Justin Fan, FengWei Zhang, Vikas Navani

In this project our initial phase specification we are designing a robot with specific characteristics mentioned in the document provided by the professor. In this, we can clearly see that a proximity sensor is needed, gps for location, a significant communication with the server and the environment and a path that is given before the simulation.

There is also a server which will be monitoring the data structure and communicating with the robot and updating the data structure.

Lastly there is a processing method needed for four loops of operation in relation to the clock cycle.

Below is the explanation per program on what has been coded to meet those requirements.

Processing.h

In order to start the robots at different times, the timer has been implemented in the processing. The timer counts and sets a value for a corresponding robot when the time condition has been met. The loops skip over robots that have not been started yet.

In the processing the update method updates the position of the robot and of the obstacles and if the robot is close to the boundary or obstacle it is going to send a signal. In relation to the receive we receive data from the robot and the robot takes 2 things and gives us three things, the clock signal, robot speed, and value.

When it is positive edge, we take the value and speed from the robot and when we have new data to transmit, we then send a clock edge and a value on which it acts upon.

Inside the processing code we have 2 tables and the map. One of those tables is for the receive method to update new data from the server. It is based on that data. The second table is for the update method and we just update if the robot is close to the boundary or close to the obstacle and we set a status flag which triggers the transmit method.

The robot relays information between the server and processing and it has the same receive and transmit method, it has the same clock edge and value its outputs. It has a receive and a transmit method for the processing and the server. If its clock edge, value is read, and the value is read and sent out.

Server.h

We receive information from the robot and then we update the table which contains current grid of robot and next grid and moving status. We have transmitted, when we update the table, we send new information to the robot. A node table is added to check robot priority at each node. To calculate the speed, it is assumed that the robot with highest priority moves at 2 m/s. The travel time would be the distance between the node grid and current grid divided by 2. This travel time is then used to calculate the speed of the lower priority robots.

Robot.h

They’re 4 methods, first is receive from server and other one is receiving from processing and then there is one regarding transfer to server and transfer to processing. The receive methods are sensitive to the positive clock edge from the respective units. The addition of speed from the server to processing is added.

The monitor for simulation checks the values sent from the robot to server, server to robot, robot to processing, and processing to robot. The speed of each robot is traced so that the speed over time can be monitored. The program could not be compiled correctly and simulation was not able to be performed.