PCM – Assignment 3

Actor Architecture:

The actor architecture is used in concurrent computation, treating every “Actor” as a different individual. Actors can make local decisions, create more Actors and send messages to other Actors. Actors can only modify their own private state, but can only affect and communicate with other Actors through messages.

Implementation:

To implement a Binary Tree that uses actors the actors have the following attributes:

* A mailbox (LinkedBlockingQueue)
* A number (unique id)
* A left and right pointer to other actors

Each Actor has its own thread that is always running till it receives a removal message. The system is capable of producing and receiving seven different types of messages, Add, Contains, Remove, Reorganize, AddResponse, ContainsResponse, RemoveResponse. Every message contains a number that indicates the recipient or the response of the message and the sender of the message, in the case of a Response message it’s also sent the supervisor of the recipient and the side of the leaf node corresponds to.

To find the recipient of the message the Actor compares the number present in the message to its own, and in the case of being inferior it send to the left leaf or to right leaf in case of it being superior. The add message searches the tree to find if the number in the message is already present in the tree, in case it reaches the bottom of the tree without finding an Actor with the number of the message it then is created an Actor with that number, and the Actor responsible for creating the new Actor sends a AddResponse message to the RootActor.

The contains message searches the tree to find the number in the message, when it finds the Actor with the number present in the message or it reaches the bottom of the tree without finding the number it sends a ContainsResponse message to the RootActor.

The remove message

Garbage Collection:

When an Actor is removed every reference to the Actor is removed and his mailbox is emptied.