

Proposed Scenario for a Multiagent System

"Cargo Shipping Terminal" *- increment one -*



Version 1.1
03 March 2011
Omid Alemi

Entities:



The Plate (Ship)



Box (Cargo Container)



Agent Type1 (Cranes)



Agent Type 2 (Truck)

Facts:

- Plate (Ship)
 - All the boxes are stacked on the plate like a wall (the photo of the ship above)
 - The plate is already loaded with boxes and no more box will be added to it during the time agents are working.
 - All the boxes which are on top are accessible at the same time.
- Box (Cargo container)
 - All the boxes have the same size
 - Is identified by a unique ID
 - Has its specific weight
 - Has a label specifying its ID and its weight on its top
 - Can be lifted by as many agents as required (combination of the agents; the total capacity of the involving agents should be equal or more than the weight of the box)
- Agent Type 1 (Lifting crane)
 - Can lift boxes and load the cart
 - Is identified by its unique name
 - Has a specific capacity (a certain weight)
 - Can only lift boxes that are up to their capacity
 - Can lift heavier boxes with the help of other agents
- Agent Type 2 (Cart/Truck)
 - Can carry any box with any weight
 - It can be available or unavailable at a time
 - There are limited number of this agent available at any time
 - It takes some time for them to carry the boxes to the destination

The Definition:

There plate is pre-loaded with boxes, on layers just like the photo above before the agents start working. There are a wall of boxes, for example 10x12 which means there are 12 layers of boxes each with the height of 10 boxes. The boxes which are on the top are available and visible to the agents, so the agents can work on them in parallel.

The goal is that the agents should unload all the boxes which are on the plate so that there is no more boxes left on the plate and the end.

There are a couple of crane agents available in the system each with a different capacity. They can lift and carry the boxes and load the carts with them.

The crane agents can see the labels of the boxes which are on the top layer so they can check the weight of the boxes before lifting them. If according to their capacity they can lift a box, they will do it by themselves, but if the box is heavier than anyone's capacity, they should ask for help of other crane agents.

For example, if we have two crane agents with 10kg and 20kg capacities, and there are boxes in 10kg, 20kg, and 30kg, then the first agent is mainly interested in lifting the 10kg boxes, as the second agent is interested in 20kg boxes (he is able to lift 10kg boxes as well, but it may not be his first preference). But when one of them faces a 30kg box, it should ask the other one to help with the lifting.

Crane agents which have something on their arm, should check whether a cart agent is ready and if a free one is found load the cart. The cart agent will go away for a while to deliver the box and will return after that.