

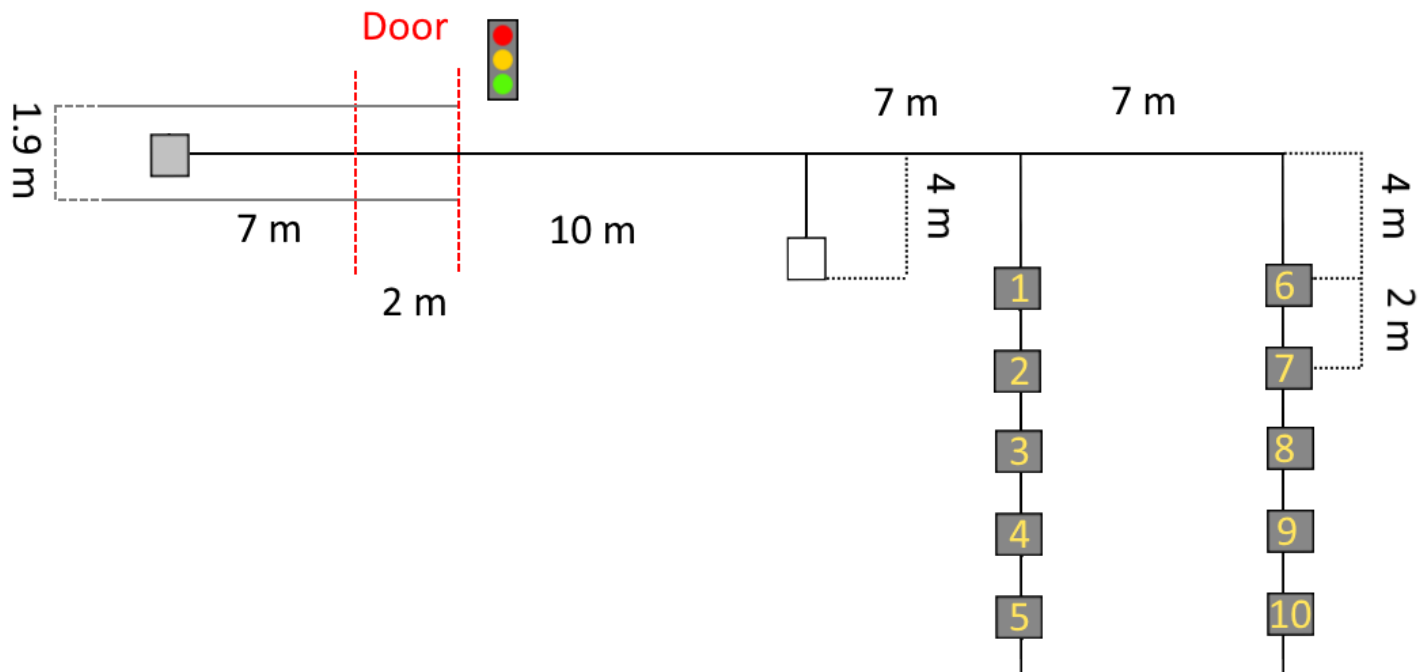
AGV Manager and RAT

This exercise is meant to start designing and drawing a real agv plant; you will be asked to handle a system where 2 AGVs must move among the stations of the map, performing a load and unload work.

1. The plant

This plant is a production system with 10 machines, put in two lines of 5 winders each. These lines are 7 m far one from the other (see picture below) and each machine is 2 m far from the others.

To the left of the production zone there is another room where an unload station is present. To go there, agvs must go through a door that can be opened or closed. Due to this, the door acts as a traffic light, allowing agvs to move (green light) or forcing them to stop and wait (red light). In the middle of load and unload area there is a standby point (white square) which is free to use.



As you can see, there is only one narrow way going to the unload station, so it is important to think not to lock agvs going in opposite directions. The standby point can be used to solve this problem.

2. Agv data

The agv model used for this plant is a 1.8 m long and 2 m large fork agv which can perform load and unload operations from its left side. AGV maximum speed is 1.2 m/s. Each one of the agvs in this plant must go to a requesting production machine, make the load operation, go to the unload station to drop the product, then start again.

There is another critical information: the area left to the door up to the download station is a corridor which is 1.9 m wide, so the agv must move there on the side.

3. PLC data

This plant is controlled by customer PLC, which is communicating with Robox AGV Manager. Prepare to handle following I/O data:

INPUT		OUTPUT	
Bit	Watch dog from PLC	Bit	Watch dog from AGVM
Bit	Call Winder 1	Bit	AGV 1 enabled
Bit	Call Winder 2	Bit	AGV 2 enabled
Bit	Call Winder 3	Bit	AGV 1 in automatic
Bit	Call Winder 4	Bit	AGV 2 in automatic
Bit	Call Winder 5	Bit	AGV 1 in mission
Bit	Call Winder 6	Bit	AGV 2 in mission
Bit	Call Winder 7	Uint8	AGV number in standby station
Bit	Call Winder 8		
Bit	Call Winder 9		
Bit	Call Winder 10		
Bit	Door open signal		

The watch dog signal can be a 1 Hz square wave exchanged between AGVM and PLC. If the PLC watch dog signal is not changing for more than 5 s, use the **AgvSetAlarm()** command to generate an alarm.

The winder call signals are used to request to the AGVM to start a loading mission to a specific production machine. While loading, the agv will wait this signal to become false again to finish the mission.

4. Draw a map with RAT (Robox Agv Tool)

Make a folder to store this project and save your xml map file in a subfolder called “map”. Open RAT and draw a map respecting the picture shown in section 1:

- 2 vertical lines with 5 load stations each (10 in total). A curve may be used to join them on the bottom side, at the end of the production machines area. Since these production lines are short, agvs are allowed to move in both directions on them, but you must always pay attention to avoid deadlocks.
- The unload station is put in the left room and the standby point is connected to the main horizontal line. The door and its relative traffic light can be drawn using generic points and filling the semaphore fields.
- Create 2 agvs in the RAT project to be played in this sample.
- Always remember the agv size when you draw lines: since agv's shorter side is 1.8 m, remember that any line must be at least 0.9 m far from the wall.

5. AGV Manager project

In the project folder you should make your AGVM project to control this system. Set AGV as emulated, since in this sample there is no Robox controller connected to a real agv.

You must write a xScript that handles the agvs and dispatches the missions.

To handle the traffic light, you can use the functions **AgvGetSemaphoreRequestMask()** to ask if any agv is requesting to pass and **AgvSetGreenSemaphore()** to set it green. Read the documentation to know more.

6. Debug

Start AGVM and make the system work. Force the PLC input signals to make the agvs to make the missions and test the stability of your system during load and unload missions.