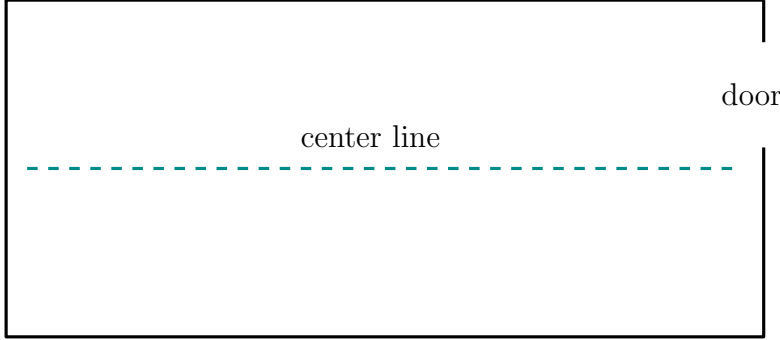# Pseudo code for mobile robot

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1 Definitions

We use the term *center line* to describe the line depicted in the graphic below:

2 Algorithm

Data: none
Result: robot leaves the room through the open door without touching any obstacles

while *door not yet passed* **do**

    measurements ⟵ scan();

    gradually make a full rotation by storing the current sensor data and then rotating around a fixed angle ϕ;

    if *door-like pattern detected in measurements* **then**

        rotate so that the robot is looking in the supposed direction of the door;

        move forward a fixed distance d_{door};

    else if *robot assumed to be on center line after analysing measurements* **then**

        assure robot is alligned with center line;

        if *wall ahead* **then**   // wall reached with no door: door on the other side

            turn 180 °

        else

            follow center line for some fixed distance $d_{centerline}$

    else if *two parallel walls detected in measurements* **then**

        rotate so that center line is in sight with no obstacles in between;

        move a fixed distance $d_{searching}$ towards center line

    else   // no clue where robot is in the room

        while *nearby obstacle in gaze direction* **do**

            rotate by a random angle in a fixed range $[\alpha, \beta]$

        end

    move forward a fixed distance d_{random}

end

Algorithm 1: Room escape

3 Sub-Routine *scan()*

The robot gradually does a full rotation, meanwhile creating a list of measurements. It stores the current distance captured by the sensor, then it rotates for a fixed angle ϕ (e.g. $\phi = 1°$) until the robot has completed a full rotation. ϕ should be chosen as divider of $2\pi = 360°$ so that the robot returns to the original gaze direction after the scan.

4 Technical remarks

- The robot does never know certainly whether it passed the door, so the outer loop is rather "while(true)". The robot is stopped externally as soon as it passed the door.

- TODO what is a door-like pattern