

Ans 1- Production system consists of

1. Set of rules (working memory): which are in the form of $P \rightarrow Q$ where left side represent the current state and right side represent a result or generated output
2. Knowledge/Database: It contains whatever info is required for the particular task. Some info. may be permanent or some may be the solution of current problem.
3. Control strategy: It is way to resolve the conflicts which arrive when several rules match at once.
4. Rule applier: It checks the ability applicability of the rules by matching the current state with left hand side of the rule and find appropriate rule from the databases of rules.

State space

Need \rightarrow Exactly 2 gallons of water into the 4-gallon jug.

1. First fill water in 3L jug completely
 $x=0, y=3$

2. Fill water from y to x
 $x=3, y=0$

Because we need 3L water in 4L jug.

3. Again fill y fully
 $x=3, y=3$

4. x's capacity is 4L and y's capacity is 3L
Now, we will fill x completely using y.

5. At the end, $x=4, y=2$

We get 2L water in y jug.

Q2-

Depth first Search

$\{x, y\}$
 $(0, 0)$

$(4, 0)$

$(4, 3)$ $(0, 0)$ $(1, 3)$

$(0, 3)$ $(4, 0)$ $(4, 3)$ $(0, 3)$ $(1, 0)$ $(4, 0)$

$(4, 0)$ $(1, 3)$ $(0, 0)$ $(0, 1)$

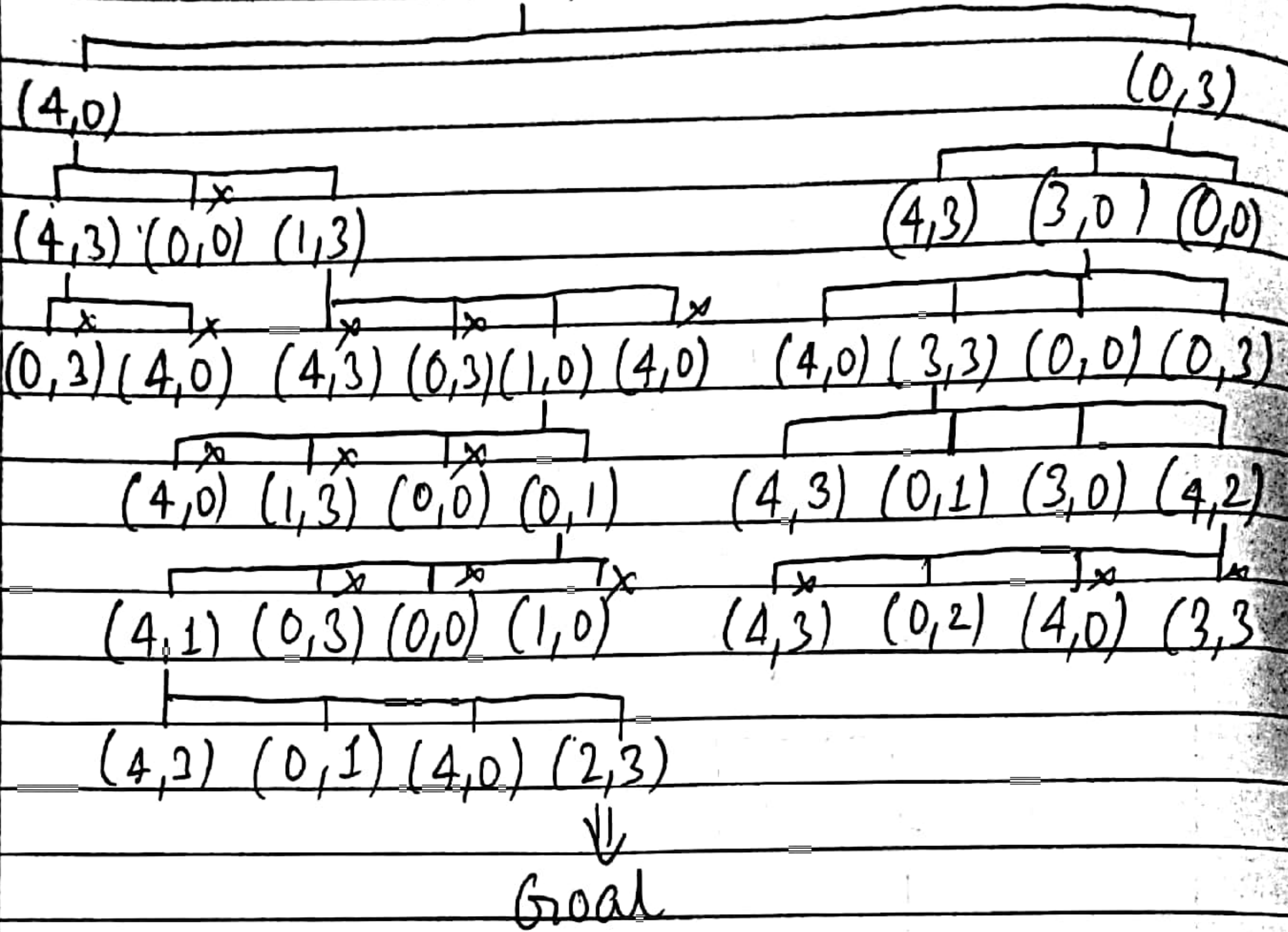
$(4, 1)$ $(0, 3)$ $(0, 0)$ $(1, 0)$

$(4, 3)$ $(0, 1)$ $(4, 0)$ $(2, 3)$

Goal

Breadth first Search

{x,y}
(0,0)



Ans 2-

A	-7
H	-6
G	-5
F	-4
E	-3
D	-2
C	-1
B	0

Initial state

H
G
F
E
D
C
B
A

Goal state

$$H_f = -28$$

$$H_f = 28$$

① - H -6

G -5

F -4

E -3

D -2

C -1

B 0

A 0

②

G -5

F -4

E -3

D -2

C -1

B 0

A 0

H 0

③ - F -4

E -3

D -2

C -1

B 0

A 0

G

↑

~~0~~

H 0

④ E -3

D -2

C -1

B 0

A 0

F 0

G 0

H 0

⑤ D -2

C -1

B 0

A 0

E 0

F 0

G 0

H 0

⑥ C -1

B 0

A 0

D 0

E 0

F 0

G 0

H 0

⑦ B 0 A 0 C 0 D 0 E 0 F 0 G 0 H 0

⑧ B 1

A 0

C 0

D 0

E 0

F 0

G 0

H 0

⑨ C 2

B 1

A 0

D 0

E 0

F 0

G 0

H 0

⑩ D 3

C 2

B 1

A 0 | E 0 | F 0 | G 0 | H 0

⑪ E 4

D 3

C 2

B 1

A 0 | F 0 | G 0 | H 0

⑫ F 5

E 4

D 3

C 2

B 1

A 0 | G 0 | H 0

⑬ G 6

F 5

E 4

D 3

C 2

B 1

A 0 | H 0

⑭

H

G

F

E

D

C

B

A

Goal