

First Software Project – component (b)

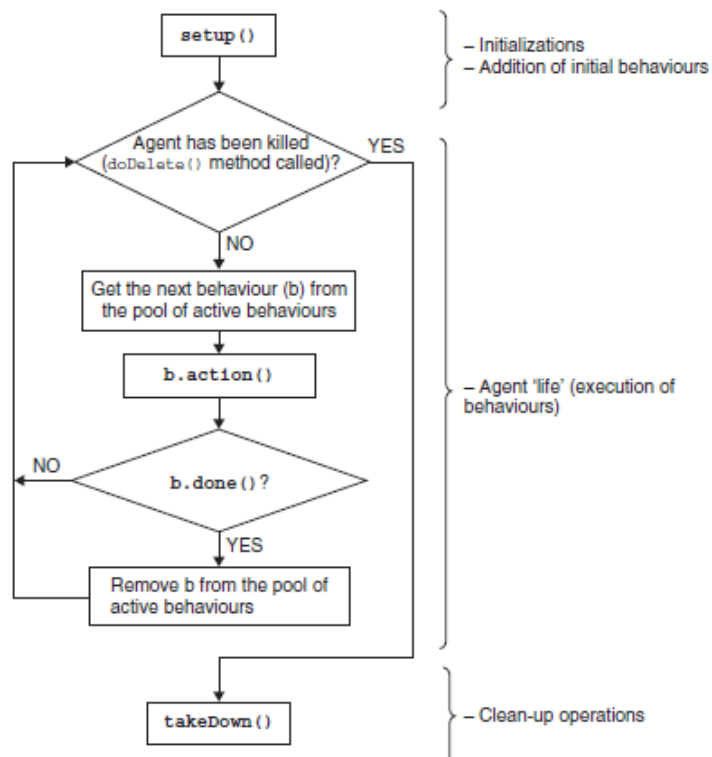
Simple multi-agent system for trading books

1. Basics

I decided to choose as my first software project, an agent-based system that will enable users to trade second-hand books. In this book-trading system there will be two types of agent: sellers and buyers. Each buyer agent takes as input some books to buy and tries to find agents selling them at an acceptable price. Similarly, each seller agent takes as input some books to sell and tries to do so at the highest possible price. Both buyers and sellers implement some simple strategies and carry out negotiations to achieve the best result for the users they represent. Both buyers and sellers may appear and disappear dynamically in the system. All issues related to purchased book delivery and payment are considered out of scope, and I will not take these matters into account.

2. Tasks

The actual job, or jobs, an agent has to do is carried out within “behaviors”. A behavior represents a task that an agent can be carried out. An agent can execute several behaviors concurrently. However, it is important to note that the scheduling of behaviors in an agent is not pre-emptive (as for Java threads), but cooperative. Therefore, in my approach, it is me who defines when an agent switches from the execution of one behavior to the execution of another. The path of execution of the agent thread is depicted in this right-hand side figure.



- The behaviors of the buyer agent

When a buyer agent is requested to buy a book, the simplest approach it can adopt is to periodically perform the task to ask all known seller agents if they have the target book available for sale, and if so, to provide an offer. Depending on this and on the range of price specified by its user, the buyer agent can then ask the seller that provided the best offer to sell the book. I'm thinking of implementing this functionality by using a `TickerBehaviour` that, at each tick, adds another behavior that talks with the seller agents.

- The behaviors of the seller agent

The users of seller agents must provide them with the titles of books to sell together with an initial price, a minimum price, and a deadline. Sellers adopt a linearly decreasing pricing strategy. Therefore, for each book available for sale the seller agents require a `TickerBehaviour` (`PriceManager`) behavior that simply decreases the current price linearly until the deadline arrives. The behavior must also remove the book from the catalogue when the deadline expires. The catalogue of books available for sale is implemented as a table that maps the title of a book onto the related `PriceManager` behavior.