# AI Übung

## Übung 7

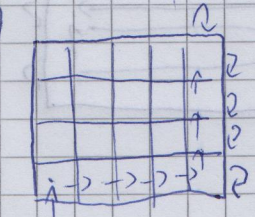
Ex 7.2)

changed to "yes", because choice/result of action depends on current state only

| | accessible | deterministic | episodic | dynamic | discrete |
|---|---|---|---|---|---|
| a) elevator | yes/no (depends on what aspects are relevant) | ~~no~~ (agent does not know what button will be pressed next) | yes | yes (buttons can be pressed while making a decision) | yes |
| b) web spider | no (blocked by firewalls, robots txt, too large for sensors) | no | no | yes | yes |
| c) Mars rover | no | no | no | yes | no |

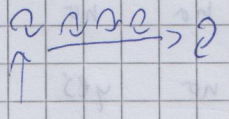
Ex 7.3)

a)




| sensors: dirt | sensors: bump | action |
|---|---|---|
| no | no | right |
| no | yes | up |
| yes | no | suck |
| yes | yes | suck |

(or: up, high)



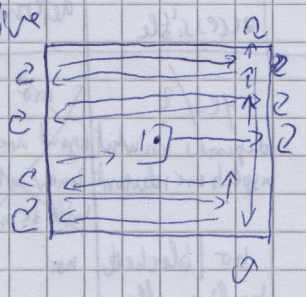
If there are $a \times b$ squares, the agent only cleans $a+b-1$ squares.
So we can calculate the probability that the room is completely cleaned is

$$P(\text{cleaned}) = 0.9^{(a \cdot b)-(a+b-1)}$$

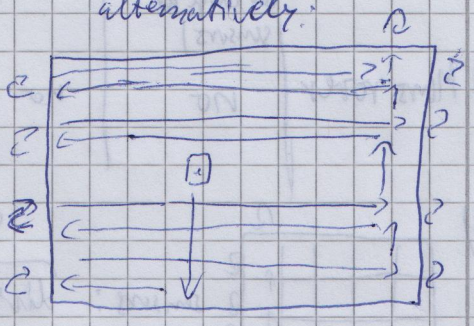
e.g. $a=7, b=4 \Rightarrow P(\text{cleaned}) = 0.9^{28-10} \approx 0.15$

Ex 1.3 b)

| dirt | bump | last_move | action (A) | alternative (B) |
|---|---|---|---|---|
| yes | * | * | suck | suck |
| no | * | none | right | down |
| no | no | right | right | right |
| no | yes | right | up | up |
| no | no | up | left | left |
| no | yes | up | down | down / switch off |
| no | no | left | left | left |
| no | yes | left | right | right |
| no | no | down | down | down |
| no | yes | down | left | left |




alternatively:




Both agents will clean the whole room.

(A) will run forever ~~no stop after cleaning~~

(B) can run forever or stop after cleaning

(because here the robot has cleaned the whole room when it is in the top right corner)

c) In general: an agent has not enough information (by sensors! purely reflexive!) without a "work-done sensor" (or a "initial-position" sensor) returning to the initial position and switching off after work is not possible because the agent cannot distinguish between situations where work is done or not / initial position vs other positions. In general, the initial situation looks like any "return situation" ← revisit a square after completing the grid.

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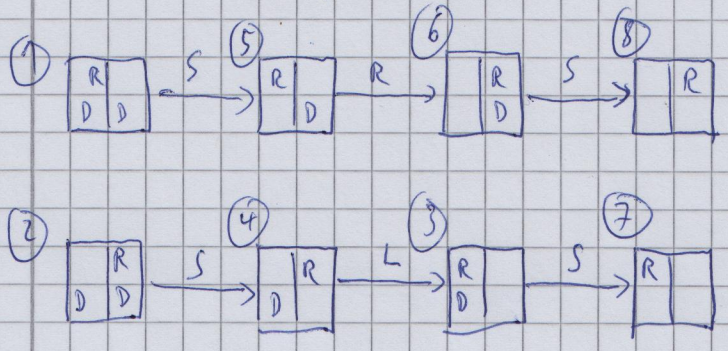
Ex. 7.4) Murphy's Law for vacuum cleaners (variant A):

"If attempting to clean a square that is already clean, with 10% probability it will be dirty afterwards."




Murphy's Law does not matter here because the robot never cleans if it is in a room without dirt.