PAC 3

Presentació

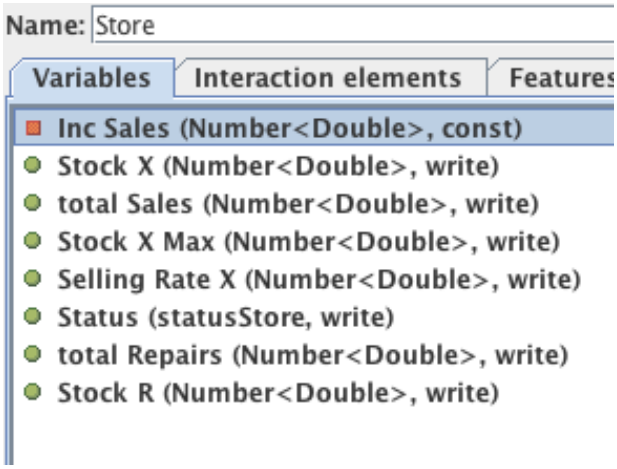
Tercera activitat d'avaluació continuada del curs. En aquesta PAC es pretén conèixer i desenvolupar sistemes multiagent.

Solució de la PAC

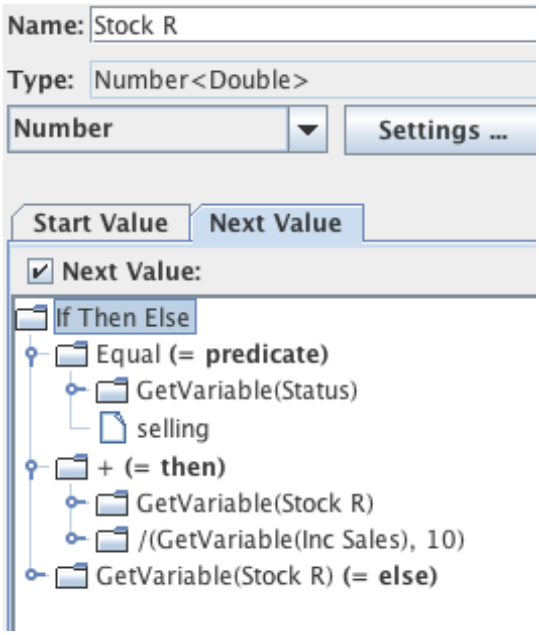
SeSam. Servei tècnic

Partim d'un sistema multi-agent de transport de productes d'una fàbrica a una botiga determinada. Ens demanen que l'ampliem per introduir la simulació del servei tècnic. Per resoldre aquest sistema mirarem agent a agent:

- Botiga. Hem afegit les variables "Stock R", "total Repairs" i "Inc Sales".

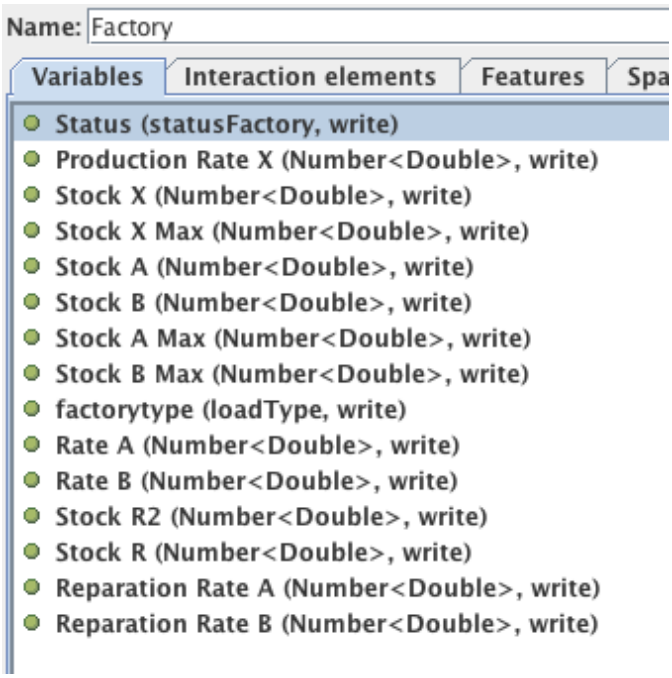


  La variable "Stock R" s'actualitza amb el "next value":

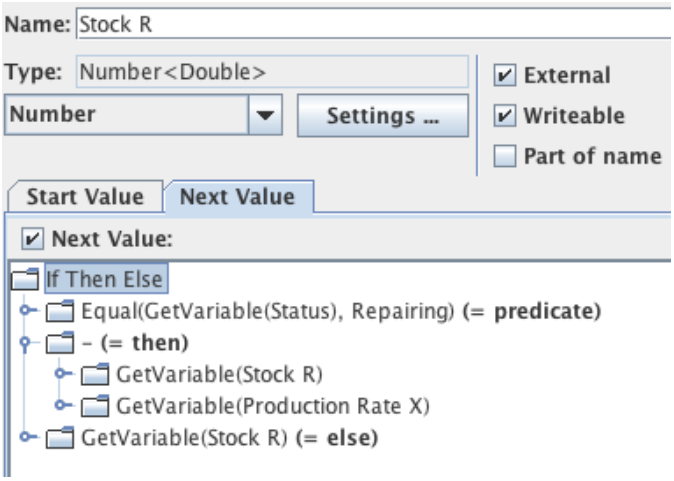


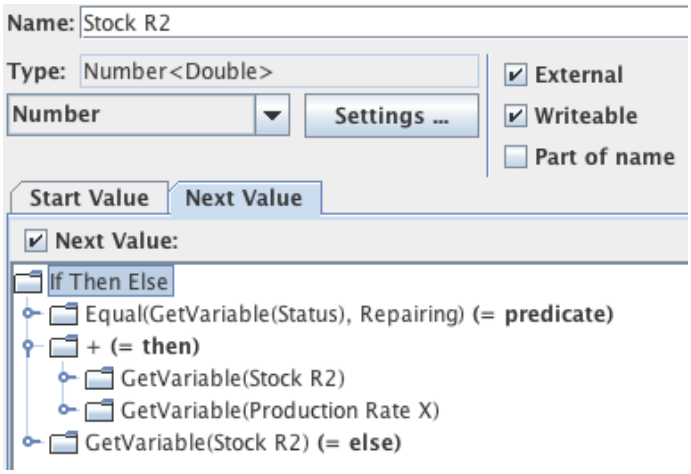
I “total Repairs” l’actualitza l’agent camió en l’estat “Unload at Store”. La variable “Inc Sales” és una variable interna per a càlculs temporals.

- Fàbrica. Hem afegit l’estat “repairing” a l’estat de la fàbrica i les variables “Stock R” i “Stock R2”. La primera guarda les bicicletes trencades i la segona les reparades.



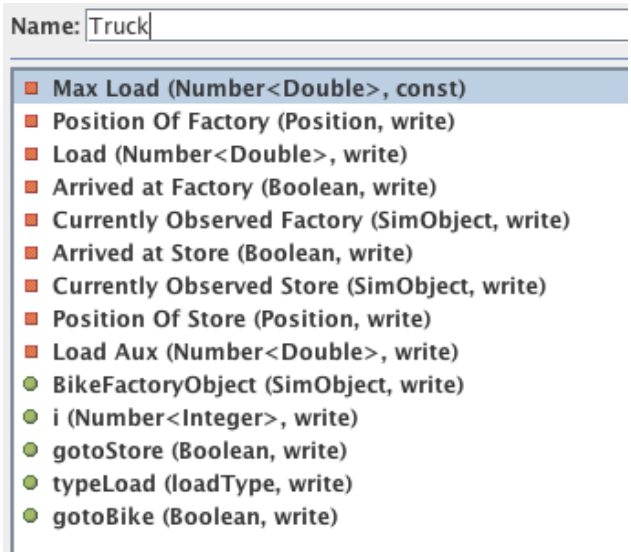
En el “next value” de les dues es produeixen el traspàs de bicicletes trencades a reparades.

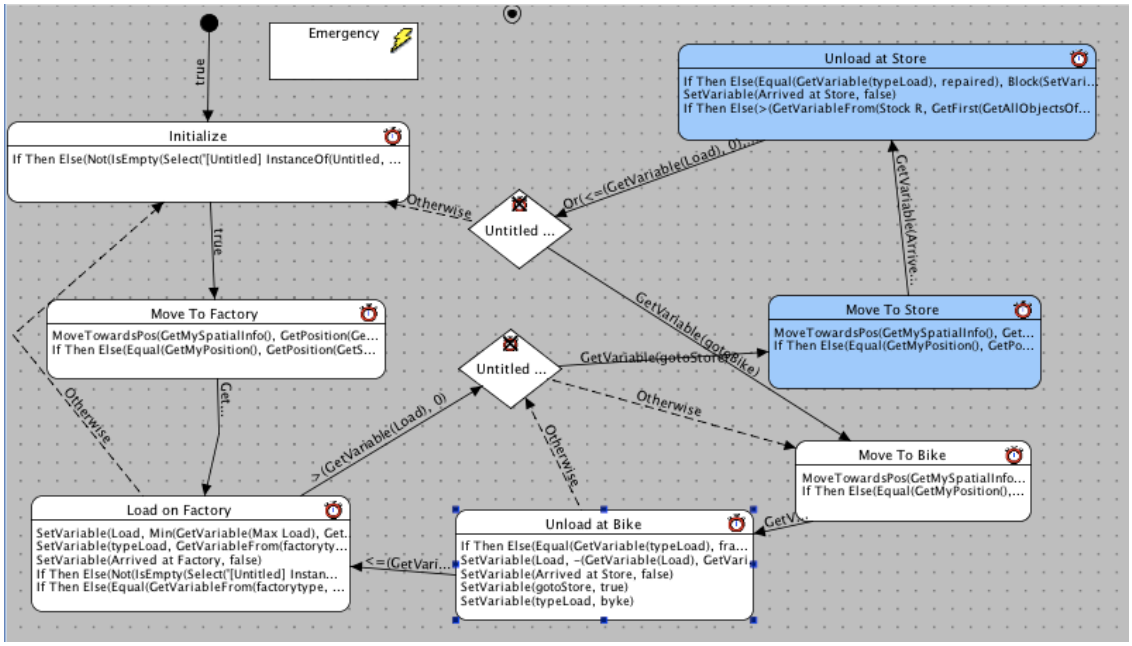




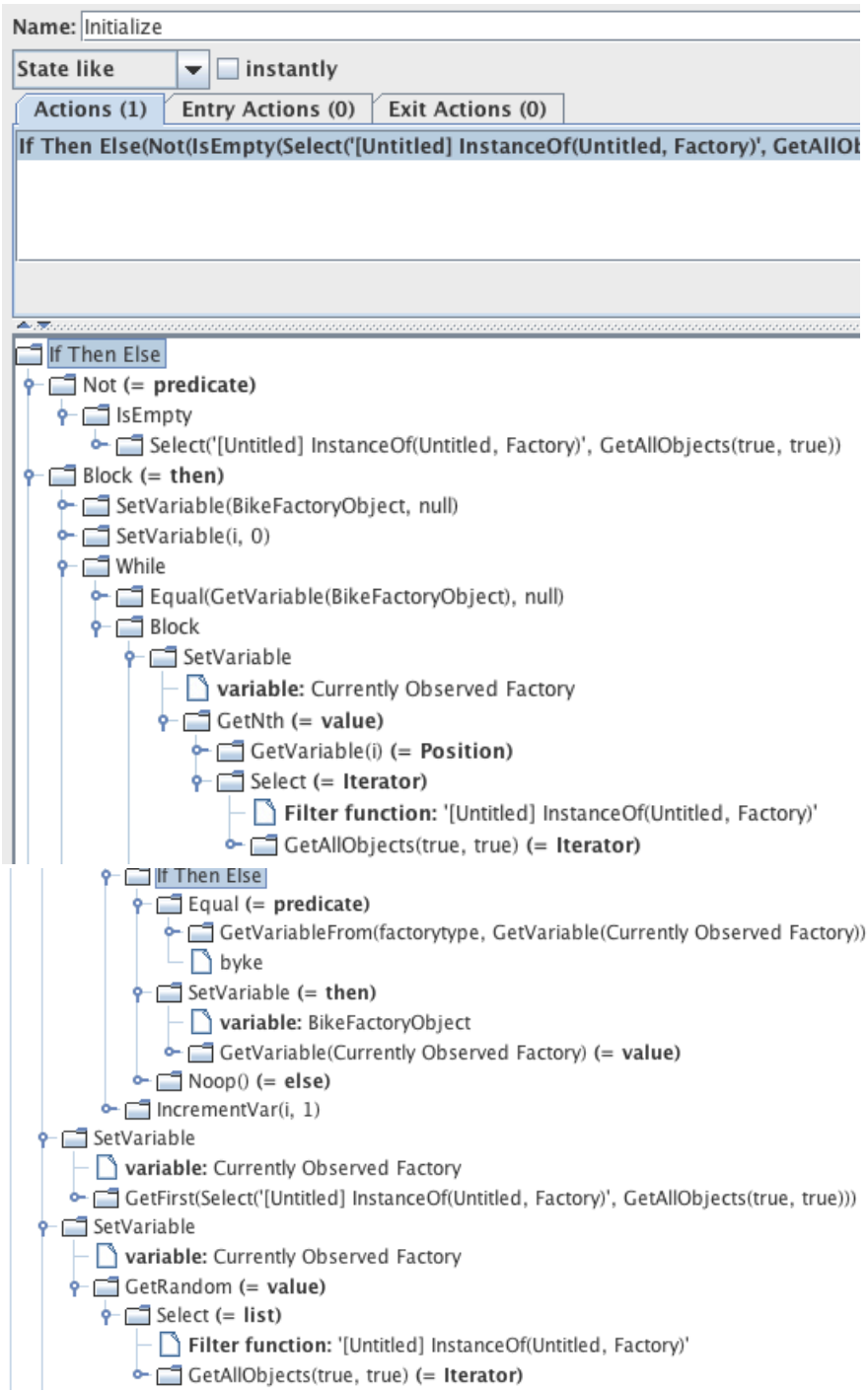
En els estats del camió es produeix la càrrega i descarrega de les bicicletes.

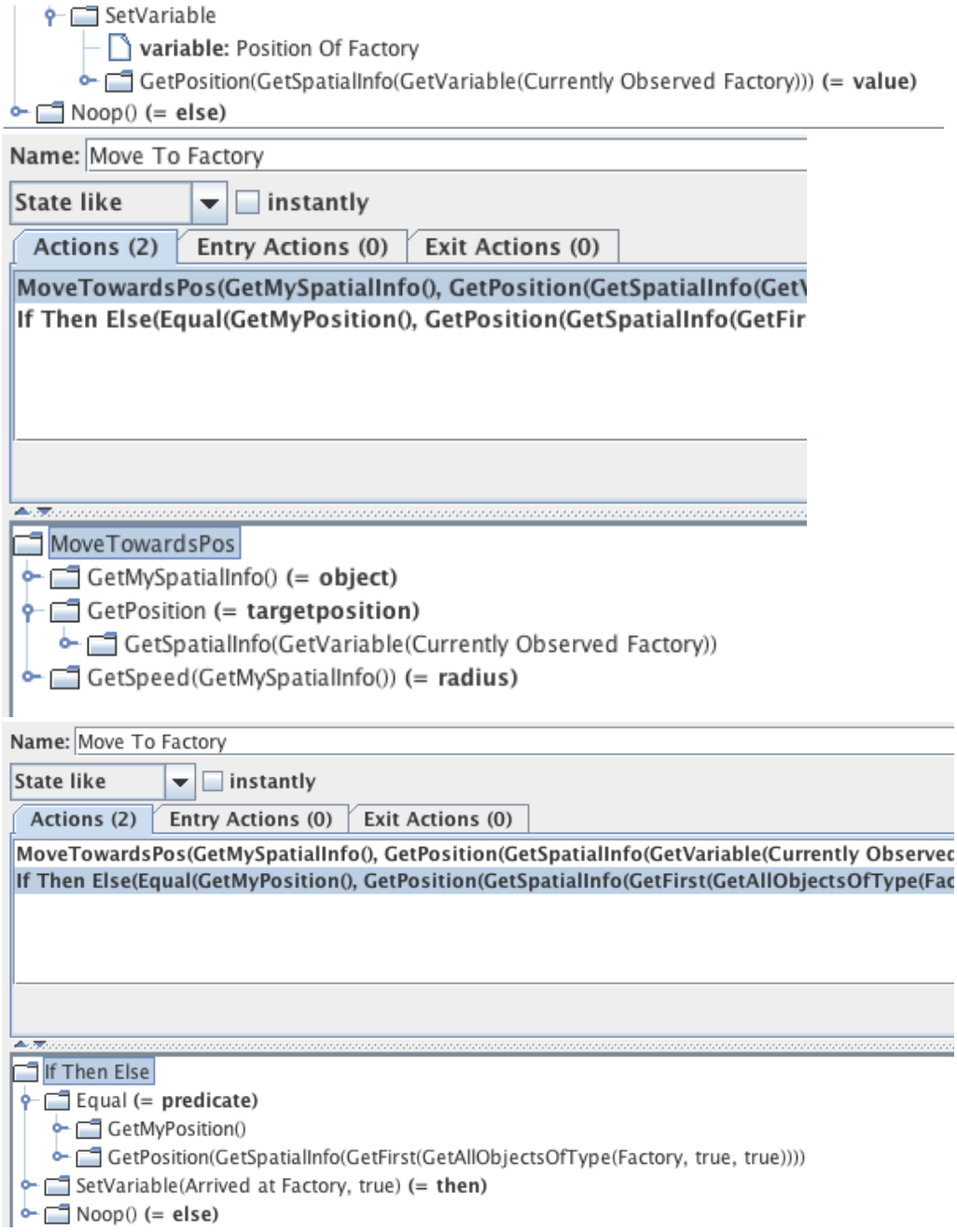
- Agent camió. A continuació es mostren les variables del camió i el seu sistema de raonament:

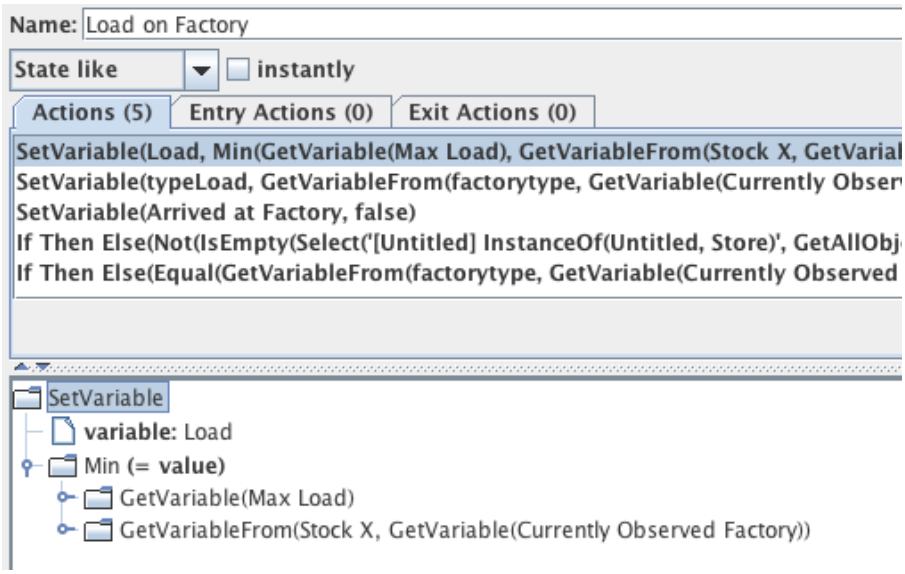


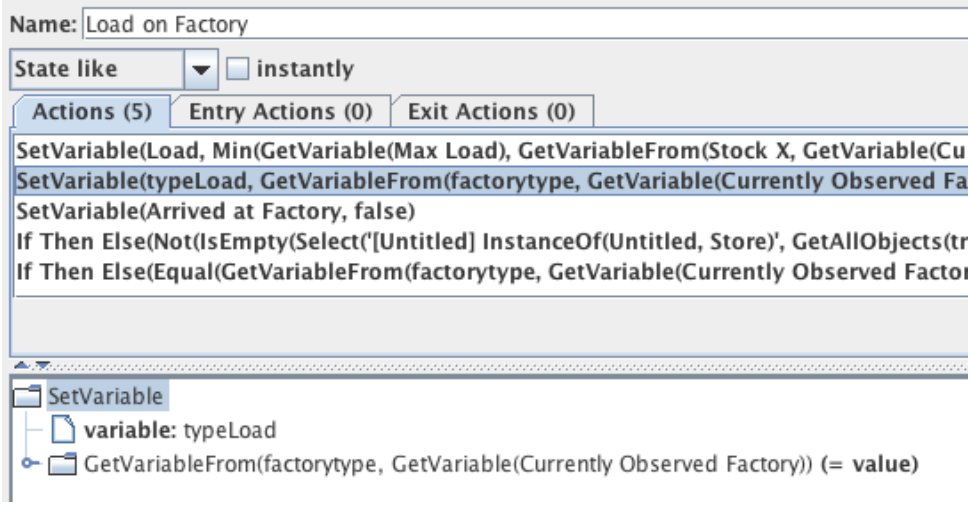


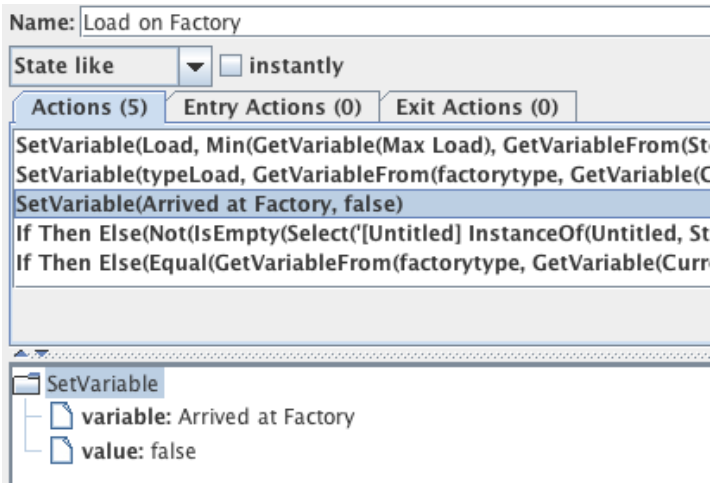
I a continuació el codi associat a cadascun dels estats:

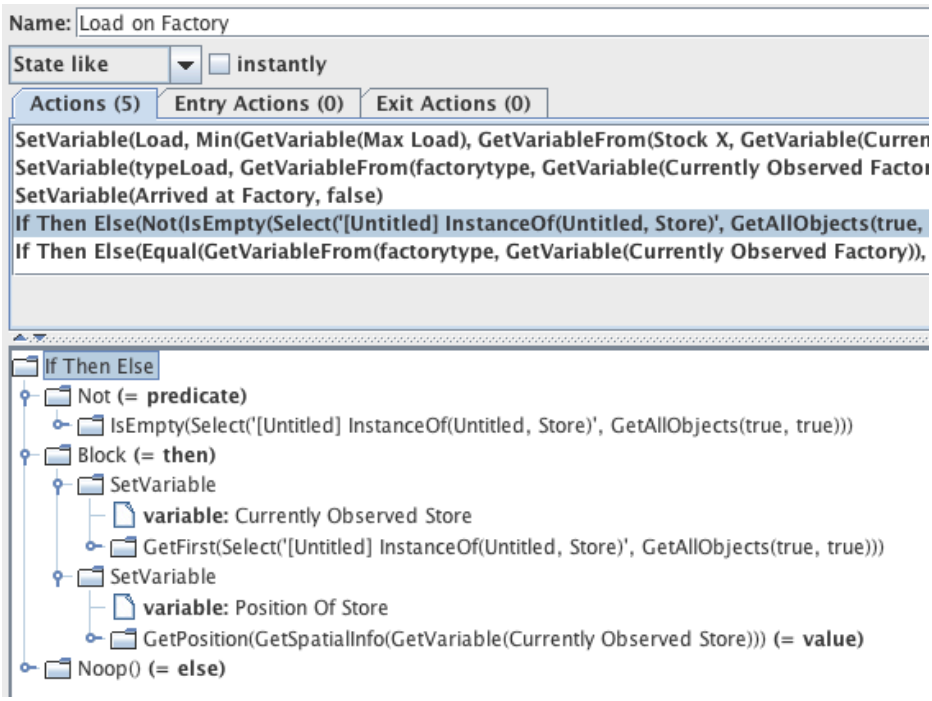

Name: Initialize
State like
instantly
Actions (1)
Entry Actions (0)
Exit Actions (0)
If Then Else(Not(IsEmpty(Select('[Untitled] InstanceOf(Untitled, Factory)', GetAllOb
If Then Else
Not (= predicate)
IsEmpty
Select('[Untitled] InstanceOf(Untitled, Factory)', GetAllObjects(true, true))
Block (= then)
SetVariable(BikeFactoryObject, null)
SetVariable(i, 0)
While
Equal(GetVariable(BikeFactoryObject), null)
Block
SetVariable
variable: Currently Observed Factory
GetNth (= value)
GetVariable(i) (= Position)
Select (= Iterator)
Filter function: '[Untitled] InstanceOf(Untitled, Factory)'
GetAllObjects(true, true) (= Iterator)
If Then Else
Equal (= predicate)
GetVariableFrom(factorytype, GetVariable(Currently Observed Factory))
byke
SetVariable (= then)
variable: BikeFactoryObject
GetVariable(Currently Observed Factory) (= value)
Noop() (= else)
IncrementVar(i, 1)
SetVariable
variable: Currently Observed Factory
GetFirst(Select('[Untitled] InstanceOf(Untitled, Factory)', GetAllObjects(true, true)))
SetVariable
variable: Currently Observed Factory
GetRandom (= value)
Select (= list)
Filter function: '[Untitled] InstanceOf(Untitled, Factory)'
GetAllObjects(true, true) (= Iterator)

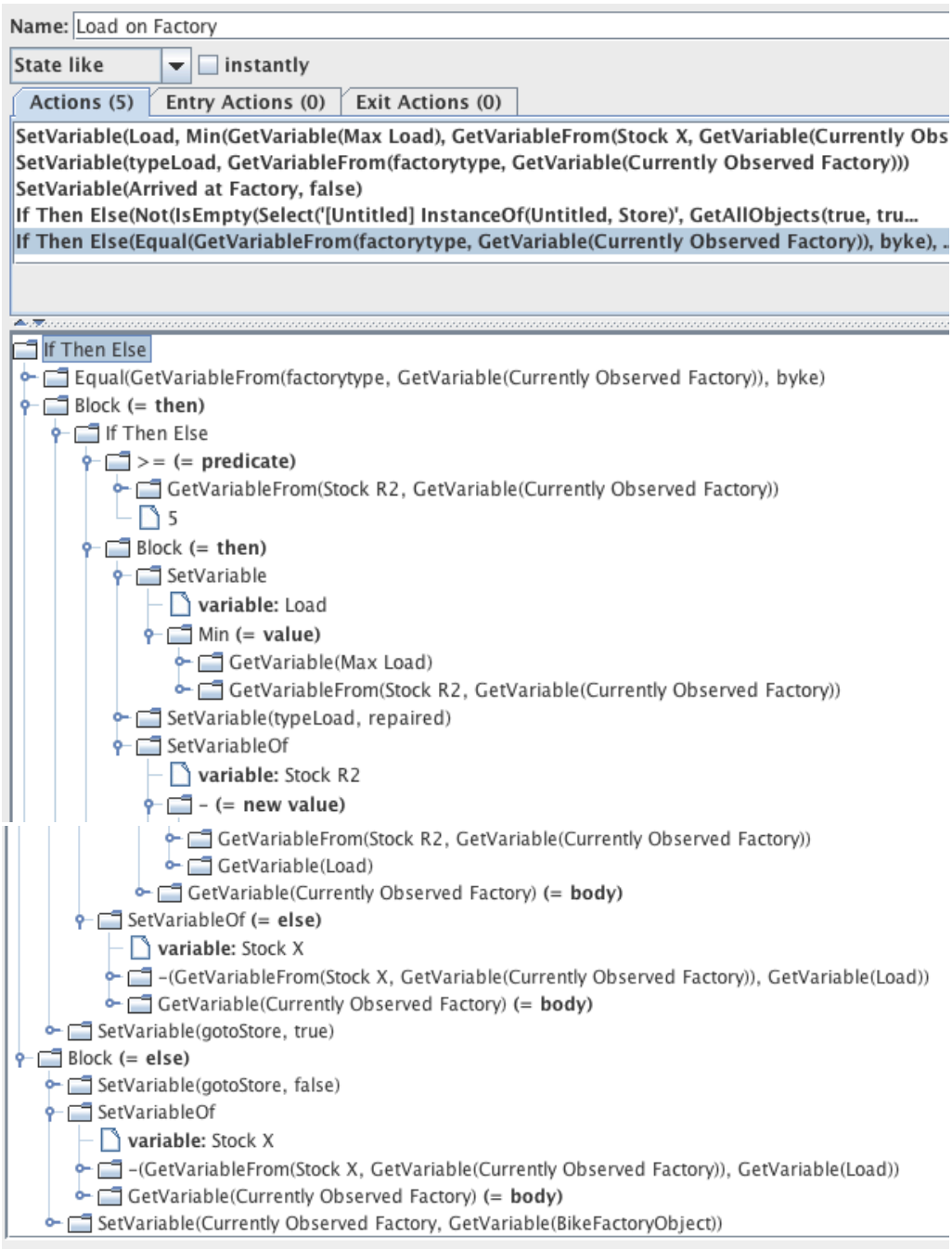

SetVariable
variable: Position Of Factory
GetPosition(GetSpatialInfo(GetVariable(Currently Observed Factory))) (= value)
Noop() (= else)
Name: Move To Factory
State like
instantly
Actions (2)
Entry Actions (0)
Exit Actions (0)
MoveTowardsPos(GetMySpatialInfo(), GetPosition(GetSpatialInfo(Get
If Then Else(Equal(GetMyPosition(), GetPosition(GetSpatialInfo(GetFir
MoveTowardsPos
GetMySpatialInfo() (= object)
GetPosition (= targetposition)
GetSpatialInfo(GetVariable(Currently Observed Factory))
GetSpeed(GetMySpatialInfo()) (= radius)
Name: Move To Factory
State like
instantly
Actions (2)
Entry Actions (0)
Exit Actions (0)
MoveTowardsPos(GetMySpatialInfo(), GetPosition(GetSpatialInfo(GetVariable(Currently Observed
If Then Else(Equal(GetMyPosition(), GetPosition(GetSpatialInfo(GetFirst(GetAllObjectsOfType(Fac
If Then Else
Equal (= predicate)
GetMyPosition()
GetPosition(GetSpatialInfo(GetFirst(GetAllObjectsOfType(Factory, true, true))))
SetVariable(Arrived at Factory, true) (= then)
Noop() (= else)

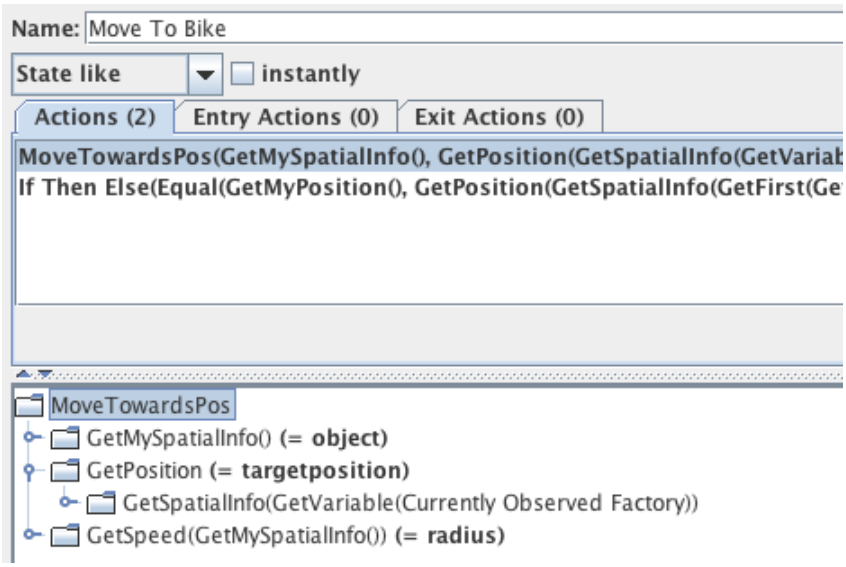

Name: Load on Factory
State like
instantly
Actions (5)
Entry Actions (0)
Exit Actions (0)
SetVariable(Load, Min(GetVariable(Max Load), GetVariableFrom(Stock X, GetVarial
SetVariable(typeLoad, GetVariableFrom(factorytype, GetVariable(Currently Obser
SetVariable(Arrived at Factory, false)
If Then Else(Not(IsEmpty(Select('[Untitled] InstanceOf(Untitled, Store)', GetAllObj
If Then Else(Equal(GetVariableFrom(factorytype, GetVariable(Currently Observed
SetVariable
variable: Load
Min (= value)
GetVariable(Max Load)
GetVariableFrom(Stock X, GetVariable(Currently Observed Factory))

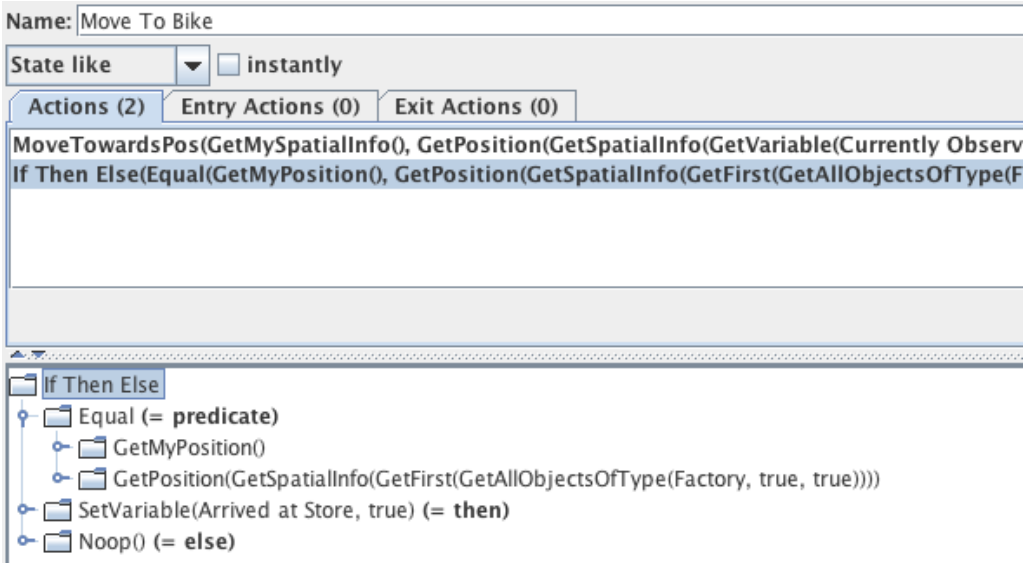

Name: Load on Factory
State like
instantly
Actions (5)
Entry Actions (0)
Exit Actions (0)
SetVariable(Load, Min(GetVariable(Max Load), GetVariableFrom(Stock X, GetVariable(Cu
SetVariable(typeLoad, GetVariableFrom(factorytype, GetVariable(Currently Observed Fa
SetVariable(Arrived at Factory, false)
If Then Else(Not(IsEmpty(Select('[Untitled] InstanceOf(Untitled, Store)', GetAllObjects(tr
If Then Else(Equal(GetVariableFrom(factorytype, GetVariable(Currently Observed Factor
SetVariable
variable: typeLoad
GetVariableFrom(factorytype, GetVariable(Currently Observed Factory)) (= value)

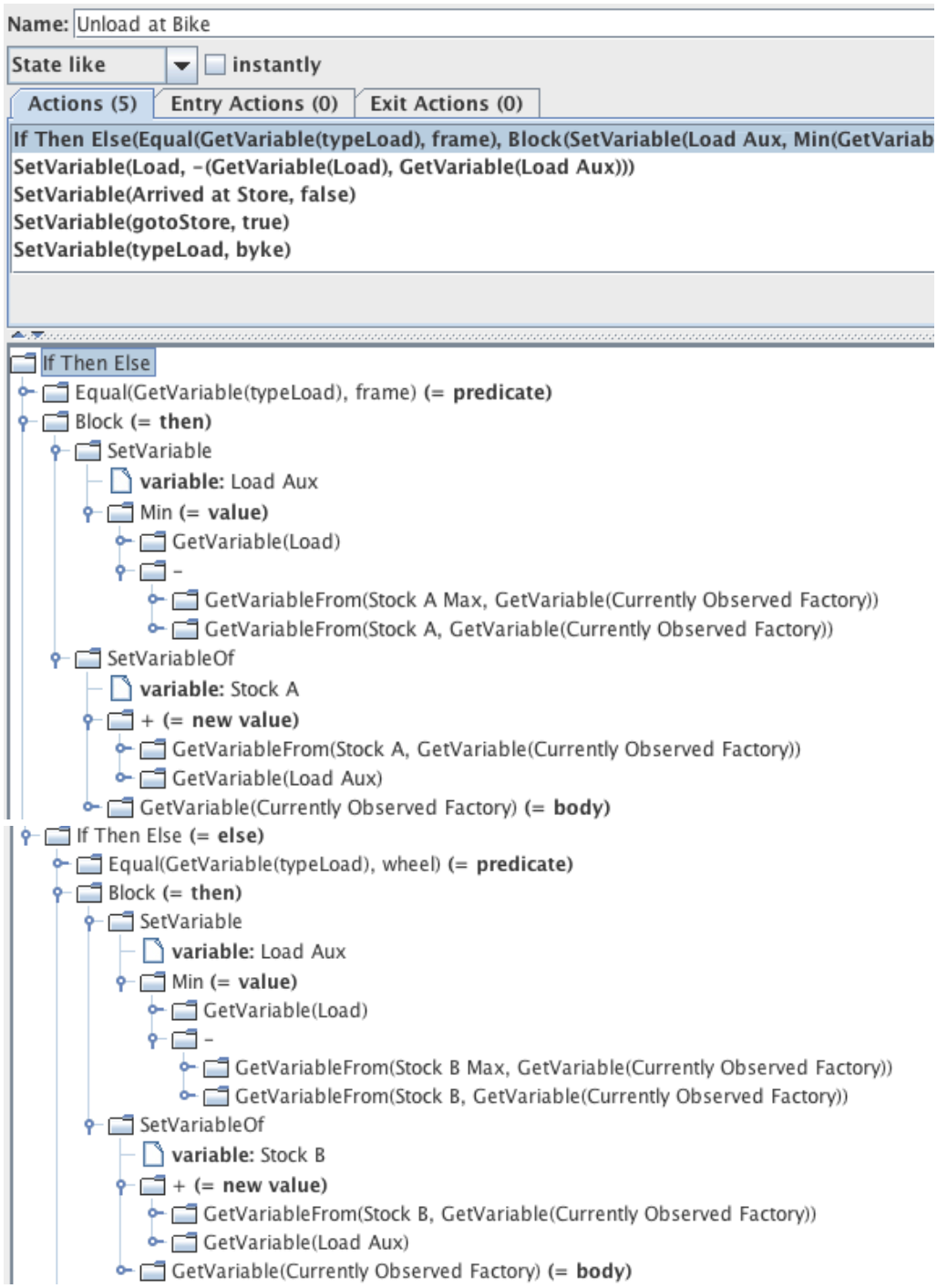

Name: Load on Factory
State like
instantly
Actions (5)
Entry Actions (0)
Exit Actions (0)
SetVariable(Load, Min(GetVariable(Max Load), GetVariableFrom(St
SetVariable(typeLoad, GetVariableFrom(factorytype, GetVariable(C
SetVariable(Arrived at Factory, false)
If Then Else(Not(IsEmpty(Select('[Untitled] InstanceOf(Untitled, St
If Then Else(Equal(GetVariableFrom(factorytype, GetVariable(Curr
SetVariable
variable: Arrived at Factory
value: false

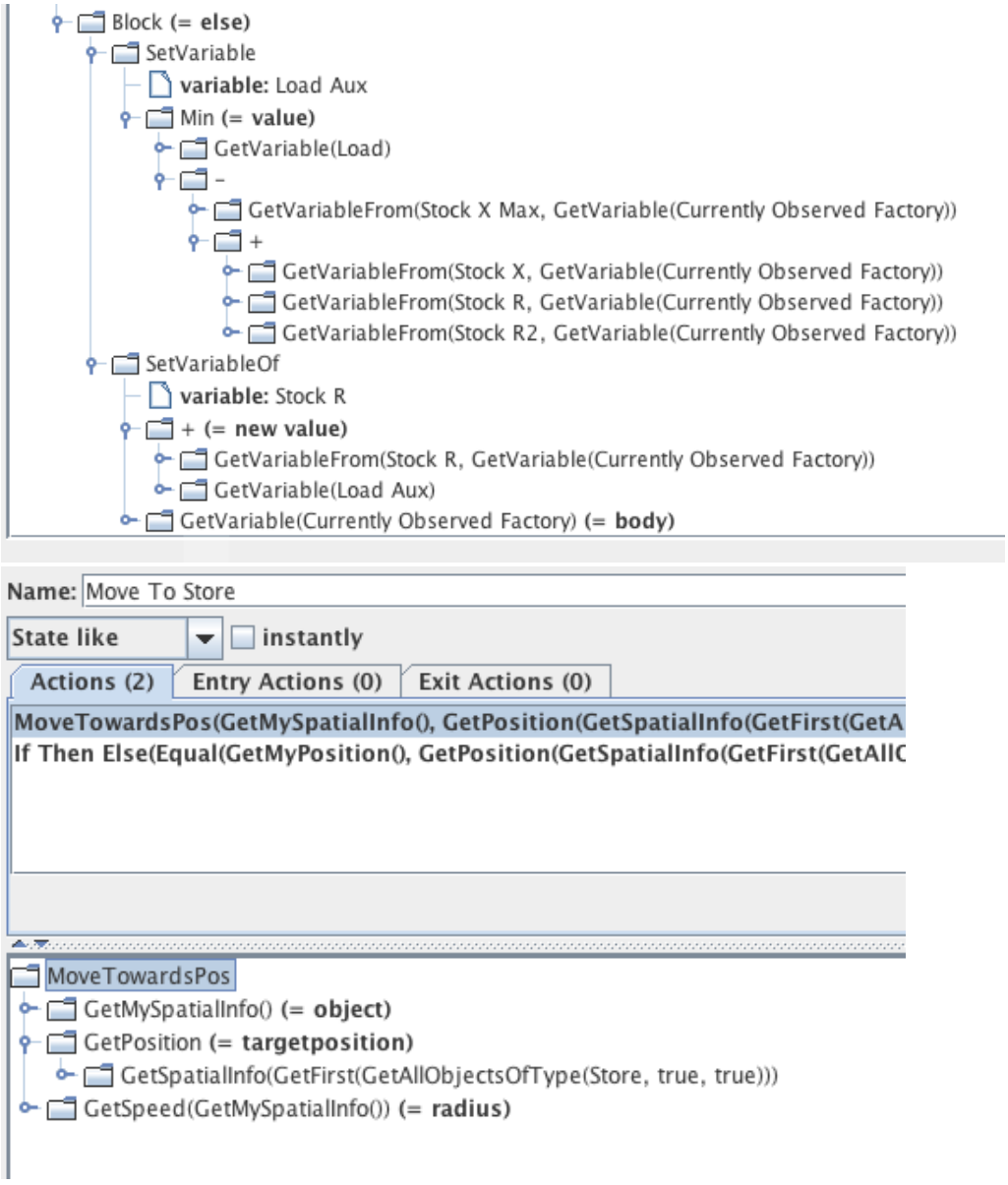

Name: Load on Factory
State like
instantly
Actions (5)
Entry Actions (0)
Exit Actions (0)
SetVariable(Load, Min(GetVariable(Max Load), GetVariableFrom(Stock X, GetVariable(Curren
SetVariable(typeLoad, GetVariableFrom(factorytype, GetVariable(Currently Observed Factor
SetVariable(Arrived at Factory, false)
If Then Else(Not(IsEmpty(Select('[Untitled] InstanceOf(Untitled, Store)', GetAllObjects(true,
If Then Else(Equal(GetVariableFrom(factorytype, GetVariable(Currently Observed Factory)),
If Then Else
Not (= predicate)
IsEmpty(Select('[Untitled] InstanceOf(Untitled, Store)', GetAllObjects(true, true)))
Block (= then)
SetVariable
variable: Currently Observed Store
GetFirst(Select('[Untitled] InstanceOf(Untitled, Store)', GetAllObjects(true, true)))
SetVariable
variable: Position Of Store
GetPosition(GetSpatialInfo(GetVariable(Currently Observed Store))) (= value)
Noop() (= else)

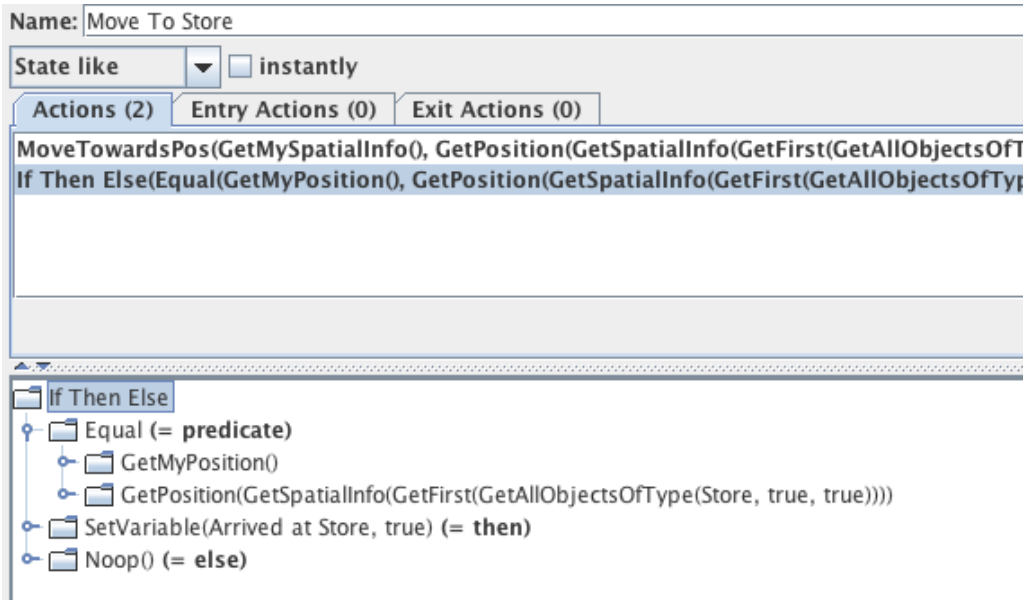

Name: Load on Factory
State like
instantly
Actions (5)
Entry Actions (0)
Exit Actions (0)
SetVariable(Load, Min(GetVariable(Max Load), GetVariableFrom(Stock X, GetVariable(Currently Obs
SetVariable(typeLoad, GetVariableFrom(factorytype, GetVariable(Currently Observed Factory)))
SetVariable(Arrived at Factory, false)
If Then Else(Not(IsEmpty(Select('[Untitled] InstanceOf(Untitled, Store)', GetAllObjects(true, tru...
If Then Else(Equal(GetVariableFrom(factorytype, GetVariable(Currently Observed Factory)), byke), .
If Then Else
Equal(GetVariableFrom(factorytype, GetVariable(Currently Observed Factory)), byke)
Block (= then)
If Then Else
>= (= predicate)
GetVariableFrom(Stock R2, GetVariable(Currently Observed Factory))
5
Block (= then)
SetVariable
variable: Load
Min (= value)
GetVariable(Max Load)
GetVariableFrom(Stock R2, GetVariable(Currently Observed Factory))
SetVariable(typeLoad, repaired)
SetVariableOf
variable: Stock R2
- (= new value)
GetVariableFrom(Stock R2, GetVariable(Currently Observed Factory))
GetVariable(Load)
GetVariable(Currently Observed Factory) (= body)
SetVariableOf (= else)
variable: Stock X
-(GetVariableFrom(Stock X, GetVariable(Currently Observed Factory)), GetVariable(Load))
GetVariable(Currently Observed Factory) (= body)
SetVariable(gotoStore, true)
Block (= else)
SetVariable(gotoStore, false)
SetVariableOf
variable: Stock X
-(GetVariableFrom(Stock X, GetVariable(Currently Observed Factory)), GetVariable(Load))
GetVariable(Currently Observed Factory) (= body)
SetVariable(Currently Observed Factory, GetVariable(BikeFactoryObject))

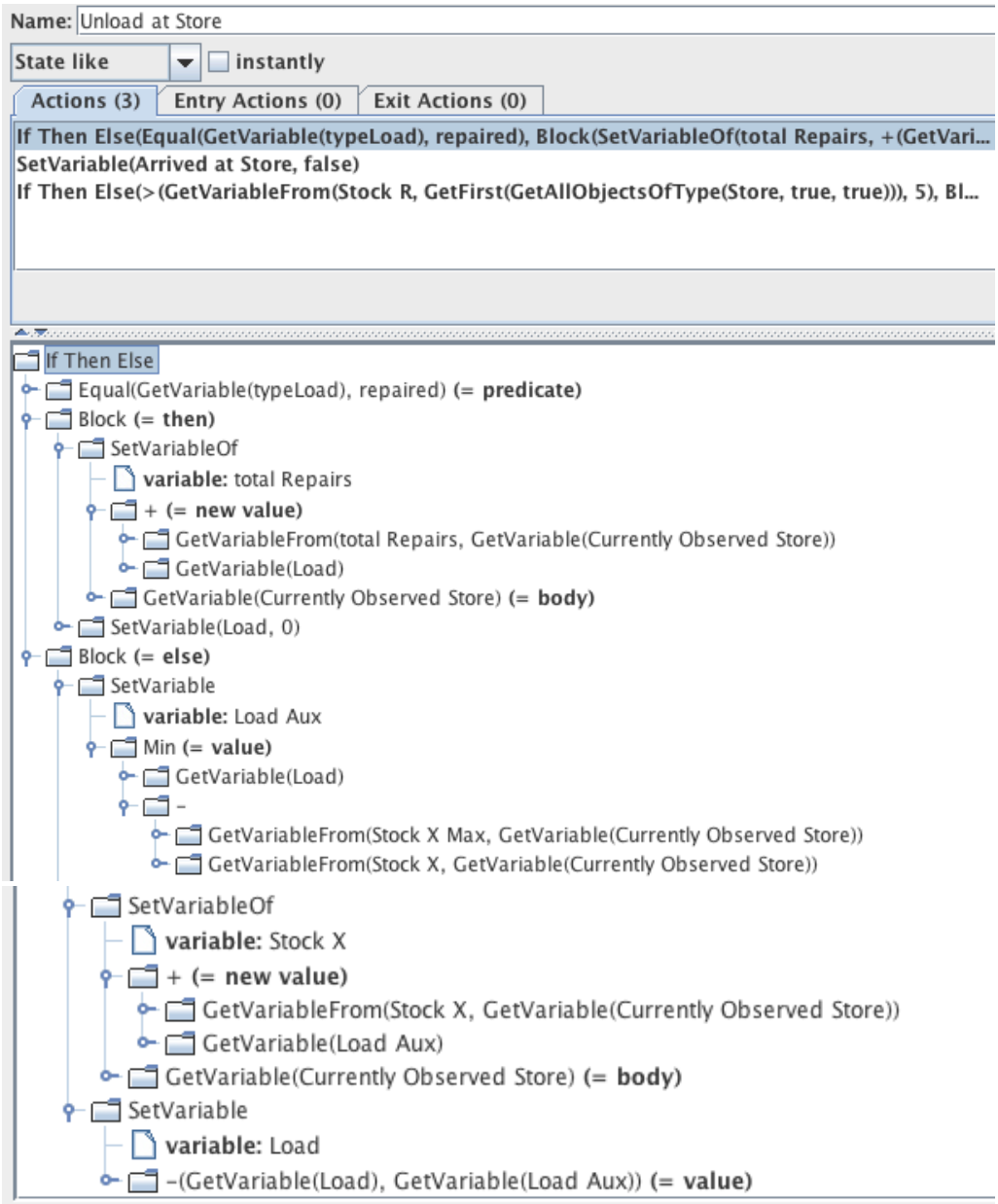

Name: Move To Bike
State like
instantly
Actions (2)
Entry Actions (0)
Exit Actions (0)
MoveTowardsPos(GetMySpatialInfo(), GetPosition(GetSpatialInfo(GetVariab
If Then Else(Equal(GetMyPosition(), GetPosition(GetSpatialInfo(GetFirst(Ge
MoveTowardsPos
GetMySpatialInfo() (= object)
GetPosition (= targetposition)
GetSpatialInfo(GetVariable(Currently Observed Factory))
GetSpeed(GetMySpatialInfo()) (= radius)

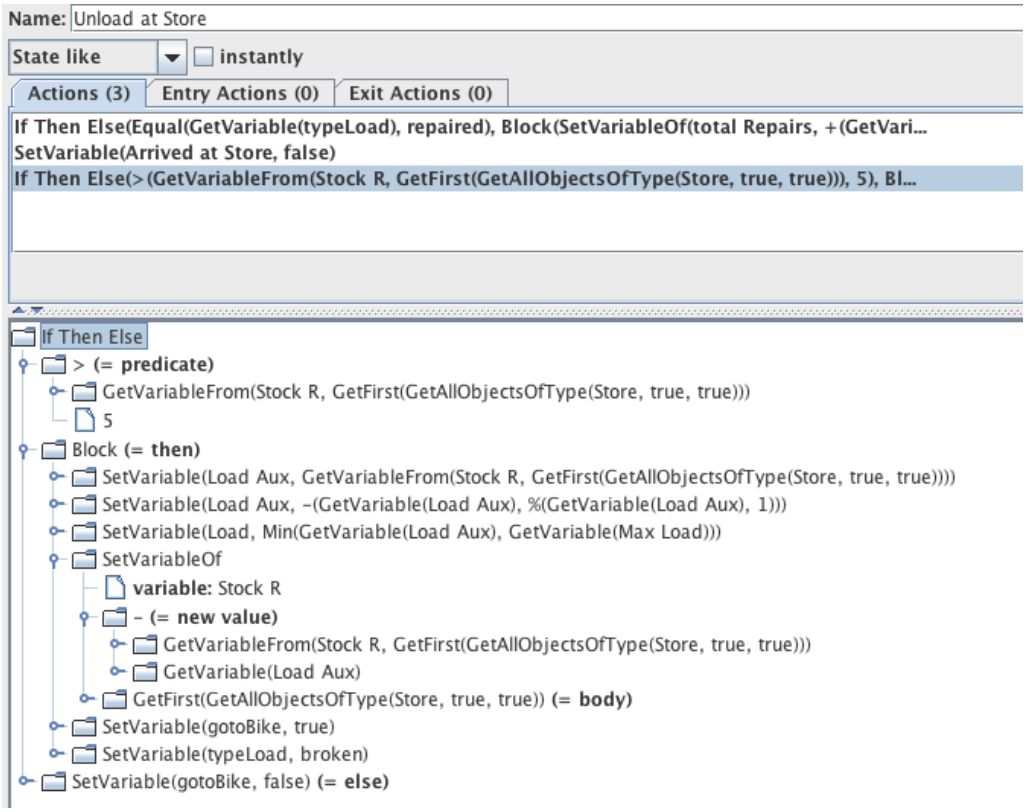

Name: Move To Bike
State like
instantly
Actions (2)
Entry Actions (0)
Exit Actions (0)
MoveTowardsPos(GetMySpatialInfo(), GetPosition(GetSpatialInfo(GetVariable(Currently Observ
If Then Else(Equal(GetMyPosition(), GetPosition(GetSpatialInfo(GetFirst(GetAllObjectsOfType(F
If Then Else
Equal (= predicate)
GetMyPosition()
GetPosition(GetSpatialInfo(GetFirst(GetAllObjectsOfType(Factory, true, true))))
SetVariable(Arrived at Store, true) (= then)
Noop() (= else)


Name: Unload at Bike
State like
instantly
Actions (5)
Entry Actions (0)
Exit Actions (0)
If Then Else(Equal(GetVariable(typeLoad), frame), Block(SetVariable(Load Aux, Min(GetVariab
SetVariable(Load, -(GetVariable(Load), GetVariable(Load Aux)))
SetVariable(Arrived at Store, false)
SetVariable(gotoStore, true)
SetVariable(typeLoad, byke)
If Then Else
Equal(GetVariable(typeLoad), frame) (= predicate)
Block (= then)
SetVariable
variable: Load Aux
Min (= value)
GetVariable(Load)
-
GetVariableFrom(Stock A Max, GetVariable(Currently Observed Factory))
GetVariableFrom(Stock A, GetVariable(Currently Observed Factory))
SetVariableOf
variable: Stock A
+ (= new value)
GetVariableFrom(Stock A, GetVariable(Currently Observed Factory))
GetVariable(Load Aux)
GetVariable(Currently Observed Factory) (= body)
If Then Else (= else)
Equal(GetVariable(typeLoad), wheel) (= predicate)
Block (= then)
SetVariable
variable: Load Aux
Min (= value)
GetVariable(Load)
-
GetVariableFrom(Stock B Max, GetVariable(Currently Observed Factory))
GetVariableFrom(Stock B, GetVariable(Currently Observed Factory))
SetVariableOf
variable: Stock B
+ (= new value)
GetVariableFrom(Stock B, GetVariable(Currently Observed Factory))
GetVariable(Load Aux)
GetVariable(Currently Observed Factory) (= body)

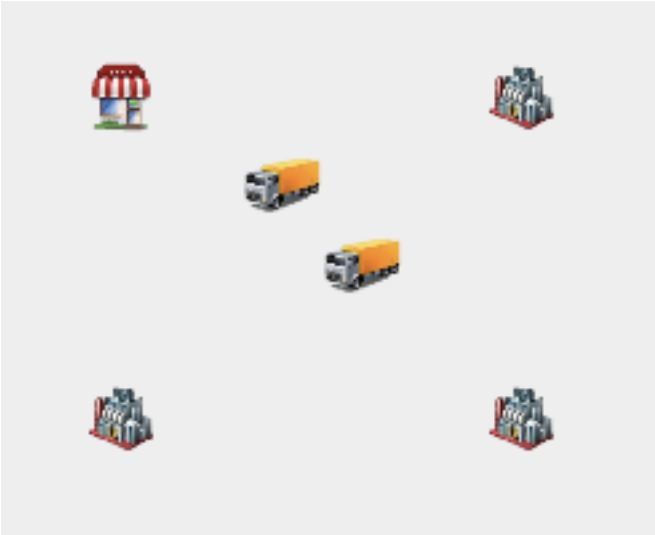

Block (= else)
SetVariable
variable: Load Aux
Min (= value)
GetVariable(Load)
-
GetVariableFrom(Stock X Max, GetVariable(Currently Observed Factory))
+
GetVariableFrom(Stock X, GetVariable(Currently Observed Factory))
GetVariableFrom(Stock R, GetVariable(Currently Observed Factory))
GetVariableFrom(Stock R2, GetVariable(Currently Observed Factory))
SetVariableOf
variable: Stock R
+ (= new value)
GetVariableFrom(Stock R, GetVariable(Currently Observed Factory))
GetVariable(Load Aux)
GetVariable(Currently Observed Factory) (= body)
Name: Move To Store
State like
instantly
Actions (2)
Entry Actions (0)
Exit Actions (0)
MoveTowardsPos(GetMySpatialInfo(), GetPosition(GetSpatialInfo(GetFirst(GetA
If Then Else(Equal(GetMyPosition(), GetPosition(GetSpatialInfo(GetFirst(GetAllC
MoveTowardsPos
GetMySpatialInfo() (= object)
GetPosition (= targetposition)
GetSpatialInfo(GetFirst(GetAllObjectsOfType(Store, true, true)))
GetSpeed(GetMySpatialInfo()) (= radius)


Name: Move To Store
State like
instantly
Actions (2)
Entry Actions (0)
Exit Actions (0)
MoveTowardsPos(GetMySpatialInfo(), GetPosition(GetSpatialInfo(GetFirst(GetAllObjectsOfT
If Then Else(Equal(GetMyPosition(), GetPosition(GetSpatialInfo(GetFirst(GetAllObjectsOfTyp
If Then Else
Equal (= predicate)
GetMyPosition()
GetPosition(GetSpatialInfo(GetFirst(GetAllObjectsOfType(Store, true, true))))
SetVariable(Arrived at Store, true) (= then)
Noop() (= else)


Name: Unload at Store
State like
instantly
Actions (3)
Entry Actions (0)
Exit Actions (0)
If Then Else(Equal(GetVariable(typeLoad), repaired), Block(SetVariableOf(total Repairs, +(GetVari...
SetVariable(Arrived at Store, false)
If Then Else(>(GetVariableFrom(Stock R, GetFirst(GetAllObjectsOfType(Store, true, true))), 5), Bl...
If Then Else
Equal(GetVariable(typeLoad), repaired) (= predicate)
Block (= then)
SetVariableOf
variable: total Repairs
+ (= new value)
GetVariableFrom(total Repairs, GetVariable(Currently Observed Store))
GetVariable(Load)
GetVariable(Currently Observed Store) (= body)
SetVariable(Load, 0)
Block (= else)
SetVariable
variable: Load Aux
Min (= value)
GetVariable(Load)
-
GetVariableFrom(Stock X Max, GetVariable(Currently Observed Store))
GetVariableFrom(Stock X, GetVariable(Currently Observed Store))
SetVariableOf
variable: Stock X
+ (= new value)
GetVariableFrom(Stock X, GetVariable(Currently Observed Store))
GetVariable(Load Aux)
GetVariable(Currently Observed Store) (= body)
SetVariable
variable: Load
-(GetVariable(Load), GetVariable(Load Aux)) (= value)


Name: Unload at Store
State like
instantly
Actions (3)
Entry Actions (0)
Exit Actions (0)
If Then Else(Equal(GetVariable(typeLoad), repaired), Block(SetVariableOf(total Repairs, +(GetVari...
SetVariable(Arrived at Store, false)
If Then Else(>(GetVariableFrom(Stock R, GetFirst(GetAllObjectsOfType(Store, true, true))), 5), Bl...
If Then Else
> (= predicate)
GetVariableFrom(Stock R, GetFirst(GetAllObjectsOfType(Store, true, true)))
5
Block (= then)
SetVariable(Load Aux, GetVariableFrom(Stock R, GetFirst(GetAllObjectsOfType(Store, true, true))))
SetVariable(Load Aux, -(GetVariable(Load Aux), %(GetVariable(Load Aux), 1)))
SetVariable(Load, Min(GetVariable(Load Aux), GetVariable(Max Load)))
SetVariableOf
variable: Stock R
- (= new value)
GetVariableFrom(Stock R, GetFirst(GetAllObjectsOfType(Store, true, true)))
GetVariable(Load Aux)
GetFirst(GetAllObjectsOfType(Store, true, true)) (= body)
SetVariable(gotoBike, true)
SetVariable(typeLoad, broken)
SetVariable(gotoBike, false) (= else)

Hem creat una simulació amb les tres fàbriques, una botiga i dos camions:



I obtingut els resultats següents: