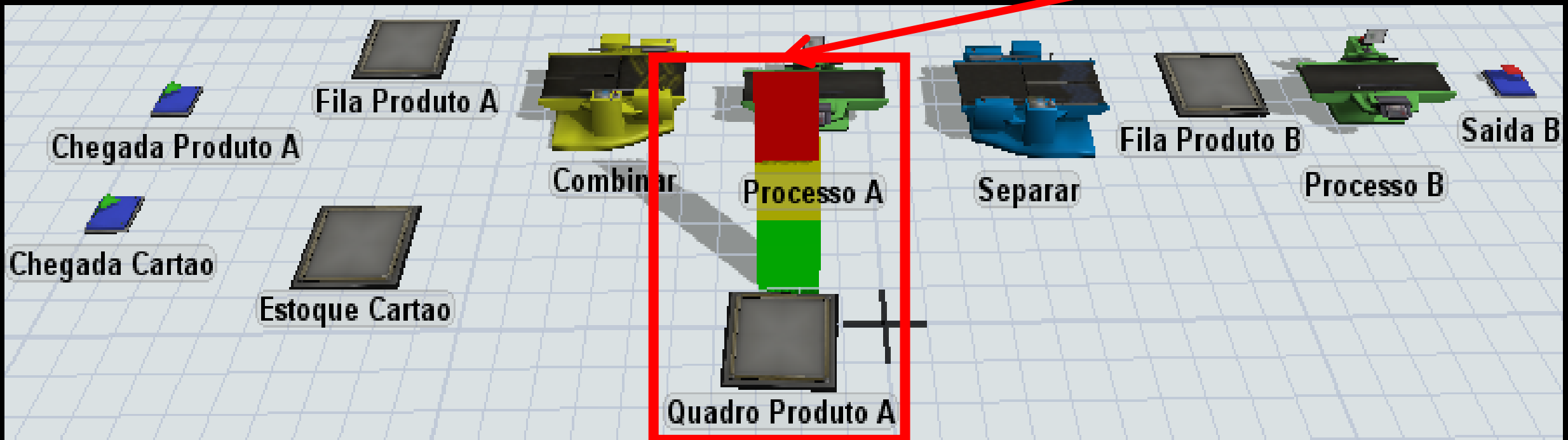
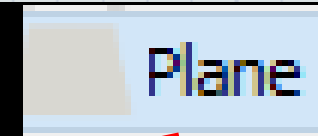
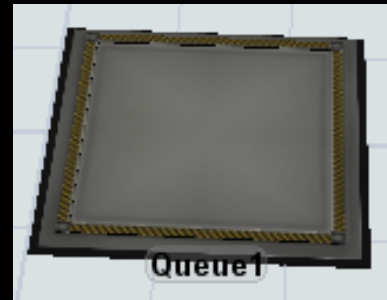
# Criando os locais



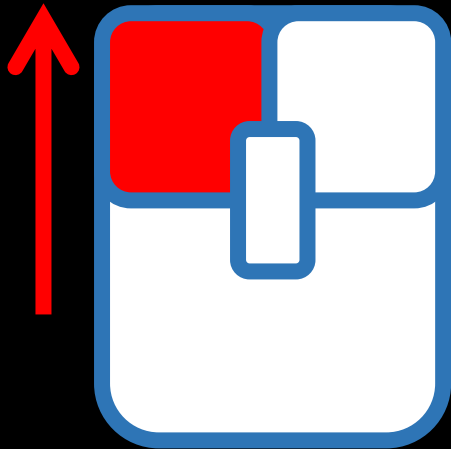
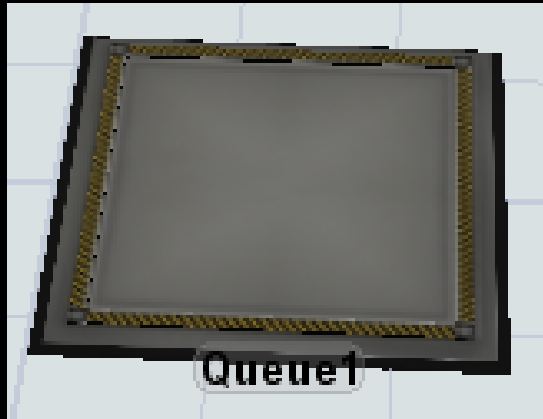
# Criando os locais



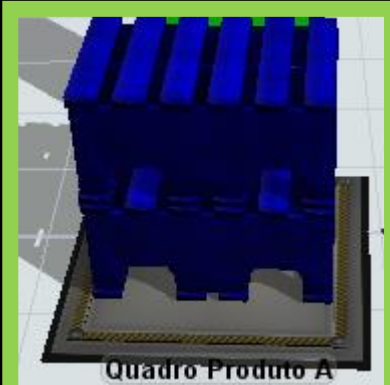
# Um novo local: Quadro Kanban



# Um novo local: Quadro Kanban



Duplo  
Clique



Queue

1

Triggers

Labels

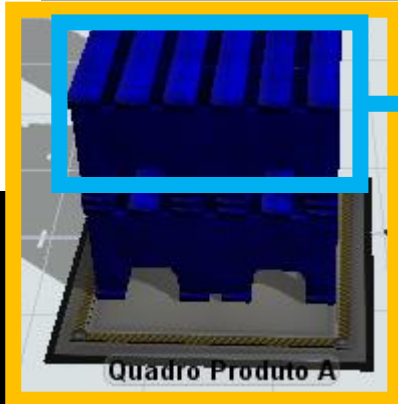
General

Maximum Content

1000

☒ LIFO

2



Quadro Produto A

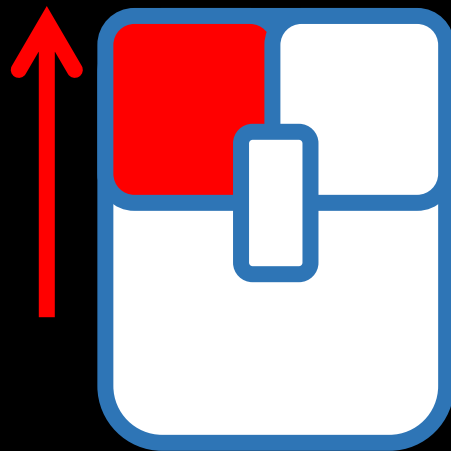
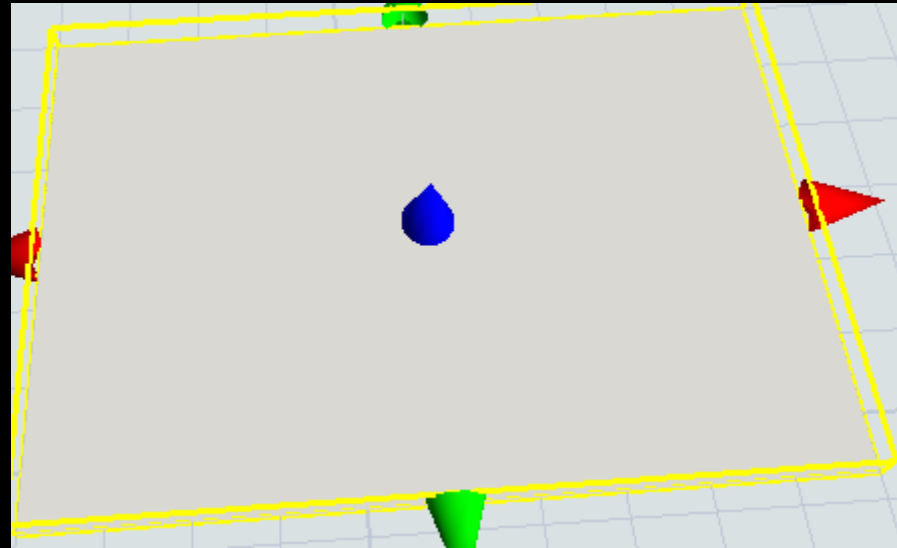
Visual

3

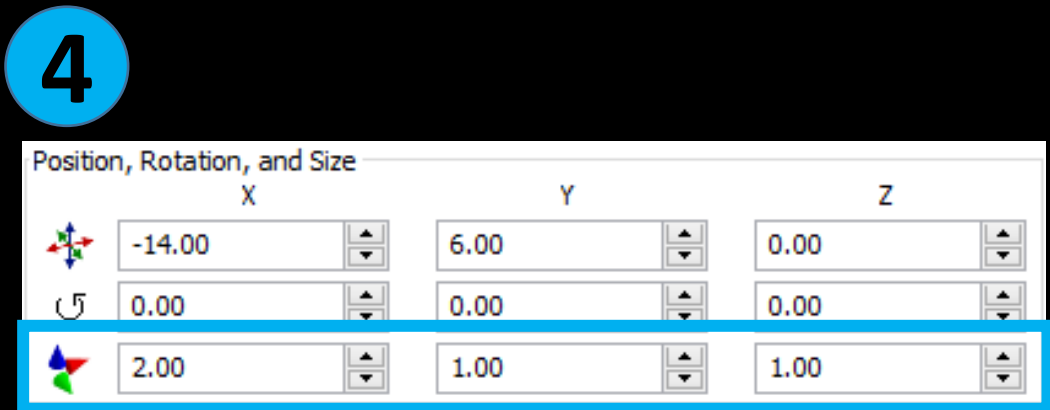
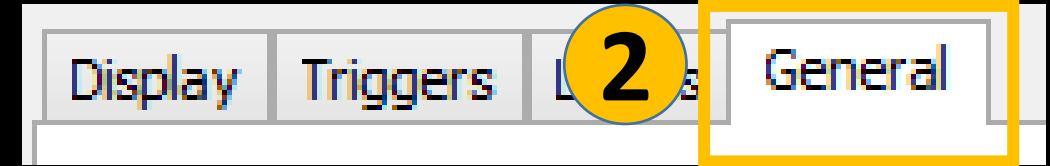
Item Placement

Stack Vertically

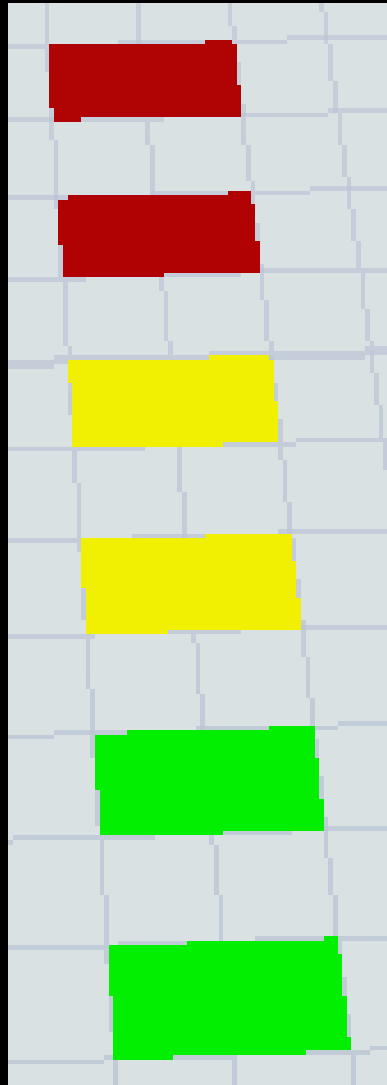
# Um novo local: Quadro Kanban



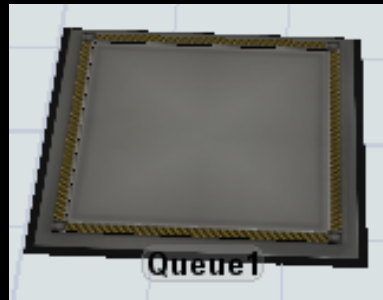
Duplo  
Clique



# Um novo local: Quadro Kanban



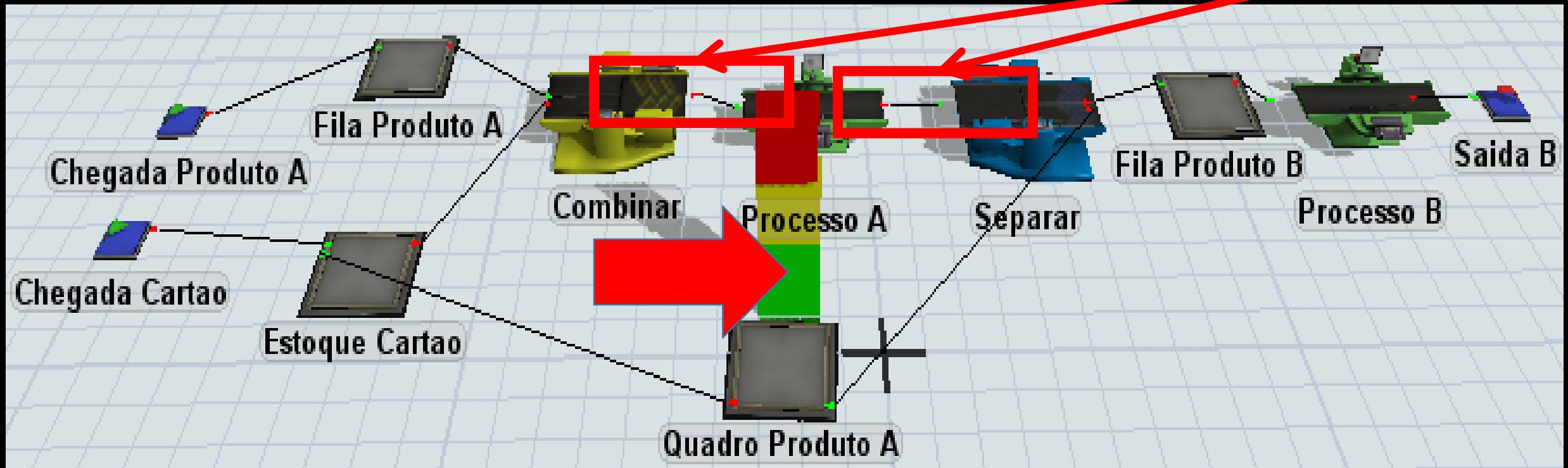
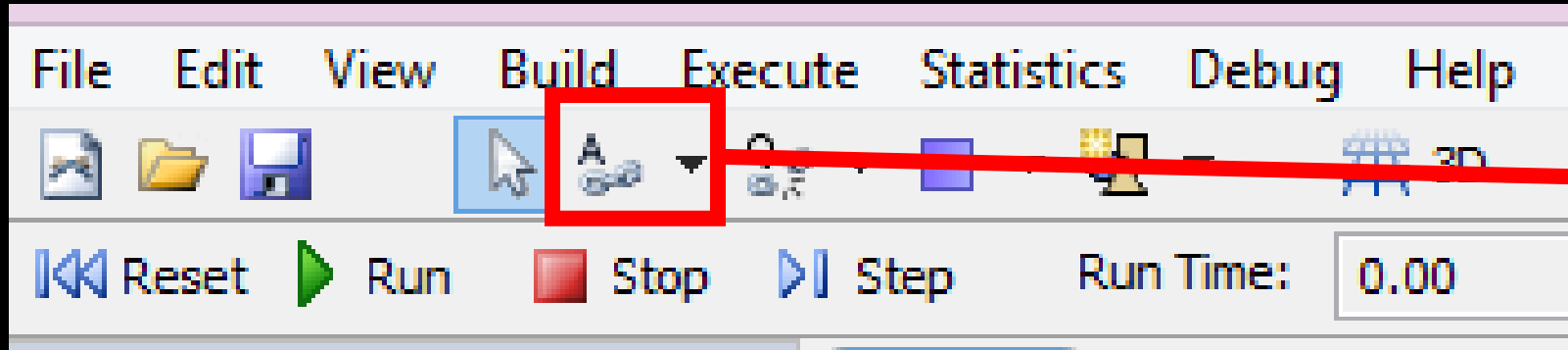
+



=

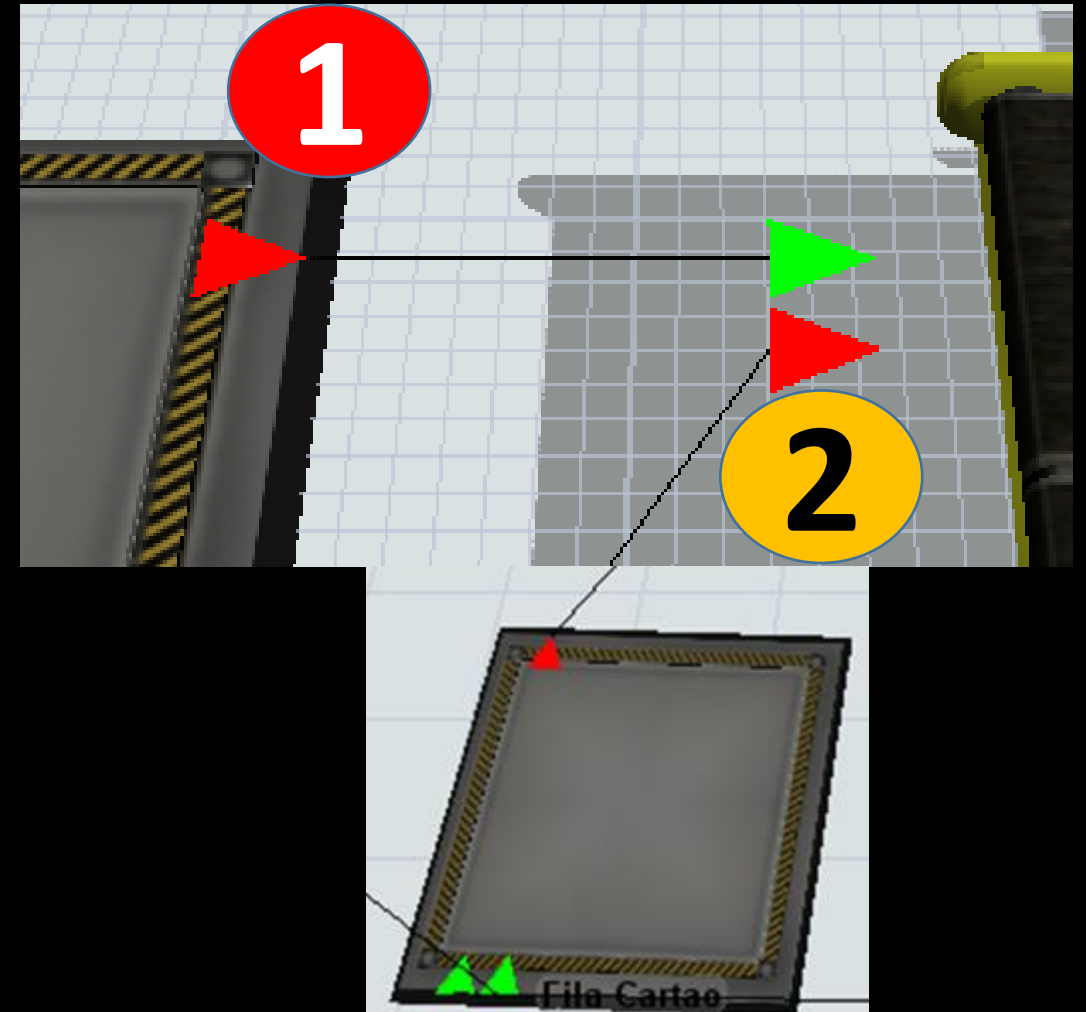
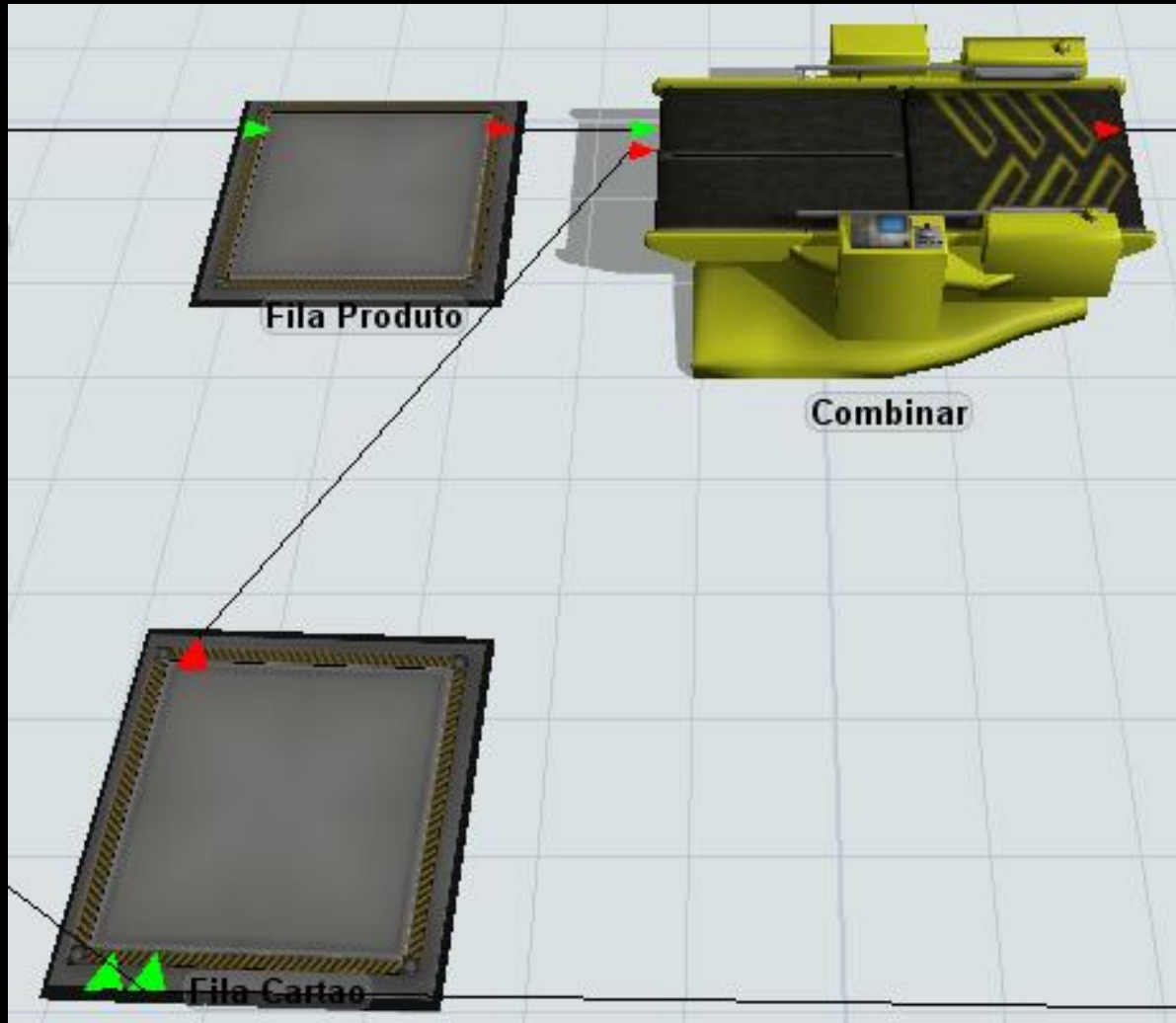


# Conectando os locais

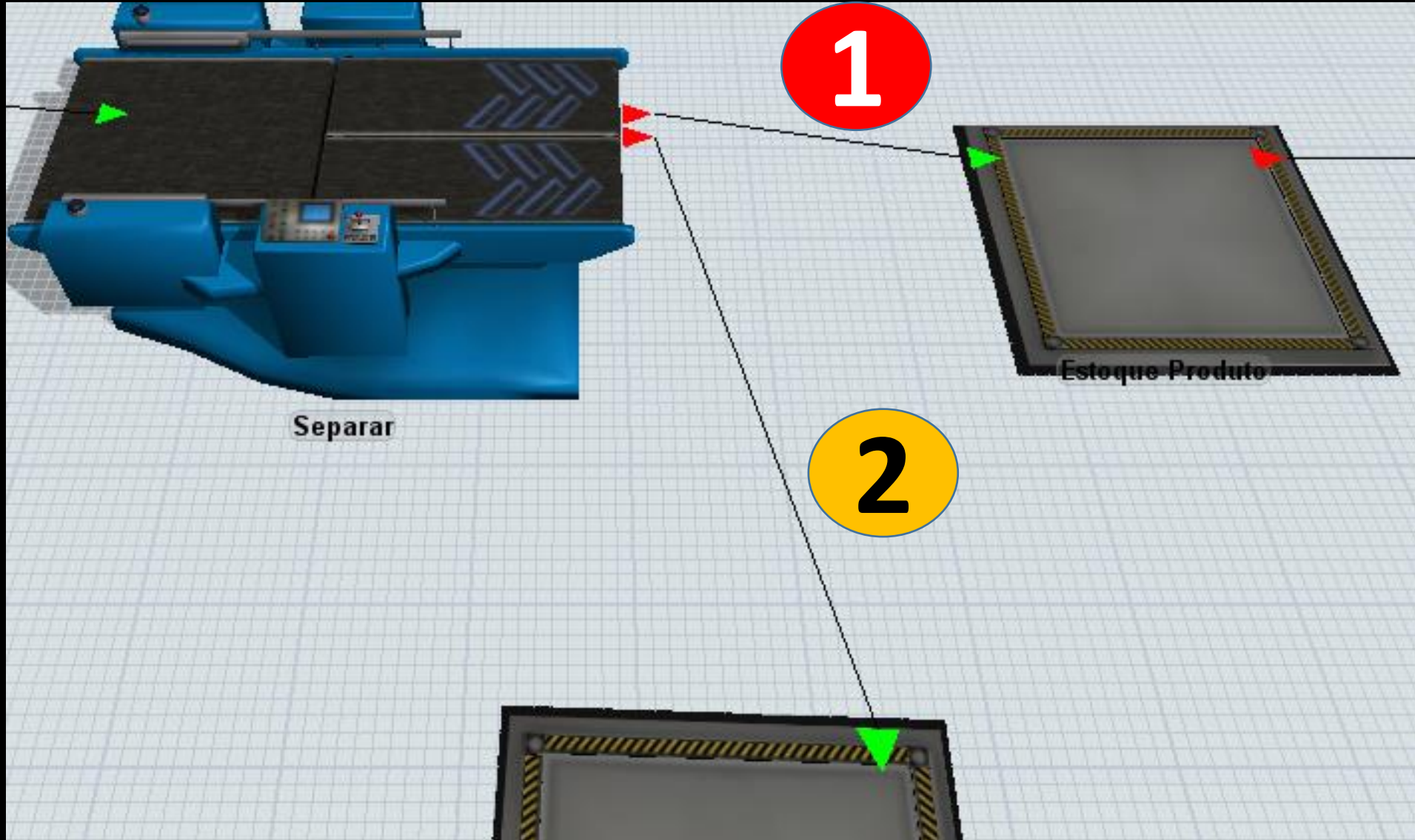




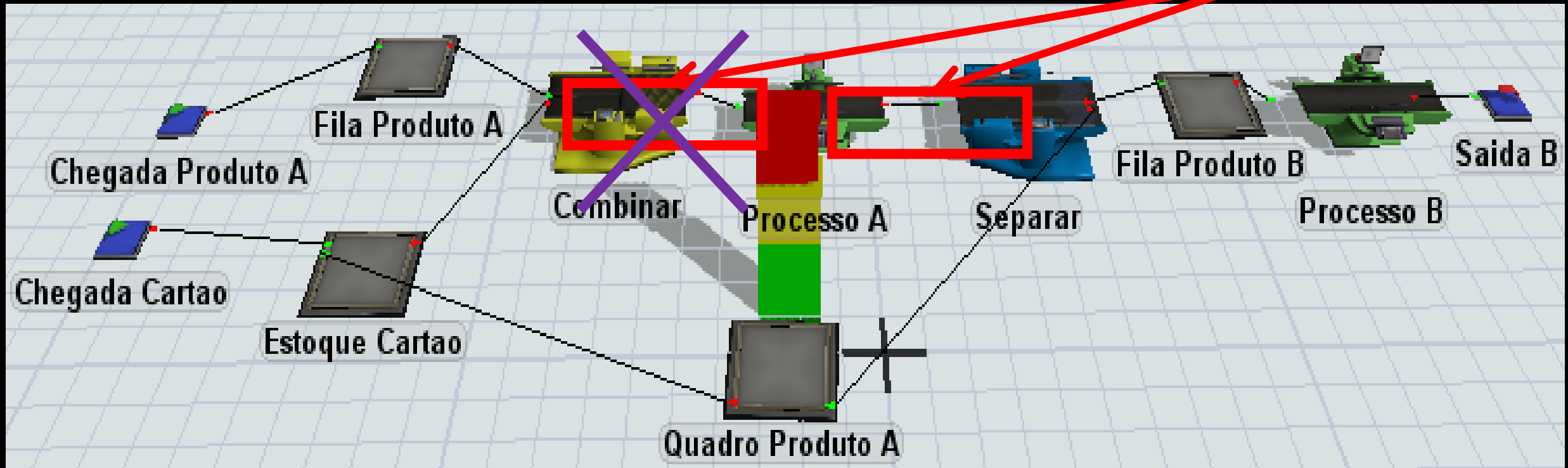
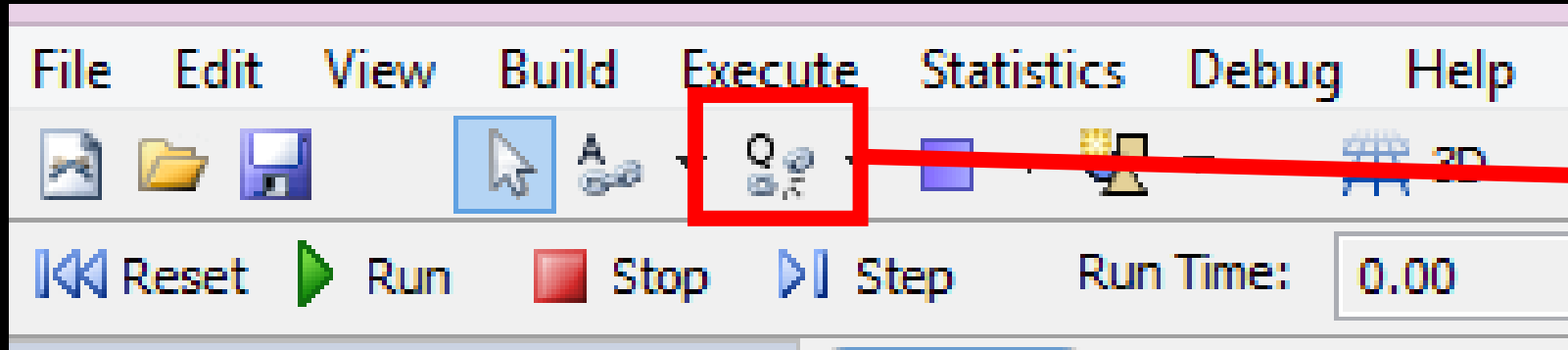
# Conectando os locais



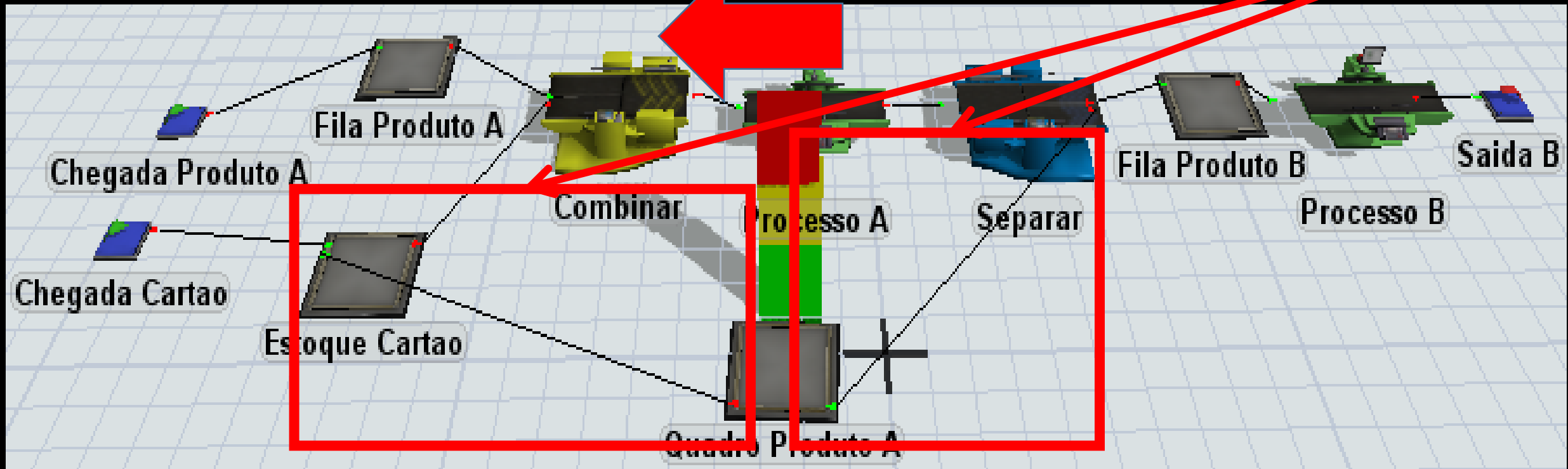
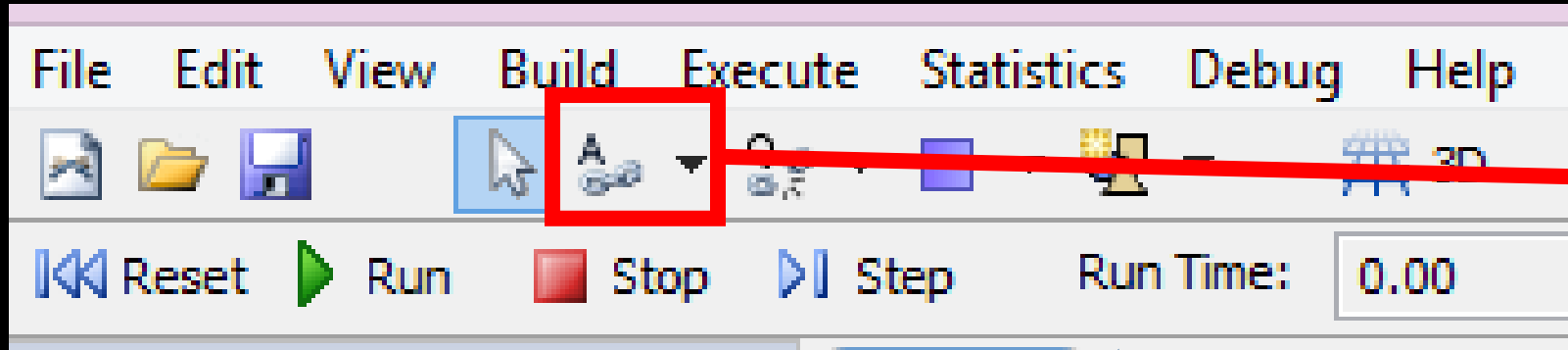
# Conectando os locais



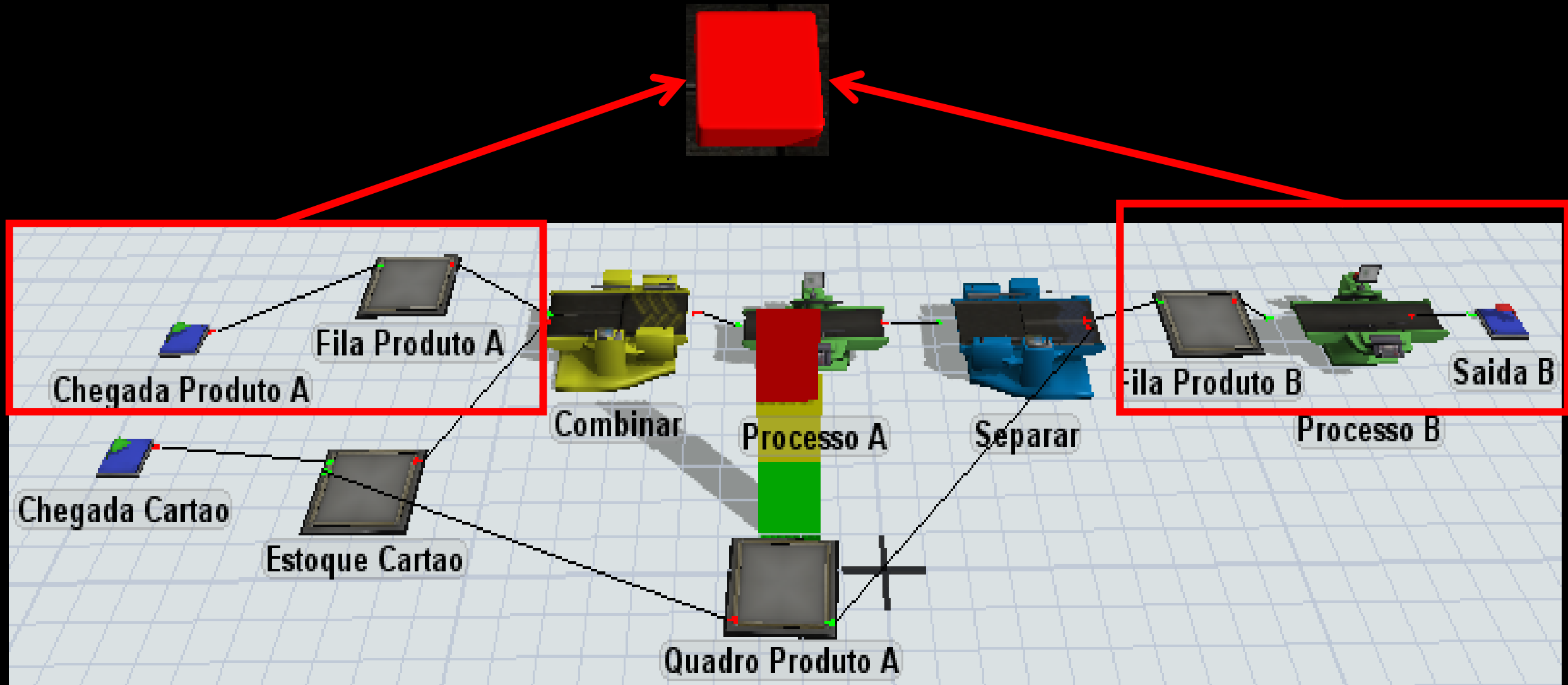
# Conectando os locais



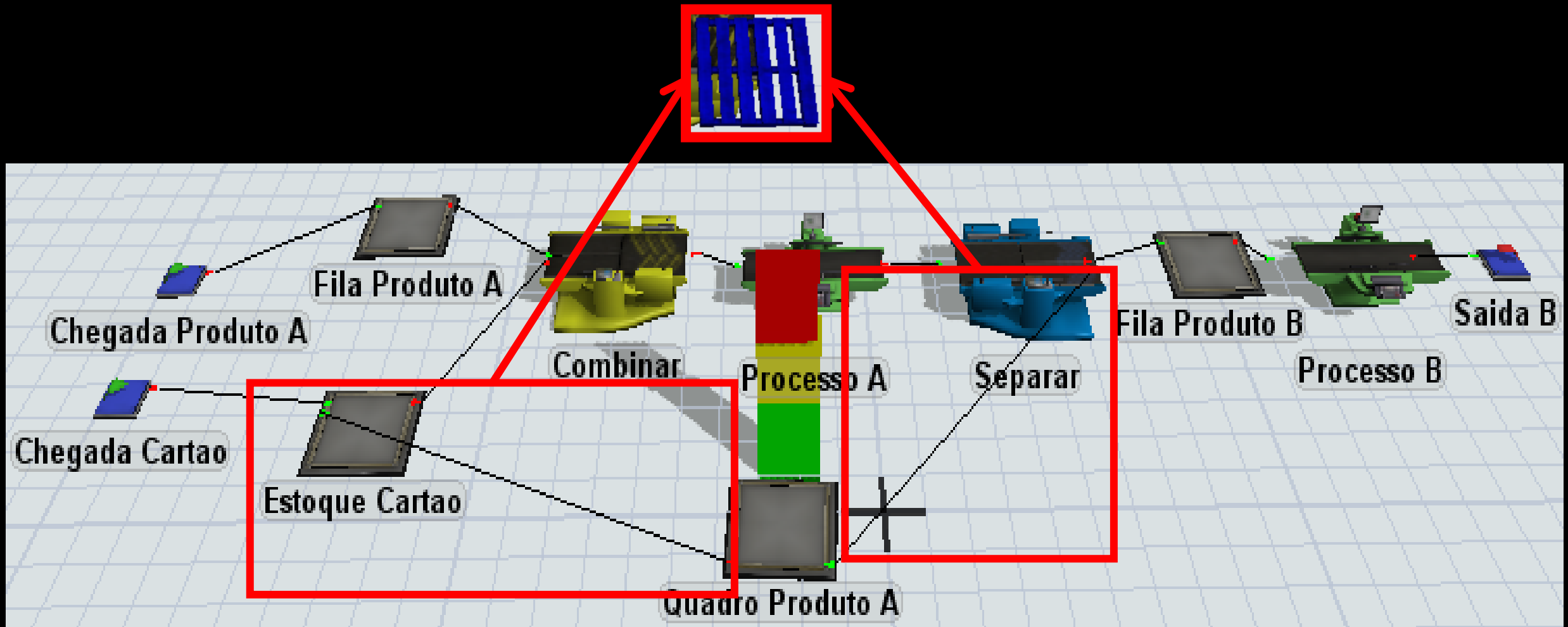
# Conectando os locais



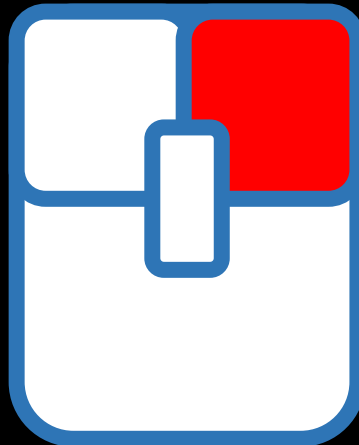
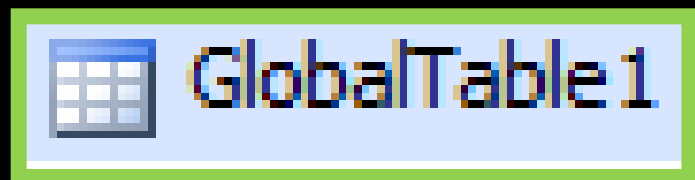
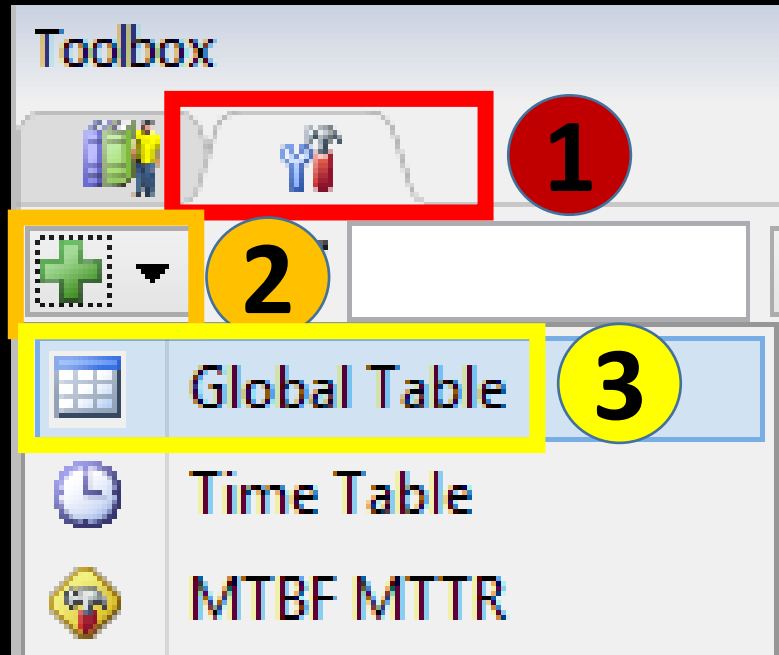
# Fluxo de produtos



# Fluxo de Kanbans

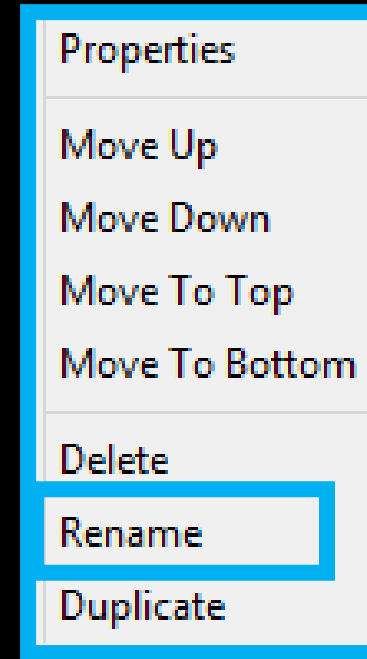


# Criando Tabela Global

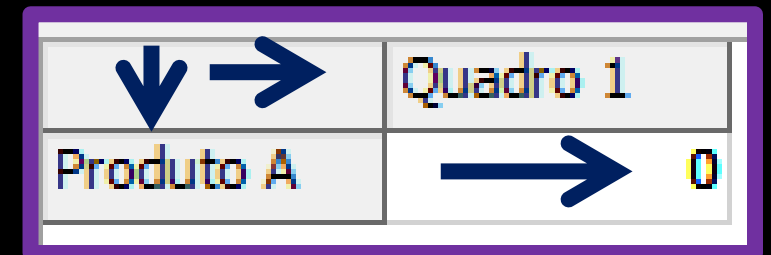


Botão  
Direito

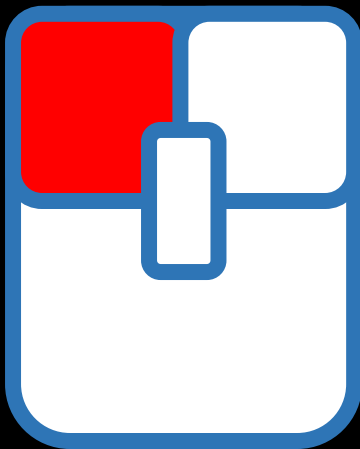
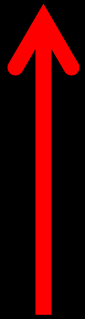
5



6



# Configurando chegada produtos

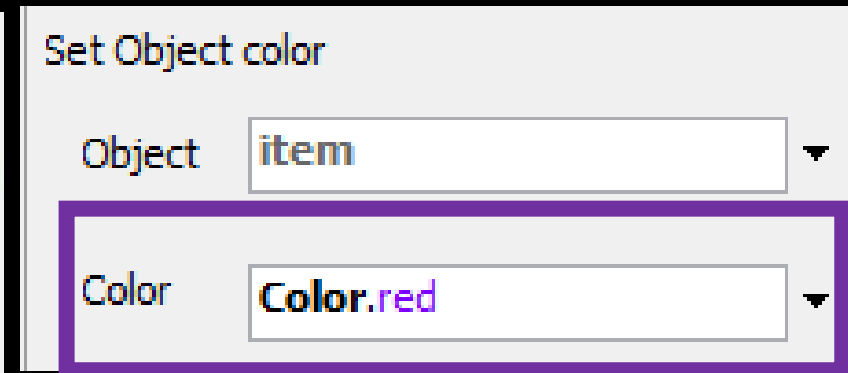
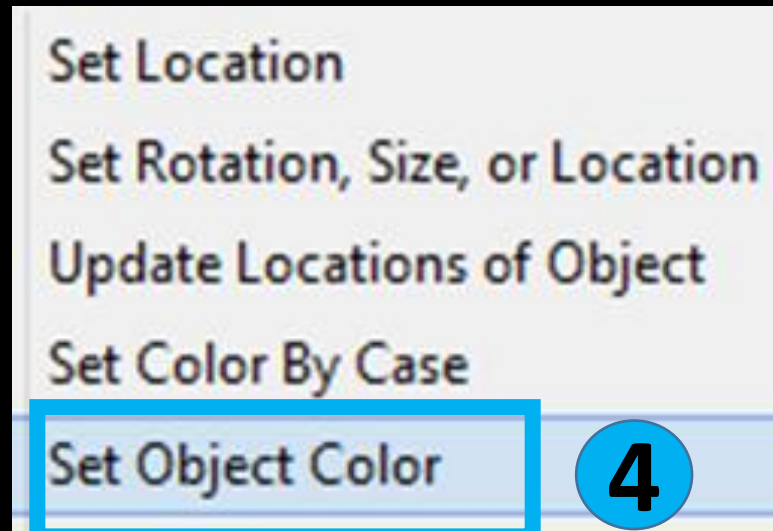
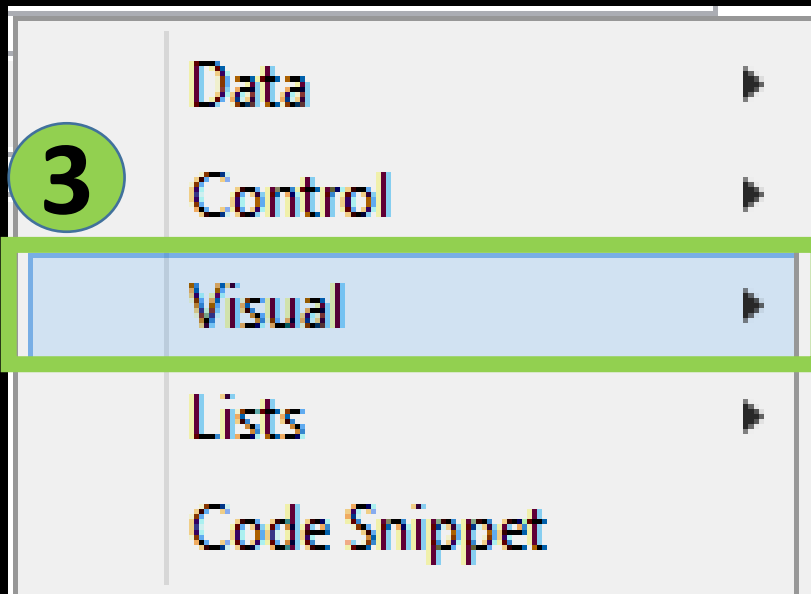
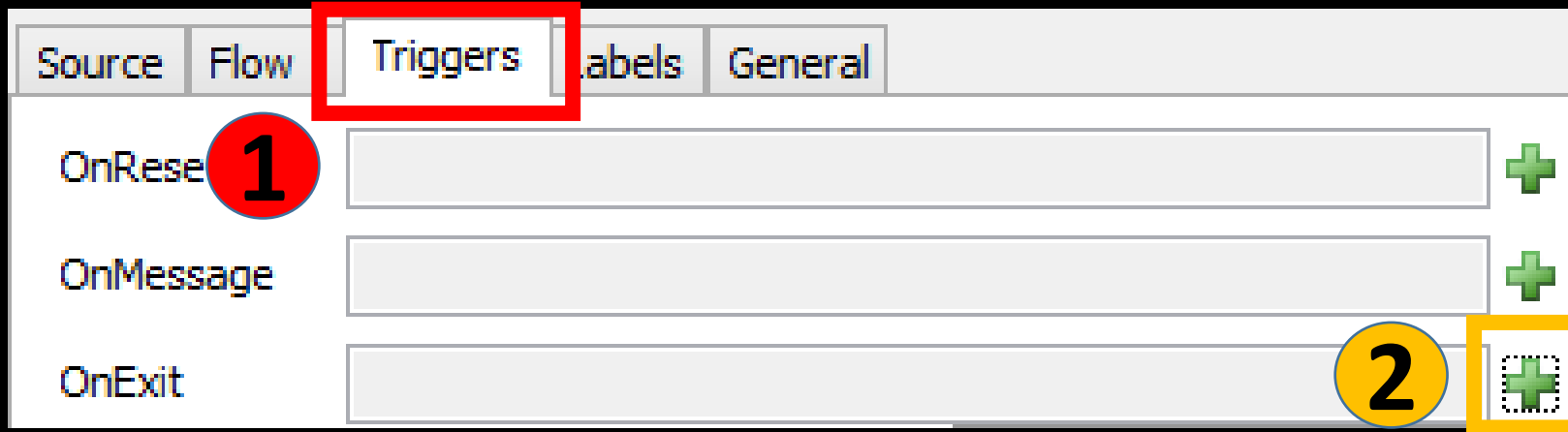


**Duplo  
Clique**

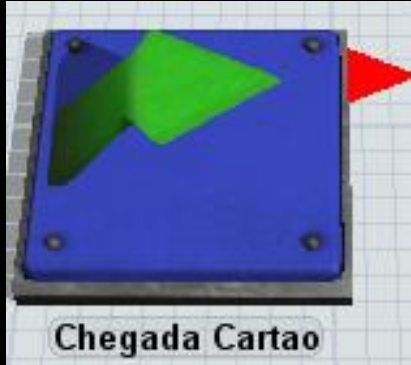
Arrival Style	Inter-Arrival Time
FlowItem Class	Box
<input type="checkbox"/> Arrival at time 0	
Inter-Arrivaltime	exponential(0, 10, 0)



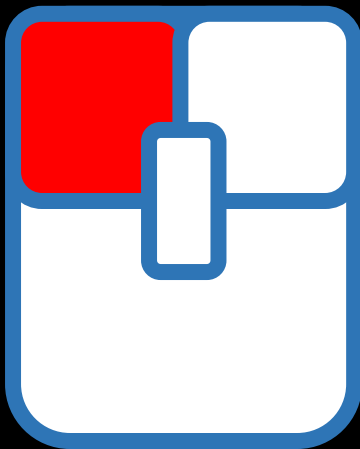
# Configurando chegada produtos



# Configurando chegada Kanbans



Duplo  
Clique



1

Arrival Style

Arrival Schedule

2

FlowItem Class

Pallet

☐ Repeat Schedule/Sequence

3

Arrivals

1

Labels

0

Add Tab

Arrival1

ArrivalTime

0

ItemName

Product

Quantity

6

4

# Configurando chegada Kanbans

Arrival Style **1** Arrival Schedule

FlowItem Class Pallet

☐ Repeat Schedule/Sequence

Arrivals 1 Labels 0 Add Tab

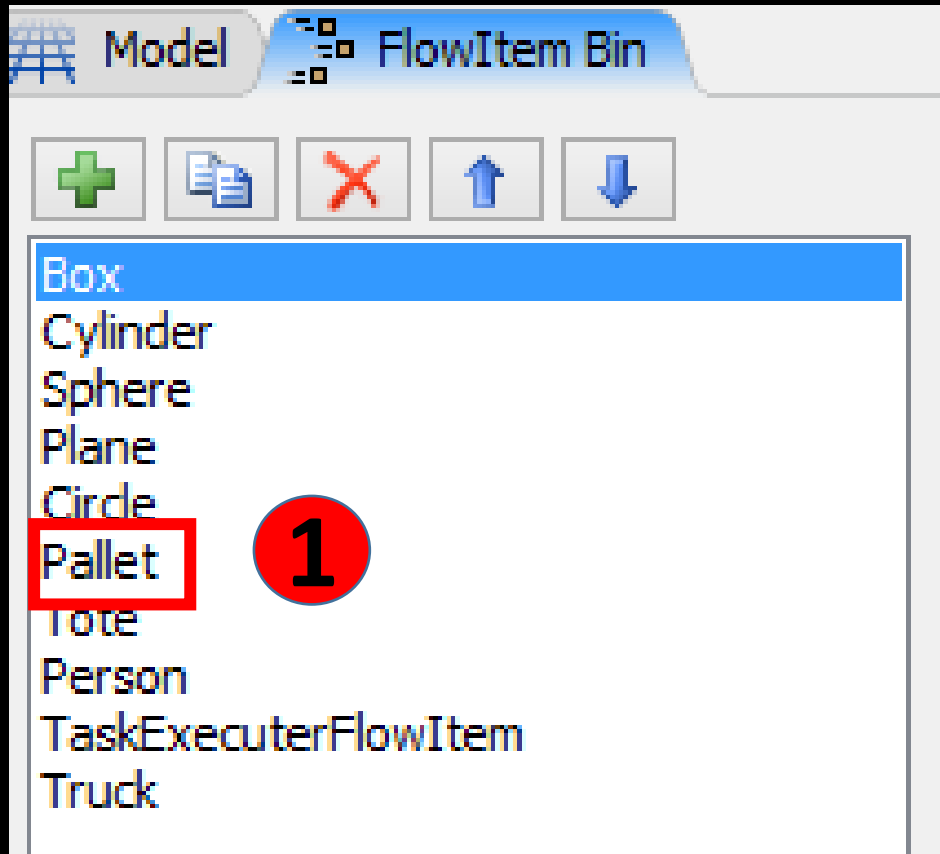
	ArrivalTime	ItemName	Quantity
Arrival1	0	Product	6

**2**

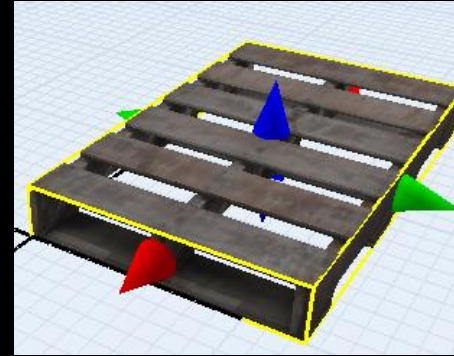
- Pallet
- Box
- Cylinder
- Sphere
- Plane
- Circle
- Pallet
- Tote
- Person
- TaskExecutorFlowItem
- Truck
- Go To FlowItem Bin...

OK **3**

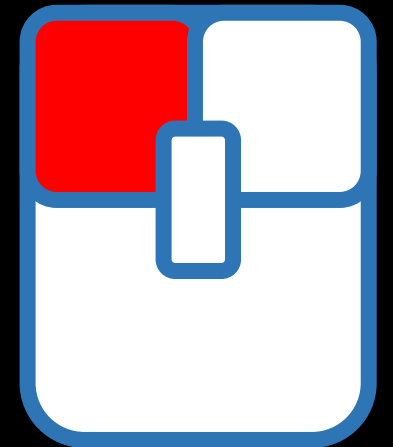
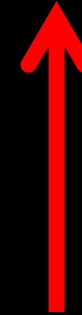
# Configurando chegada Kanbans



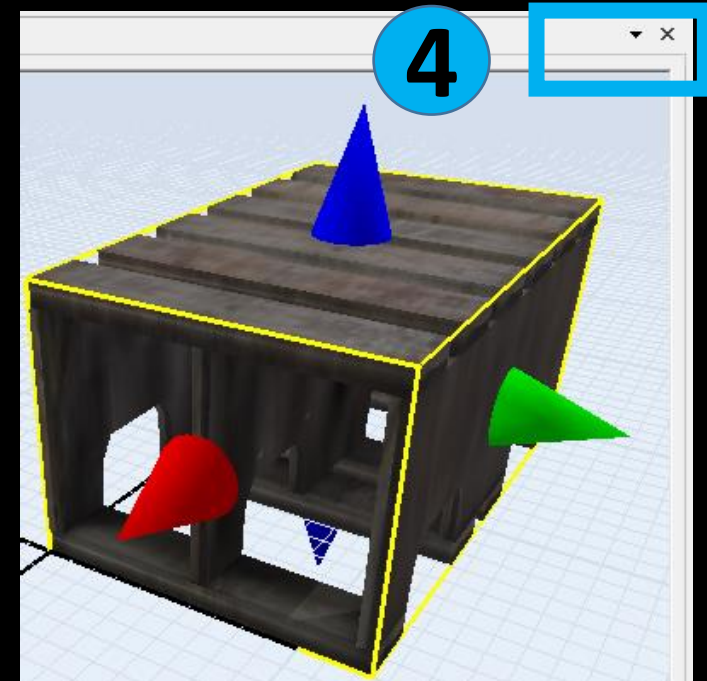
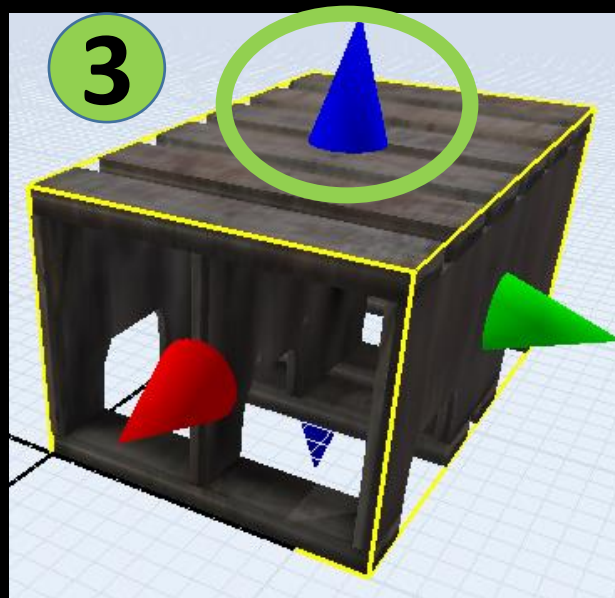
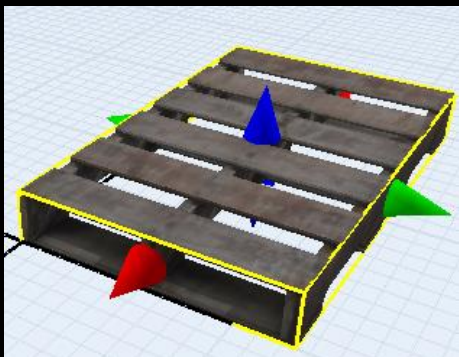
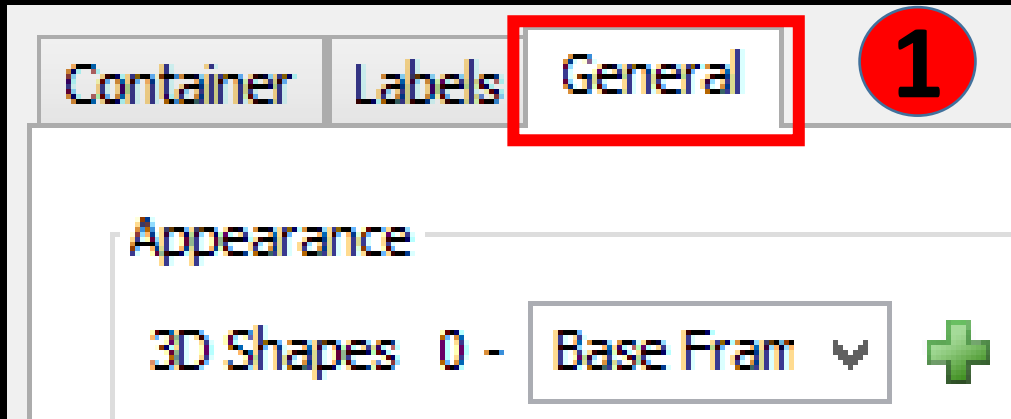
2



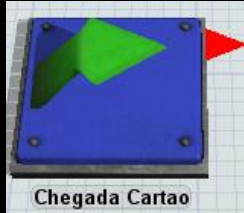
Duplo  
Clique



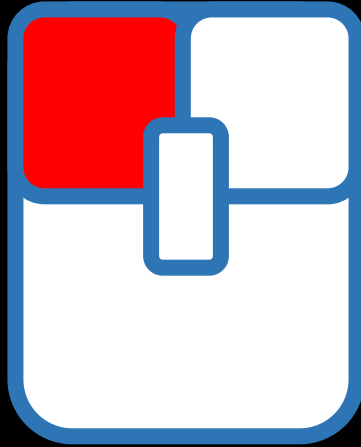
# Configurando chegada Kanbans



# Configurando chegada Kanbans



Duplo  
Clique



Source Flow **Triggers** Labels General

OnRelease **1**  +

OnMessage  +

OnExit  **2**  +

**3**

Data ▶

Control ▶

**Visual** ▶

Lists ▶

Code Snippet

Set Location

Set Rotation, Size, or Location

Update Locations of Object

Set Color By Case

**Set Object Color** **4**


Set Object color


Object  ▼


**Color**  ▼ **5**


# Configurando chegada Kanbans

Source Flow **Triggers** Labels General

OnRelease **1** 

OnMessage 

OnExit 

OnCreation  **2**

**Data**

Control **3**

Visual

Lists

Code Snippet

Set Label

Set Name

Set Item Type

Set Item Type and Color

Set Item Type by Percentage

Set Tracked Variable

**Write to GlobalTable** **4**

Add Row and Data to GlobalTable

Increment Value

**5**

Write to a Global Table

Table "QuadroKanban"

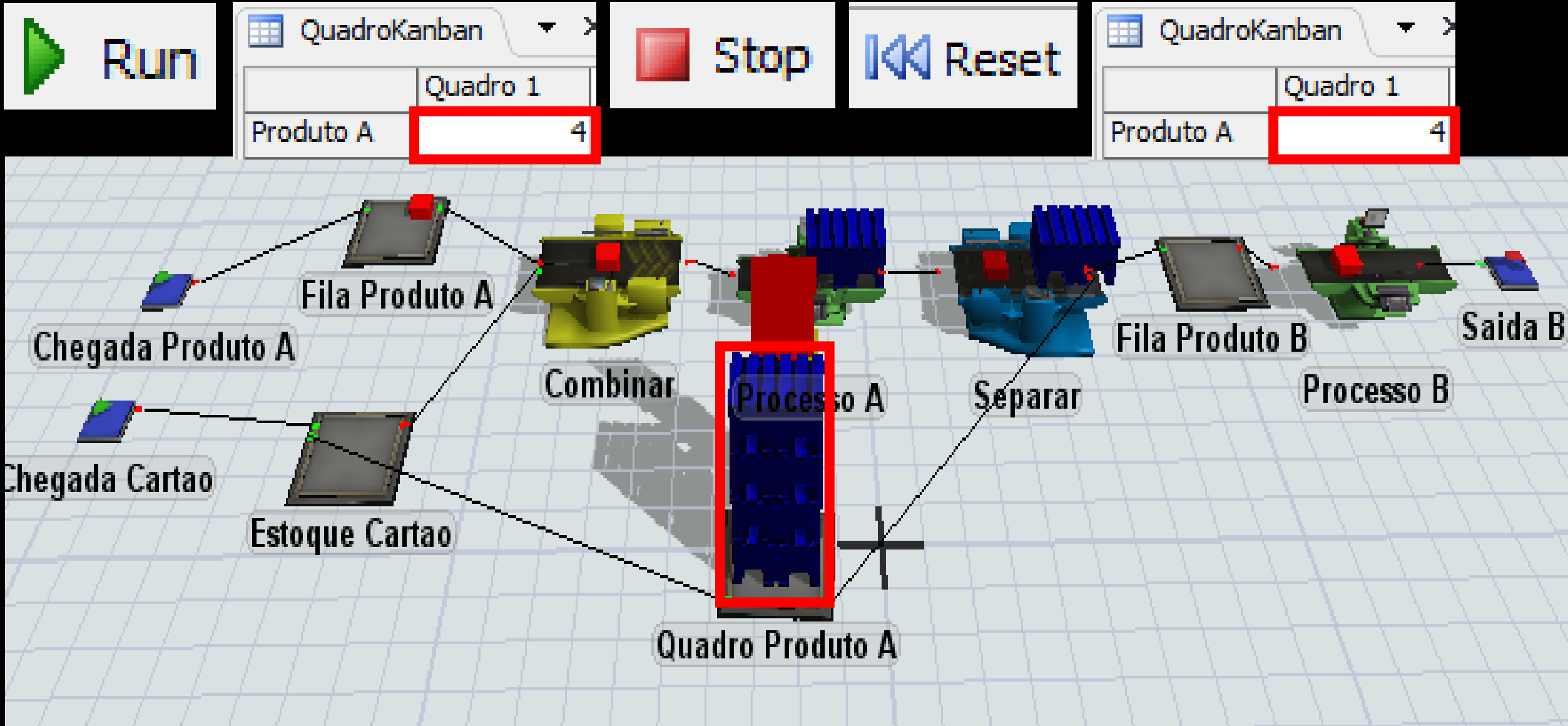
Row 1

Column 1

Value 0

**6**

# Configurando chegada Kanbans

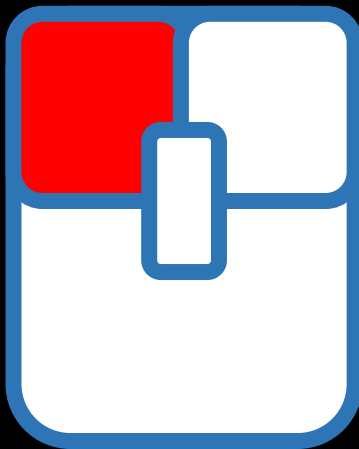
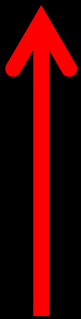




# Configurando Quadro Kanban



Duplo  
Clique



Rack SizeTable **1** Triggers Labels General

OnReset  +

OnMessage **2**  +

OnEntry  +

OnExit  +

Data Control **3** Visual Lists Code Snippet

Set Label **5**

Set Name

Set Item Type

Set Item Type and Color **6**

Set Item Type by Percentage

Set Tracked Variable **4**

Write to GlobalTable

Add Row and Data to GlobalTable

Increment Value

Increment  by

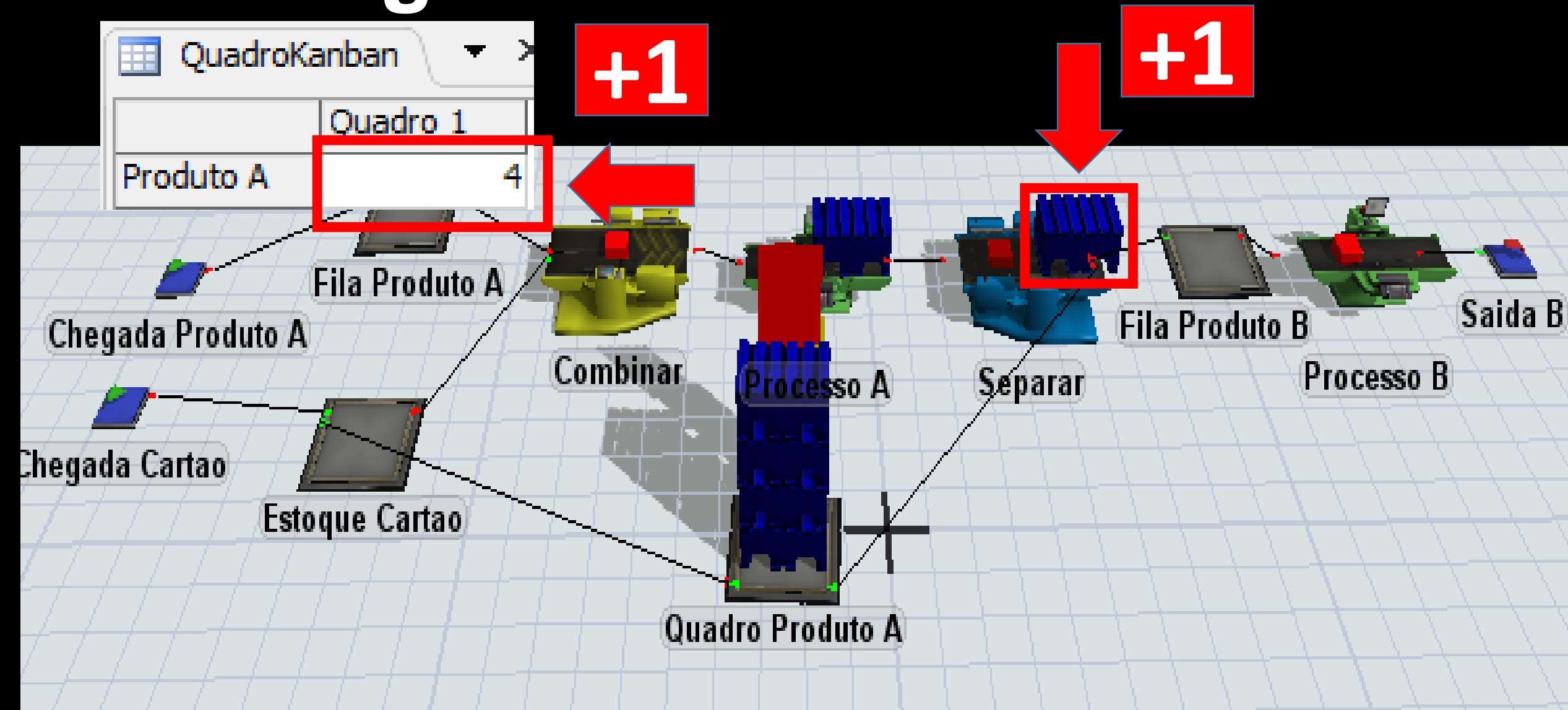
item.labels["labelName"]

gettablecell("table", 1,1)


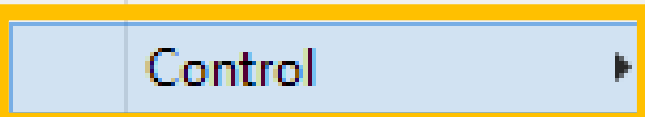

model().find("tools/myvalue")

**"QuadroKanban"**

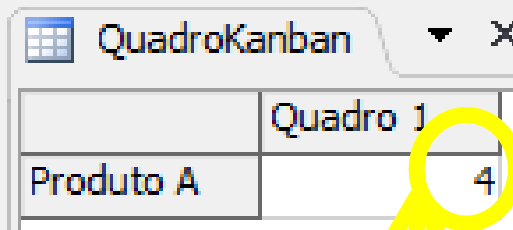
# Configurando Quadro Kanban



# Configurando Quadro Kanban

**1**  **2**  **3** 

Send Message  
Sort by Expression  
Close and Open Ports  
Close Operators  
End the Model Run

**6** 

	Quadro 1
Produto A	4

```
gettablenum("QuadroK  
anban",1,1)<=4
```

The Action will be applied to the Object if the Condition is true (non-zero)

**4**

Action:

Object:

Condition:

The Action will be applied to the Object if the Condition is true (non-zero)

**5**

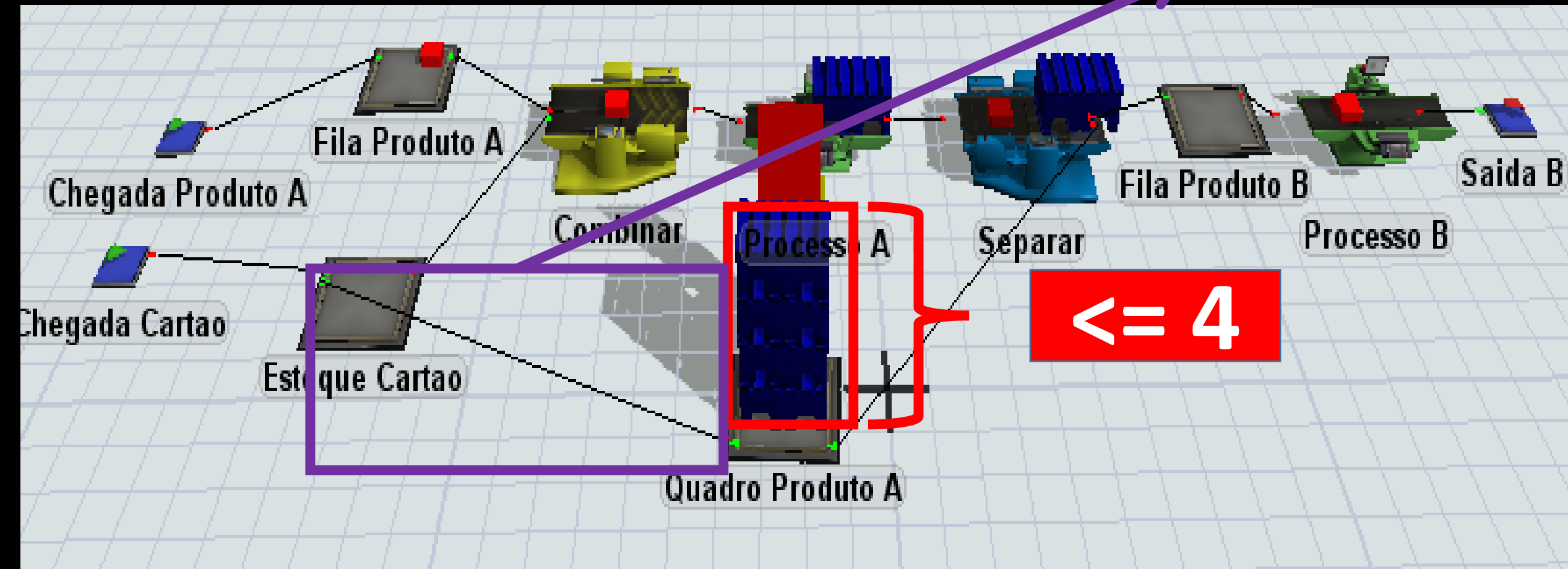
Action:

Object:

Condition:

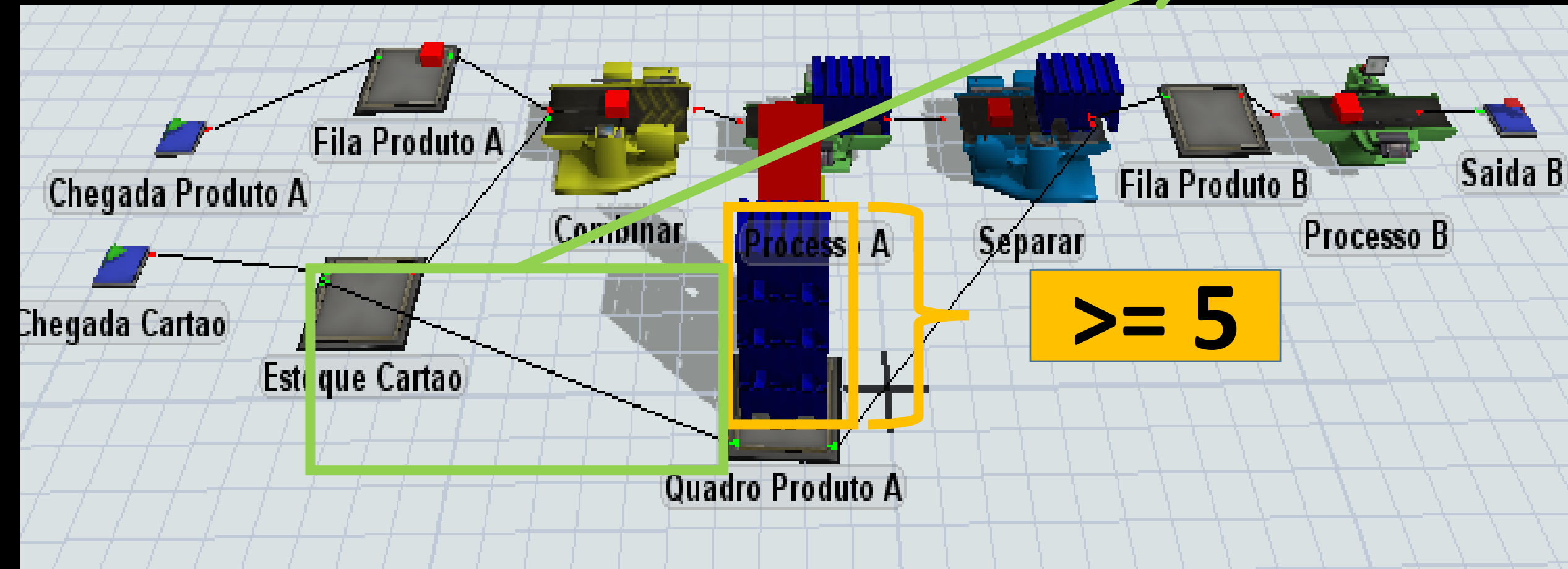
# Configurando Quadro Kanban

PORTA DE SAÍDA FECHADA !




# Configurando Quadro Kanban

**ABRIR PORTA DE SAÍDA !!**



# Configurando Quadro Kanban

**1**  **2**

- Data
- Control**
- Visual
- Lists
- Code Snippet

**3**

- Send Message
- Sort by Expression
- Close and Open Ports**
- Close Operators
- End the Model Run

**4**

QuadroKanban

	Quadro 1
Produto A	5

`gettablenum("QuadroKanban",1,1)>=5`

The Action will be applied to the Object if the Condition is true (non-zero)

**4**

Action:

Object:

Condition:

The Action will be applied to the Object if the Condition is true (non-zero)

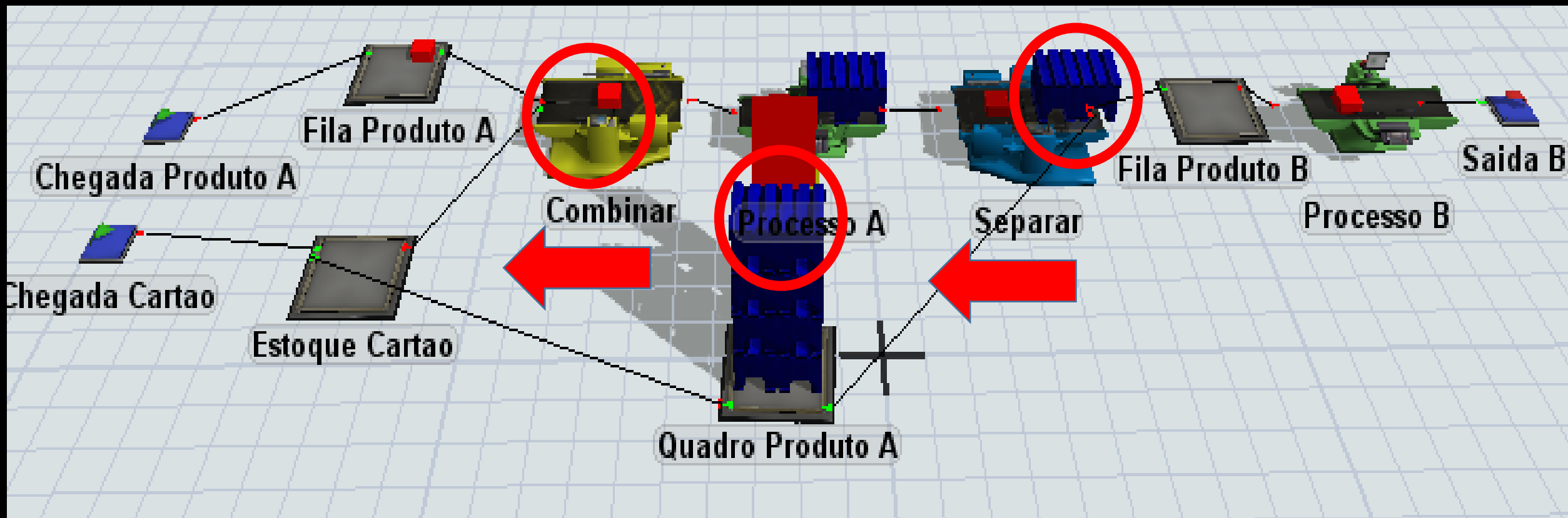
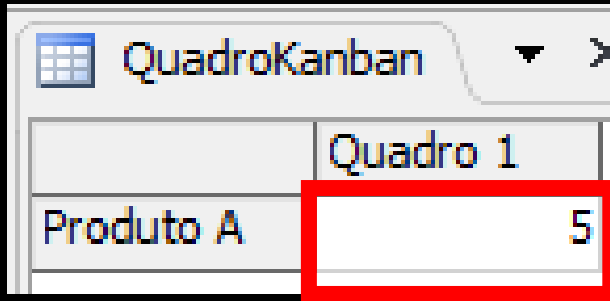
**5**

Action:

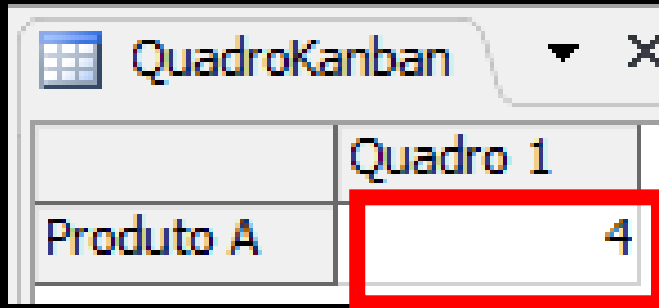
Object:

Condition:

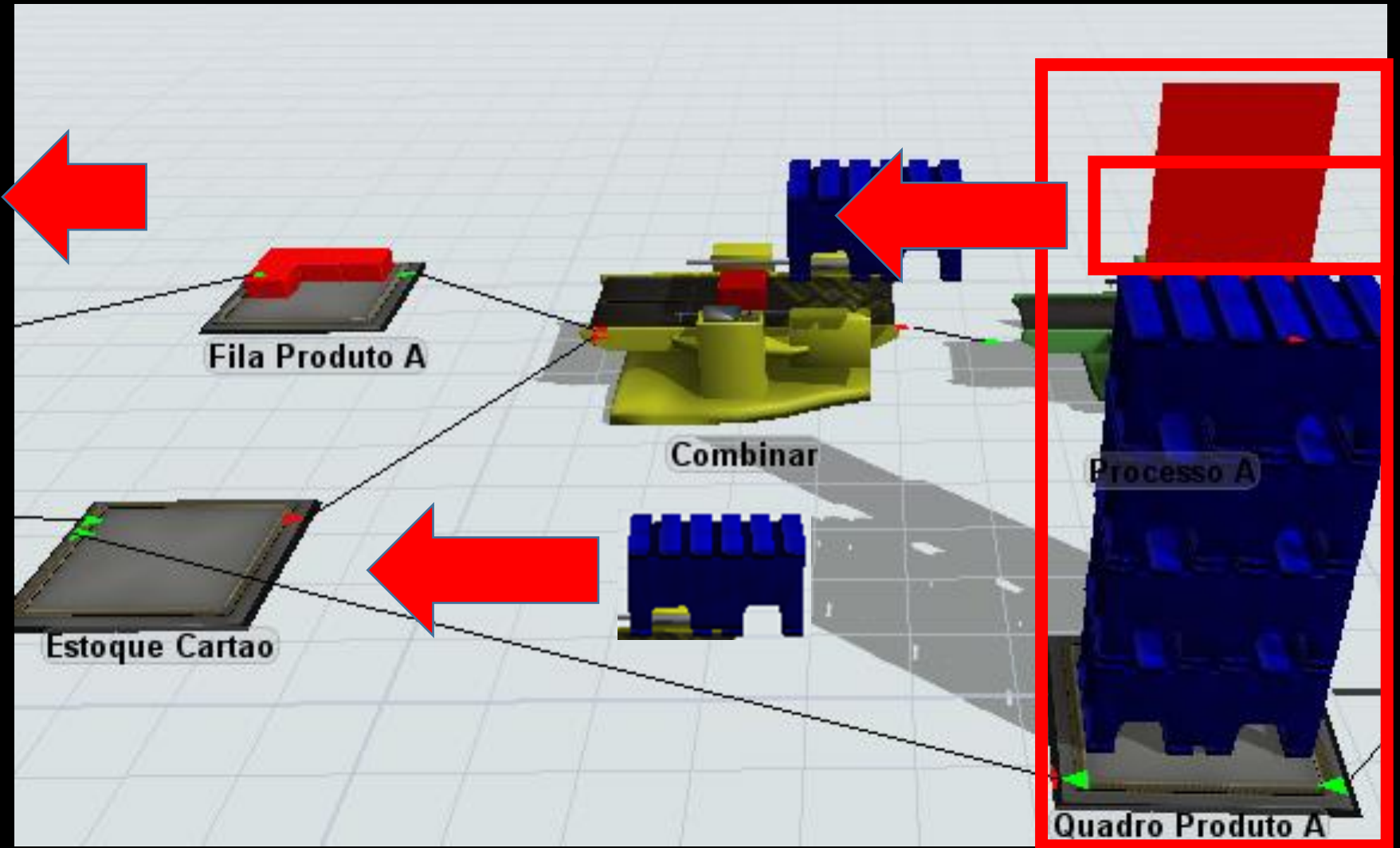
# Configurando Quadro Kanban



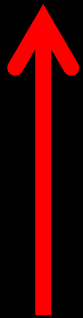

# Configurando Quadro Kanban



Produto sai:  
Atualizar  
**Quadro** e  
fechar porta  
de saída?

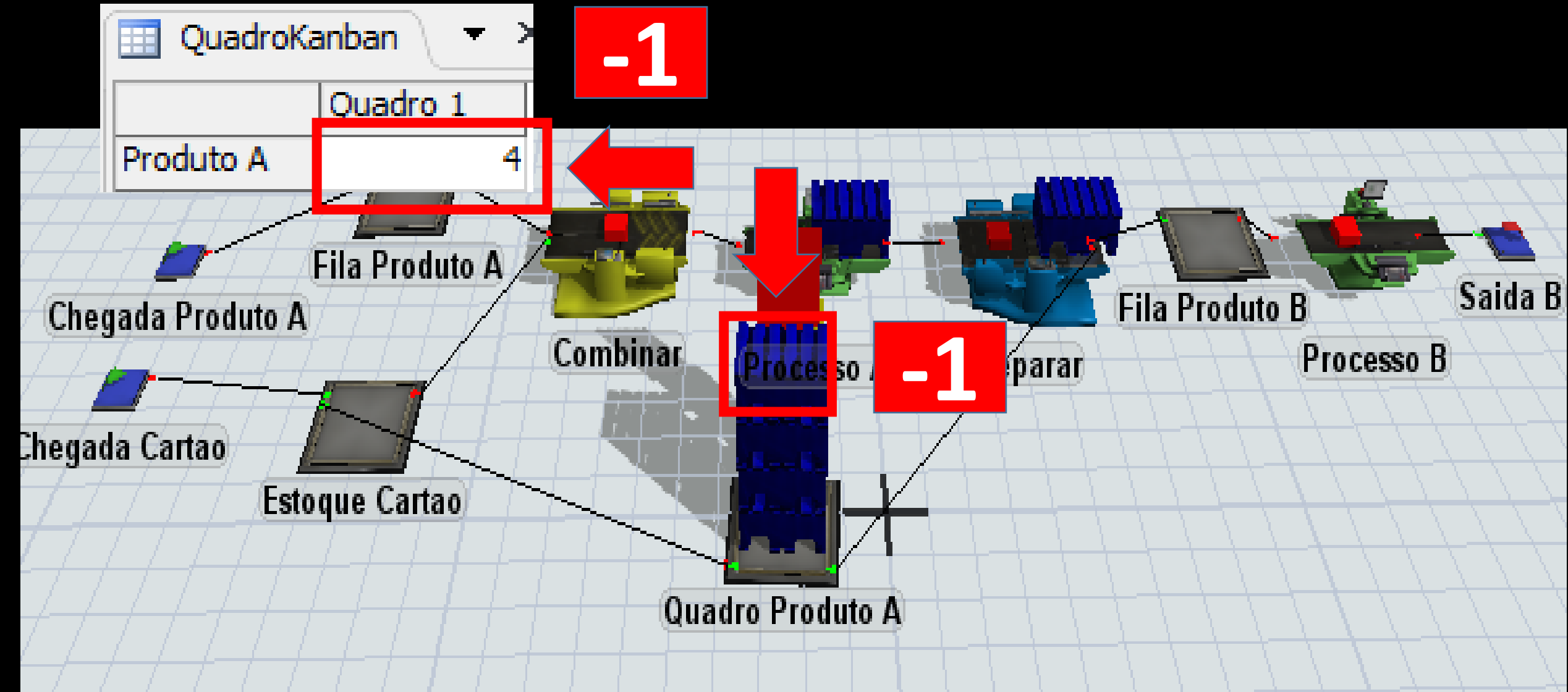






## “QuadroKanban”

# Configurando Quadro Kanban



# Configurando Quadro Kanban



Data

Control

Visual

Lists

Code Snippet

1

Send Message

Sort by Expression

Close and Open Ports

Free Operators

End the Model Run

2

The Action will be applied to the Object if the Condition is true (non-zero)

3

Action closeinput

Object current

Condition true

4

The Action will be applied to the Object if the Condition is true (non-zero)

5

Action closeoutput

Object current

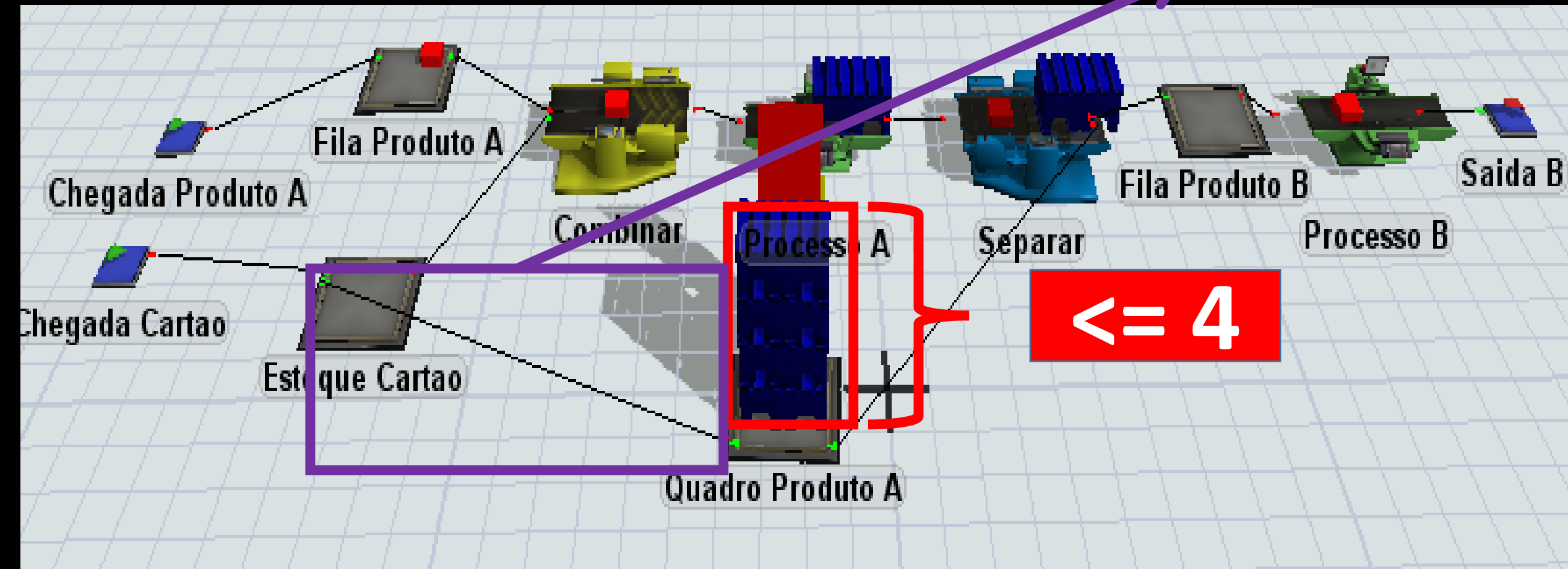
Condition `gettablenum("QuadroKanban",1,1)<=4`

6



```
gettablenum("QuadroKanban",1,1)<=4
```


# Configurando Quadro Kanban

PORTA DE SAÍDA FECHADA !



# Configurando Triggers - Resumo


Triggers	
OnEntry	Increment Value, Close and Open Ports, Close and Open F 
OnExit	Write to GlobalTable, Close and Open Ports 

Increment  

by

The Action will be applied to the Object if the Condition is true (non-zero)


Action

Object  


Condition

The Action will be applied to the Object if the Condition is true (non-zero)

Action

Object  


Condition

Increment  

by

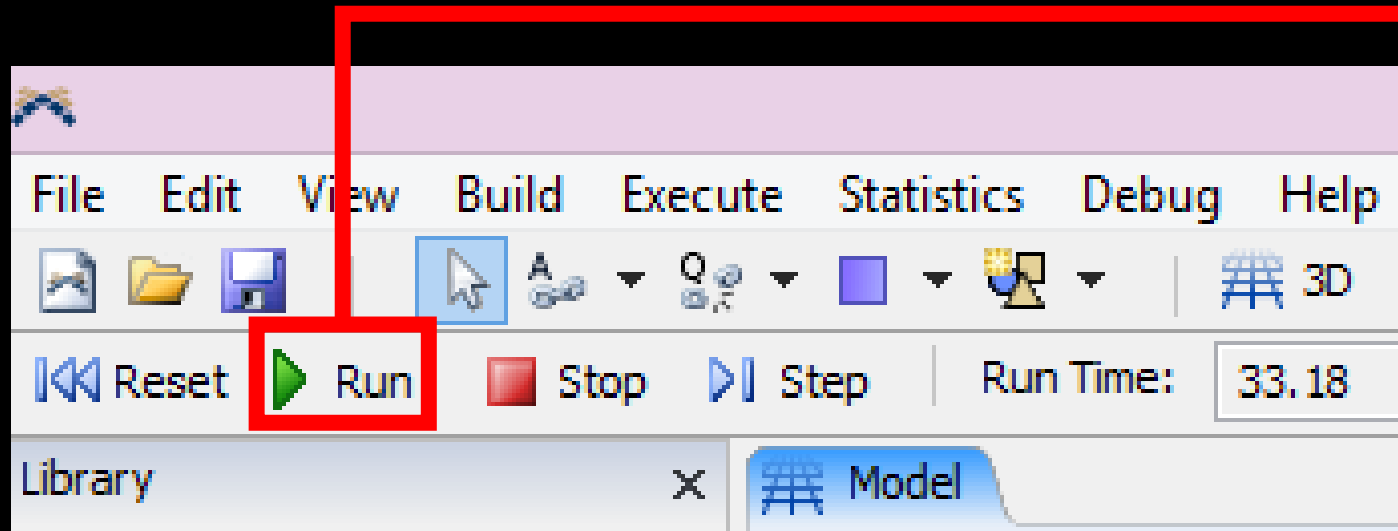
The Action will be applied to the Object if the Condition is true (non-zero)

Action

Object  

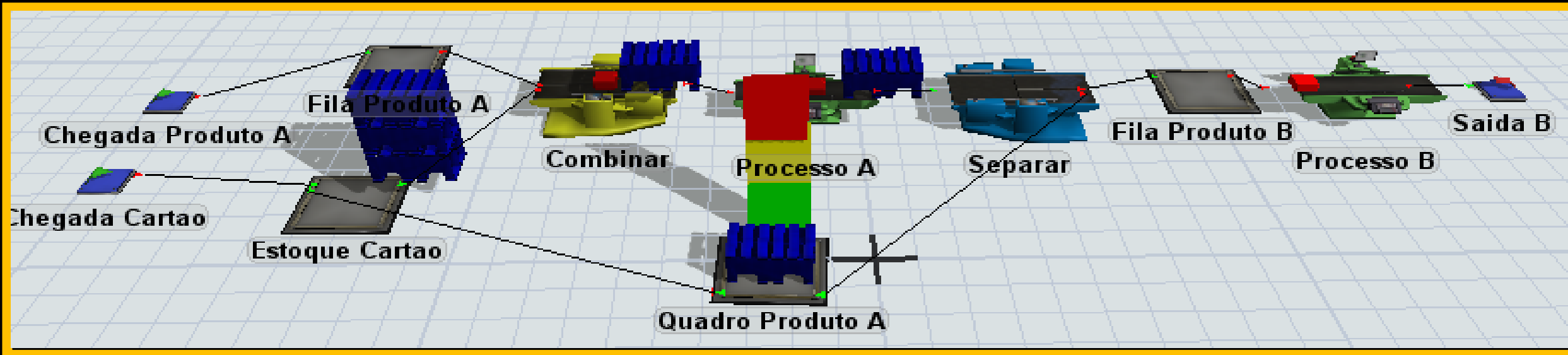
Condition

# Rodando o modelo

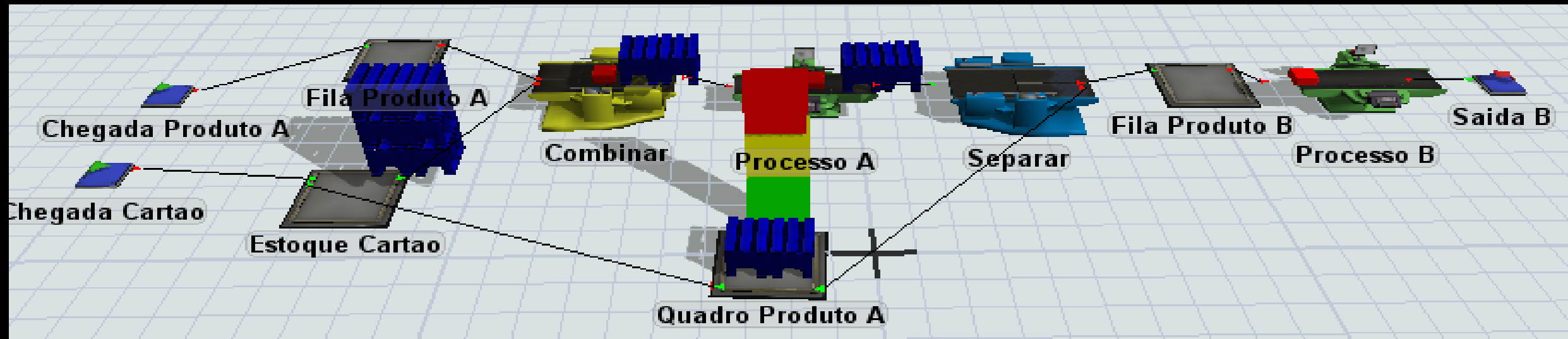


1

2



# Análise do modelo



# Análise do modelo

1

**AGUARDANDO  
KANBAN**

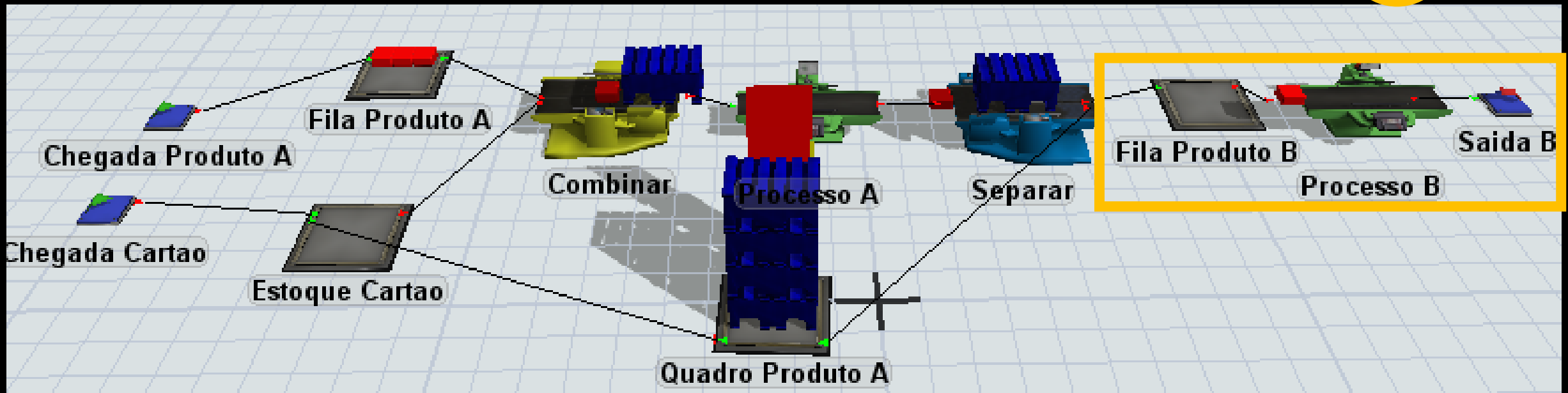




# Análise do modelo

**FLUXO  
PRODUTO**

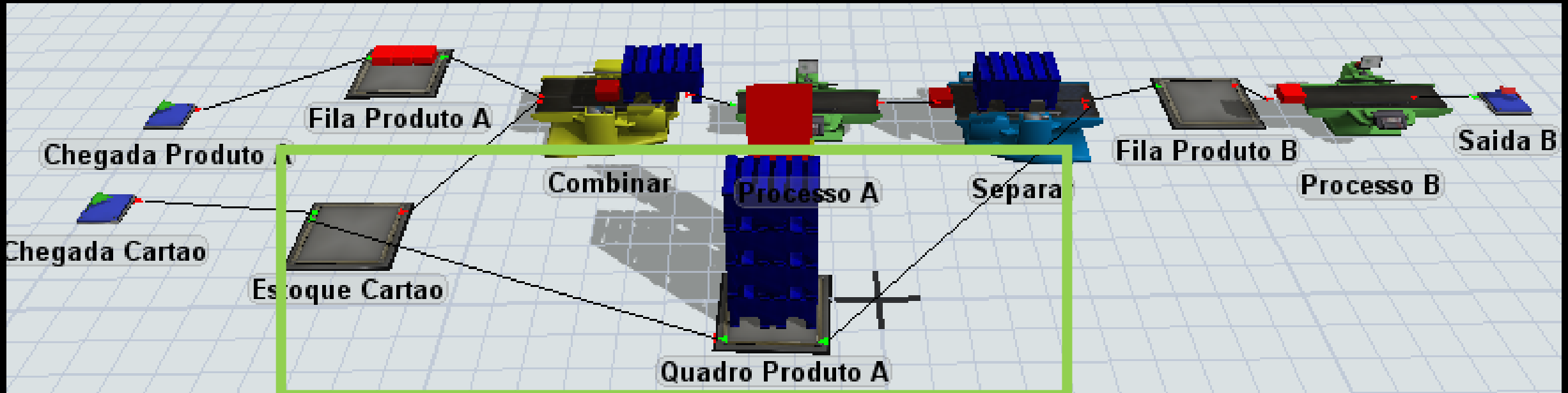
**2**



# Configurando chegada produtos

3

FLUXO  
KANBAN



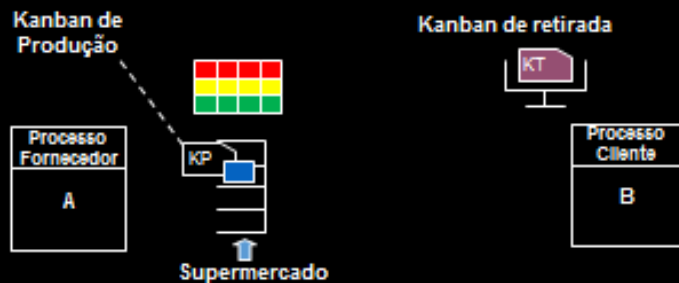
# Melhorando sua habilidade

## EXERCÍCIO 1

### Sistema kanban de 2 cartões



### Sistema 2 Kanbans



## EXERCÍCIO 2

### Sistema kanban de Sinal



### Kanban de Sinal

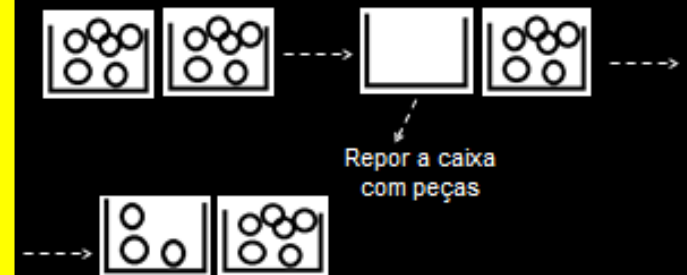


## EXERCÍCIO 3

### Sistema duas gavetas



### Sistema duas gavetas



**Fim**

**Obrigado !!!**