# Different Path Planning Models for a Point-represented Mobile-robot in MatLab domain

# About me

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# Path planning

- Determining the appropriate movements to a robot

- Robot must achieve a destination avoiding obstacles in its way

- Low-level descriptions of how to move, defined by algorithms. Examples of algorithms:
  - ➢ Path planning based on visibility graphs
  - ➢ Path planning based on graphs
  - ➢ Path planning based on Voronoi diagram
  - ➢ Path planning using potential fields

# BUG algorithms

- Assume only local knowledge of the environment and a global goal (usually modeled with a goal sensor and a local visibility sensor)

- Simple behavior: the robot follows a wall and then moves in a straight line toward the goal

- There are several variations of path planning based on BUG algorithms: BUG0, BUG1, BUG2, Tangent BUG

# BUG2 algorithm

- Given the start and goal positions, an *m-line* is generated, linking the starting point to the goal;

- The robot follows the m-line;

- In case it finds an obstacle on the way, the robot follows its boundaries until finding the m-line again;

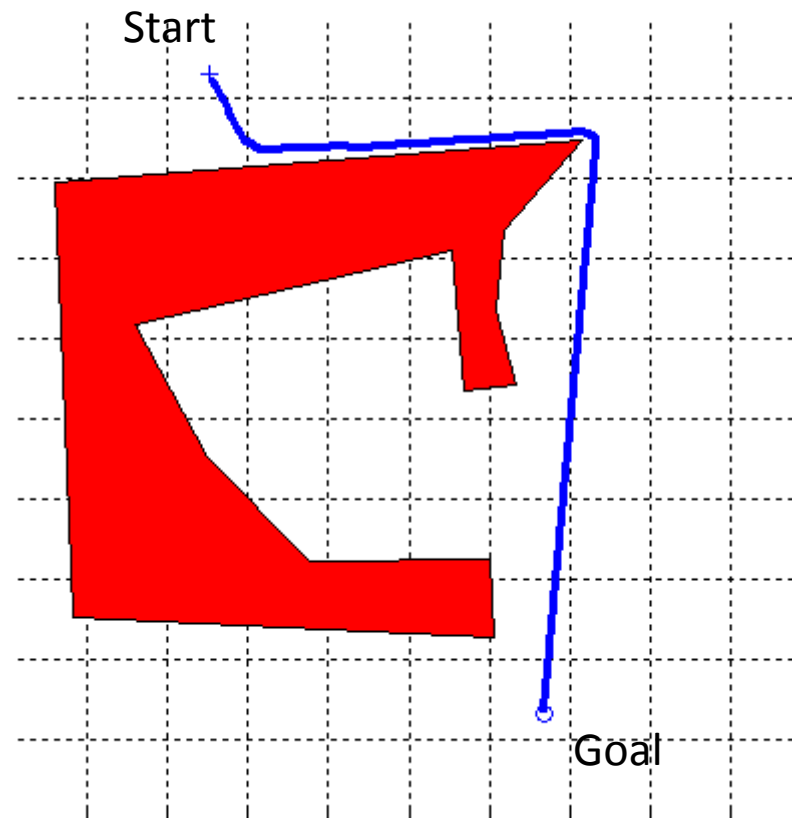- When it reaches the m-line, it starts following it again towards the goal.

# BUG2 example
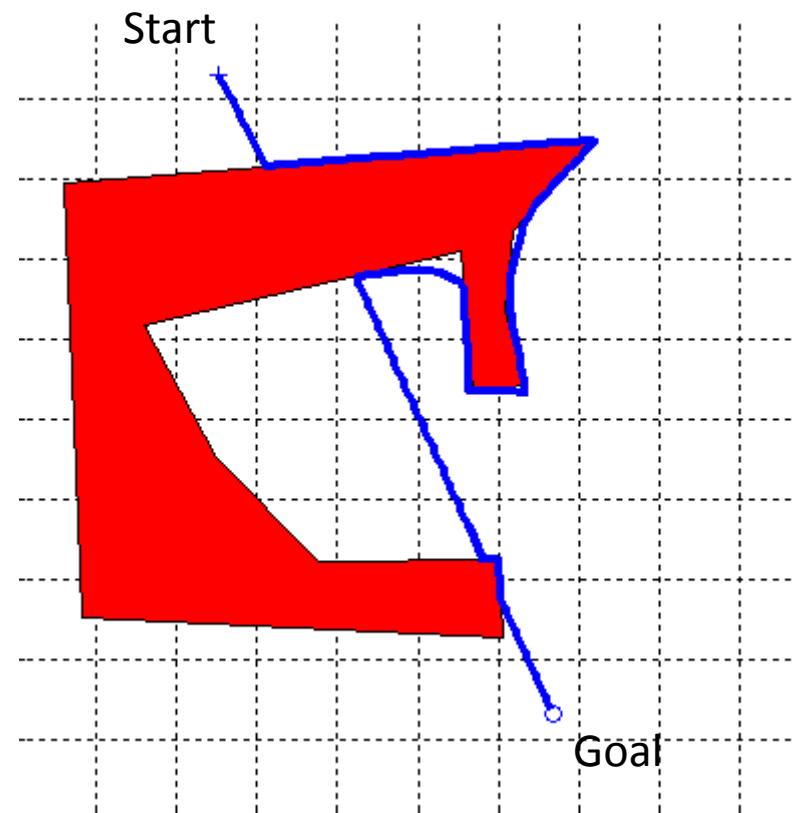
# Tangent BUG algorithm

- It does not consider tactile sensing, as BUG2 does;
- Considers a range sensing device;
- Allows the robot to look ahead, setting a depth limit for the range sensor.
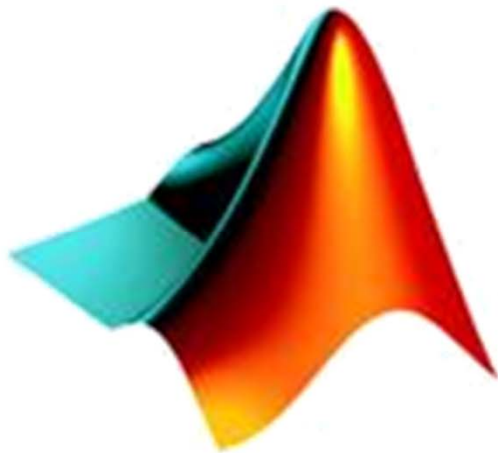
# Tangent BUG example

# The task

- Developing a simulation environment for BUG2 and Tangent BUG algorithms, in MATLAB domain

- The user must be able to:
  - ➢ Select start and goal positions for the robot;
  - ➢ Insert obstacles in the workspace;
  - ➢ Select between the two implemented algorithms.

- The program must be able to:
  - ➢ Calculate and draw the route;
  - ➢ Simulate the robot motion.

# Executing the program