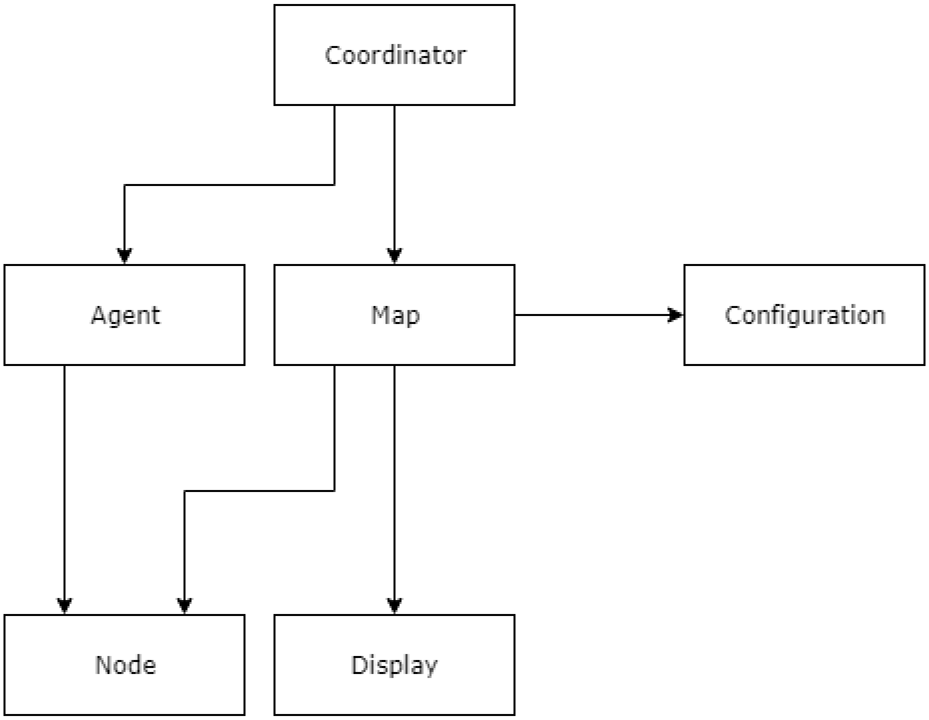
Mobile Agents Design



Design Descriptions

Coordinator

Coordinator manages the simulation. It instantiates and manage all threads. It creates a map based on the given config file, manages the start button press and fire spreading countdown, and tells the map to check for changes to display. The coordinator contains two threads, one for the fire spreading and one for updating the map and checking the simulation state.

Map

Map is used to make the simulation coordination between objects easier. Provides a reference to all nodes in the simulation to easily update the display and to easily spread the fire. Map does not make direct changes to nodes, it only sets them on fire.

Configuration

Configuration is used to provide different possible maps for the simulation. The configuration file can be given to the program at run time and the map will use the configuration for program setup.

Agent

The Agent object is a thread. The initial agent is placed on a station node at runtime. The Agent randomly visits Nodes in the map in search of fire. If fire is found, the Agent clones itself onto nearby near-fire nodes and standard nodes that are near near-fire nodes.

Node

Each Node object is a thread. Nodes have a message inbox and have a reference to their neighboring nodes. When a Node receives a message (from the agent) it passes it along to its neighbors to eventually reach a specific designated node. The designated node stores the messages received.

Display

The Display is a map UI of the nodes, fire, agents, and station node that are involved in the simulation. It displays the table of agents that exist that is contained by the Station node.

Helper Objects Used

MainApp

This class is used to instantiate the display, assign the given configuration file, and start the coordinator object. It is also used to check if the simulation is over and if the coordinator is finished.

Message

The Message object is used to pass information to and from the Station node. It can contain display properties and information about an agent that would be needed for the station's agent table.

MultiPoint

The MultiPoint object is used to simplify reading in the configuration file. The config file contains edges given in a format that contains two points and this class is used to represent them at runtime.

NodeInterface

The interface given to the Node objects is used to offer more functionality for the simulation nodes. The node interface implements Runnable and is used by the Station node and the Node nodes.

RoutingTable

The RoutingTable object is used to offer more functionality for the neighboring nodes information table that each Node object contains.

Station

The Station object extends the Node object. It is a Node object that handles message passing differently. It acts as a receiver for messages and stores a list of agents that exist on the map.