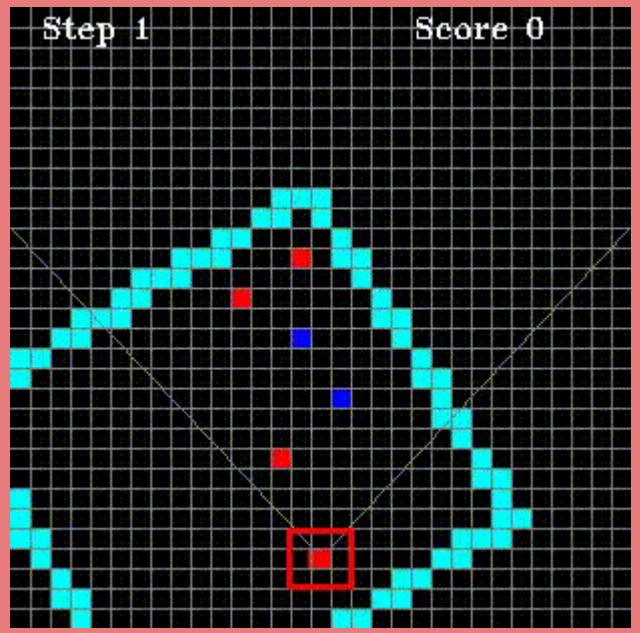
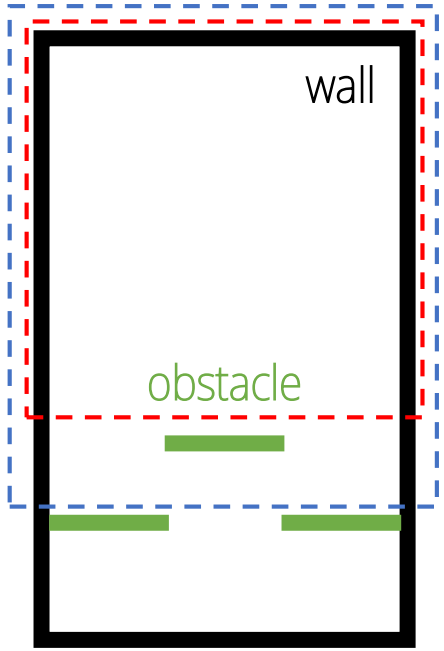
SIMULATOR

- Map
- Action
- Reward



Map

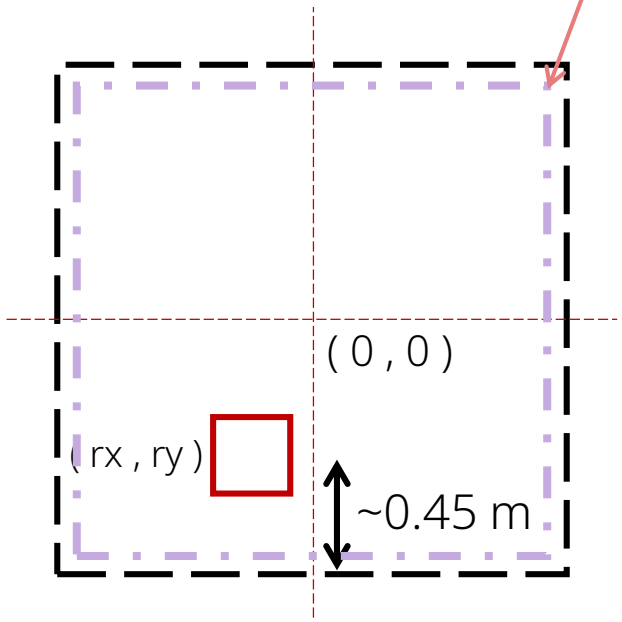
3 types of map will be appear randomly



<Actual structure>

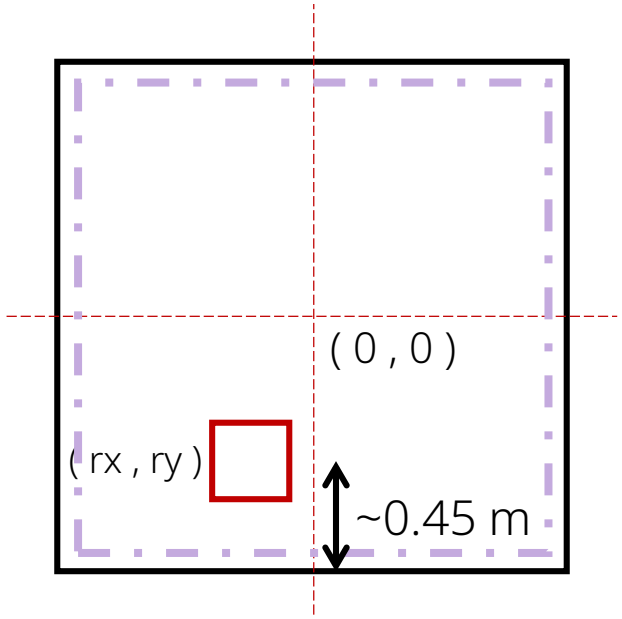
Ball safety margin

i) No walls



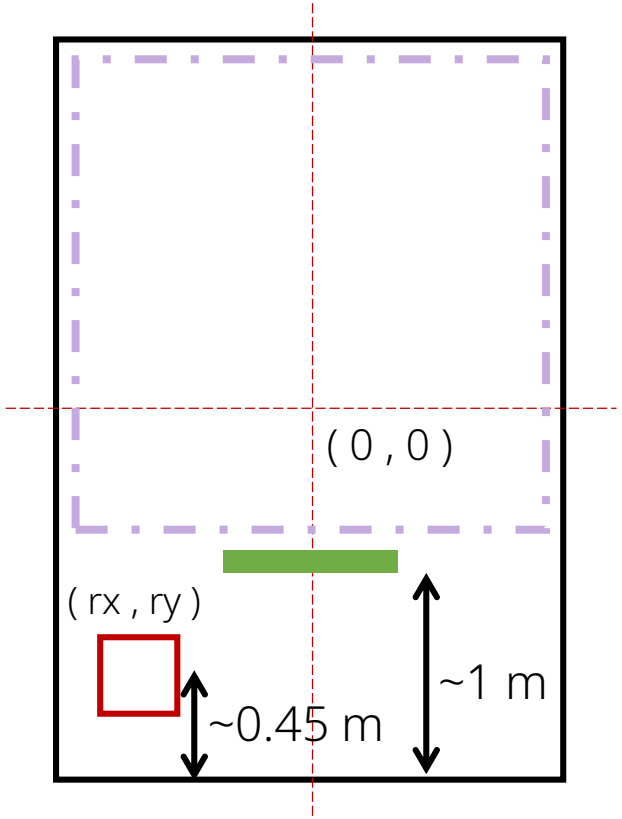
width = 2.5~3.5 m
length = 2.5~3.5 m

ii) Walls without obstacles



width = 2.5~3.5 m
length = 2.5~3.5 m

iii) Walls with obstacles



width = 2.5~3.5
length = 3.5~4.5 m

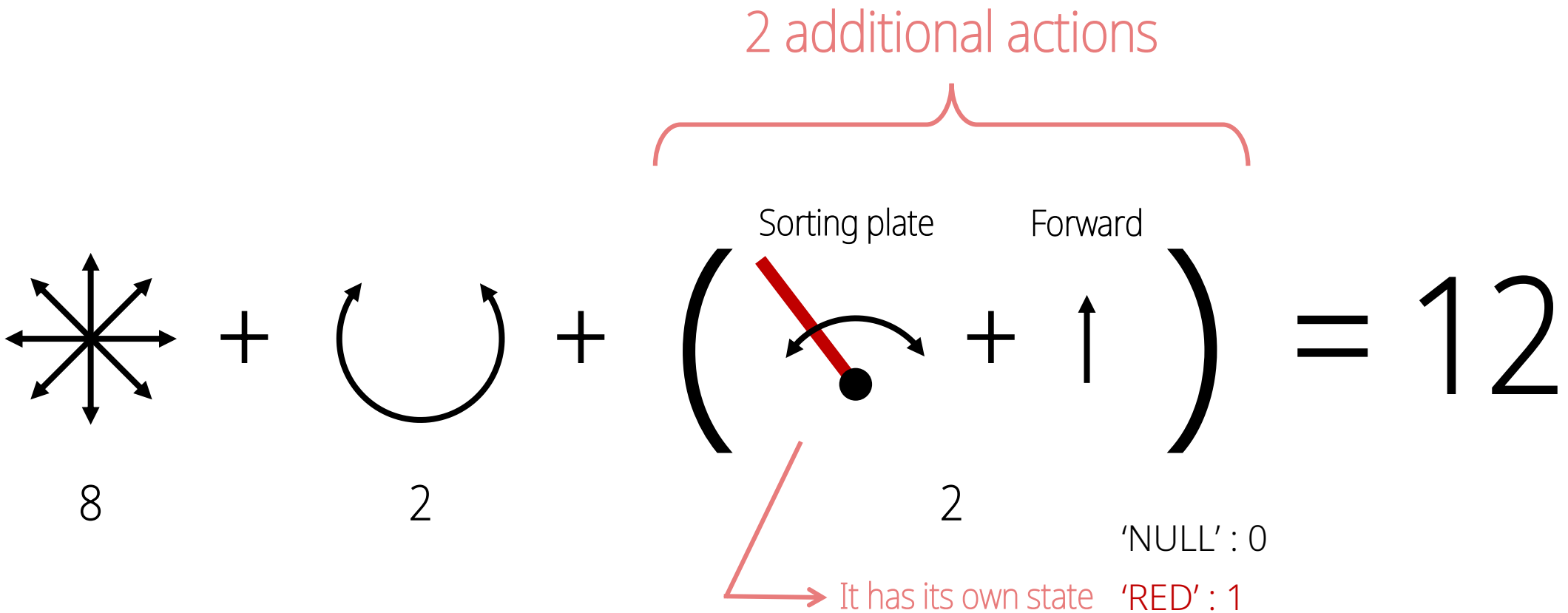
Map

[List]

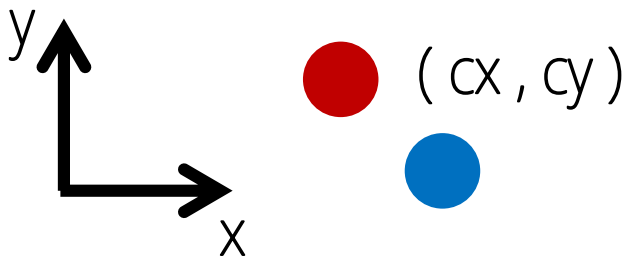
- walls_initial
- obstacles_initial
- obstacles_temp
- obstacles

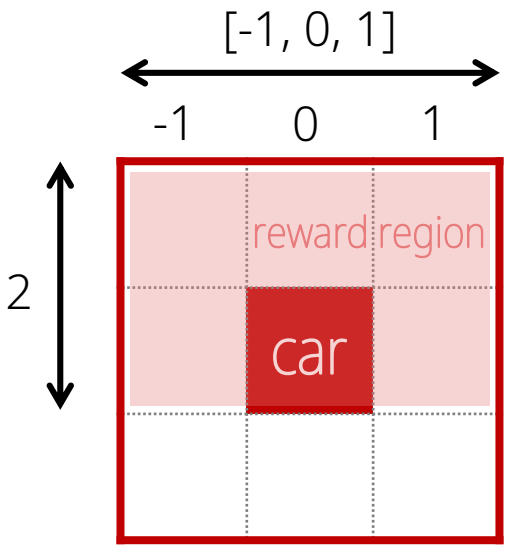
```
rand_map = random.random()
if rand_map <= 0.333    # map without walls/obstacles
        walls_initial = [ ]
else:
    if 0.666 <= rand_map    # map with walls only
    else: (0.333 < rand_map < 0.666)    # map with walls and obstacles
            obstacles_initial
        walls_initial
obstacles_temp      # walls + obstacles w.r.t robot position (after tf)
obstacles       # copy of 'obstacles_temp'
```

Action


2 additional actions
Sorting plate
Forward
8
2
2
'NULL' : 0
'RED' : 1
'BLUE' : 2
It has its own state

Reward





reward_region_x = [-1, 0, 1]
reward_region_y = 2

if ball (cx and cy) in reward region and ball is visible:

- if ball pass through the center:
  - reward += 10
- else :
  - reward += 7
- if ball comes from backside or sorting plate is not in the right state:
  - reward = -2

#learning correct sorting plate position

if there is no ball seen from current point:

- if car rotate left:
  - reward += 0.001

#action to search for balls