

10/3/21

ISE AI

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~~Q1~~

Q1 MCQ

- 1) A
- 2) D Utility based Agent
- 3) C Set of rules & sequence of steps
- 4) C Small search space
- 5) C fuzzy logic
- 6) C Act like human
- 7) B When all steps costs are equal
- 8) C Successor function
- 9) D Act rationally
- 10) B John McCarthy



Q2 PEAS stands for  
Performance Measures  
Environment  
Actuators  
Sensors.

Assumptions :- Guiding to location is just telling the floor & room number. User selects options available & keys in specific query.

Performance Measures :-

- Complete list of FAQ's present + 7
- Shows next state and when presented with current state of patient in vaccination  
Eg (has registered on portal next is go to vaccine room) + 8
- guides to proper location based on ~~break~~ types of requirements + 8
- Multiple language support + 4
- Query not answerable. - 5
- Wrong location guidance - 4
- Is if user is aged large font with audio support + 6
- ~~the~~ Ease of navigation & understandability of instructions + 9



Environment :-

Vaccination Centre with doctors, patients, helping staff, etc.

Actuators :-

- Printing on screen the response.
- Audio output of response as some senior citizens have difficulty in reading small characters.

Sensors :-

touch, & keyboard input

Properties of task environment :-

- Partially observable :- Agent might answer queries but some queries can be vague which it cannot answer. Also ~~for~~ technical faults might result in changing location of some room that may not be updated to agent immediately.
- Single Agent :- As agent will have no possible intervention in its work as only user keys in query & agent responds.
- ~~Environ~~ Deterministic :- if patient wants steps of vaccination the agent will simply print it.
- Stochastic :- Agent cannot predict the next query of the user.

- ~~for~~ Episodic :- As all queries are independent queries related to technical registration & queries of related to biological history do not have related responses.
- Static :- The locations do not change frequently. The sequence of steps to get vaccinated remain the same.
- known :- All the condition action rules for guiding & FAQ are pre programmed.
- Discrete :- As all senior citizens are considered under one category the procedures will be same for all people of that age group.



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Q3. Water jug problem

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assuming litres &amp; gallons are equal quantity.

The state space of the problem can be set of integers  $(x, y)$ .  
 $x$  is quantity in 4 gallon jug.  
 $y$  is quantity in 3 gallon jug.

$$x = \{0, 1, 2, 3, 4\}$$

$$y = \{0, 1, 2, 3\}$$

start state :  $(0, 0)$ goal state :  $(2, 0)$  (No goal test as goal state is explicit)

Path cost : - Each action costs 1 unit

Actions : - Completely fill  $x / y$ .  $x = 4 / y = 0, 3$ & empty all contents of  $x / y$ .  $x = 0 / y = 0$ 

transition

Model.

transfer all contents of  $x$  in  $y$ .  $x = 0$   $y = y + x$ transfer all contents of  $y$  in  $x$ .  $y = 0$   $x = x + y$ 

↓

transfer  $x$  to  $y$  till  $y$  full.  $x = x - (3 - y)$   $y = 0, 3$ transfer  $y$  to  $x$  till  $x$  full.  $y = y - (4 - x)$   $x = 4$

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Rule	State	Process
1	$(x, y \mid x < 4)$	$(4, y)$ {fill 4 g jug completely}
2	$(x, y \mid y < 3)$	$(x, 3)$ {fill 3 g jug completely}
3	$(x, y \mid y > 0)$	$(x, 0)$ {empty 3 g jug}
4	$(x, y \mid x > 0)$	$(0, y)$ {empty 4 g jug}
5	$(x, y \mid x + y \geq 4$ or $y > 0$	$(4, y - (4 - x))$ {3 $\rightarrow$ 4 untill 4 is full}
6	$(x, y \mid x + y \geq 3 \wedge x > 0)$	$(x - (3 - y), 3)$ {4 $\rightarrow$ 3 untill 3 is full}
7	$(x, y \mid x + y \leq 4 \wedge y > 0)$	$(x + y, 0)$ {all from 3 to 4}
8	$(x, y \mid x + y \leq 3 \wedge x > 0)$	$(0, x + y)$ {all from 4 to 3}
9	$(0, 2)$	<del>(2, 0)</del> pour. $(2, 0)$ {pour 2g from 3 to 4}

Solution :-

Initialize jugs to

$(0, 0)$

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$(x, 3)$  after applying Rule 2.

$(3, 0)$  —||— Rule 7.

$(3, 3)$  —||— Rule 2.

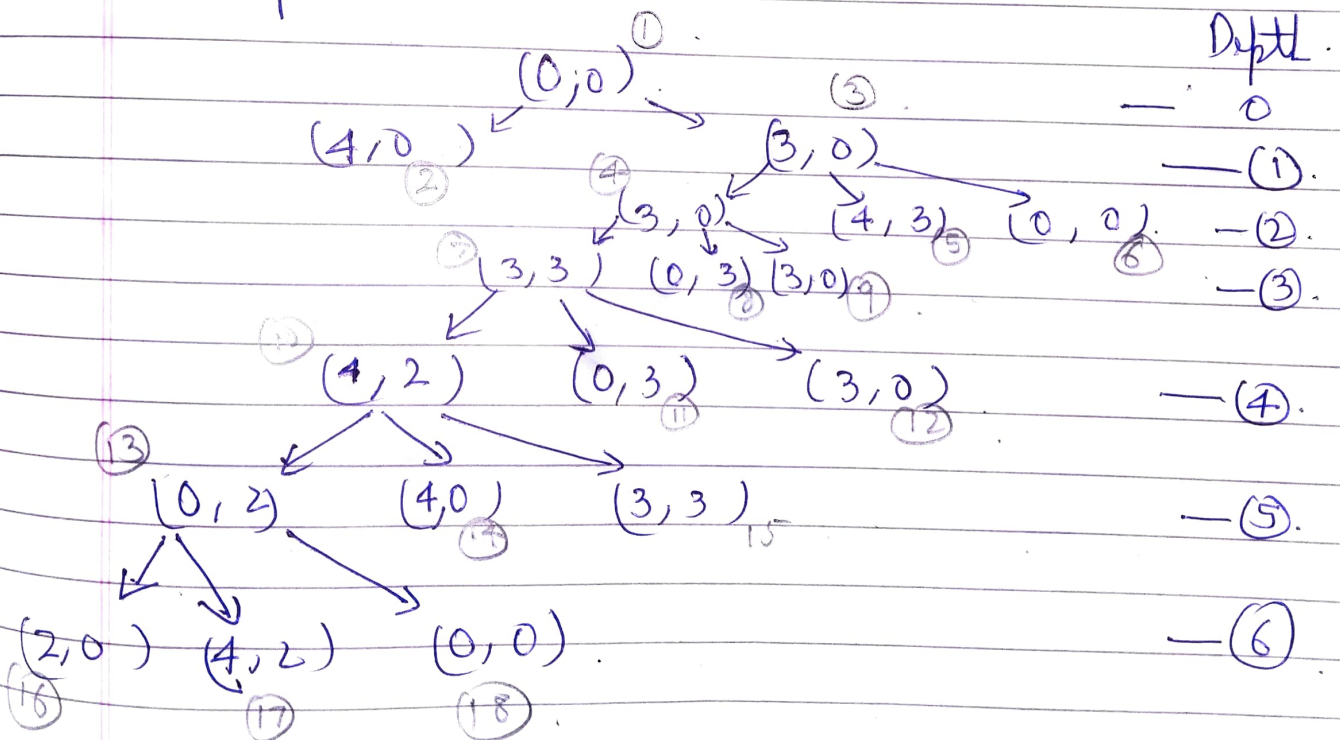
$(4, 2)$  —||— Rule 5.

$(0, 2)$  —||— Rule 3.

$(2, 0)$  —||— Rule 9.

↖ goal state

state space tree.

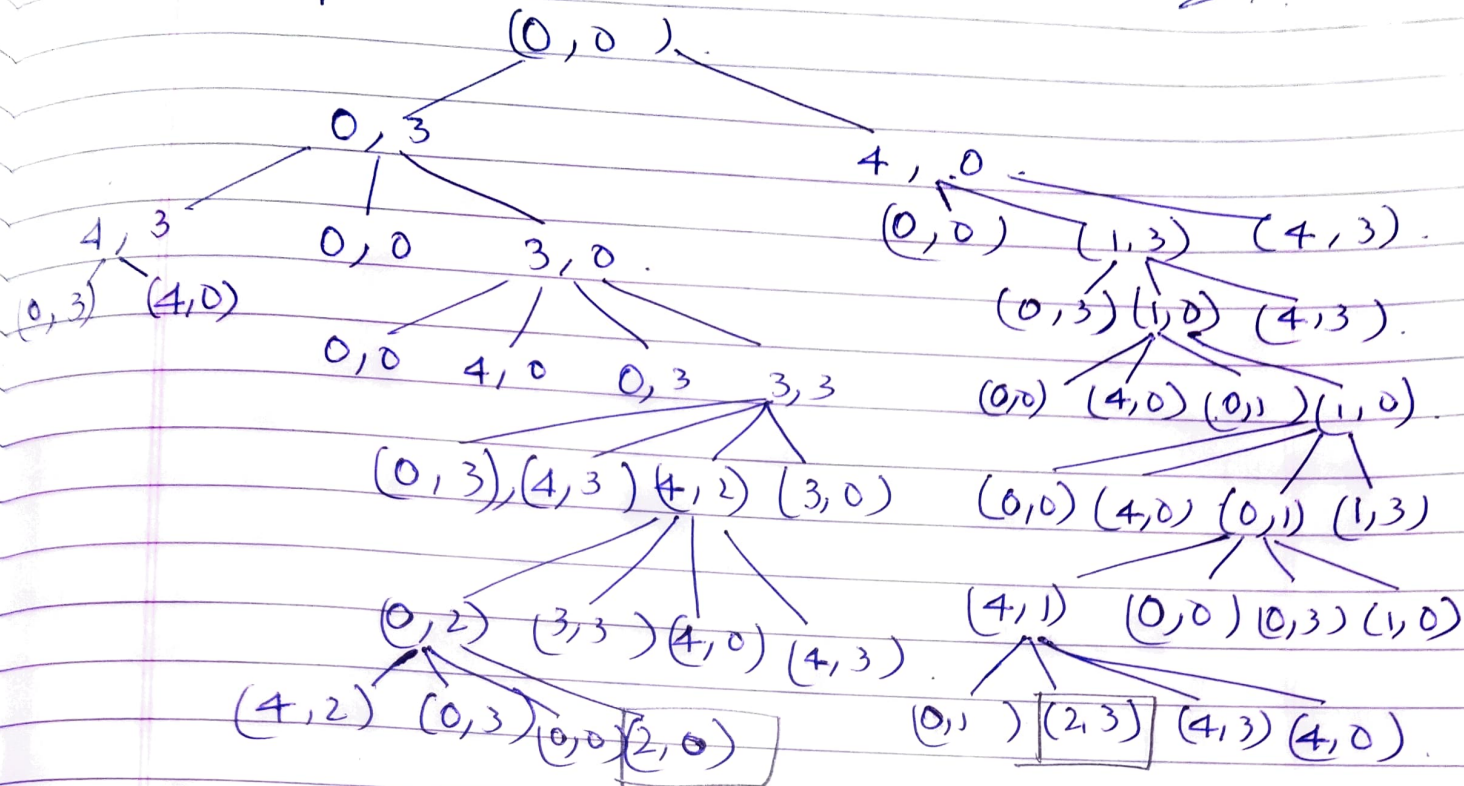




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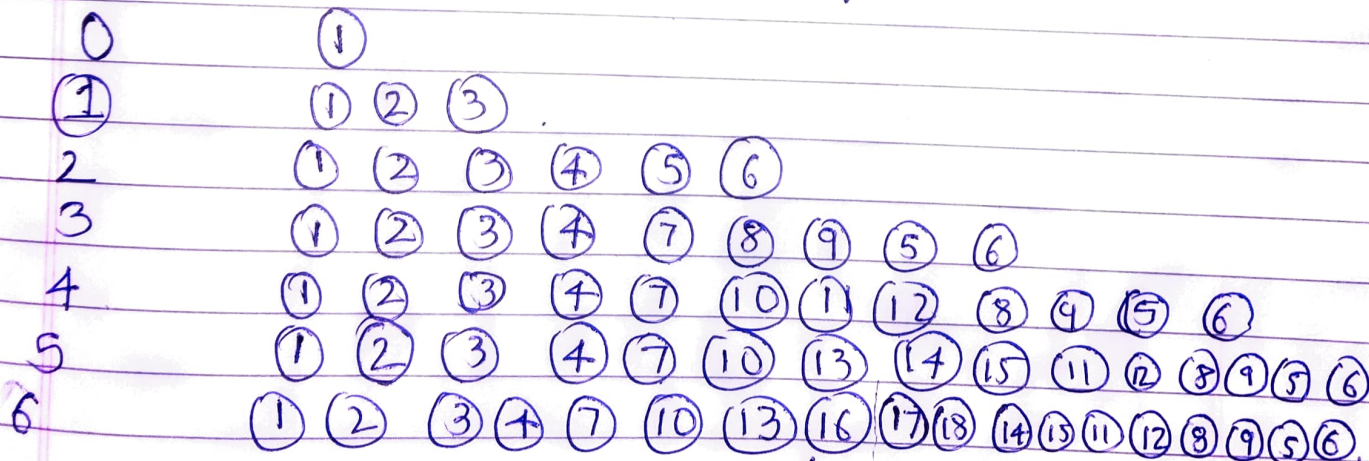
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Complete search tree



For optimal solution of IDS we will consider left subtree i.e. diagram of page no (7).

Depth IDS (iterative depth first search)



goal state found here.