TU9 MOOC Week 8 – Assignment
## Explore an unknown maze with your virtual robot

Task

You control a virtual robot who has been placed into an unknown maze. Your task is to find the shortest possible path to a goal position somewhere hidden in the maze. Therefore you must explore the maze until you have gathered sufficient information. Then you reset your bot to your start position and follow the take the shortest path to the goal. The maze is a square of 31 field, which can either be free or part of a wall. Your robot occupies exactly one field.

You can move the robot by sending it one of the following commands:

- 'n': moves the robot one field north
- 'e': moves the robot one field east
- 's': moves the robot one field south
- 'w': moves the robot one field west
- 'r': sets the robot back to its starting position
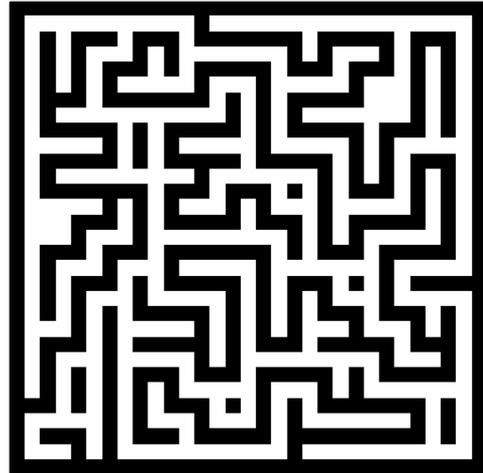
A movement only succeeds if the respective field is free. Otherwise the robot stays at its position. The only information available for the robot is its position relative to the starting position, the number of commands (steps) it has issued, and if it's current position is the goal.

Example

The game starts up. Your robot is therefore at its start position (0, 0). You issue the command 'n'. As a result the step counter increases. If the cell north to the start position is free, the robot will now have the new position (1, 0), otherwise it remains (0, 0).

Implementation

The game is running on a server at our institute. Your control client communicates with the bot via the MQTT protocol[1]. Libraries are available for most programming languages. Connect your client to the broker "iot.eclipse.org".

- The game is started by sending a message to the following topic 'botgrid/init'. Send a message containing an identification string, e. g. 'SurnameName'.
- The game is then initialized. After some seconds your robot starts sending information messages to the topic 'botgrid/<id>/state' where <id> is the string you sent to 'botgrid/init'.
- To send a command to the robot, send a message to 'botgrid/<id>/command' containing single characters as described above.

The state information messages received via 'botgrid/<id>/state' hold a JSON[2]-formatted string such as '{"position": {"y": 0, "x": 0}, "step": 0, "is_goal": false}'.

A game automatically ends after one hour or 10 seconds of inactivity.

For any questions please contact botgrid@ima-zlw-ifu.rwth-aachen.de!

Good luck, have fun!

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[1] http://mqtt.org/

[2] http://json.org/

IMA/ZLW & IfU – RWTH Aachen University
Institute of Information Management in Mechanical Engineering IMA
Center for Learning and Knowledge Management ZLW
Ass. Institute for Management Cybernetics e.V. IfU

Head of Institute: Prof. Dr. rer. nat. Sabina Jeschke
1st Deputy: PD Dr. phil. Ingrid Isenhardt
2nd Deputy & MD IfU: Dr. rer. nat. Frank Hees
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http://www.ima-zlw-ifu.rwth-aachen.de