Stage 1

Problem definition

We want to deliver food quicker and better than humans do, because humans need breaks and vacations. In addition,humans sometimes may have physical problems or some mental breakdowns and that will affect their work and attitude will not be the same every day. Also their maximum work hours are 8 per day, maybe less.

Planning

-Our plan to solve this problem is developing a waiter robot can help increase efficiency and create a safer environment for our staff and guests.
Robots can be used to deliver food more evenly and quickly than humans, and they don't need breaks or vacations. In addition, robots can be programmed to handle other tasks such as taking orders, cleaning tables, and even greeting guests,their maximum work hours per day are more than 8.

Our food service robots can:

- Take orders and deliver food and drinks to our guests.
- Carry dirty dishes back to the kitchen.
- Learn routes and tasks and maneuver around tables, guests and employees.
- Work independently and navigate across different floor surfaces.
- Work alongside staff and other delivery robots

Environment type

Un-Deterministic ,non-Episodic , Dynamic , Continuous

Agent type

Goal based(Proactive agent)

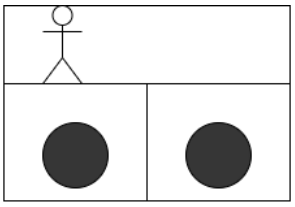
PEAS (Performance measure, Environment, Actuators, Sensors)

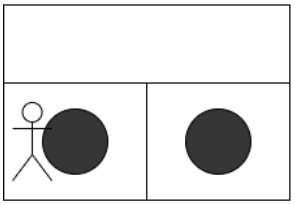
Peas
P:- throughput, battery life, carrying capacity, accuracy
E:- restaurants ,public places(restaurants)
A:- wheels,catering box
S:-ultrasonic , camera

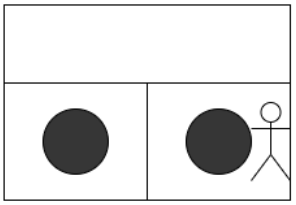
Stage 2

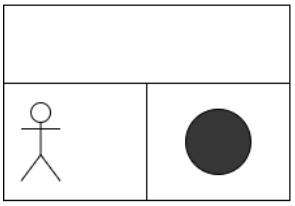
- **Problem state space (State graph and/or State tree)**

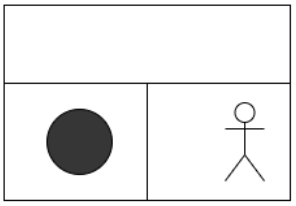
10 states

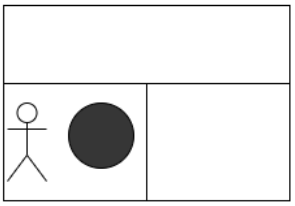


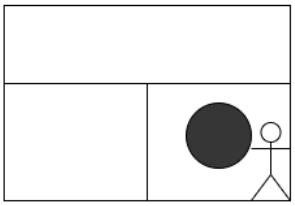


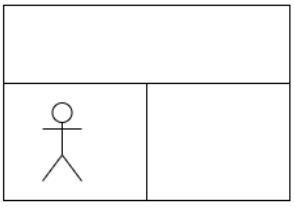


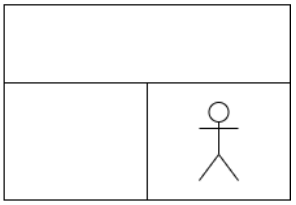


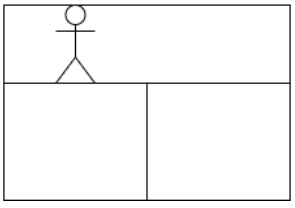












- **Initial state.**
  -Start from kitchen

- **Goal test to verify reaching goal state.**
  -Deliver from kitchen to all tables

- **Successor function with (Set of actions & Paths costs).**

  generates the states that results from trying the three action (move left, move right ,Deliver). The complete state space is shown in the graph below.

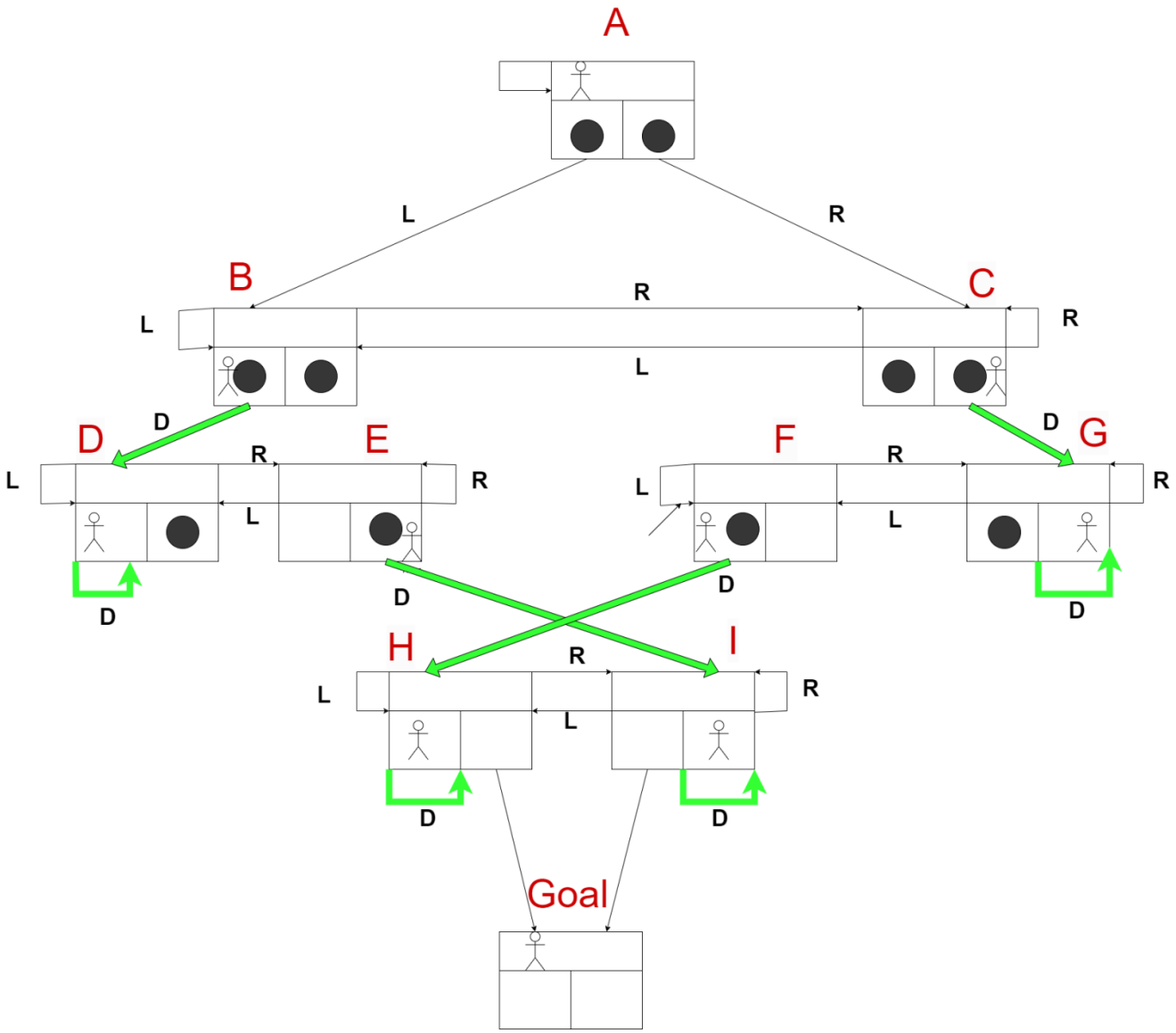
  Actions (move left, move right ,Deliver)

  Path cost : Each step costs 1, so the path cost is the number of steps in the path. Graph The state space, Ares denote actions: L = Left, R = Right, D=Deliver.

Transition model

Left, Right, and Deliver, moves left, moves right, and Deliver respectively. If in rightmost square, Right has no effect. In Left most square, Left has no effect. Deliver in a delivered square has no effect.

- **A solution / plan to show the transformation from initial state to goal state.**



Some transformations from initial to goal

- A,C,G,F,H,Goal 5
- A,B,C,G,F,H,Goal 6
- A,B,D,E,I,Goal 5
- A,C,B,D,E,I,Goal 6
- A,C,G,F,H,I,Goal 6
- A,B,C,G,F,H,I,Goal 7
- A,B,D,E,I,H,Goal 6
- A,C,B,D,E,I,H,Goal 7