Digital and Embedded Systems
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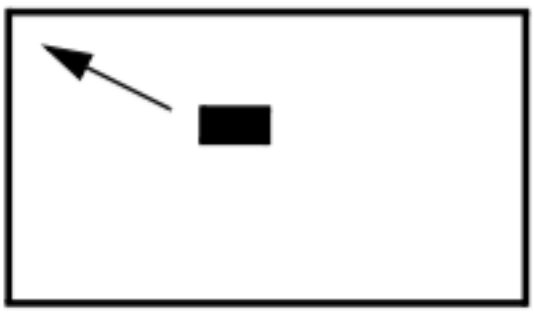
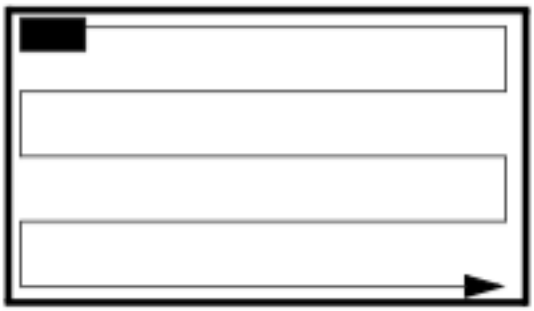
Tutorial 9 – Robot Driving

1. Write a program for a robot to completely search a rectangular driving area and report all objects found along the way with object type and position.

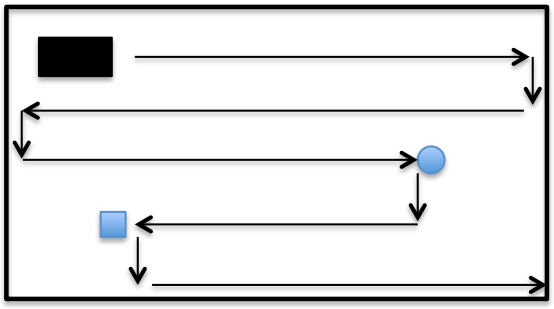
- The robot starts in a rectangular driving area at a random position and orientation 0°, 90°, 180° or 270°.
- The robot has to drive to a corner.
- The robot should drive an area-filling sweeping pattern to navigate the complete driving area (see figure), then stop.





2. Extend the program to find and report all objects (obstacles) encountered along the way.

If the robot encounters an object/ obstacle, i.e. it cannot drive the full length of the rectangle, it should report the position, turn 90° like at a wall, and continue its search from there.



3. *Extension:* How could you distinguish between round and box-shaped objects (using shape, not color)?

Think about a way to distinguish between the shape of a circle and a cube in the image plane. Using a histogram over the object pixels may be a solution.